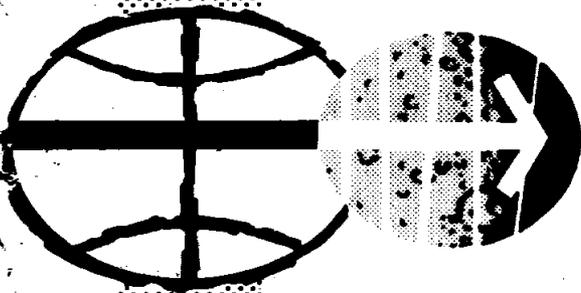




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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 17
TECHNICAL AIR-TO-GROUND VOICE TRANSCRIPTION

Prepared by
Test Division
Apollo Spacecraft Program Office



MANNED SPACECRAFT CENTER
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INTRODUCTION

This document is the transcription of the technical air-to-ground (TAG) voice communications of the Apollo 17 mission. The transcript is divided into three columns — time, speaker, and text. The time column consists of four two-digit pairs for days, hours, minutes, and seconds (e.g., 04 22 45 12). All times are in Apollo elapsed time (AET), which is true mission elapsed time. The speaker column indicates the source of a transmission; the text column contains the verbatim transcript of the communications.

The time used by Mission Control Center (MCC) and indicated as ground-elapsed time (GET) in the Flight Plan may be updated to both the spacecraft and MCC computers but will not be updated to the telemetry downlink pulse-code-modulated bitstream or other time-recording devices. This GET updating will be performed only to correct significant changes in the Flight Plan time occurring as the result of delayed lift-off, midcourse corrections, or spacecraft burn-time differences (trajectory dispersions).

Should these updates occur, the Apollo elapsed time (the true mission-elapsed time) used in this transcript may not agree with Flight Plan and MCC times. Users of this transcript are cautioned to apply the appropriate time corrections for the updated periods.

Communications recorded from the primary communications network (GOSS net 1) comprise the bulk of this transcript. During periods when the lunar module (LM) and command module (CM) are physically separated, it is occasionally required that communications with both spacecraft be available simultaneously. To accomplish this, another communications network (GOSS net 2) is activated. At such times, this transcript will include the simultaneous but separate communications; GOSS net 1 communications will be contained on tapes with the suffixed letter A (i.e., Tape 88A); GOSS net 2, with B (i.e., Tape 88B).

A series of three dots (...) is used to designate those portions of the text that could not be transcribed because of garbling. A series of three asterisks (***) is used to designate those portions of the text that could not be transcribed because of clipping caused by the voice-actuated (VOX) mode. One dash (-) is used to indicate a speaker's pause or a self-interruption and subsequent completion of a thought. Two dashes (- -) are used to indicate an interruption by another speaker or the point at which a recording was abruptly terminated. Words given unusual emphasis by the speaker are underlined.

The Apollo 17 mission was flown December 7 to 19, 1972; lift-off occurred at 05:33:00.60 G.m.t. (12:33:00.60 a.m., e.s.t.) on December 7.

Speakers in the transcript may be identified as follows.

Spacecraft:

CDR	Commander	Eugene A. Cernan
CMP	Command module pilot	Ronald E. Evans
LMP	Lunar module pilot	Harrison P. (Jack) Schmitt
SC	Unidentified crewmember	
MS	Multiple speakers	

Mission Control Centers:

CC	Capsule communicator (CAP COMM)
MCC	Unidentified speaker, other than CC, in the Mission Operations Control Room or a Staff Support Room
LCC	Launch Control Center
F	Flight director
S	Surgeon

Remote sites:

AB	Airboss (Recovery aircraft)
CT	Communications technician (COMM TECH)
TIC	USS Ticonderoga
P-1, P-2, etc.	Photographic helicopters
S-1, S-2, etc.	Swim teams
R-1, R-2, etc.	Recovery helicopters

When the CDR and LMP are in the undocked lunar module or on the lunar surface, their speaker designations will be suffixed by either LM or EVA to indicate their status (e.g., CDR-EVA or LMP-LM). Voice calls during this mission were assigned in accordance with the following station operating procedures: "For all phases when only the CSM is manned, the AS-512 call sign will be Apollo 17. When both vehicles are manned, the voice call will be America for the CSM and Challenger for the LM. The calls for the CDR and LMP during lunar surface operations will be individual crew's first names."

Transcription of these tapes was managed by James L. Gibbons, Test Division, Apollo Spacecraft Program Office, to whom inquiries regarding this document should be referred.

ACRONYM LIST

Because specialized readers of the Apollo 17 transcription, such as the principal investigators, may not be thoroughly familiar with the acronyms used during the mission, the decision was made to define those acronyms that probably will be encountered. For obvious reasons, no effort was made to include every acronym that conceivably could be used; only those acronyms that are considered likely to be used are included here.

AEA	Abort electronics assembly
AGS	Abort guidance system
ALSD	Apollo lunar-surface drill
ALSE	Apollo lunar sounder experiment
ALSEP	Apollo lunar-surface experiments package
AOS	Acquisition of signal (or of site)
AOT	Alinement optical telescope
AP	Alpha particle (spectrometer)
APS	Auxiliary propulsion system (S-IVB) or ascent propulsion system (LM)
ARIA	Apollo range instrumentation aircraft
ARS	Atmosphere revitalization system

ATCA	Attitude/translation control assembly
BEF	Blunt end forward
BMAG	Body-mounted attitude gyro
BSLSS	Buddy secondary life-support system
BUSS	Biomedical urine sampling system
CM	Command module
CMC	Command module computer
COAS	Crew optical alinement sight
CP	Control point
CRD	Cosmic ray detector (experiment)
CSC	Close-up stereo camera or contingency sample collection
CSM	Command and service module
CWEA	Caution and warning electronics assembly
DAC	Data acquisition camera
DAP	Digital autopilot
DEDA	Data entry and display assembly
DET	Digital event timer
DOI	Descent orbit insertion
DPS	Descent propulsion system
DSE	Data storage equipment (CM)
DSEA	Data storage equipment assembly (LM)
DSKY	Display and keyboard
ECS	Environmental control system
EI	Entry interface

EMS	Entry monitor system
EMU	Extravehicular mobility unit
EPS	Electrical power system
ETB	Equipment transfer bag
EVA	Extravehicular activity
EVT	Extravehicular transfer
FDAI	Flight director attitude indicator
FDO	Flight Dynamics Officer
FUS	Far-ultraviolet spectrometer
G&C	Guidance and control
GCTA	Ground-commanded television assembly
GDC	Gyro display coupler
GDO	Guidance Dynamics Officer
GET	Ground-elapsed time
GETI	Ground-elapsed time of ignition
HGA	High-gain antenna
HFE	Heat flow experiment
IMU	Inertial measurement unit
IP	Initial point
IPI	Integrated position indicator
ISA	Interim stowage assembly
ISR	Infrared scanning radiometer
IU	Instrument unit
LACE	Lunar atmospheric composition experiment

LCG	Liquid-cooled garment
LCRU	Lunar communications relay unit
LEAM	Lunar ejecta and meteorite (experiment)
LEB	Lower equipment bay
LEC	Lunar equipment conveyor
LEVA	Lunar extravehicular visor assembly
LGC	Lunar module guidance computer
LM	Lunar module
LNP	Lunar neutron probe (experiment)
LOI	Lunar orbit insertion
LOPC	Lunar orbit plane change
LOS	Loss of signal (or of site)
LPD	Landing point designator
LRV	Lunar roving vehicle
LSG	Lunar surface gravimeter
LSPE	Lunar seismic profiling experiment
LTG	Lunar traverse gravimeter (experiment)
MCC	Mission Control Center or midcourse correction
MESA	Modular equipment stowage assembly
MET	Mission event timer
MTVC	Manual thrust vector control
OPS	Oxygen purge system
ORDEAL	Orbital rate display earth and lunar
PDI	Powered descent initiation

PGA	Pressure garment assembly
PGNCS	Primary guidance, navigation, and control system (CM)
PGNS	Primary guidance and navigation system (LM)
PI	Principal investigator
PIPA	Pulsed integrating pendulous accelerometer
PLSS	Portable life-support system
PRD	Personal radiation dosimeter
PTC	Passive thermal control
RCS	Reaction control system
RCU	Remote control unit
REFSMMAT	Reference to stable member matrix
RLS	Radius of landing site
RTG	Radioisotopic thermoelectric generator
SBT	S-band transponder
SCE	Signal-conditioning equipment
SCS	Stabilization control system
SECS	Sequential events control system
SEF	Sharp end forward
SEP	Surface electric properties (experiment)
SEQ	Scientific equipment bay
SIM	Scientific instrument module
SLA	SM/LM adapter
SM	Service module
SME	Soil mechanics experiment
SPS	Service propulsion system

SRC	Sample return container
TEC	Transearth coast
TEI	Transearth injection
T _{ephem}	Time of ephemeris
T _{ig}	Time of ignition
TLC	Translunar coast
TLI	Translunar injection
TPI	Terminal phase initiation
TSB	Temporary stowage bag
TVC	Thrust vector control
UHF	Ultrahigh frequency
VHF	Very high frequency

Tape 1/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

PRELIFT-OFF COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 00 00 03 CDR Roger. The clock has started. We have yaw.

00 00 00 12 CDR Roger; tower. Yaw's complete. We're into roll, Bob.

00 00 00 17 CC Roger, Geno. Looking great. Thrust good on all five engines.

CDR Okay, babe. It's looking good here.

00 00 00 21 CDR Roll is complete. We are pitching.

SC Wow woozle!

LMP Thirty seconds. We're going up. Man, oh, man!

00 00 00 36 CDR Thirty seconds, and 17 is GO.

00 00 00 38 CC Roger, 17. You're GO.

CC 17, stand by for Mode I Bravo -

00 00 01 01 CC MARK. Mode I Bravo.

00 00 01 04 CDR Roger. I Bravo; we're GO at 1 minute.

CC Roger, Gene. You're looking great. Right on the line.

00 00 01 11 CC 17, you are feet wet - feet wet.

00 00 01 13 CDR Roger. Feet wet.

00 00 01 34 CDR 01:30, and we are GO, Bob.

CC Roger, Gene. You're looking great.

CC Stand by for Mode I Charlie, 17.

00 00 01 59 CC Mark. Mode I Charlie.

00 00 02 00 CDR Roger. I Charlie; 2 minutes and EDS is OFF and we are GO.

Tape 2/2

00 00 02 06 CC Roger, 17; you're GO. 17, you are GO for staging.
CDR Roger. We're GO here.

00 00 02 22 CDR Inboard cut-off.

00 00 02 23 CC Roger. Inboard.

00 00 02 49 CDR Okay, Bob. I guess we got all five.
CC Roger. They're looking here - looking good.
LMP Sure felt like it. I think we saw them all from here.
CC Roger, Jack. And the thrust is GO on all five of them. They're running good.

00 00 03 02 CDR Okay; 3 minutes and we're GO.
CC Roger, 17.

00 00 03 15 SC Say, we just had skirt sep.

00 00 03 18 CC Roger. We confirm skirt sep.

00 00 03 21 CDR There goes the tower. Oh, there she goes!

00 00 03 24 CC Roger. The tower; you're Mode II.

00 00 03 26 CDR Roger. Mode II.

00 00 03 37 CC The steering has converged. The CMC is GO. You're going right down the pike, 17.

00 00 03 39 CDR Okay, Bob. I just confirmed guidance. Okay, Bob, I got the ELS SEP circuit breakers. And we've seen it all: ignition, staging, and tower.
CC Roger. Got you.

00 00 04 03 CDR Okay; 4 minutes and we're GO here, Bob.

00 00 04 06 CC Roger, Gene. We're going round the room. Looks GO here. You're looking real good, Gene. Right down the line.

00 00 04 29 CDR Okay; 04:30 and we're still GO on board.
CC Roger, 17. You're GO.
CDR Let me tell you, this night launch is something to behold.

00 00 05 04 CC Five minutes, Geno, and you're GO down here. You're looking great.
CDR Okay, Robert. We're GO here at 5.

00 00 05 26 CC 17, Houston. Your times are nominal. Level sense arm at 8 plus 36; S-II shutdown at 9 plus 20. Nominal times.
CDR 8 plus 36 and 9 plus 20. Roger.
CC Stand by for S-IVB to COI capability.

00 00 06 00 CC MARK. S-IVB to COI capability.

00 00 06 02 CDR Roger. S-IVB to COI. We're GO at 6.
CC Roger, Geno.

00 00 06 22 CDR Okay, Bob. We're got four good motors and we're GO at 06:20.
CC Roger. And, 17, we copied the gimbals and watched them and they looked good.
CC Stand by for S-IVB to orbit capability.

00 00 06 51 CC MARK. S-IVB to orbit capability. And we'd like OMNI Delta, Jack.

00 00 06 58 LMP Roger. You've got it.
CC Roger.

00 00 07 08 CDR Seven minutes, Bob. We're looking good on board.
CC Roger.

00 00 07 41 CDR We have inboard cut-off.

Tape 2/4

CC Roger, Gene. Inboard on time.

00 00 08 03 CDR Eight minutes, and we are GO.

CC Roger, 17. You're looking great.

00 00 08 22 CC 17, Houston. You are GO for staging.

00 00 08 28 CDR Thank you, Bob. We are GO for staging up here.

00 00 08 42 CC You have level sense arm this time, Gene.

SC Roger, Bob. Level sense arm.

00 00 09 02 CDR Nine minutes, Bob, and 17 is GO.

00 00 09 07 CC Roger, 17. You're GO here.

00 00 09 18 CC Stand by for Mode IV capability.

00 00 09 22 CDR S-II cut-off.

00 00 09 23 CC MARK. Mode IV capability, and we copy cut-off.

00 00 09 25 CDR Roger. Mode IV. And we do have S-IVB ignition.

00 00 09 30 CC Roger. We see it, and the thrust is looking good on it.

CDR We saw that one, too, Bob.

CC Roger.

00 00 09 57 CC 17, the steering has converged and the CMC is GO. You're looking great.

CDR Roger. The CMC is GO, 10 minutes, and 17 is GO on board.

00 00 10 08 CC 17; Houston. You are GO for orbit - GO for orbit.

00 00 10 11 CDR Those are kind words, Robert. We're GO for orbit here.

CC Good show, Gene.

00 00 10 33 CDR Okay. 10:30, we're GO.
CC Roger, 17. You look great.

00 00 11 05 CDR Eleven minutes and we are GO.

00 00 11 08 CC Roger, Gene. And cut-off will be at 11 plus 47,
11 plus 47.
CDR 11 plus 47. Roger.

00 00 11 32 CDR Okay. 11:30 and we're GO here. And - Standing by.
CC Roger, Gene. Cut-off time is still holding good,
11 plus 47.

00 00 11 42 CDR Okay. Cut-off at 42.
CC Understand. Cut-off at 42. Roger. We copy.

00 00 12 03 CDR We're looking at 93.1 by 89.5.
CC Roger, Gene. We're copying the DSKY.
SC Okay, Jack. Give - -

00 00 12 24 CC And the local horizontal maneuver has initiated,
Gene.

00 00 12 50 CDR And, Houston, the - looks like the - tank pres-
sures are venting.

00 00 12 57 CC Roger, Gene. The range safety is safe and we -
you are in a GO orbit, nominal.
CDR Roger. GO orbit, nominal. Thank you.
CC And, 17, I'll be unable to update that AOS time,
but 52:20 is looking good.
CDR Roger.

00 00 14 10 LMP Houston, can you confirm - MAIN BUS TIE A/C, OFF?
CC Stand by on that, Jack.

Tape 2/6

00 00 14 18 LMP I've been carrying very low amps on the BAT BUS, and I did not see a drop. I'm carrying about 2 amps now. Volts are 3 - 30.5.

CC Jack, go ahead and take the B/C motor switch OFF.

00 00 14 48 LMP Okay. It's OFF. And I confirm that one.

CC And we think it's the EDS POWER switch and the fuel cell ... switch that are drawing the current that you're seeing there.

LMP Okay. That could well be.

CC Okay, Jack, we're going to lose you in about 1 minute off of Vanguard here and see you at 52:20.

LMP Roger; we're pressing and thanks, Bob.

00 00 15 11 CDR Okay, Bob. Everything is looking GO on board. Everything's stable. We can see the APS firing, and our altitudes look good.

CC Geno, everything is in good shape down here. The booster's in good shape; you're looking good; and their AOS time is 52:20 as I gave you.

CDR We got that, babe. We'll see you coming around.

CC Good show, babe. A little late but a good show.

CDR Outstanding ride.

00 00 16 26 CC 17, Houston. We're hanging with you here. Looks like you're hanging in Vanguard a little longer than we expected.

END OF TAPE

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CARNARVON (REV 1)

00 00 52 20 LMP Hello, Houston; how do you read 17?

CC 17, read you loud and clear.

LMP Hey, we're going real well up here, Bob. Have no significant anomalies as yet; and we've just about completed our part of the insertion checklist. Gene has his SCS check yet, and Ron's got some P52 numbers for you. And the only thing I've seen so far is a - some spurious MASTER ALARM without caution and warning that seem to be associated with moving switches on panel 2.

CC Okay. Can you get a sudden - what switches anywhere - any ... any switches on?

LMP So far, it's been fairly random. Some that I remember is the SECONDARY COOLANT LOOP EVAP switch, the LAMP TEST switch, - see - I think I got one with the TEMP IN AUTO switch. Gene got one doing something. I can't remember exactly what it was.

CC Okay - -

LMP Probably random.

CC - - we copy. Jack, we're standing by for that P52 data. We've only got about a 4-minute - a 5-minute pass here. We'll take the 52 data, and I got a few updates for you.

LMP Okay.

CMP Okay; 52 data is coming. NOUN 71 is 24 and 30; NOUN 05 is .01; NOUN 93s are plus .080, plus .029, plus .018; and we torqued at 35:25.

CC Okay. We copy that. Okay, while we're filling in some here, you might want to know this, Jack. Your sunset and sunrise times in the Launch Checklist

Tape 3/2

are all off by 8 - approximately 8 minutes and 30 seconds. That every - sunset and sunrise will occur about 8 minutes and 30 seconds sooner than in the - in the Launch Checklist. That's an approximate number.

LMP Okay, we got you.

CC Okay. And on page 2-17 of the Launch Checklist, you're going to want to delete all reference to Honeysuckle AOS and LOS and delete all reference to Canaries AOS and LOS.

LMP Wilco.

CC And we want to add an Ascension pass; AOS at Ascension, 01 plus 54 plus 00, and Ascension LOS will be 02:00:16.

00 00 55 13 LMP Okay, Bob; you're going to have to repeat that.

CC Okay, stand by. Let me give you a page. On 2-17 - let's go Hawaii AOS first of all. On Hawaii AOS, on page 2-17. AOS - -

LMP Go.

CC - - is 01 plus 17 plus 24. Hawaii LOS, 01 plus 22 plus 49.

LMP Roger. Now what about the Ascension?

CC Okay, here - give you the Ascension again now. AOS, 01 plus 54 plus 00. Ascension LOS will be 02:00:16. Over.

LMP Okay, I got those. Hawaii is 01 plus 17 plus 24, and LOS is 01 plus 22 plus 49. And Ascension is AOS, 01 plus 54:00; and LOS, 02 plus 00:16.

CC Roger, Jack. Good copy. And booster's looking good down here and you're looking good.

LMP Okay, and I'll do a better job of itemizing those switches. We were pressing pretty hard, and I'll - I'll be able to go back and get most of them, I think. And we'll keep an eye on it - on the MASTER ALARMS.

CC Roger, Jack. We understand. And I think we copied most of what you said there, and we're working on it.

CDR Okay, Bob; other than that MASTER ALARM, all is well on America, and I understand the booster is looking good to you.

CC That's affirmative.

LMP And, Bob, let me add that not - we did get spurious MASTER ALARMS without switch movement, but many came with switch movements. We've had about seven.

CC Okay; understand.

LMP That was only after insertion.

CC Seven times that your heart doesn't need, huh?

LMP Oh, we were paying attention to a sunset that was the biggest - -

CDR Sunrise.

LMP - - or sunrise or something that we saw. It was the biggest rainbow I'd ever seen.

CC Beautiful. We can't wait to hear what you had to say about that - the ignition on the S-II. It sounded pretty spectacular.

LMP Bob, just let it be said that that was quite a booster ride. When we get a chance a little later - -

CC Roger.

LMP - - maybe we'll be able to tell you something.

CC We're about ready to lose comm here. You're looking great, guys, and we'll pick you up in Hawaii here shortly.

CDR Okay, we're looking at the deserts of Australia right now and, again, everything's good on board.

Tape 3/4

CC Roger. Pick you up at 01:17:24.
00 00 58 24 LMP Roger.

STDN (REV 1/2)

00 01 17 25 LMP Hello, earthlings. We're back with you.
CC Roger, Jack. Read you loud and clear; how us?
LMP You're loud and clear. And no change systems-wise that I've seen.
CC Roger, Jack. Any more MASTER ALARMS?
LMP We had one when Ron's - looked like his neck ring hit panel 2. ...
CC Okay. Sounds like we had something loose in panel 2, huh?
LMP Yes. I don't know - It may be annoying, but so far it doesn't seem to be a problem.
CC Roger. Just for your information, everything is looking outstanding and no problems. We're taking a good look at the data here at Hawaii, and we'll make a GO/NO GO decision about 60 seconds after acquisition at Goldstone. But there's nothing right now to lead us to believe that zero opportunity will be required.
LMP Okay, Bob, understand that. We are prepared, however. Spacecraft, other than those MASTER ALARMS, is looking very good. We got the docking probe extended. The SCS reference attitude check is complete.
CC Roger.
LMP Hey, Bob, I just remembered another switch that I think gave us a MASTER ALARM was H₂O QUANTITY INDICATOR.

CC Roger. Copy that, Jack. H₂O QUANTITY INDICATOR.

CC Roger - 17, we're going to lose you in about 30 seconds. But when you get over the stateside here, we're going to take - take the dump on the data, and we'll read it out real carefully so when you get in TLC we ought to be able to see where that MASTER ALARM glitch is coming in to.

LMP Okay, Bob. And - yell at me if you want anything done on the comm with this change in AOS LOS stuff.

CC Negative on that right now. We'll see you at 01:28:59 through Goldstone.

CDR Okay, 01:28:59, Bob. We'll be there.

00 01 22 48 CC Roger, Gene.

GOLDSTONE (REV 2)

00 01 28 00 CC 17, Houston. We're back with you.

CDR Okay, Bob. We're still same as before and ready when you are for TLI.

CC Roger.

LMP I can see the lights of southern California, Bob.

CC Roger, Jack.

LMP We're going to be going a little bit south of that area.

CC Right. Your ground track looks like it's taking you right up over the mid part of Baja California.

LMP Yes, sir; I'll believe that. I'll bet you I can see Ensenada right now.

CC Roger.

CMP Bob, I expect he'll probably be able to see the lights of Silver City, too.

Tape 3/6

LMP Well, I'm sure going to be looking for them, I'll tell you.

00 01 29 59 CC Jack, just for your information, you'll probably - when you come up a little farther in this orbit here and get over Mexico, you should be able to see all that bad weather that was giving us so much worry and had Tindall and New Orleans and everything all messed up this morning when I went through there. They had a pretty bad line of weather along there.

LMP I assume it wasn't too bad. I think you made it, didn't you?

CC Oh, yeah, I made it, but I had to - you know, I had to work at it. But it's a - we were - I was worried about it getting down as towards MILA there after - you know if we had to scrub and go tomorrow night. Boy, I'm sure glad we got you off tonight.

LMP Guess who else is.

CC No, I can't - I wouldn't believe that.

CC Parker can't make it back. He's got to come back on the ... So you might have to have Young on for a while after we do a TLI.

LMP Hey, you just wouldn't believe, Bob, the light you can see in the west right now. It must be absolutely clear.

CC Roger, Jack. Sounds spectacular. Jack, people in the room here want to know if you've been down your checklist yet?

00 01 31 24 LMP Oh, we got that out of the way in about 5 minutes. Have we missed something?

CC There's a different checklist here we're talking about.

LMP (Laughter) If you're talking about the Flight Plan, yes.

CC Roger.

CMP What a waste.

LMP If I'm not mistaken, we must be just south of Arizona now. Is that right, Bob?

CC That looks real good. Yes, you're over Mexico there, and looks like you're - oh - maybe a hundred miles south of the border there.

LMP Okay. I was pretty sure I was looking up in the Phoenix-Tucson complex there.

CC Roger. Understand.

LMP Clear night.

CC Little better than ... Florida.

LMP The west is always that way. I wish it was daylight so we could see Sonora and that country. That's spectacular, I'll bet you.

CC Roger.

LMP Man's field of stars on the Earth is competing with the heavens, Bob.

CDR Bob, you're coming through with a large squeal right now in the background.

CC Understand ...

LMP Okay, I think we got the Gulf Coast showing up now by the band of lights, Bob.

CC Roger.

CDR Okay, Bob. Assume the booster is still looking good, and we'll be GO for a nominal TLI.

CC That's affirmative.

LMP Okay.

CDR And you're still coming up with a loud squeal.

CC Roger. ...

Tape 3/8

CC 17, how do you read?

CDR No, Bob, you still got the loud squeal.

LMP Would you believe we're just south of Houston now, Bob?

00 01 35 17 CC 17, are you receiving Houston now?

CDR All right, Bob. You came up unreadable with the squeal that time.

CC Am I still squealing? This is Houston.

CDR That's affirm. You're very loud, almost unreadable with the squeal. Bob, why don't you give us the short count?

CC Geno, don't change anything. We think it's a ground site situation here, and just stand by.

CDR I believe it's in the VHF, Bob.

LMP Okay, Bob. I'm not sure exactly where we are, but I'm looking out - to an awful lot of horiz - lights on the horizon out there at 12 o'clock, and an awful lot of lightning in the clouds out there.

CC Roger. I - we show you just about over the middle of the Gulf. Looking ahead, you're probably seeing the very southern tip of Florida there.

CDR It looks like almost the entire Florida peninsula has got lights - got lightning on it somewhere.

CC Roger. How does my comm sound to you now, Gene?

CDR Okay, give us a quick short count.

CC Roger. Short count follows: 5, 4, 3, 2, 1, 1, 2, 3, 4, 5; short count out.

CDR Bob, you're all right now.

CC Okay.

CDR And can you give us a feel for what the final weather was at the Cape - at launch?

CC Yes. Let me get that for you. The reason why we had that problem on the comm is we just handed over from Texas to MILA, and we're - and you're going through MILA now. And it's great. So we have a little problem with our Texas site.

CDR Okay.

CC The television coverage had you all the way through staging very well on - and the S-II ignition. Then, you went right behind a cloud for a while, but they were tracking you pretty well.

CDR Okay.

CC They also - cut in for about a half minute or so and showed a view of the crowd in just the available light from the booster, and it stood out pretty well.

LMP Okay, Bob. We're going right over Florida now, looking down at Miami. A beautiful view of the Keys all lit up, and I just saw a shooting star right over Miami.

CC Roger.

LMP That's a very, very fine view of Miami. Hard to believe.

CC I'll bet they sat there and watched you go.

00 01 38 44 LMP Looks like we're right over the Bahamas now, Bob.

CC Roger. I'll buy that.

LMP Well, I'm not easily impressed, Bob. But I'm certainly impressed by this one.

CC Roger. What's the CMP doing? We haven't heard much from him. Is - is he at the other window?

CMP He's crawling around looking for things down in the LEB.

Tape 3/10

CC (Laughter) Okay. They won't let you have a window tonight, huh, Ron?

CMP No, I'll catch one here pretty quick.

CC Just a reminder, if you haven't already done it. There is no need to unstow the TV, because due to this late launch, there's just no site available.

CDR Okay, Bob. We're not going to unstow it.

LMP Bob, I don't - I guess there's no site available for some time, is that correct?

CC That's affirmative. And if I can pull one of you guys away from a window, I've got a TLI plus 90 pad.

LMP Oh, I'd love to copy that. Just a minute.

00 01 41 29 LMP Hello, Houston; Apollo 17. How do you read?

CC 17, Houston. Go ahead.

LMP Okay. Lost you there for a minute. We had good signal strength all through that, so I figured it was your problem. ...

CC Roger. We're just waiting here - You ready for the pad?

LMP We were calling you, and you missed us. So you might think about that. Ready for the pad.

CC Okay. It's a TLI plus 90, SPS/G&N; 66953; minus 0.59, plus 1.88; ignition time, 004:40:01.48; minus 0351.8, minus 0000.1, plus 3378.2; roll is 180, 073, 003; NOUN 94 [sic] is - H_A is not applicable, H_p is plus 0020.1; 3396.4, 4:50, 3380.8; sextant star is number 11, that's 11, 342.4, 32.3. Stand by. 17, Houston; are you still reading me?

LMP Hey, Houston, if you read, we're reading you. Got you all the way through the trunnion on sextant star.

Tape 3/11

CC Okay, we'll have to wait and pick you up at Ascension. We just had a keyhole pass at Bermuda, and a little bit of a pass at Vanguard.

00 01 43 51 LMP Okay, I'll wait for you to finish that, and on the readback. Okay.

CC That's affirmative. Stand by. We've got Vanguard, I can continue on with - after trunnion, the bore-sight Star is not applicable, Jack. NOUN 61, plus 13.29, minus 032.00; 1099.2, 34904; GET of .05G, 024:38:09. Want to read back that much of the pad, Jack?

LMP Okay, Bob. It's TLI plus 90 pad, SPS/G&N; 66953; minus 0.59, plus 1.88; 004:40:01.48; minus 0351.8, minus four zeros 1, plus 3378.2; 180, 073, 003; H_A is NA; plus 0020.1; 3396.4, 4:54, 3380.8; 11, 342.4 32.3. Boresight is NA; plus 13.29, minus 032.00; 1099.2, 34904; 024:38:09. Over.

CC Roger, Jack. Good readback except burn time is 4:50 and not 4:54. And we'll be losing you here in about a minute, so wait on the rest of that pad. Just a reminder for Ron, we'll be standing by at Ascension for the next gyro torquing and - we might have a drift update on the - IMU there.

LMP Okay, he copied that. And we'll wait for the rest of the pad.

CC Okay.

LMP Burn time was 4:50 - I think that was when you started to cut out.

CC Roger.

00 01 48 11 CC 17, this is Houston through ARIA. How do you read? Over.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 01 48 53 CC 17 Houston through ARIA. How do you read?
CC 17, Houston. How do you read through ARIA?
00 01 54 07 CC 17, Houston.
LMP Go ahead.
CC Roger. You're back with us. I'll finish up that TLI plus 90 pad so we can talk a little here if you want.
LMP Go ahead.
00 01 54 19 CC Okay. Set stars are Sirius and Rigel; R_{ALIGN} is 318; 148; 358. There'll be no ullage. Okay. Down at the bottom of the pad we've got the P37 for lift-off plus 9. GET is 009:00; DELTA-V_T, 4897; longitude, minus 175; GET of 400K, 033:49. Over.
00 01 55 09 LMP Okay, Bob. Zero - Sirius and Rigel; 318; 148; 358; no ullage; 009:00; 4897; minus 175; 033:49. Over.
CC Okay, Jack. Good readback.
LMP Okay, Bob. We had - as usual - up here (laughter) a spectacular sunrise, and Gene wants to talk to you.
CDR I got some numbers on Ron's P52 for you, Bob.
CC Okay; standing by to copy. Go ahead.
CDR Okay. NOUN 71 were stars 22 and 24; NOUN 05 are all balls; NOUN 93s are all minus. They're 00.037, 00.007, and 00.021. That's minus 37, minus 07, and minus 21; and they were torqued at 01:51:40.
CC Okay. We copy.
LMP Bob, we're over - what might be - intermediate to low strata that have a very strong crenulation pattern - pulling out some geological terms here. I don't think I've ever seen anything like it - flying.

Tape 4/2

CC Roger.

LMP Looks like about a north-south lineation with a very strong crinkling, roughly east-west.

CC Roger. Copy that; that's interesting. You know, you're just directly over that South Atlantic area. Your - you - your path just kind of kept you going right between the - Africa and South America, right dead center all the way.

00 01 57 44 CC And, 17, just for your information, we've searched all the data we can, and we cannot find anything wrong with the spacecraft or the booster at all. Everything is looking real fine, and the only problem in the air is that - those master alarms that you have reported - we're not able to tie in anything common yet to any of those things either.

CDR Okay, Bob. We have not had any for - quite some time, I think, since the last time we talked to you about them.

CC Roger. Understand. We'll probably get a good workout on that after TLI and try and track it down one more.

CDR Okay. But, also, we have not really been doing much switching since the insertion checklist was complete, either.

CC Roger. Understand. It's got you glued to the windows, I guess, huh?

CDR They are interesting; I'll say that.

LMP Well, I certainly am, Bob, and - again there's a big - a fairly continuous intermediate cloud deck, I think. And it has patterns comparable to what I've seen on pictures of ice floes.

CC Roger. Understand.

LMP And - of pack ice; I should say pictures of pack ice in the Antarctic.

00 01 59 00 CC 17, Houston. We've got two questions concerning the MASTER ALARMS. One, do you get the MASTER ALARM on the LEB also; and, two, do you get the tone with the MASTER ALARM?

LMP We did get the tones. The MASTER ALARMS were on both - panel 1 and panel 3. I can't tell you about the LEB right now. Maybe Ron can.

CMP No, I didn't pay that much attention.

CC Okay.

CDR And, Bob, there was something interesting I wanted to get around to tell you. The - MISSION TIMER down in the LEB, when Ron went down there to get things squared away, was about 15 seconds or so behind all the other clocks.

CC Roger. We copy that.

CDR Okay; and we reset it - resynced it - and it's been running okay. I don't know whether that's a clue to anything or not, but apparently it happened either during launch - or somewhere before we got down there right after insertion.

CC Okay. We're going to lose you here in about 9 seconds. You are GO and looking great, and we'll work on it. And if you get another MEV [?], will you check the LEB for us?

CDR Yes, sir; sure will do, Bob. We'll see you. What's our next AOS?

CC Stand by. It's Carnarvon at 02:25.

CDR Thank you.

00 02 25 18 CDR I see you're trying.

CC 17, Houston. How are you doing?

LMP Well, we're pretty good. You're wavery here a little bit on signal strength.

Tape 4/4

CC Okay. We've got a TLI pad any time you're ready to copy it, Jack.

LMP Goodness; okay, let me get rid of something here. Ron, I'm putting that right underneath you.

CC And, guys, we'd like POO and ACCEPT, please.

LMP Okay.

CC You'll get a CSM state vector if you'll give us POO and ACCEPT.

00 02 25 51 CDR Got POO and ACCEPT.

LMP Okay. Let me have my favorite pad.

00 02 25 54 CC Okay. Here's the TLI pad. Time base 6 at 3:02:57; 180, 312, 000; 5:51; DELTA-V_C is 10359.6, 35582; 000, 345, 040; extraction will be at 300, 165, 320; 312.0, 306.0, 57:10, yaw is 0; ejection time, 4 plus 39 plus 00. Over.

LMP Okay, Houston. Here's your TLI pad. 3:02:57; 180, 312, 000; 5:51; 10359.6, 35582; 000, 345, 040; 300, 165, 320; 312.0, 306.0 57:10, 000; ejection time, 4 plus 39 plus 00.

CC Good readback, Jack; and we'd like OMNI Charlie, and it's your computer, and you've got your state vector.

00 02 28 04 LMP Okay. You've got OMNI Charlie. And, Bob, we had almost a completely weather-free pass over Africa and Madagascar. And the scenery - both aesthetically and geologically - was something like I've never seen before, for sure.

CC Roger.

LMP We got odds and ends on the tape and quite a bit on the film.

CC Roger; good show. Are you saying that you didn't have any weather over that southern Africa there?

LMP Not very much. Barely broken clouds in some places. Most of the countryside was clear.

CC Roger.

LMP There were - patterns - like I haven't even seen in textbooks. Maybe I haven't been looking enough, but some of the desert and grassland patterns were - had the appearance of ice crystals almost, except on a megascale, if you - have ever looked at ice crystals in sand.

CC Roger.

LMP Or, better yet, ice crystals on your car window when you - get out early in the morning up in - northern areas.

CC Roger. And just be advised, we'll be standing by for the GO/NO GO for PYRO ARM when we get to Hawaii, and we'll be giving you a GO for TLI about that time.

LMP Okay; and we'll be ready.

CC And, Ron, in - on the Launch Checklist, on 2-25, on the manual and nominal S-IVB TLI-1, add 34 degrees on the nominal pad for all the pitch angles; and on the manual pad, add 34.5 degrees to all the pitch angles, and you'll have it right.

CMP Okay, Bob. You ... - -

CC And - -

CMP - - let me get set. That's - okay, we'll just add 34 to the nominal and 34.5 to all the manual ones ... - -

CC And you'll want to do that on your cue card also, Ron.

CMP Yes, that's affirm.

CC And we're about ready to LOS; we'll see you at Hawaii.

Tape 4/6

CDR Okay, Bob, we'll see you - -
CC 02 plus 50 at Hawaii.
CDR Okay, 50. And we'll be into our TLI checklist,
 and - we'll be ready for that PYRO ARM.
CC Okay.

HAWAII (REV 2)

00 02 49 52 CC Apollo 17, Houston.
 LMP Go ahead.
 CMP Houston, this is Apollo 17. Go ahead.
 CC Hey, Ron, you're sounding great. Good voice here.
 LMP Golly, we've got things all set up here and we're
 kind of standing by for a logic check - whenever
 you guys - can give us a GO.
 CC Roger. As soon as we get some TM in here, we'll
 give you a GO.
 LMP Okay.
00 02 50 37 CC 17, Houston. We're ready for the logic check.
 CDR Okay, Bob. Okay. Wait 1.
00 02 50 55 CDR Okay. SECS ARM breakers are closed.
 CC Roger.
00 02 51 00 CDR Okay; and LOGIC 1 is ON -
00 02 51 02 CDR MARK it; and LOGIC 2 is ON -
00 02 51 05 CDR MARK it.
00 02 51 16 CC 17, you're GO for PYRO ARM.
 CDR Thank you; understand GO for PYRO ARM.
 CC 17 - -

LMP And, Bob, in case you're interested, there - all through the nightside pass here - there's a - quite a strong - well - stronger than I would have ever expected - horizon glow off to the north. I suspect that, I think Gene said a while ago that it's around on his side also.

53 15 CC Roger. Guys, I've got the word you wanted to hear; you are GO for TLI - you're GO for the Moon.

CDR Okay, Robert. I understand. America and Challenger with their S-IVB are GO for TLI.

CC That's affirmative.

CDR You're a sweet talker.

CC We try to please here, Gene.

CDR You know, somehow, Bob, I knew you were going to say that - we were GO - and that you try to please.

CC We've been working together too long, I guess.

CDR Not long enough, yet.

CC And, 17; Houston. You're about 1 minute from LOS, and we'll pick you up at Goldstone at about 3 hours and 00 minutes; and that's only a couple of minutes prior to time base 6 start.

CDR Okay, Bob. We'll be with you.

CC Roger.

LMP Bob, that glow is actually above the horizon, just in case you're curious. I can see - stars below the top of the glow - down closer to the Earth.

00 02 55 21 CC Roger, Jack.

GOLDSTONE (REV 2)

00 03 01 16 CC 17, Houston. We're with you again, and you're looking good.

Tape 4/8

CMP Okay; mighty fine, Bob.

23 CDR And, Bob, we've got the PYROs ARMED now.

CC Roger. And you can expect some different OMNI calls as we go LOS and AOS again.

CDR Okay.

CMP I always expect that, Bob.

CC Roger.

00 03 03 00 CDR SEP light is ON on time.

CC Roger.

00 03 03 07 CC And it shows time base 6 right on time, Gene.

CDR Okay.

CC We'd like OMNI Delta, please.

00 03 03 27 LMP Okay, you've got it.

CC Roger.

LMP I'll just switch, Bob. I won't give you a call.

CC Roger.

39 CDR SEP light was OUT on time.

CC Roger, Gene.

00 03 06 15 CDR Comm check, Bob.

CC 17, Houston; go ahead.

CDR I was just checking with you; you're so quiet down there, we almost forgot you were there.

CC Roger. Don't want to forget me. We're just watching everything; we can't find anything wrong, so we're just trying to keep quiet here.

CDR Okay, Bob. We're watching the S-IVB tanks pressurize.

CC Roger.

CDR You ought to look for the good things rather than the bad.

CC Well, that's good when we don't find anything wrong.

CDR Can't agree more.

00 03 07 30 CC 17, the chilldown is in progress, and the tank pressures are looking good.

CDR Okay, Bob; looking down here.

00 03 09 35 CC 17, Houston. You are GO at 3 minutes prior to ignition. You're looking good, and you're going to - we're going to have A - ARIA coverage all the way through the burn until Ascension.

CDR Roger; understand, Bob. 57:10, ORDEAL OPERATE -

00 03 11 01 CDR We're in average g.

CC Roger. We confirm it.

00 03 11 13 CDR SEP light ON at 3:06.

CC Roger.

00 03 12 01 CC 17, you're looking great on the final status check here, and you're GO for TLI.

ARIA (REV. 2)

00 03 12 20 CDR ... 42, the SEP lights are OUT.

SC Roger.

00 03 12 37 CDR The lights on and we have ignition.

CC 17, Houston. You're looking good, and the thrust is GO.

CDR Bob, you're now advised that we're GO on board at 20 seconds.

Tape 4/10

CC Roger.

SC ... antenna.

CDR One minute, Houston, and we're GO.

CC Roger, Gene. We can barely hear you through ARIA, but you're GO.

CDR You have reasonable signal strength, but you are unreadable.

CDR Everything's GO at 1:30.

CDR Confirm a PU shift to GO at 01:45.

CC 17, Houston. We can confirm PU shift, and you are GO.

CDR Okay, Houston, 2:30 - in the blind - we're still GO.

CC Roger, 17. You're GO; looking great.

CDR Okay, Bob. Got that. Understand we're GO from the ground; and it's a good ride, although it's rumbling around a little bit.

CC Okay.

00 03 15 38 CDR Three minutes, and we are GO.

CC Roger, Gene.

CDR Bob, we're going to TLI right through sunrise.

CC Roger; understand.

00 03 16 06 CDR Okay, 3:30 is GO. We have - 17 is GO at 3:30.

CC Roger, 17.

00 03 17 06 CDR Okay, Bob, 17 is GO at 4:30. You're still unreadable.

CC Roger. How do you read me? You are GO, by the way.

CDR Okay, we got you that time. Understand we're GO on the ground, and we're still GO here, and we're TLI-ing right through sunrise.

CC Understand.

CC 17, Houston. Your burn time is nominal.

CDR Roger. Understand burn time, nominal.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 03 18 30 CMP Cut-off at 52. Did you read the DSKY?
CC We don't have the DSKY. You have to read it to us, Ron.

00 03 18 40 CMP Okay. V_I is - I got a 00 and a 00 and NOUN 95
 V_I is 35573 - is a plus 9. And, Bob, the EMS is minus - EMS is minus 19.4, minus 19.4.
CC Roger. We copy that.
CMP And it was an auto cut-off - auto cut-off on time.
CC Understand a guided cut-off on time. Looking great.
CMP And I am watching tank pressures - are venting, the tanks are venting.
CC Understand. The tanks are venting.

NOTE

After the ARIA pass following TLI, there is continuous acquisition among Goldstone, Parks, Honey-suckle, and Madrid.

00 03 22 52 LMP Okay, Houston, how do you read?
CC 17, Houston. We'd like OMNI Delta.

00 03 22 59 LMP Okay. I picked it up a little bit. How do you read now?
CC Read you loud and clear.
LMP Okay. I hope you got all that. It was a beautiful burn, right through sunrise. Did you get the numbers?

Tape 5/2

CC Yes, we copied your V_I and your EMS numbers, and we've got a number for you. Maneuver start time will be at 03 plus 33 plus 27.

LMP Okay, we got you. Maneuver at 03:33:27.

CC That's affirmative, Jack.

LMP You guys didn't tell us we couldn't see anything going through the sunrise.

CC (Laughter) Roger.

00 03 25 01 CC 17, Houston. We're making plans here for a spacecraft SEP time of 03 plus 43.

LMP 03 plus 43. Roger.

00 03 27 27 CC 17, Houston. We're copying cabin press of 5.9 this time.

CMP Roger. We - we just got it, Bob.

CC Okay.

CMP Thank you.

00 03 31 55 LMP Frame 65 for the LMPs mag November November.

00 03 34 10 LMP Okay. We - we are maneuvering, Houston.

CC Roger. We're watching it.

CMP Now we've got a few very bright particles or fragments or something that go drifting by as we maneuver.

CC Roger. Understand.

LMP There's a whole bunch of big ones on my window down there - just bright. It looks like the Fourth of July out of Ron's window.

CMP Yes. Now you can see some of them in shape. They're very jagged, angular fragments that are tumbling.

CC Roger. They look like fluid of some sort?

CMP Not to me. They look like pieces of something.

CC Roger.

CMP They're very bright.

CC Jack, we'd like OMNI Charlie.

CMP Bob, for the most part, these fragments are not - or are tumbling at a very slow rate. I tried a couple of pictures of them - different settings. You may get an idea of what, at least, the patterns look like.

CC Roger. I've got you. We're all ears on these fragments. Do you think you can figure out what they might be?

CMP Well, you know I - I don't know. There are a number of possibilities. If you had some kind of a - I got the impression maybe they were curved a little bit, as if they might be - off the side of the S-IVB. And that's a wild guess - -

CDR Okay. RCS LOGIC is ... - -

CMP - - ice chunks, possibly. Or maybe there's paint coming off of it.

00 03 37 34 CC Roger. I noticed on one trip up the elevator last week near one of the flags. I thought it was on the S-II, but it might have been on the S-IVB. Looked like it was peeling. Maybe that's what you've got.

00 03 37 45 CC And the S-IVB maneuver is complete.

00 03 37 46 LMP ... in 1 minute.

CDR Okay. We'll set the old clock.

CMP Okay. And the - with the maneuver complete, the fragment field is essentially static, except for very slight tumbling within the fragments.

Tape 5/4

00 03 38 01 CC Roger. Cut in.

CMP Every once in a while, a fragment of considerably higher velocity than the others goes across my window. But that's very rare.

CC Roger.

CMP Hey, that's that field of view I saw out my window. Jack, do you see it now?

LMP Yes.

CMP And, Bob. At least, there - there's no apparent relative motion between fragments.

CC Roger. Understand.

CMP I'll take two pictures about a minute apart if I can. And it'll be Frame 70.

CC Okay. Frame 70.

CDR And, Bob. This is Geno. My impression is that they are - flat, flakelike particles. Some may be 6 inches across. And, although there's no relative motion between the two, most of them seem to be twinkling. And I think, for the most part, they're all moving away from us.

CC Roger, Gene. Thank you.

00 03 39 35 CMP Okay. We've got 0180 and 0 on the old thumbwheels.

LMP Okay.

CC Roger, Ron.

00 03 39 53 CMP Okay. TRANS CONTROL is ARMED.

LMP ... two ARMED.

00 03 39 57 CMP CONTROLLER number 2 is ARMED.

LMP ... SECS LOGIC ...

00 03 40 01 CMP Okay. SECS LOGIC is CLOSED; SECS ARM are CLOSED; LOGIC POWER is ON.

LMP Okay.

00 03 40 13 CC 17, Houston. You have a GO for T&D.

CDR Okay. A GO for T&D.

00 03 40 38 CMP Okay. We'll ARM the PYROs. And we'll hit the GDC ALIGN.

00 03 41 00 CMP And maneuver's complete. And 0180 and 0? On the GDC? No. It's just ... It's kind of diddling.

00 03 41 19 CMP Okay. DELTA-V in NORMAL.

00 03 41 42 CMP S-IVB, okay. Okay, switches are all set.

LMP Okay; 59:30.

00 03 41 55 CMP Okay. Let's start the DET.

00 03 41 59 CDR Tickity-tick-tickity, Houston. We're running at 59:30.

CC Roger.

CMP Okay.

00 03 42 12 CMP Okay. That's LAUNCH VEHICLE SEP, push button.

LMP Okay.

00 03 42 19 CMP MC in AUTO.

CMP Next?

00 03 42 29 CDR SEPARATION, Houston.

CMP Okay, check the covers. Okay. And check the other ones off.

LMP They're all ...

CMP Okay, I'm going to start the - My gosh, look at the junk! Okay; there's 15 seconds. Pitch her up. Okay, we'll PROCEED on the - -

Tape 5/6

LMP ... normal ...

CMP Okay, we've already PROCEEDed, Jack.

00 03 43 10 CMP Okay, we've checked her out.

CDR Houston, we're right in the middle of a snowstorm.

CC Roger. And we'd like OMNI Delta.

CMP Hey, look at that burst. It's going to be bright as all get out.

00 03 43 22 CDR And there goes one of the SLA panels.

CMP Yes.

CMP We're not there yet. Long ways to go yet. It's on the other side of the Earth, if the simulator's any good.

CMP Oh, man!

00 03 43 58 CDR There goes another SLA panel, Houston, going the other way.

CMP Yes.

CDR I've - -

00 03 44 03 LMP Hey, there's the booster!

CC Roger. Bet you never saw the SLA panels on the simulator.

CDR No, but we've got the booster and is she pretty. Challenger's just sitting in her nest.

CC Roger. We'd like OMNI Bravo, now, Jack.

LMP Okay, we'll plus-X it. We'll see the - oh, you can't see ... Okay. Oh, I can't see my COAS.

CDR And, Houston, some of the particles going by the window - -

LMP Okay, did you change the DAC?

CDR - - were obvious enough - fairly obvious to me -
paint.

CC Okay. We'll buy that.

LMP Okay. There it is. Okay, did you change the DAC?
Got ATT 1/rate 2?

CDR Okay, Houston, you want the high gain?

CC Roger. We're standing by for it, and the angles
as published on L/3-3 should be good.

CDR Okay.

00 03 46 01 LMP Okay, it's flying pretty good.

LMP Okay, we're in REACQ here.

LMP Houston, how do you read? We don't have a very
good knock - lockon here in REACQ.

CC Roger, Jack. We're reading you pretty good -
voice.

LMP Okay. It looks like it's improving. It dropped
off - signal strength dropped off, and now it's
picking up again.

CC Roger.

CC We're getting good signal now, Jack.

CC Jack, the high gain is looking good.

LMP Oh, okay.

CMP I'm guessing. I don't know - about a
hundred ... - -

LMP That's good news. It seemed to smoo - slew very
smoothly, so it looks all right.

CC Roger, Jack.

LMP ATT 1/RATE 2?

Tape 5/8

CDR I can't tell you too much, Bob, from the center seat other than Captain America is very intent on getting Challenger at the moment.

CC Roger. I can believe that.

00 03 48 26 CMP Yes, I'm coming in a little slow, but we've got plenty of time.

00 03 48 59 CDR Okay, Houston. While we're moving in here, I can see a few chunks of that platy material, possibly paint, down in the SLA sort of bouncing around between the S-IVB and the LM.

CC Roger.

CDR But, so far, LM looks very clean. Can't see anything abnormal from this view yet.

CC Okay.

LMP Isn't it, though? That thing is really stable out there.

00 03 50 31 LMP Yes. Can you see it at all, Gene?

00 03 51 20 LMP Got one little chunk coming out - it just came out of the SLA, and it's spinning along the long axis, and it looks very stable.

CC Roger.

LMP Every once in a while, a small particle flies off of it though.

CC How big of a chunk are you talking about, Jack?

LMP Say again?

CC How big an item are you talking about?

LMP Oh, I - reference to the thrusters, about the same diameter as the thruster on the LM.

CC Oh, Roger.

LMP That's how long it was, and about - oh, a fifth that thick or that wide.

CC Roger.

LMP And I don't think - I don't think it's more than a quarter of an inch or maybe even less thick.

CDR That same particle, Bob, came by and as it went spinning, it was throwing off pieces of itself - radially out.

CC Roger. We copy.

00 03 52 31 CDR There's a small one come floating by and it looked like flakes. And I think I caught three of the four SLA panels going as we were maneuvering. I've got one out the hatch window now. It's quite a ways out.

CC Roger.

CDR It's tumbling in all three axes.

LMP And I saw the fourth one out my side, so we saw them all.

LMP Area around the two spacecraft is cleaned up pretty well by now. There are just a few fragments moving around.

CMP Now she's coming in.

00 03 54 58 LMP Rover looks in good shape, so far.

CC Roger, Jack. Can you see down on that quad? Is that what you're looking at?

LMP Yes, I'm looking right at it. And I got a good view of the MESA top anyway. It's pretty well covered, but it looks all right also.

CC Roger.

LMP All the antennas look good; thruster quads all look great. I could see all four of them a minute ago.

Tape 5-10

CMP Okay, about 10 feet there, Gene. Stand by for a ... on the barber pole.

CDR Okay.

CMP All right; in good shape.

00 03 56 35 CMP It's out now.

00 03 56 45 CDR Capture, Houston.

CC Roger. We copy.

CMP Okay, we're FREE; rates look pretty good. Let's lock it together.

LMP Okay. You ready?

CMP Ready. She's lined up not bad.

CDR Okay.

CMP PRIM 1.

00 03 57 03 CDR MARK it. Stand by.

00 03 57 04 CMP Here she comes.

00 03 57 10 CMP Ka-chunk. My gosh!

00 03 57 13 CDR Okay, Houston, ripple fire; but we still have number A barber pole.

CC Roger. We copy.

00 03 57 19 CDR And we have a MASTER - and a MASTER ALARM.

CC Roger.

CDR We got - we got the most of the latches, but A is barber pole, and B is gray.

00 03 57 29 CMP Okay, check both circuit breakers; they're IN. Yes, Okay.

CMP We had one clear fire, maybe one or two latches and then a ripple fire on the rest.

CC Roger.

CMP And, by the way, I had a good view into the AOT, and I can still look in there, and it's very clean.

CC Roger.

CMP In fact - -

CC Ron and Gene, we saw your MASTER ALARM. Did you have any - anything on the matrix light up?

CDR No, not a thing. I looked.

CC Roger.

00 03 59 20 CDR Okay, Bob, we're going to go ahead and take a look at that docking malfunction before we press on here further and check this barber pole out.

CC Roger. We're working some words up here. We'll be back with you in a second on that, Gene.

00 03 59 33 CDR Okay. We're down on the checklist through the EDS POWER breakers, OPEN.

CC Understand.

CDR And, Houston, in case we didn't tell you, it's talkback A that's barber pole.

CC Understand. We have it.

CC Say - say, Gene, we don't think it's a problem. We'll find out what it is when you get in. We think we should just press right on with the Flight Plan checklist and keep going.

CDR Okay, we concur with that. Okay, we'll press on, Bob.

00 04 01 38 CDR Okay, Bob. We just got a MASTER ALARM when I went to the RETRACT PRIM, from 1 to OFF.

CC Roger. We copy that. Looks like panel 2 is jinxed up there, huh?

Tape 5/12

00 04 03 09 CDR Okay, O₂ HEATER number 3 went to AUTO.
CC Roger. We copy that.

00 04 07 47 CDR Okay, Bob. We're reading a DELTA-P of greater than 4, and I'm going to open the PRESSURE EQUALIZATION VALVE now.
CC Roger, 17. We copy that.

00 04 08 44 CDR Okay, the DELTA-P is coming down, Bob.
CC Roger.
CC Gene, while you're watching that, I just thought you'd be interested. We talked to some of our friends down at the Cape who watched the launch, and they said you were aglow all the way until you faded into - you couldn't tell you from a star. They saw staging, and they could just see you as a star way off in the distance until you faded out. Not a cloud in the way at all.

00 04 09 31 CDR Beautiful. Okay, we're at - we're at 2, and we're monitoring it for 3 minutes.
CC Okay.

00 04 09 46 LMP And, Houston. While we're checking the integrity here, on mag Alfa Alfa, there's about 50 percent.
CC Mag Alfa Alfa, 50 percent. Roger.

00 04 12 28 CDR Okay, Bob. That's 3 minutes. It's - DELTA-P change is less than 0.1.
CC Three minutes and less than 0.1.
CDR We are pressing on.
CC Roger; press.

00 04 14 18 CMP Okay, you want cabin's at 4.8 now; REPRESS is about empty. Okay. No, not yet, it's still getting a little bit.
CMP That REPRESS PACKAGE VALVE is kind of noisy.

00 04 14 56 CMP That's all the REPRESS O₂. We'll turn that OFF.
Okay, Houston, the REPRESS PACKAGE is empty now,
and we're down to a DELTA-P of 0.2.

CC Roger. We copy that.

CC And, 17. Just be advised, you're going to have an
S-IVB nonpropulsive vent start 04:18:27. You've
got about 3 minutes on that.

CDR (Laughter) Okay. Thank you.

00 04 16 40 LMP Can you reach ... there?

CMP Yes, I'll get them.

00 04 16 43 CDR Okay, Bob. We seem to be holding DELTA-P at
about 0.2. I suspect that's probably zero.

CC Roger. We copy that.

00 04 17 00 CDR And the cabin pressure's about 4.5. You want us
to wait until 5 psi for the EMERGENCY CABIN PRES-
SURE SELECTs?

CC Negative on that. Let's just go ahead and let's
press on.

CDR Okay. They should be BOTH.

00 04 17 33 CMP Okay, EMERGENCY register working.

CMP Coming down though, Gene. Let's wait until it
gets down a little ways.

CMP Yes.

CMP Yes. Straight up and down as well.

CMP Up one one. Must be the nonpropulsive VENT that's
banging. (Laughter) Here comes all the - look at
all the stuff going again. It's really glowing.

LMP Your nonpropulsive vent gives quite a glow.

CC Roger, Jack.

Tape 5/14

CMP It looks like a rainbow. Dark one.

00 04 19 16 CMP Okay. REPRESS PACKAGE to FILL.

CDR That ought to take the surge tank down a little bit. ... about at what? About 400?

CDR 500 on the surge. No, they ought to be closed off by now, I think. Yes.

CC 17, Houston.

CDR Go ahead.

CC Roger. Be advised, you don't have to wait until 5 psi cabin to go ahead and open the hatch.

CDR Okay, we're not, Bob. We're pressing on with it now.

CC Roger.

00 04 20 07 CDR Okay, it looks like we're going to maintain about 400 on the surge.

CMP Okay?

00 04 20 53 CDR Okay, Houston. The hatch is coming out.

CC Roger.

CMP (Laughter) I don't know what you're going to do with it.

CDR Put it up here in the - in the - on the couch.

CDR There we go.

CDR Hey, that's a lot lighter than it used to be.

CDR There's going to be a lot of happy people down there, Bob. I haven't checked them all, but visually, they're all locked.

CC Understand, Gene. All of them are locked.

CDR Let me give them a good check.

CMP Yes. You'd better check them, because we got a barber pole on that one.

CDR Okay, here's one that *** over.

CMP What is the position of it?

CDR 7 ***

CMP 7 and 9?

CDR Hey, Bob. Maybe we aren't all going to be so happy.

CC Go ahead.

CDR Okay, 7, 9, and 10 - the handle is flush; the bungee is vertical, but the handle is not locked down, and the - and the red button is showing. And I can pull each one of them back slowly. I haven't done anything with them. That's 7, 9, and 10.

CC Roger. We copy that. The handle is flush; the bungees are vertical, but the handle is not locked down, and the red button is showing on 7, 9, and 10.

CDR That's affirm.

00 04 23 58 CDR Okay, Bob. Bob, I just pushed the handle on 10 home a little bit and it did lock. And the red button is flush. So that leaves me 9 and 7.

CC Roger; understand.

CC Geno, go ahead and try the handle on 9 and 7; and, if that doesn't work, cock them and refire them starting with 9, please.

CDR Okay; the handle doesn't work. I'll have to re-cock them.

CC Okay.

CMP When you trip it with your - did you cock it twice?

Tape 5/16

CDR Yes.

CMP And it took two cocks to make it go?

CDR Yes.

00 04 25 04 CDR Okay, 9 cocked twice; it tripped. It is overcenter and locked.

CC Roger. How about the barber pole now?

CMP Okay. Wait a minute, I've got - DOCKING PROBE MAIN A circuit breaker's IN and gone to RETRACT, and it's gray.

CC Okay - -

CDR Aha! That did it.

CC Roger.

CC And -

00 04 25 47 CDR Okay, Bob. Cocked 7 twice and tripped it, and it's overcenter and locked.

CC Roger.

CDR I think that takes care of them all.

CC Good show.

00 04 26 34 CMP Okay, DOCKING PROBE circuit breakers are OUT and EXTEND/RETRACT is OFF.

00 04 26 48 CMP Because it belongs on the probe. ... it's painted yellow, it belongs on the probe.

00 04 28 08 CDR Okay, Bob. The umbilicals are connected.

CC Roger.

00 04 29 06 LMP Okay, Houston, 7 Delta on the test meter is now reading 1.0. It jumped up to 2.6, and is now back to 1.0.

CC Roger. We copy. That's good.

00 04 30 31 LMP There we go. Okay. There, we're going up in the tunnel.

CMP Pretty good ham sandwich.

00 04 32 02 CDR Okay, Bob, the hatch is back in.

CC Roger, Gene.

00 04 34 57 CC 17, Houston.

CMP Go ahead, Houston.

CC Roger. We've got some new - new angles here for you.

LMP Stand by a minute, and let me find a place to copy them.

CMP What - what kind of angles are they, Bob?

CC They're your NOUN 22 attitude maneuver for APS burn out of the hatch window. They're in the middle of the page L/3-5.

CMP Oh, okay.

CC Instead of 270, we want 274.

CMP Wait 1. We're not quite with you.

CC Okay.

CMP Okay. I think I'm with you at 3-7; go.

CC It's on 3-5, Jack, middle of the page there. Those NOUN 22s.

LMP Okay, I take it back; 3-5, middle of the page.

CC Okay. You notice there's three angles there - 270, make that 274.

LMP Okay. That the only change?

CC And the - N, the next one, the 129.8, change that to 164. And 4.3 on the yaw, change that to zero. It's close enough; zero on the yaw.

Tape 5/18

LMP Okay. We got them 274, 164, 00.

CC Roger, and the high-gain angles that you've got on the Flight Plan are close enough and should do it.

LMP Very good.

00 04 39 23 CMP Okay. We're 6 frames a second. Okay, what - what did ... RANGE ...

CMP Okay, I'll - I'll leave it at 10 feet and about an f - f/8. Okay, ... at set. Because I had that one to 0180 to 0.

00 04 40 32 CDR Okay, Bob. We're aligning our GDC, and the next thing we'll pick up will be SECS ARM circuit breakers. And we'll give you a call on the LOGIC.

CC Roger, Gene.

LMP Okay, Bob. While we're waiting, does the balance on the - -

CMP I see what you mean (laughter).

LMP - - H₂ and O₂ flow into fuel cell 3 - well, actually, in all three fuel cells, look pretty good to you?

CC Jack, the flows look just right for the current.

LMP Okay. Used to seeing them more or less lined up, and I hadn't calculated any further than that.

CC Roger.

LMP O₂ - O₂ seems a little higher H₂, relatively speaking.

CMP Okay. That's pretty close. Verified: SECS ARM breakers are CLOSED.

CMP Okay, Houston. We're ready to come up with the LOGIC.

00 04 42 13 CMP Okay, Houston, LOGIC 1 is coming on now and LOGIC 2.

CC Roger.

CMP And, Houston, just to keep track of EMS null bias check that time, was - went from 100 to 100.7 in 100 seconds.

CC 17, we'd like to just verify on that top line S-IVB/LM SEP circuit breakers - both of them are CLOSED?

CMP Okay, we'll verify them again. We doublechecked them.

CC Okay, we just didn't hear your call and we want to make sure of that. Didn't want to miss anything here.

CMP Okay. They are - they are verified CLOSED, and Jack just checked them again.

00 04 43 27 CC Okay. You are GO for PYRO ARM and GO for extraction.

CMP Okay, GO for PYRO ARM; GO for PYRO extraction - or LM extraction (laughter).

LMP Okay, PYRO ARM.

00 04 43 41 CMP Okay, we'll ARM the old PYROs. There's PYRO A; PYRO B.

LMP SERVO POWER number 1 ...

00 04 43 49 CMP TVC SERVO POWER, AC 1.

LMP TRANS CONTROL POWER, up and ON.

00 04 43 54 CMP TRANS CONTROL POWER is ON.

00 04 43 59 LMP Okay, ROT CONTROLLERS are ARMED. Okay, I'll wait just a little bit on that - EMS to NORMAL. Get DELTA-V ...

00 04 44 28 CMP Okay, EMS to NORMAL? Push right there. Yes.

Tape 5/20

CDR Okay; on my mark, the S-IVB/LM SEP will come on.

00 04 44 40 CMP Okay, and then I'll back it off to - Okay?

00 04 44 51 CDR Okay, on my mark, S-IVB/LM SEP: 3, 2, 1 -

00 04 45 02 CDR MARK it. Okay, we got it.

CMP Oh, ho! Man, did we! There she goes. Yes; LM came with us.

00 04 45 13 CMP Okay, we're CMC, AUTO. All right. We've got 0.6. It's all right. Okay, whoopee-dee-doo!

00 04 45 28 CMP Safe the PYROs. Okay, LOGIC's OFF.

00 04 45 38 CMP SECS - SECS ARM breakers are OPEN.

00 04 46 10 CMP Now I think we ought to go to the maneuver pretty quick. Otherwise, the S-IVB will be so far away you can't see it. Okay, you ready to maneuver?

00 04 46 26 CMP Okay, CMC in AUTO, caged. Away we go. That - that ... wasn't as bad as the original ...

CMP Yes.

CMP Came right out, though.

00 04 46 48 LMP MAPPING CAMERA and PAN CAMERA are OFF.

00 04 47 05 CMP Okay. POWER's OFF. Hey, Jack. Hand me the Hasselblad. I think we're bowing the right direction. Yes, the Moon is there. The Earth is - that's the Earth.

CMP SERVO POWER's OFF, yes.

CMP The Earth just fills up window 5. Okay, f infinity, about a 250th.

00 04 47 45 CMP What - what do you have? A zero in there? Hey, I lost my watch. Turn ... OFF. Yes, AC is OFF. Whoo, what a beauty! What a beauty! Yes, the Earth.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 04 48 16 CDR I can't see the S-IVB. It's gone.

SC Look at that.

LMP Yes, Madagascar and Africa. Got to be.

CDR ... see it.

LMP Got to be.

SC Yes, as soon as I ... the S-IVB, we'll -

LMP Hey, there's Antarctica. It's all full of snow. Okay. You want to look?

CMP Yeah.

LMP Yes. Oh, there it goes, there. Looks kind of empty down there without the LM - -

CDR Okay, Bob, we're looking right up the dome of the S-IVB.

CC Roger. We copy that. We're standing by for your GO for yaw maneuver.

CMP We can give them a GO for yaw, can't we? We can see it now.

CDR Yes, we can see it. You've got the GO for the yaw.

CC Roger. Thank you, 17.

CDR Looks like she came out of there clean as a whistle.

CC 17, Houston. The yaw maneuver will be starting in about 4 plus 52, a little less than 2 minutes from now.

CDR Okay.

CC Sounds like you are taking a picture of that old dome out there, huh?

Tape 6/2

CMP Oh, we're at the end. (Laughter) We're at the end - you know.

SC ... in there.

00 04 52 04 LMP Hey, there it goes. Look at the aft fire of the thing.

CDR Yes, we can see it fire now.

CC Roger, 17. Yaw maneuver started.

LMP The old S-IVB had a flare for the dramatic, but it certainly did its job for us.

CC Roger, Jack. Preliminary data indicate that you are about as nominal as you can be.

CDR That's the way we'd like to keep it, Bob.

CC You'd better believe it.

CDR Okay. She's - as we're looking at it, she's pitching up. She was looking right at us - we were looking right at the dome - and now she's pitching up. The shroud around the IU seems to be totally intact. It - it looked like a super clean separation. I can't really see where there's any paint or anything externally chipped off the - the booster from here. We're beginning to - to pick up the bell. It's really a shame you don't have this - this whole thing on TV; it's really quite a sight.

CC Roger. We concur with that.

CDR The Mylar and the gold coating on the inside of the shroud that's now visible is also intact. It looks like you could use it again if you could get it back.

CC Well, it's got a job to do when it hits the Moon yet.

CDR Okay, Bob. We've - we're almost looking at it broadside now.

CC Roger.

CDR Okay. She's spitting a little; looks like the yaw maneuver may be complete.

CDR We got a - full view of the - entire J2 from here; and no kidding, Bob, the whole bird, the shroud at the top by the IU, the separation plane down by the S-II, from here all looks as clean as a whistle, all the way.

CC Roger, Gene. If you're happy, we'd like a GO from you for the evasive burn.

CDR Okay. You're going to burn on the boosters plus X-axis, is that right?

CC That's affirmative.

CDR Let's get a picture or two here yet, and we'll give you a GO.

CC And, Gene, it'll be about 7 minutes until the evasive burn; 5 plus 03.

00 04 56 31 CDR Okay. You have a GO.

LMP And for your reference, at frame 105 I started a few 250-millimeter pictures of the S-IVB.

CC Roger, Jack.

CDR And, Bob, the entire sky, as far as I can make it out through the hatch window, is completely filled with our twinkling flakes.

CC Roger. We copy that.

LMP I saw a couple particles go by the window awhile back, and it looked a little bit like insulation in this - these particular case - styrofoam insulation, but in flat flakes.

CC Roger that.

LMP That was right after we separated from the S-IVB.

CC Roger.

CDR CSM sep - CSM sep, Bob.

Tape 6/4

CC Roger. Understand.

00 04 59 05 CDR Bob, I know - I know we're not the first to discover this, but we'd like to confirm, from the crew of America, that the world is round.

CC Roger. That's a good data point. Have you gotten a good look at any of that weather down there on the Antarctic?

CDR Well, on Ron's window number 1 - maybe he can tell you a little about it.

CMP You know, it's real funny there in Antarctica the - You can see the snow, but there isn't any weather at all in it. All of the weather's around it in the water.

CC Roger.

LMP That's where the moisture is. I don't know what to take a picture of.

CMP I can't see the U.S. at all.

CC 17, Houston.

CDR Go ahead.

CC Look's like you've got a superconservative CMP up there. We've run off some numbers - Looks like you used about 40 pounds of RCS on the T&D, and you've used about a total of 42 pounds RCS total; so we're hanging right in there. Beautiful.

CDR Very fine; glad to hear that.

SC ... velvet touch.

CMP Still a little bit too much, but that's not bad.

CDR We'll be glad to leave all that extra, I hope, in the service module when we get home.

CMP It's in the Volkswagen pouch down there.

LMP Oh, I'll change the lens now.

CC 17, Houston. It's about 30 seconds from the evasive maneuver burn.

CDR Okay.

CMP Here, Jack, can you see him good? Check the settings there. I took an f/22 stop.

00 05 03 19 CDR There it goes, Bob.

LMP There it goes; finally.

CC Roger.

CC 17, Houston. The evasive burn is complete, and the LOX dump will be at 5 plus 24 plus 20.

CDR Okay; 5 plus 24 plus 20.

CC Roger.

LMP It's going to be gone, I think, before we see it.

CDR And, Bob, you can tell Frank to forget the - returning that phone call I made to him a couple days ago.

CC Roger. Understand.

CDR All my questions are answered.

CC Think you've had enough booster briefings, huh?

CDR Yes. I figure this is probably the best one of all.

CC Frank said he'd guarantee all those S-IVBs would be just as good as that one.

CDR Okay. That's - fair enough.

CDR The S-IC and the S-II didn't put on a bad show either.

CC That's right.

CMP Houston, magazine November November is on about 1/23 right now.

Tape 6/6

00 05 08 14 CC Okay, Ron. Magazine November November is on 1/23.

CDR And, Bob, we're on page 3-9 of the Flight Plan now. We'll check the LM/CM DELTA-P, get the cabin fan filter in. We'll go over the check - the Systems Checklist, get the primary EVAP and a few odds and ends, and start doffing our PGAs. How's that sound?

CC Sounds like a winner, Gene.

CDR Okay.

LMP I guess you saw that one, Houston. That had no caution or warning with it.

CC Roger. That a MASTER ALARM?

LMP Yes, sir.

CC How about the LEB?

LMP ... say again. (Laughter) You caught me. I forgot to look. Keep after us; we'll get you that data point.

CC Roger, Jack.

LMP Gene's got his hands all over panel 2, which probably is what caused it.

CC Jack, we think that might have been a real one due to the accumulator cycle with the O₂ makeup flow going on there - it gave - it held the O₂ flow higher for - greater than 16 seconds.

00 05 11 35 LMP Well, that's certainly a possibility. We didn't notice it - Looked upright at the time. But it - Sure that was the right time?

CC Well, EECOM's watching it here, and he feels it is.

LMP Gee, I can't argue with him.

LMP Okay, Houston. Ready to deactivate the primary evaporator if you concur.

CC Roger, Jack. We concur.

00 05 15 18 LMP Okay, Bob. VHF SIMPLEX Alfa's OFF.

CC Roger.

LMP And we're gradually moving into getting out of the suits.

CC Yes. I'll bet you're looking forward to that.

LMP Well, I'll tell you it's a different world without that old one g on you. The old suit's a little bit friendlier.

LMP And, as you may have noticed, Bob, we've come to the end of the Launch Checklist.

CC That's affirmative, and we've put ours away for posterity. We also stored it with our TLI zero data that we worked so hard to generate.

LMP Well, I'm just happy - didn't - use it. That view of the Earth for a rev there was something I was looking forward to and I was not disappointed.

CC That's great, Jack.

CDR Bob, you've got a pretty good size storm over the north - I guess the northwestern coast of India, where it starts to wrap up and around to the west. It's a - rounded out on the horizon, so I can't make out exactly where it is too well.

CC Roger.

CC Could we get a read-out on the LM/CM DELTA-P?

00 05 18 20 LMP Plus 0.4.

CC Roger. We copy that.

CDR Bob, Antarctica is what I would call effectively just a solid white cap down on the - South Pole. There's definite contact between the continent and the water. But, as Ron said, most of the clouds seem to be very artistic, very picturesque - some in clockwise rotating fashion but appear to be

Tape 6/8

very thin where you can, for the most part, kind of see through those clouds to the blue water below.

CC Roger.

CDR The continent - the continent itself is - is the same color as the clouds; but, of course, more dense - and striking difference than any of the other white background around because you can definitely see that contact with the water and with the clouds over the water.

CC Roger. Understand. There'll soon be a comm switch over to Madrid here shortly. We may break ... in just a few minutes here. Or a few seconds, rather.

CC And you might watch - your accumulator's going to cycle in about 20 seconds here. Let's see what happens on the MASTER ALARM.

CC 17, Houston. How do you read through Madrid?

00 05 20 36 CMP You're loud and clear, Bob, and could you give us our distance from the Earth?

CC Roger. I'm looking up at the board. I'd guess at about 19,000 miles. Want me to get it exact?

CMP No, just approximate's good enough.

CC 18,100, FIDO says.

CDR Okay. And I suppose we're seeing as 100 percent full Earth as we'll ever see; certainly as I've ever seen. It appears to be - it may be a little bit - a little bit of a terminator way out to the - well, to the east - out beyond Australia and beyond India. But beyond that it's about 99 percent pure.

CDR Bob, it's these kind of views - these kind of views that stick with you forever.

CC Roger, Gene.

00 05 22 39 CDR We've got a - I guess probably the continent of Africa dominates the world right now. It's covering the - oh, the upper third - upper and western

third of the - of the world. We can see the Sinai; we can see up into the Mediterranean; we can see across the Mediterranean, although we can't quite make out the countries up there; we can see across into India. I catch a glimpse of Australia out in the far horizon. Got Zanzibar on the southern tip of Africa, the Cape down there just almost directly below us. And, I don't know exactly how big Antarctica is, but I guess we can certainly see more than 50 percent of it. And - the rest of it is all ocean. The Indian Ocean out into the Pacific Ocean and back into the Atlantic Ocean. And for the most part relatively clear of clouds except in the Antarctica region, and up towards Europe which is - which is on the horizon, across the Mediterranean, it looks like there might be some clouds back up in that way. I probably - probably - well, not probably - I can make out the entire coast of Africa from Mediterranean around to the west, coming back to the south back where it takes its big dip to the east, back around the Cape, back around up through the Suez Canal, almost perfectly.

CC Roger. We understand.

CDR And there's one batch of clouds in northern Africa, just a small batch, it looks like it may be up near the - well, no, it's not near the mouth of the Nile; it's quite a bit west of that, as a matter of fact, I can see the mouth of the Nile; I can see it running straight down towards us as it parallels the Suez and then sort of fades out into the central darker brown or darker green portions of Africa.

CC Roger, Gene. Sure be nice to have that on TV, wouldn't it?

CDR Boy, I'd love to give it to you; any way I could.

CDR You know - and there's no strings holding it up either. It's out there all by itself.

CC Roger. I just was - going through the 17 status report on CSM systems and, boy, everything is absolutely nominal, with the exception of ... glitching MASTER ALARMS that we're trying to still track down; but every other system is just nominal. Everything is great.

Tape 6/10

00 05 26 01 CDR Okay. Sounds good. That's the way they built it for us.

 CC Gene, looking at our plot board, you're directly over the southern tip of Africa or just slightly out in the Indian Ocean there, according to our plot board, which isn't exactly accurate all the time. But shortly you're going to start going backwards on the Earth here and head back across the Atlantic. That ought to be some sort of a first. You cross the Atlantic twice, going from west to east, and then, now you're going to cross it going from east to west here shortly. All in a very short span of time.

00 05 27 40 CDR Yes. I guess that does sound like a first.

00 05 29 53 CDR Bob, I can assume that from what you said there will be - probably not be a midcourse 1?

 CC That's exactly what we're working towards, Gene. And I - I'm sorry I didn't convey that feeling to you a little earlier. There's no reason for mid-course 1 right now.

 CDR Okay. Because we prefer to press on and get the suits off and hit the sack rather than make it, unless we have to.

 CC That's for sure. Roger. The earlier data showed us midcourse 1 would have been less than 3 feet per second, and we wouldn't have done it. And the data's been fluctuating, but they're smoothing it out, and it's still holding that way; so we won't be doing it, probably.

 CDR Okay. Very good.

 LMP Bob, I'm looking over Gene's shoulder here at the Earth, and it must be an awful clear day for the so-called convergence zone across Africa. Gene, I think, indicated, as it looked to us as we crossed it earlier, most of Africa is clear. Only some - probably are broken and scattered clouds - cumulus in the east central portion that are running along the line of - north/south lines.

 CC Roger.

Tape 6/11

LMP Looks like a major circulation system off the southern tip of Africa, as Gene mentioned, plus one west of that, 20 or 30 degrees of longitude. Make that east of that.

CC Roger.

LMP And, southwest of the - make that south southwest of the tip of Africa at Cape Good Hope, there looks like an incipient circulation system developing about half way between the coast of Antarctica and Africa. If I had to guess, it's going to swing up north towards the Cape and - and then swing west. The whole pattern, ... it looks like now, is a fairly equally spaced cyclones that are sort of circling around the Antarctic continent, as we can see it now.

CC Roger, Jack.

00 05 33 50 LMP But I would guess that South Africa is going to have good weather for several more days, at least. And if the pattern is - is apparent in the clouds we see is correct, the last disturbance I mentioned probably is going to pass south of the Cape also.

CC Roger. Understand.

LMP As we were going - over our daylight around the Earth in orbit, it was very clear looking at the various clouds, Bob, what were high clouds and what were low clouds, particularly when you had them together. The high clouds cast very distinct shadow patterns on the lower ones and, very commonly, had entirely different orientations - pattern orientations. The low ones seem to be more associated with arcuate front patterns; whereas, the high clouds were generally transverse to that, roughly north/south directions. That's not completely general observation, but I noticed it several times.

CC Roger. Understand.

CC I just noticed on the plot board here, it looks like you're come up on 20,000 miles out, right about now.

Tape 6/12

00 05 35 27 LMP It feels like about, 20,000 miles.

CC Okay.

LMP Bob, I have the first hint of contamination on window 5. It's covering, probably, the central - well, I'd say, - roughly around - it's square about - 7 inches in - on the side with a very thin film that's catching the sunlight; and slightly iridescent, but also very finely granular - very finely granular. You can just barely tell what it is, actually.

CC Roger. Understand.

00 05 37 45 LMP Looks like very uniform in thickness right now.

00 05 46 31 LMP Bob, this is Jack. We've got a UCTA dump scheduled, or is possible, at 6 o'clock. There's nothing sacred about that time, is there?

CC Nothing at all. Whenever you're ready, just go ahead and dump.

00 05 49 03 LMP Okay.

LMP Bob, one of the things that we miss in our training is a good geography lesson, and particularly on Antarctica. I got the monocular out, and apparently the dark band that Gene - Ron mentioned as interface between the continental water is that between the pack ice and the water. And you can, by very subtle changes in the apparent smoothness of the ground, probably make out where the actual continent begins and the pack ice ends. There are a few exposed ranges. I guess it's midsummer down there now, and you can make out the snow-free areas scattered at least in the northern portion of the continent.

CC Roger. Did you get any pictures of that, Jack?

LMP Oh, yes. We got some pictures earlier. I'm going to get another one here in a minute. I'll tell you, if there ever was a fragile-appearing piece of blue in space, it's the Earth right now.

CC Roger.

00 05 50 21 CDR And we got a MASTER ALARM.

CC Okay. We copy that.

CDR And there's one in the LEB.

CC Okay. Good data point.

CDR And there are no caution lights.

CC It came right ... accumulator cycle, along with the high O₂ flow again.

CDR Yes, I just checked the time, and I think you are right on that one. Well, we gave you your LEB data point.

CC Yes, sir.

LMP The problem with looking at the Earth (laughter) particularly Antarctica, is it's too bright.

CC Understand.

LMP And so I'm using my sunglasses through the monocular, which is not the best (laughter) viewing platform. I think I can see some of the areas of the Dry Valley, but, again, I'm not too sure of my geography, Bob. There are clouds over the continent, I believe. But, of course, they're just as white as the snow, and you only see differences in texture brought out by - probably varying photometric return because of fairly low sun angles down there.

CC Roger.

LMP But you can see patterns of what I believe is pack ice - leading off from that sharp interface that was talked about earlier. And those patterns seem to merge directly with the patterns of the clouds as if the - at least near the continent - the oceanic currents are controlling the air currents, up to a point, along with the movement of the pack ice.

CC Roger.

- LMP I'm distinguishing the pack ice from clouds mainly by the angularity of the patterns within them. There is no good clear color or albedo distinction. So, I could - I could be looking entirely at clouds, but I suspect there are some pack ice patterns, too. I'm not keeping you awake, am I, Bob?
- CC No, sir. Just keep talking; we're listening. And I'm sure not much of the world is listening, but this will all be recorded, and you can read it all when you get back and think it through and tie it up with the pictures. And I'm sure there's going to be people interested in this. And we're interested ourselves; just keep talking.
- 00 05 53 29 LMP All I want to do is read what I say.
- CC Roger. If I had a little more geology training, I'd be asking you some better questions. I'm afraid, right now, I can't think of anything to ask you.
- LMP Well, I can't - I really wish I knew that geography. I don't know - I wish I'd thought of bringing a good map of Antarctica. Could somebody do a little researching for me and see if they could tell me if we're - have a Little American view - say on the eastern edge of the continent?
- CC Roger. We'll see if we can get some Antarctica geographers around.
- LMP Yes, I'd like to - and, also, whether or not they think the Dry Valley area is visible to us. Let's see, there's some - some of the people over there in Bill Bennett's group, I think, have a little Antarctic experience, or used to. They might be able to help you out.
- CC Okay. We'll see what we can track down on it.
- LMP Don't use up a lot of people's time on it, but - but I'd be interested.
- CC Roger. It's getting pretty empty around here. It's 5:00 in the morning, so - (laughter)

LMP Okay. There is a good strong northern hemisphere cyclone up near India, and I think Gene mentioned that. It, I think, was one I saw in some of the forecast sheets as a dissipating hurricane or typhoon. I'm not sure which it is there. I guess it's a typhoon. And I see something here that I noticed in Earth orbit, Bob. That as you approach the terminator - and now I'm looking at the eastern terminator - have to keep all my directions straight here - yes, eastern terminator. The clouds - those associated with the cyclone over India and one that's - appears to be due south of there - maybe 30 degrees of latitude - have a gray appearance. The - instead of the brilliant white of other clouds as you approach the terminator, those - at least the high level clouds are gray. Now, when we were going over them in orbit, the lower level clouds were still white, and I think I can see a hint of that right now. The Sun gives a strong light reflection off of the buildups in the low-level clouds; whereas, the high-level and probably layered cirrus and maybe some of the intermediate level stratus tend to look gray because of grazing Sun, I suspect.

00 05 56 46 CC Roger. You mentioned something in Earth orbit that kind of intrigued me. You mentioned seeing the rainbow, and we were trying to figure out how you saw a rainbow up there. And you were in orbit already at that time. Do you remember that?

LMP Well, - we're not - we were speaking of the merits of the sunrise.

CC Okay. Roger.

LMP Of having a banded color appearance that varied as you approached sunrise. I can't remember what we - I think we put some of that on tape, and we were probably LOS at the time. But the banded character of the sunrise in the atmosphere was very, very marked. There was a gray-blue upper layer followed - that merged or graded into a brilliant blue intermediate zone that was just above the cloud levels. And within the clouds, you got an orange to yellow band, getting more yellow as the Sun rose, that was broken by the dark patterns of the buildups.

Tape 6/16

CC Roger. Good show.

LMP The interesting thing was the continual glow on the horizon we had, even at night, on the darkside pass. And that glow was in the atmosphere because I could see stars rise over the horizon in it and then pass on through it.

CC Roger. You were talking - the airglow, I guess, is the phenomenon most of the guys had seen before. It's kind of interesting, huh?

LMP Yes, that's - that's right. It's interesting - I guess standard airglow, but it is very striking that it's a continuous thing even in the dark pass.

CC Roger.

LMP I think I did see the eastern tip of South America, now.

CC Roger. You're starting to back up now, coming the other way. So you're still over Africa, according to our chart here, but you're backing up towards the - South America.

LMP Yes, I can see the part of South America that Mercator thought that fitted in with the bend in Africa so many decades ago and started people thinking about moving continents around on the crust.

CC Roger. Jack, how'd the PGA doffing go? Most of you - are you all out of the PGAs now?

00 06 00 01 LMP That's in work. We're taking it slow and easy up here, Bob.

CC Roger. Understand. I'll just be curious to see if they all fit in that bag.

LMP I think you'll find that Ronald Evans will also be curious about that. He's already made comments.

CC Roger.

LMP Bob, you certainly do have a very clear intuitive impression, although the evidence is hard to pull

together, that the - any frontal systems that move off the Antarctic continent do not take on any well-defined character until they get into the ... regions of the ocean. And when they do, they seem to pick up an arcuate circ - circulation that, in the view we have, seem to get fairly regularly spaced cyclone patterns that lie between the Cape of Good Hope and northern portion of Antarctica. And these - circulations of cyclones follow roughly an east/west pattern, and the curve - and the arcs of the fronts are more north/south than - let's say northwest, swinging around to the south.

CC Roger.

LMP All of them - all of them very - very nicely defined as southern hemisphere cyclones. There are about four of those visible swinging around - oh, I guess, that's latitude - I'm having to guess here, but I'd say latitude 50 to 60 south.

CC Okay; 50 or 60 south on that, huh?

LMP Yes, I have to look at the map here in a minute and see if that puts me between Antarctica and the Cape.

CC Roger.

CC Well, the tip - the tip of Africa there is at about 32 south.

LMP Well, that sounds like a pretty good guess, then. It looks like the intertropical convergence zone over Africa is starting to get more and more clouds in it now. I suspect as midday approaches, which is what we're seeing there, we can expect to see more and more moisture indications.

CC Roger. They're - they're probably about noontime right there right now. It's 11:36 at the zero meridian at Greenwich, so it's just a little bit before noon right in that area you're talking about.

LMP Yes, some of those masses of what I suspect are cumulus buildups - well, not really. They don't

Tape 6/18

look like they're as concentrated and localized. More like just masses of fairly dense clouds that are developing in that band of green that crosses the lower portion of Africa.

CC Roger.

00 06 04 19 LMP Stay tuned for the next installment on the Earth. I'll try to get out of this suit.

CC Okay. Just take it easy, Jack, and we'll be listening.

LMP Man, I've never taken it so easy in my life. I'll tell you, Bob, I couldn't have believed this would be an experience like it is now.

CC Roger.

LMP Every time you turn around, there is something else to see and wonder what's causing it. Whether it's a particle zipping across the window, or one zipping across the cabin, or spring mechanics here in zero g; there's always something going on.

CC Roger.

00 06 10 20 LMP Bob, if I'm not waking you up, an observer from another planet certainly - probably could decide that we have such things as clouds and at least large thunderstorms because right at the terminator you get a brightening of the sunlit side and a long, long shadow out to the - out to the east that is reminiscent of what we saw in the early days looking at the Moon at the terminator.

CC Roger.

LMP However, in the next pass around, I'll bet you wouldn't see them.

LMP I've never been a big - Well, I didn't grow up with the idea of drifting continents and sea-floor spreadings, but I tell you, when you look at the way the pieces of the - of the northeastern portion of the African continent seem to fit together separated by a narrow gulf, you could almost make a believer of anybody.

Tape 6/19

CC Roger. It's beginning to look like the globe that you might buy down at the store, huh?

LMP Oh, I don't think so, Bob. (laughter)

CC Okay.

LMP I don't think we'd better put this one up for sale. Somewhere there might be somebody who would like to buy it.

00 06 12 53 CC Say, Jack. We noticed the O₂ flow has dropped down now. We're wondering, did you all close the waste storage vent valve?

CMP I don't think so; let me check on that. It might have gotten closed inadvertently in this game we were playing down in the LEB.

LMP Ron says it's still on VENT.

CC It's on VENT. Roger.

CC Okay. We're noticing the flow is coming back up slowly; so something caused it to drop, and it's coming back up.

00 06 13 42 LMP Okay.

00 06 18 09 CC 17, Houston.

LMP Go ahead.

CC Jack, just to ease those words I said before, we looked at the schematics here a second, and you'd be dumping urine out of that same line as that waste vent, and that would probably cause the pressure to build up enough to slow the O₂ flow. And we noticed that the O₂ flow is climbing back up to where it belongs.

LMP Well, that's clever. Okay.

CC Didn't mean to worry you there. Shouldn't have said it, I guess, before we looked at the schematic.

Tape 6/20

LMP Oh, I really hadn't started to worry about it yet,
 Bob, so no sweat.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 06 22 44 LMP How'd the S-IVB work go, Bob?
CC They just finished their second burn, and it's targeted right where they want it. Just working perfectly.
LMP Where were they going to put that one? I guess I lost track of that.
CC Seven degrees south and 8 degrees west, Jack.
LMP Say again, you cut out on the first.
CC Okay; 7 degrees south and 8 degrees west.
00 06 23 45 LMP Okay. That ought to be interesting.
00 06 29 19 CDR Hello, Houston; how do you read CDR?
CC Read you loud and clear, Gene.
CDR Okay.
LMP Bob, LMP's going off the air for a little while.
CC Roger, Jack.
LMP It sounded like a sigh of relief.
CC No, sir. Been enjoying listening to you; keeping - keep me awake down here.
LMP You had a long day.
CC Not as long as you've had.
LMP I've just been lying around, floating around.
CC You make it sound so good.
LMP Piece of cake. I'll talk to you in a little while.
00 06 30 41 CC Yes, sir.

Tape 7/2

00 06 40 31 CMP Houston, Apollo 17.

CC Go ahead, Ron.

CMP Okay; we had another MASTER ALARM, and I just glanced up and it was the MAIN A UNDERVOLT light that was on, just for a second.

CC Okay. Ron, we didn't see anything at all on MAIN A down here. We did have an ACCUMULATOR cycle again. Don't know if that ties in or not.

CMP Well, the MAIN A UNDERVOLT - I just happened to be looking right at the panel and the MAIN A UNDERVOLT light blinked on for a second. And, of course, obviously, MAIN A is up now.

CC Roger.

CC Ron, Houston here. We've checked the back room and the high-speed charts and that and don't see any glitch on MAIN A at all on our data down here.

00 06 42 34 CMP Okay, Bob.

00 07 10 28 CMP Houston, 17. That was O₂ FLOW HIGH.

CC Roger. We copied that one. We saw it. Just about ready to call you when you called us just now.

00 07 10 41 CMP Okay. Mighty fine.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSMISSION

00 07 50 33 CMP Houston, 17.

CC Roger. Go 17.

CMP That little MASTER ALARM there, I can't be absolutely positive, but out of the corner of my eye, I think it was the SUIT COMPRESSOR light that glitched.

CC Okay. We copy that. You - we believe down here it was the HIGH O₂ FLOW.

CMP Well, they're pretty close. I thought it was red and I thought, okay; that's good. That's the right time, I guess.

CC Okay; because we'd just called it out. I was just read for you 5 seconds before you called me.

CMP Very good, Doctor.

CC Roger. And Tony is back in Houston on the console.

CMP That's hard to believe. What are you doing back there? We're - we haven't even had time to go to sleep.

CC Well, I tell you, it's a tale that's hard to believe. It's almost as miraculous as your escape from the pad tonight.

CMP Did you enjoy the launch?

CC Beautiful.

CMP You've seen one night launch, you've seen them all. Huh, Parker?

00 07 52 54 CMP We go to SCS. Okay.

CMP Never know if it's drifting up, but we'll try it.

CMP Dust whipping all over the place. The stars in there -

Tape 8/2

CMP ... Yes, let's do a little better now.

00 07 57 21 LMP MARK. Bob, mag November November is 130 now. And I just took another set of Earth pictures.

CC Okay. Copy that. November November at 130.

CMP And, Houston, 17. You copying the torquing angles now?

CC Roger. Stand by.

00 07 57 59 CC Okay. We have them, and you're GO to torque them.

00 07 58 05 CMP Okay. I'll torque it at 58:10.

00 07 59 38 CMP ... REFSMMAT.

CC And, 17, we have a preferred REFSMMAT standing by if you want to give us ACCEPT, and we'll send it up before you do your second P52.

00 07 59 53 CMP Okay, you have POO and ACCEPT now.

00 07 59 55 CC Roger. Understand we have updata. It's coming in. And, Ron, while we're sending it up to you, we'll also send you an update on the zero trunnion bias, as per the Flight Plan.

CMP Okay. Mighty fine.

CMP Somewhere. There it goes.

CMP There they are, right there.

00 08 03 15 CC Okay, 17. Ron, you can go to BLOCK now. You've got your PTC REFSMMAT. You're free to do a P52 option 1, if you want. And, be advised we are suspicious from time to time you may have an open mike there.

CMP Okay. Thank you, Bob.

00 08 10 45 CMP Okay, Houston. Those are the differences in the gyro torque and I'll torque it - oh, 11, I guess. Eight to 11.

CC Okay. Copy that.

00 08 14 13 CC Apollo 17, Houston. Over.

CDR Go ahead.

CC Roger. We've been discussing the question of what your sleep configuration is going to be in terms of headsets or not, particularly with reference to all of these various MASTER ALARMS. And I guess we'd feel better if one of you guys slept with his headset on. We were curious as to what your plans are?

CDR Bob, since I've got to wear the biomed anyway, I might just as well go ahead and keep it on.

CC Okay. The other option is for us, - if we were trying to get hold of you - is to put the Klaxon up. But we're a little - un-in-favor of that, because of the possibility of one of these spurious things waking everybody up that way.

CDR Yes, I'll go ahead and keep it on and see how it works out for a while.

CC Okay. We copy that. And, when you guys are ready, we have a couple of - we have three items to read up to you, three updates in the Flight Plan.

CMP Okay. Go ahead, Bob.

00 08 15 34 CC Okay. The first's in the Flight Plan itself, and it's the quads for the PTC spinup, and they'll be Alfa and Bravo.

CMP Okay. For PTC spinup, quads Alfa and Bravo.

00 08 16 06 CC All right, we just took that back. It should be Bravo and Delta for spinup; Alfa and Bravo only for damping. Copy Bravo and Delta for spinup; Alfa and Bravo for damping.

00 08 17 45 CC And, 17, if you have that, I have two others. One in the Flight Plan Supplement Book, and the other one is in the G&C Checklist.

Tape 8/4

CMP Okay. Go with the Supplement.

CC Okay. In the Flight Plan Supplement, we have an E-LOAD update on page 1-43. Okay; 1-43 - give me a call when you get to that page.

CMP Okay, Bob. I'm there.

00 08 18 23 CC Okay. Under line - it's 307 04, column Bravo - you'll find currently 33550. And let me give you a word of warning. When we change this, we'll be changing it again around 67 hours. These are primarily due to the launch delay. And we'll give you another GET update of this sort later on. The new number to replace 3 - -

CMP Bob - -

CC Go ahead.

CMP Let me get a pencil, please.

CC Okay.

CMP I'll use that instead of a pen.

CC Okay.

CMP Go ahead.

00 08 20 03 CC Okay. Under - Again, I remind you, 307 04 column Bravo, which was 33550, is now 34761. The line just below it, which is 05, also in column Bravo, is 15403. Over.

CMP Okay, Bob. For 30704 Bravo, 34761; and for 310 05 Bravo, 15403.

CC Okay. Very good. The next one is in the G&C Checklist under the P37 block data. And to help you find it, that's on page 4-23.

CMP Okay. Go ahead.

00 08 21 20 CC Okay. On the lift-off plus 15, be the first block. It's 015:00, 3893, minus 174, 057:56. The second

Tape 8/5

block for lift-off plus 25 is 05 - Pardon me, start over again there; 025:00, 6651, minus 175, 057:25. Over.

CMP Okay, Houston; Apollo 17. First one would be 015:00, a DELTA-V of 3893, minus 174, and GET_{400K} is 057:56. The other one is T_{ig} of 025:00, DELTA-V of 6651, longitude of minus 175, GET of 400K is 057:25.

CC Roger. Good readback.

00 08 23 13 LMP Okay, Bob. This is Jack. I'm going to be moving into the presleep checklist here. Are there any things you want to change or alter in that? Are you ready for the waste - waste stowage vent to be closed?

00 08 23 30 CC Roger, 17. We're ready for the vent valve to go closed. WASTE STOWAGE VENT to CLOSED. And we have no anticipated changes, at the present time, in the Flight Plan, Jack.

LMP Okay, I'm just looking at 1-29 in the presleep checklist and - wondering if there was anything there.

CC Stand by, Jack.

00 08 24 43 CC Okay, 17. For antenna management tonight, we'd like you to select OMNI Bravo at the current time, and stow the high-gain antenna. And we'll take care of managing our antennas from here on.

CMP Okay. We'll give you OMNI Bravo and stow the high-gain.

CC Okay.

CC And, Jack, we indeed do not have anything to add to the presleep checklist tonight.

LMP Okay.

00 08 25 56 LMP And - with your concurrence, I'll take the H₂ FANS all to AUTO now.

Tape 8/6

CC Stand by.

00 08 26 07 CC Roger. We're ready for that. All to AUTO.

00 08 27 10 CC Okay, Jack. I guess that you - we're not quite sure what you said or meant there - or what - what it is. In the Flight Plan itself, we want H₂ HEATERS 1 and 2 to AUTO, and we want H₂ FANS, on tank 3 only, to AUTO. They're three there for H₂ tank 3.

LMP Okay. You're teaching me to read carefully early, aren't you?

CC We're trying. The 1 and 2 HEATERS will be in AUTO and 3 FAN will be in AUTO.

00 08 27 46 LMP That's the way it is now, and consider the fans have been cycled.

CC Roger.

LMP According to the checklist, you might look at the third line on 1-29, and look at the H₂ line on the Flight Plan, and see why I was confused.

CC Roger. We were just discussing whether or not there was a fan or fans in each tank.

LMP That ought to keep you awake this morning.

CC Going to take something.

LMP What I was really trying to do, Bob, was get out of chlorinating the potable water, but you wouldn't bite.

CC Apollo 17, Houston. Over, Jack.

LMP Go ahead. Over, Bob.

00 08 31 33 CC Okay. We're going to give you a little high-gain antenna practice here. We'd like to pick up with the high-gain antenna again so that we can get your PTC or can watch your PTC develop. We'd like you

to go to a PITCH of 40 and YAW of 275 on the HIGH GAIN. That's 40, PITCH: 275, YAW; and MANUAL and WIDE. Over.

LMP Okay. You want the high gain selected, I presume.

CC That helps, yes.

00 08 32 15 LMP You got it.

CC Roger. Our apology.

LMP Oh, I don't expect that'll be the last time you have to apologize. I think we're running about even now.

LMP You're missing quite a view, Bob. Sorry you're not here.

CC That makes two of us. White just said; "That makes three of us."

LMP What are you trying to tell me?

CC Look out.

LMP Who's your friend off on your right, tonight?

CC Wally Moon, would you believe?

LMP Say again?

CC Wally Moon.

LMP Oh, a Moon, huh? Why don't you ask him what he's reading at H₂ tank 3 quantity?

CC Okay. I'm asking him.

LMP In percent.

00 08 34 05 CC Okay, 17. On tanks 3 of H₂, we're reading 84.38.

00 08 34 13 LMP Okay, it looks like we're reading almost the same nowadays.

CC Good.

Tape 8/8

LMP I thought we launched a little bias, but I guess that's gone now. We're a little higher than that.

00 08 36 09 CC And, 17, Houston. We're seeing your rates are quite low enough to start the spinup to PTC.

CMP Okay. We'll see if we can't get it right this time.

CMP Houston, 17.

CC Go ahead, 17.

CMP Does it make any difference with the plus or minus roll there with the - now that you are going to use the high gain?

CC Okay. Well, the Flight Plan says minus roll, why don't we do it that way?

CMP Oh, okay.

00 08 38 59 CC And after you start the roll, 17, we'd like to go back to OMNI Bravo and stow the high gain.

CMP Okay.

CC We only needed the high gain to just keep a good check on your rates.

CC And, 17, that means stow the high gain after you - after the startup. We'd like to watch the startup itself.

CMP Okay. I was just going to ask you when.

00 08 42 18 CC Okay, 17. We're ready for high gain to stow and select OMNI Bravo.

CMP Okay.

00 08 49 35 CC 17, Houston. We gather you're ready for sleep, almost. One thing we'd like to check at the end here is your O₂ heater configuration. Over.

CMP Okay. Go ahead, Bob.

CC Roger. Can you give us your O₂ heater configuration?

Tape 8/9

CMP Okay. We've got 1 and 2 in AUTO, and 3 is OFF.

CC Okay. We'd like those per the Flight Plan; 1 and 2 to OFF, and 3 to AUTO.

00 08 50 09 CMP Okay; 1 and 2 to OFF and 3 to AUTO.

CC Okay. And do you have a final change or update on the film status - beyond that 130 that Jack gave us?

00 08 50 19 CMP Stand by 1.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 08 58 03 CC And, 17, your PTC is looking real good so far.

CDR Okay. That number on that mag is still 130, Bob.

CC Okay. I copy that, Gene.

CDR And Alfa Alfa, that 16-millimeter mag, is about 25 percent left.

CC Okay; copy that as well.

CC And I guess as soon as you change the LiOH canister, if you have or haven't, and charge BATTERY Bravo, then we're ready for you to sleep at your leisure. Configuring your comm, remember the SQUELCH, ENABLE, and the VOICE, OFF, when you get ready to go to sleep.

00 08 59 31 CC Roger, Apollo 17. We copy the film update, and we're ready for you to go to sleep once you've got the LiOH canister changed, if you haven't. And remember also the charge on brady - BATTERY Bravo. After that, it's just the comm configuration, SQUELCH, ENABLE, and VOICE, OFF, when you get ready to go to sleep.

CDR Roger. You cut in and out. Stand by. We'll talk to you in a minute.

CC Okay, I think we're losing an omni here.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 15 02 57 CC Apollo 17, Houston. Good morning.

CDR Hello, Robert.

CC Glad to have you with us again. You guys got a good night's sleep, we think.

CDR Well, I'll tell you, it was (laughter) looked forward to.

CDR Give us a few minutes here and we'll - get operational.

CC Roger. Give us a call when you're ready to talk to people.

CDR Okay.

00 15 09 44 CDR Yes, from the looks of things, Bob, down there, it looks like getting off last night was a good idea.

CC Got a new CAP COM now, Geno. Why? Looks kind of cloudy down there?

CDR Yes. Hello, Gordo. How you doing? Yes, I'm looking - oh, we're probably directly over - just west of the - out in the Pacific, but abeam of the bottom third of South America, I suppose. And I've got North America, Mexico, and the U.S. on the top third - the top 25 percent of the Earth. And it looks like you've got cloud cover from somewhere where the coast bends around Corpus right on north into the Great Lakes and is completely out into the Atlantic, including covering Florida out there.

CC Roger. I can verify the part between the Cape and Houston, anyway.

CDR Yes, the Gulf looks like it's pretty well filled with clouds. Looks pretty thick from here.

CC Roger.

Tape 13/2

CDR However, if you're interested in going to South America, the whole continent looks - looks pretty good. A few clouds; but, for the most part, you can see the entire continent.

CC Roger. Guess it's summertime down there.

CDR Okay, Gordo. We're - we're stirring slowly. We'll get back with you here.

CC Okay.

CDR Gordo, one question. How does the spacecraft look to you? I didn't hear anything all night long as far as any MASTER ALARMS or anything.

CC I'm getting the word that nothing was seen here either. It looks absolutely super.

CDR Very good.

00 15 15 26 CDR Okay, Bob - or Gordo, I've got H₂ HEATERS 1 and 2, OFF, now.

CC Roger, Gene.

00 15 16 54 CDR Hello, Houston; America.

CC Go ahead, America.

CDR Okay, Gordo. I'm looking over the Flight Plan today. We'll be with you with the postsleep checklist, and primarily it looks like a P23 day for Ron. And what we'd primarily like to do is spend a good part of that time getting the spacecraft cleaned up, reshuffled, restowed a little bit, and get it in order for the next few days ahead. It doesn't look like today's that big of a day.

CC Okay. Geno, I might give you some words on what we have in mind to get the GET back in sync here, if - if you want to hear those while you're looking through the upcoming hours.

CDR Yes, why don't you - why don't you pass a few words on that?

CC Okay. The plan we're considering, and we're offering it to you now for your opinion, is at 65 hours GET, we'll update, and at the time the clock goes to 65, we'll update it 2 hours and 40 minutes to 67:40. And we're shaping your trajectory such that you'll arrive at the Moon at the same time G.m.t. as you would have had you launched on time. In other words, your translunar time is 2 hours and 40 minutes less. So once we do that, we'll be back with all the right times in the Flight Plan without any updating. And the one thing we think of is that your next day will, which is now a 16-hour day, will shorten to a 13-hour and 20-minute day. But that's about the only real effect we can see. How does that sound?

CDR Yes, we - we'll get to the Moon, you say, the same G.m.t., so all our sunrise, sunset, lunar-orbit activities, and Sun angle at landing will be the same. And let me - I'll - It sounds pretty good, Gordo. I just want to take a look at that day that you're shortening and see what we're doing in there.

CC Okay. It doesn't cut out anything. In fact, we picked a time that's pretty much dead time as far as the Flight Plan goes. Take a look, and we'll talk about it later.

CDR Okay.

LMP Good morning, Gordy. This is Jack.

CC Good morning, Jack.

LMP Let me fill my square on the postsleep checklist. I've got 24030, PRD.

CC Okay.

LMP And I slept in and out - probably totaled about 4 hours in that last period. But I feel pretty good in spite of that, and expect now that I've educated myself on how to sleep, that it'll pick up the next time around.

Tape 13/4

CC Roger.

LMP No medication yet, but I'm considering a couple of aspirin. I'll let you know if I take them.

CC Roger.

LMP And, fluids? Let's see, I guess I've had two of your little water-measurement-containers-full so far, plus the meal I had in my pocket. And I'll catch up on - I think I'm a little dehydrated. I'll catch up on fluids with breakfast.

CC Okay.

LMP And my meal yesterday was the meal B in the pocket.

CC Roger. Meal B.

LMP And I guess consumables update. That's mainly yours.

CC Roger.

LMP There's plenty there. And I'll wait for your words on that. And the watch is wound.

CC Roger. Okay. Got the consumables update numbers, if you're ready to copy.

LMP Not quite, Gordy. I'll give you a buzz.

CC Okay. No hurry.

00 15 22 40 LMP Okay. The CMPs rad's, 1509.

CC Okay.

LMP 15019. 15019.

CC Roger.

LMP Gordy, this is Jack. How do you want to send the consumable - consumables information?

CC We were just discussing that here. Used to - in flights gone by, there was a place in the Flight Plan, a little form to fill out. But we're trying to figure out if there is such a place in the current data file. Do you know of one?

LMP Well, I'll tell you what I've got. I've got the consumables curves, and if there are any major changes to those curves, I guess you could give them to me, and I'll put them on as points.

CC There's no - -

CDR Hey, Jack.

CC - - changes at all.

LMP Okay. And why don't we just do it that way in the future in case there is anything. And that's on page 1-45 and subsequent in the Flight Plan Supplement.

CC Okay.

LMP Looks like you took good care of my space - my systems last night.

CC No troubles at all.

00 15 31 05 LMP Okay, Gordy. Your friendly medical officer up here has some more information for you. CMP, continuing, had about 3 hours of sleep, had - three cans of fluid - of water, that is. And he ate everything in meal B but the fruitcake, and he didn't use the brownies and the beverage in meal C.

CC Okay.

LMP Okay. And continuing, the CDRs PD - PRD is 17019. He had 3 hours of fair sleep, no medication, and 1-1/2 cans of water, and one-half a sandwich. The CMPs sleep was 3 hours. And I'll try to get more systematic as we go along here.

CC Okay.

Tape 13/6

CC Jack, we are assuming no - no medication on the
CMP. Is that right?

LMP That's affirm. We haven't gotten that kit out yet.

CC Okay.

00 16 00 33 LMP Gordy, this is Jack. Looks like the windows have
cleared up pretty well in PTC from the - ice
crystals, anyway, that were on window - window 1.
The hatch window still seems to have a film of
something on it. But, otherwise, they look pretty
good.

CC Okay, sounds good. Jack, while you're there, I
might try - we've been talking about consumable
updates and what would be the most meaningful way
to give you the information. As a trial, for
14 hours, with reference to the charts in the back
of the book, which in the case of - in case of all
of them, are listed in percentages except the RCS,
which is in pounds. On the cryo quantities, when
I take all the tank percentages and plot them, it
turns out that there's no real significant differ-
ence from the lines that are plotted on either
hydrogen or oxygen. On RCS, you're running about
3 percent ahead of the line. And if that's a sat-
isfactory way to put it, that's the way we'll give
you the - the updates rather than giving you every
tank percent by percent. Over.

LMP Okay, that's good. That's outstanding.

00 16 12 20 LMP MARK. Two aspirin for the LMP.

CC Roger, LMP.

CC Jack, next time the Surgeon would like a mark on
each individual aspirin.

LMP Well, I gave it to you since I swallowed them
both simultaneously.

CC Roger.

Tape 13/7

LMP I knew they wanted that, Gordy, and that's why I
only gave you one.

CC Okay.

LMP Would they rather have them go down one at a time?

00 16 14 06 CC I'll have to go back to the backroom on that.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 16 44 52 CC 17, Houston. We see the optics starting to stir there. You can go ahead with a P52, but before you do the P23, we have some updates to it.

CMP Hey, okay, Gordo. We'll do that.

CC 17, Houston. Can you confirm that you did change the LiOH canister before going to sleep last night?

CMP Well, we can confirm that we didn't. How about that?

CC Okay.

CMP We'll - Thanks - thanks for reminding us. We'll try that first thing this morning. I was just getting too tired, and the CO₂ didn't look quite that high last night, so I - -

CC Roger.

CMP - - I let it go.

CC Okay, that's - that's fine. We're not concerned about being late with it.

00 16 46 22 CMP Okay.

00 16 53 15 CMP Okay, Houston. That looks like a pretty good one that time. You note the star angle difference?

CC Roger. We copy.

CMP Okay (chuckle). I can't see squat out through that telescope. I just hope it lines it up and does the right thing. Okay. Those are the torquing angles, and you can let me know when you have them.

CC Okay. Stand by.

Tape 14/2

CMP The telescope is no different than any other time. There is just a lot of reflection from the lunar module. And even though everybody said that before, you don't quite believe it until you see it yourself.

CC Okay, Ron. You're clear to torque it.

CMP Okay. We'll torque it at 54 30.

CC Okay.

00 16 55 35 CC 17, Houston. When you - if you can find a stenographer, I got some dictation, some pads for you and also a Flight Plan update.

CMP Stand by 1, Gordon.

00 16 57 49 LMP Okay, Gordy.

CMP P37.

LMP Oh, okay. Stand by. Okay, Ron's ready to copy.

CMP P37 pad's first.

CC Okay. Okay, the P37 block data for 35 hours. Well, we've got 35, 45, 55, 65. GET ignition of 035:00. DELTA-V_T is 5326, minus 175, 081:39. For a GET of 045:00, 7728, minus 177, 081:18. For a GET of 055:00, 5859, minus 175, 105:30. GET of 065:00, 4703, minus 175, 129:40.

CMP Okay, I'll read that. Let's see, 35:00 at 5326, minus 175, and 81:39. At 45:00, 7728, minus 177, and 81:18. At 55:00, it's 5859, minus 175, 105:30. At 65:00, it's 4703, minus 175, and 129:40.

CC Okay, that's correct. I've got a maneuver pad for you. It's a flyby maneuver at a time of 81 hours, which is 5 hours prior to LOI. This is required because you're presently on an impacting trajectory. And this is assuming you wouldn't do midcourse 2. Midcourse 2 will put you on a - on the proper trajectory. If you can get a maneuver pad out, I'll give it to you.

LMP Okay. That's in work.

00 17 02 23 CMP Okay, Houston. This is 17. Ready for the flyby pad.

CC Okay, Ron. We were just watching your roll angle. You're going to - we're going to be updating the optics cal attitude. And the roll will be 164, and you're coming up on that. Maybe you want to stop the PTC near that roll angle.

CMP Hey, that's a good idea.

LMP Gordy ...

LMP Gordy, did you read Jack?

CC Loud and clear, Jack.

LMP I can take the pad, if you want to while Ron stops PTC.

CC Okay. Why don't I give you the update to the Flight Plan, since that'll give you the new attitude and also the - change in the star for the P23. And then Ron can get on with that. The pad we can get after that.

LMP Go ahead.

CC Okay. Turn to 17 hours in the Flight Plan, page 18.

LMP Go ahead.

CC Okay. The "VERB 49 maneuver to optics cal attitude" right at the top of the page. Cross out the attitude numbers and replace them with "Roll 164, pitch 301, and yaw 348 at a high-gain pitch angle of minus 48 and a yaw of 315." Over.

LMP Okay; 164, 301, 348, minus 48, and 315.

CC That's correct. Now go down a few lines to the sighting attitude at - one's at 17 hours and 15 minutes. And cross out that attitude and the high-gain pitch angle and change to a "Roll of 196, pitch 304, and yaw 348." High-gain pitch is minus 61, and the yaw remains the same, 357. Over.

Tape 14/4

LMP Okay, 196, 304, 348, minus 61.

CC That's correct. And now, on the first star of P23, we're going to change the star, so cross out - replace the NOUN 70 numbers with star 21. That would be three balls 21. And delete the NOUN 88 and the vector numbers there.

00 17 06 25 LMP Okay, start 21 and no NOUN 88s.

CC Right. And over on the right where it says "Merak," you can write in "Alphard." That's what 21 is.

LMP Okay.

CC Okay. Now down on the next page, at 18 hours 20 minutes, where it says "Optics calibration attitude." We got to put in the same thing as - the same change as above. We want, instead of "175, 298, 330," change that to "164, 301, and 348. High gain of minus 48 and 315." Over.

LMP Okay, 164, 301, 348, minus 48, 315. Over.

CC Okay. Now, about 10 lines down, delete "Charge battery A." We're going to leave battery A charged for a while longer, since we used up so much of it on the pad last night.

LMP Okay. Delete "Battery charge A," and you want to leave it on B.

CC Yes. Right. Flip the page. Might as well clean up all of these checklist changes. At 19 hours 40 minutes, change "Magazine Kilo Kilo" to "Magazine November November."

LMP Okay. That's done.

CC And then skip a few pages to 24 hours and 30 minutes.

LMP Go ahead.

CC And just above the "CSM Systems Checklist" call-out there, write in "Charge battery A."

LMP Okay, I got you.

CC And we'll be leaving it on battery A all night long. Okay, that's all the Flight Plan changes. I've got that flyby pad when you're ready.

LMP Okay, I'm all set.

00 17 09 12 CC Okay. Purpose is flyby, SPS/G&N. The weight is 66839; plus 1.21, minus .02 - correction, the yaw trim is a minus 0.12. Ignition time is 081:17:21.03. NOUN 81 is a plus 0091.1, plus 0204.1, plus 0459.3. Attitude is 121, 153, and 321. Apogee is NA; perigee, plus 0021.2. DELTA-V total of 0510.8, 1:17, 0506.3. Sextant star: 26, 096.5, 33.9. Bore-sight star is NA; NOUN 61, plus 15.57, minus 175.00; 1099.9, 362.43; and GET of 0.05G is 153:24:11. PTC align stars are Sirius and Rigel; 256, 152, 069. Ullage is none. And for remarks: number 1 is "Burn docked;" number 2 assumes PTC REFSMMAT; number 3, LM weight, 36281; and number 4 is "Assumes no Midcourse 2." Over.

00 17 12 45 LMP Okay, Gordy. You read that?

CC I haven't heard anything since I finished the pad, Jack.

LMP Okay. I'll push the other button then. Okay, your readback: Flyby, SPS/G&N; 66839; plus 1.21, minus 0.12; 081:17:21.03; plus 0091.1, plus 0204.1, plus 0459.3; 121, 153, 321; H_A is NA, plus 0021.0; 0510.8, 1:17, 0506.3; 26, 096.5, 33.9. Bore-sight star is NA; plus 15.57; minus 175.00; 1099.9, 362.43; 153:24:11. Sirius and Rigel; 256, 152, 069. No ullage. Remarks: 1, burn docked; 2, PTC REFSMMAT assumed; 3, LM weight, 36281; and 4, assumes no midcourse 2.

CC Okay. One correction on perigee of NOUN 44. That's a plus 0021.2.

LMP Okay; 0021.2 plus.

Tape 14/6

CC And one additional remark. This results in a 187-mile perigee - perilune.

LMP Okay. I got that.

00 17 15 16 CC Okay. For general information, we're planning midcourse 2 tomorrow at about 35:30, and it should be about 10 feet per second.

LMP Okay. Strangely enough, that's even scheduled at 35:30.

CC Roger.

CC I have one reminder to open the WASTE STOWAGE VENT valve as shown on the - at 17 hours there.

LMP Oh, okay. We were just going back to clean up. I think we owe you a LiOH canister change, too.

00 17 16 25 CC Roger. We concur with changing it.

00 17 20 15 CMP And, Houston. Apollo 17 will maneuver to the optics calibration attitude now.

CC Okeydoke.

CMP It's funny eating potato soup, and all the soup is all around the outside of the bag. And you get a little hole right down through the middle of it.

CC How about that?

CMP It's just like in one g. The spoon isn't quite long enough to reach the bottom without getting your fingers on the side of the bowl.

00 17 21 09 CC Roger.

00 17 24 11 LMP Gordy, I don't know what your weather is like down there, but from here it looks like you're probably overcast today. Might even have a pretty good storm going.

CC Well, it's gray and cold and a little rain, so your - your call is correct.

LMP Yes, it looks like Mexico, in general, is pretty nice, although there is a band of east-west trending clouds that start from the Gulf of California, cross Sonora and probably up through New Mexico, and over into Texas as far around as I can see. Southern California looks like it's in pretty good shape today, but northern California looks like it's probably overcast. And a major system probably associated with that that stretches into the northern western United States. But a band of clear weather looks like it stretches from Arizona right on up through, I would guess it - through Colorado and Kansas and probably into the Midwest pretty well.

CC Roger. You're a regular human weather satellite.

LMP If Ron would just stop his maneuvers I'd tell you some more, but the Earth just set behind the LM.

CC Roger.

LMP More specifically, it set behind the Rover, which may be a space first. Pretty impressive storm system down off the west coast of Antarctica.

00 17 26 27 CC Roger.

00 17 27 40 LMP And, Houston. The canister has been changed. Number 3 is in A as per the earlier Flight Plan instructions.

CC Okay.

LMP Sorry we were late, but we got a little tired last night.

00 17 28 57 CC Jack, Houston. We'd like you to go ahead and get that WASTE STOWAGE VENT open now, so we can keep to the schedule on cabin enrichment.

LMP Okay; Ron is getting that. Keep nagging.

Tape 14/8

00 17 29 13 CC Thank you.

00 17 35 59 CMP That the same as I had before?

CMP Hey, that looks like a pretty good optics cal right there. That's three times. Okay. No, that's not very good.

CC Ron, we're copying your comments.

CMP Okay. Think we'll use that one there for the optics cal.

CC Roger.

00 17 37 07 CMP Okay. Let's go to the old sighting attitude. Well, let's put the other thing in there first.

00 17 41 07 CMP Yes. That's a pretty good VERB 49. I got the - got an orange Earth in the sextant. Let me put up the old EMP now. If you all don't need all that light in there, Jack, I could sure - Like the window shade might help a little bit, really. Not - not very much. Okay. Address 304, we want 06. Address 305, 24 44; 306, 60 06 ENTER; 307 was 77. Okay, at address 310, we want 15 62 ENTER; 311, we want a 52 05 ENTER; 330, we'll VERB 30 37. VERB 25 NOUN 26 ENTER 1. Okay. R-2 is a 44 ENTER. R-3 is a 140 - 5. Okay, ENTER that. Now, we're ready to go on the first star here; 7 ENTER; 23 ENTER. ... we don't want to do an optics cal. No, we don't want to do that. ENTER. Okay, first star is 21. ENTER. I am going to use the ... 110 ENTER. PROCEED. Son of a gun. Okay, we don't want to do the 180 option, so ENTER that one; 19630 ... getting pretty close. Okay. PROCEED.

LMP ... mike ...

00 17 44 27 CMP Okay, we're CMC OPTICS ZERO's OFF and ... Now let's see if we can see the old star in there.

LMP Gordy, this is Jack. You guys did a good job fixing that MAS - MASTER ALARM problem. What did you do?

CC Jack, did you call?

LMP I was wondering what you did to fix the MASTER ALARM problem.

CC Let me check and see.

CMP (Laughter) Yes, I've got to find the subsolar point. A little bit of an error looks like. Let me see, we'll fix it down a little bit. That really jars us back, doesn't it?

CC Jack, I guess all we've done is wish it away. Actually, we think it's still there, and you may - you may get them here later after the waste stowage vent - O₂ flow gets on up.

00 17 46 13 LMP Okay, but those were associated with the accumulator as I recall. Yes, the random ones is the ones I was interested in. They just seemed to stop. Of course, we haven't been moving switches on 2, but we were getting them without doing that also.

CMP Okay, there's the old star. Works just like the simulator; you can't see the star when it goes down in the Earth.

CC It's still being worked on, Jack. Though we don't have any real concrete story to give you on it yet.

LMP Okay, it seemed to be pretty quiet last night, so that's the only problem. Okay. Gene, you want to give me CMC FREE?

00 17 47 05 CDR Okay.

00 17 49 42 CMP Let's see. 379, okay. That's not too bad. ... There it is; ENTER. Release 23; ENTER.

00 17 51 32 CMP Okay.

00 17 53 05 CMP Yes, I don't know what - what's -

00 17 53 42 CMP Okay, those would punch a hole in it.

Tape 14/10

00 17 55 22 CMP I think that's five on that star. Do you concur that that's five on that star, Houston?

CC Stand by. Let me check.

00 17 55 38 CMP I think it was. I'll take another one just in case.

00 17 56 15 CMP Okay, Gene. CMC AUTO.

CDR Roger.

CMP Okay, Betelgeuse. All right. That's all right; don't move.

00 17 57 11 CMP 20. Okay. Earth's far horizon; 25 ENTER. Plus 02745 ENTER. Plus 99128; 28 ENTER. Plus 12885 - 1288 - 5 - 2885. Okay. Hit. It's okay; want the 180 option, no? Computer ... Betelgeuse. Okay, that's Earth's far horizon.

00 17 58 30 CMP Punch a hole in them. Yes. Good. Okay, as soon as we're there - Okay. Set the old ... at the substellar point. Okay, it's the far horizon, the double line is down in the - down in the Earth. Shaft 280; okay. Reach up a little bit here.

00 17 59 55 CMP Okay. Didn't do such a hot job of putting them on there. You want to go to CMC FREE. Okay. Give it a flip that way and a flip thataway and a yaw that way, two yaws that way.

00 18 01 46 CMP (Singing)

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 18 03 09 SC Oh! ...

SC Yes. That was a good ...

LMP Gordy, this is LMP.

LMP Hello, Houston; 17. Are you reading?

CC Go ahead, Jack.

LMP Yes, you got any news today - to read up to us?

CC Well, yes. As a matter of fact, we have a little bit made up here. I guess along the personal line, we checked with Barbara and Jan and the kids, and they're all back home safe and sound and they mentioned that they're going into their own personal quarantine period, glued to the squawk box. Over.

CDR Okay.

CMP I was afraid you were going to get too personal there, for a minute. (Laughter)

CC I'll run down a few quick summaries of this morning's news. Former President Harry Truman has rallied slightly, despite his weakened heart and labored breathing. His doctors report that their main worry is whether his heart is strong enough to withstand the strain, the physical strain of 88 years. Despite the slight rally, Truman's condition is still considered critical. In Paris, Henry Kissinger met with Hanoi's Le Duc Tho for 4 hours yesterday in planned secret talks. Paris newspapers report an imminent cease-fire, but neither Kissinger or Tho indicate that this is true. After the 4-hour talks, Kissinger shook hands; and ... - got a little typo error here - but neither representative made any comment concerning their meeting. At Camp David, Maryland, President Nixon's press secretary, Ron L. Ziegler, said that Kissinger and Nixon are in close communication by cable concerning the secret peace talks. But Ziegler declined to provide more

Tape 15/2

information about progress in the talks. President Nixon selected Claude S. Brinegar, a California oil executive and a doctor of economics, to be Secretary of Transportation succeeding John A. Volpe. Volpe will become the U.S. ambassador to Italy. Here's one concerning last night's launch. Mrs. Spiro Agnew reportedly made a wish on a falling star just before the delayed launch of Apollo 17. Sitting beside her at the VIP viewing site was Barbara Cernan, who said that she was nervous when the lift-off was postponed. She added, "But Al Bean was there with me. He said not to be concerned." Mrs. Cernan was accompanied by her daughter, Tracy, and her mother, Mrs. Jackie Ashley. Mrs. Ron Evans, who saw the launch with her children, Jamie and John, said that she was never worried because everybody knew what they were doing.

SC (Laughter)

00 18 07 36 CDR Good summary, Gordo. We thank you, and our best wishes for the return to health of Mr. Truman.

CC Roger.

CDR Gordo, we were figuring up here that we probably launched on the 6th of December in Houston and on the 7th of December in Florida.

CC That's right. You called it right.

CMP Okay, CMC AUTO there, Gene, please.

SC Oh, boy.

00 18 09 04 CMP Okay, let's use the VERB 23, ENTER. Oh, what did I do there. ENTER, let's see, is a 110. There, okay. VERB 25 - ENTER. Oh, Gamma Prime Leonis. (Coughing) Okay, minus 8490 - 84900, I mean; plus 40299, plus 40299, ENTER; plus 34176, plus - 76, ENTER; okay, proceed. 202 ... 18, okay. There already. ... I guess. We'll try that one more time. ... CMC, AUTO? 196306, ...

LMP Gordy, you still there?

CMP Okay; that's right.

CC Go ahead, Jack.

LMP I mentioned to Bob yesterday how - when we moved away from the Earth - how fragile a piece of blue it looked to be, and that impression certainly grows the farther you get from it. I wish everybody could have a chance to get that impression. Things might go a little easier for us.

CC Roger.

CMP Okay, Gene, ... CMC FREE?

CMP (Singing) ... must be making the vector worse and worse instead of better. (Laughter) Well, it was on the substellar point that time except it was halfway through the Earth almost. Not really.

00 18 12 41 CMP Hey, Gordy, we haven't really had a clear and detailed description of what you or somebody else saw at the launch, in terms of the lighting around the countryside, the state of the flame, and how long the - exhaust was under the S-IC. Do you have anything to add to that?

CC Well, I can give you my feelings, anyway. It was a spectacular sight, and no doubt about it. I'd say the level of illumination would have made it easy to - to read a newspaper or anything like that from my vantage point near the VAB. The - the plume itself actually looked no larger or - or even any brighter, really, except in contrast, than it does on a day launch by comparison. But - well, the effect, I guess, was about what I expected just trying to extrapolate previous launches into a nighttime situation. The weather was very clear. That was one advantage gained by delaying the launch the 2 hours and 40 minutes that you did. By that time, there were very few clouds around at all. And we could see a brilliant flash there when the first stage cut off and the second stage ignited. And I lost you visually probably, oh, 4 to 5 minutes into the second stage, as best I can remember. Part of the problem was the brightness of the plume during the first stage, it kind of burned a spot on my eye; and so then I was - had reduced efficiency at looking for a small

Tape 15/4

point of light from there on out. Stu's here with me and he was watching it, too. I'll see if he has anything to add.

CMP Stu who?

CC He said after that comment he has no comment.

00 18 15 26 CMP (Laughter) I'm sorry, Stu. I can't believe that; Stu always has something to add. (Singing) Houston, in case you just noticed, I forgot the VERB 67 until just now. Although, in reality, all we're trying to do here is get a DELTA-H measurement anyhow. And, Houston, do you have any feel yet for what the DELTA-H is - line has been?

00 18 16 14 CC Stand by, Ron.

SC ...

CC Ron, this is Houston. We're not going to be able to give you a handle on the DELTA-H until we have a chance to take all the data and reduce it and work it around a little.

CMP Okay, that's mighty fine.

CMP Okay, Geno, CMC AUTO? Let's see what's on this star here. Kalinan [sic] - Menkalinan, I guess. Okay, Earth far horizon; 23, ENTER 120, ENTER, 25 ENTER ... (Coughing) (Singing) Plus - 7073 ENTER, plus 70644 ENTER. Okay, that is the unit vector of the star.

00 18 22 14 CMP Okay, it's a 180 option we don't want. ... the real option. (Laughter) I guess they're getting - Houston, you must be getting all the good data without the high gain, huh?

CC That's affirmative, Ron.

CMP Okay; let's ENTER that.

CMP Okay, Gene, you go CMC FREE now? Yes, that's about a half a sextant diameter above the - above the horizon. Substellar point looks pretty good, though.

00 18 25 51 CMP Hey, guys, -

00 18 30 54 CMP - Yes, not yet.

00 18 31 11 CMP Yes, it's on there.

00 18 36 47 CMP 30 ENTER - oops! CMC AUTO ... Now, last star.
What was that? I'm going to go back to the calibration attitude.

00 18 38 04 CMP Okay, CMC auto engaged, and away we go.

CMP Hey, we ... the waste water, too - to 10 percent.

00 18 38 37 CMP 164, 301, and 318 - that's the optics calibration attitude that we want to start with. Put the ... line of sight mark on star 22. Also the optics line of sight, with optics zero. Let's see, I'll ... the optics, I guess first.

00 18 45 43 CMP Okay, Houston, looks like optics calibration here is 89 995. I get that half the time and 997 the rest. So (laughter) we'll use 995, I guess.

CC Roger.

LMP Okay, Houston, you ready for some purges and dumps?

CC Let me make sure here. We're standing by.

LMP Okay. I'll get going on the O₂ purges on the fuel cell.

CC Okay.

00 18 49 28 LMP Well, I had my clock on the wrong scale. Is that about 2 minutes, Houston?

CC That's good, Jack.

CC Did you copy that, Jack? They said that was fine.

LMP Yes, sir, Stu; I copied that. How are you?

CC Okay; swinging.

LMP That's good to hear.

Tape 15/6

CC Sure am enjoying your descriptions.

LMP Well, if I could get Ron off his - work with the optics, we'd look at the Earth some more. But that will come. Right now I'm seeing all sorts of little ice crystals of various composition, (laughter) that are moving around, and every one of them bounces off the LM that I can see. No, none of them stick. I noticed that some of them will go into a corner with a fairly high velocity and either be turned around by a double bounce, or just get lodged in the corner and have very low velocity when they come out.

CC Roger.

LMP Most of them look like they have at least a foot or 2 per second.

CC Roger.

CC Hey, Jack, I was surprised when you said when you got Ron off the optics. Don't tell me that Ron is going to let you look through his optics.

LMP Oh, heavens no! We just move the windows.
(Laughter)

CC (Laughter) Okay.

00 18 52 02 CMP That's for sure.

LMP Stu, apparently you get - do get some particle/particle collisions, because some of the trajectories are back towards us.

CC Okay; we're waiting for the explanation of that.

LMP Well, I think it's because the particles and - some of them, you know, are bouncing off the LM and get out into the stream, which normally would have no collisions. How's that? You can say it's not very good. I don't care.

00 18 53 20 CC Got to use tact here.

00 18 55 40 CC You can terminate the purge on fuel cell 3 - O₂.

CMP Yes. I even forgot to listen for the ding on that one. Thank you.

00 18 57 58 CC 17, we'll be having a communications handover to Honeysuckle in about a minute and a half.

CDR Okay, Gordo.

LMP That's great. Next time I look at the Earth, I'll see what's happening in Australia.

00 19 00 51 CDR Okay, Houston. We're starting our waste water dump.

CC Okay.

CDR Wish us luck. Wish us luck.

CMP Hey, that really goes out!

CC Can you give us POO and ACCEPT? And we'll give you a new state vector.

00 19 01 33 CMP Probably need one after all those ... Okay, you've got POO and ACCEPT.

CC Roger.

00 19 03 38 CC Okay, the vector's in there. It's your computer.

00 19 03 44 CDR Okay, Gordo. Thank you.

00 19 09 51 LMP Houston, you going to want to cycle some film here?

CC That's affirm. We're planning on it. Let me make sure they're ready, though, before you do it.

LMP Well, I didn't want to bring it up, but you're about - 20 minutes late on your cue.

CC You must have missed our first call.

00 19 10 34 LMP I probably did.

00 19 12 21 CC Jack, we're ready for the pan and mapping camera film cycling. You haven't started into the procedure yet, is that correct?

Tape 15/8

LMP No, not yet.

CC Okay, at your convenience, we're ready to - watch you do it.

LMP Okay. And were those last high gain - I guess they're still good, huh? You want the high gain on it?

CC Okay; we'd like you to use PITCH at minus 50 and YAW 320 and acquire the high gain.

LMP Okay, will do.

CC You have 10 percent waste water now. You can terminate the dump.

00 19 14 12 LMP Okay. We're just about there.

00 19 15 07 CMP Okay, the old IMAGE MOTION is OFF.

CC Roger.

00 19 15 13 LMP DATA SYSTEMS are going ON. AUX TV is going to SCIENTIFIC.

CC Jack, we'd like AUTO and NARROW on the HIGH GAIN.

00 19 15 38 LMP There you go. Okay?

CC Thank you.

00 19 15 52 CMP Okay. SM/AC POWER is coming ON. MAPPING CAMERA is going to STANDBY; talkback's gray. PAN MODE is verified in STANDBY. PAN CAMERA MODE? Yes. Okay. PAN CAMERA is going to POWER - now. Barber pole ...

CDR Okay, the PAN CAMERA just went to POWER. Okay, Ron's talking to you. Didn't know that.

CC Roger.

00 19 16 40 CMP PAN CAMERA SELF TEST has gone to HEATERS.

CDR High bit rate. Okay; waiting your cue, Gordy.

CC Okay, stand by.

CC Okay, Ron, we're ready for the film cycling.

00 19 17 45 CMP Okay, MAPPING Camera is going ON.

00 19 18 15 CMP Okay, PAN CAMERA SELF TEST is going to SELF TEST. That makes barberpole. Okay, I forgot to time it, yes.

00 19 19 08 CMP Okay, talkback went gray on the PAN CAMERA.

CC Roger.

00 19 19 27 CMP Okay, PAN CAMERA POWER is OFF.

00 19 19 54 CMP Okay, MAPPING CAMERA is going OFF.

00 19 20 34 CMP Okay. SM/AC POWER is coming OFF, huh?

LMP Okay, Houston. Film cycling is complete.

CC Okay. It looked real good on both cameras.

LMP Very good.

00 19 23 49 LMP Okay, Gordy. If your friends there on your left are wondering what strange sounds they're hearing, I just got the harness on.

CC Roger.

CDR And, then, I guess if you're through with the high gain, I'll go back to OMNI Bravo.

CC Okay. We concur with that idea.

LMP And if I could ever get Ron out of the kitchen, we'd get into PTC.

CC Jack, you'll be glad to know your heart is beating normally. We have a good signal.

00 19 25 07 LMP Just so long as it's beating, Gordy. About 20 hours ago, I wasn't so sure.

00 19 27 06 CDR Gordo, (cough) we're maneuvering to the PTC attitude now.

CC Okay.

Tape 15/10

00 19 29 20 CMP Houston, Apollo 17. Any recommended quads for damping the PTC rates?

CC Stand by on that, Ron. We'll give it to you in a minute.

CC Ron, we're recommending AB for damping and Bravo Delta for roll spinup. I'll say again. Alpha Bravo for damping and Bravo Delta for roll spinup.

CMP Okay, Robert, and welcome back aboard.

CC Roger, sir.

CMP You know, this eating in zero g is not so bad if you keep your bags right side up. If you keep them that way, you get the right perspective. It's sure something funny, if you turn the bag upside down, and it still doesn't fall out, you know.

CC Roger.

00 19 31 41 CMP Having a little peach ambrosia for a snack here.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 19 51 52 CC 17, the rates are looking good. They're damped adequately. We're ready for spinup.

CDR Okay, Bob.

00 19 54 23 CDR Okay, Gordo. We're in PTC. Or, Bob, I guess you're down there now.

CC Roger, Gene.

00 19 55 20 LMP Bob, did you ever find out what part of Antarctica we were seeing at various Earth orientations?

CC Jack, I've - I tried that this afternoon, and I couldn't get hold of anybody, and I looked on a map for a while, and I - I'm not sure where Little America was. I can't truthfully say I did it - get it. I'll keep looking at it.

LMP Okay. I - at any rate, it looks like there's a very well-developed front coming out of the north-western portion of Antarctic ice shelf. And - and it - let's see here. Well, stand by 1.

CC Roger.

LMP Have to change windows.

00 19 58 25 LMP Okay, Bob. That front looks like it starts and develops as a small - it - it actually seems to start with an anticyclone development off the coast of Antarctica. Moves up across New Zealand. Looks like the South Island primarily, a little bit of the North Island is still visible and into the eastern coast of Australia. And I'll give you a spot where it intersects and crosses the whole of Australia. However, it - it breaks up and is not very well formed, once it gets inland away from the coast. I see no well-developed waves on it at this time, so it's hard to say how strong it is. There might be one developing just to the south of New Zealand or right off the coast of New Zealand.

Tape 16/2

CC Roger. I copy that, Jack.

LMP There at least is some sinusoidal motion or appearance to the front ... And you'll have to wait, because I lost it again.

CC Roger.

00 20 00 05 LMP I took two 5 - 50-millimeter pictures. Mag November November is on 132.

CC Roger. November November on 132. Those are pictures of the - -

LMP And that was the -

CC Jack, Houston. Was that - were those pictures of those fronts you are talking about?

00 20 02 59 LMP Bob, I got our orbital map out now, and that front is going off across to the coast of Australia north of Sidney and largely a little south of Brisbane and - and swings across the whole of Australia and seems to come - near as I can tell, go by into the Indian Ocean about - well, where the Great Sandy Desert intersects the northwestern coast of Australia.

CC Roger, Jack.

00 20 07 02 CC 17, I've got a Flight Plan update here.

LMP Stand by, please.

CC Roger. It's just a short one. One item to change.

LMP Well, if you saw my hands right now (laughter), you'd know why I said wait 1.

CC Understand. I'm just - just waiting for your call. Just didn't want you to think we're going to give you a whole rafter of it.

LMP Oh, we know you wouldn't do that.

CC If you're eating, Jack, just go ahead and eat. This is nothing that can - we can just wait, and any time, just go ahead.

LMP Yes, I'm not panicking.

00 20 09 00 LMP Okay, Bob. Go with the update, and LM/CM DELTA-P at 20 ... 09.

CC Want you to know, Jack, we just cut out by the antenna switching. Say again the LM/CM DELTA-P.

LMP Okay, 0.6 at 20 plus 09.

CC Roger. Okay. My update is just simply on the botton of page 3-23 at 2300 hours in the Flight Plan or 23 hours in the Flight Plan. "WASTE STOWAGE VENT valve, CLOSED." Just delete that one, and move it over to 24:30. That's because you got started late on that.

LMP Okay. You could've just said, move it.

CC Okay. Just change it down to 24:30.

LMP 24:30.

00 20 11 48 LMP Okay. Bob - about revision one on my previous discussion of the weather around Australia. That front does cross. Probably Brisbane is probably cloudy. It does cross about that area, and - however, there is a bank of clouds that runs off of it down the coastline. So Sidney is either cloudy or has some pretty nice clouds off - off shore. And the remnants of the front as it dissipates in the hinterland of Australia dies out at about the Great Sandy Desert, and there is not a good indication that it crosses into the Ind - Indian Ocean. But we're getting over near the LM, and that's a little hard to tell.

CC Roger.

LMP Now, it - more - looks more and more like the cyclone circulation developing right over the top of New Zealand; the South Island, I think. And now I'm looking with the binoc, and as much at

Tape 16/4

anticyclone circulation is centered on the ice shelf. And I think that - well, I just don't know. I think that's the Ross Ice Shelf, but I'm not sure, off Antarctic. And the clouds from that circulation do extend over the ice shelf and barely into the Antarctic con - continent.

CC Roger, Jack.

00 20 13 46 LMP Now to the north of Antarctica. Let's see now. I ought to give you a better orientation than that. But, anyway, there is a large cyclone circulation pattern that has its southern extremity right on the edge of the ice shelf. And that - that is east by 20 or 30 degrees of longitude of the front that I just was discussing. By the way, that front intersects Antarctica.

CC Roger, Jack.

00 20 16 21 LMP Between New Zealand and Australia, the front I was discussing previously has some fairly strong transverse cloud patterns. It's hard to say whether they're high cirrus or not. But the clear area to the south of the front suggests that maybe the jet stream is roughly paralleling that front in that area.

CC Roger. I'd have to look up and see - -

LMP If I had to guess, I'd -

CC - - if they do have any jet stream down there right now.

LMP I - if I had to guess, if you were flying - west from Sidney this afternoon, you'd have a pretty strong tailwind behind you, Bob.

CC Roger.

LMP Let's see, did I get that right?

LMP Would you believe a headwind?

CC Okay. I'll believe that.

LMP But the bulk of Australia is very clear, all the south and the north. It's just that one line of - of clouds that crosses the center section.

CC Roger.

00 20 18 45 LMP That put all the major cities of the south, Perth and Adelaide, at least, and Melbourne, certainly in the clear. And in the North Darwin, in those areas, are very nicely clear today.

CC Roger. I hope we can get this out to them and let them know that you're watching and tell them how good the weather is.

LMP Oh, that's all right. I'm just having fun, Bob.

CC Understand. I imagine they'd appreciate it though.

00 20 34 06 LMP Bob, I tried to pick out the Hawaiian Islands on that last little turn here through window 5. And I can't say that I did. I think I've got them - the area spotted. It looks like they might be under some fairly heavy cloud cover today. I do not see the islands. I'm not sure I could, if it was clear.

CC Roger. Hey, Jack, I got some answers to your question from last night on where Little America is with respect to - on Antarctica.

LMP Go ahead.

CC There's a - inden - indentation that looks like a gulf that's called the Ross Sea, and on the north-west edge of the Ross Sea is Little America. That's the location of it.

LMP Okay. And that would be the coast of Antarctica that sort of faces New Zealand and Australia. Is that correct?

CC Negative. According to the map I've got, it's - the Ross Sea looks like it would be more facing up towards the South America area. It's actually kind of facing up sort of the middle between Australia and South America, Jack.

Tape 16/6

LMP Okay, Bob. You cut out, and I presume you meant that - the Ross Sea was facing north - sort of the Pacific between South America and Australia?

CC That's affirmative, Jack. It's a very sharp indentation or sea or gulf onto the Antarctic.

LMP Okay. I think I know the area you mean, and I'll check it out again when it comes by.

CC Okay. That's Little America on that west-northwest edge of that Ross Sea. That's where Little America is.

LMP Yes, all that - those names are familiar. I just had forgotten my geography. I'll see if I can recognize them.

00 20 50 13 LMP Okay, Bob, checking on the Ross Sea, and if I've got her pegged right, it's got a fair amount of open water in it this time of year.

CC Roger.

LMP Although it's completely surrounded, I think, completely surrounded, I think by portions of the icepack. And off to the west of there, it looks like there's an area that might be - clear of snow, and - does my memory serve me correctly, that that's where McMurdo Sound is, and some of the dry valleys?

CC I believe so. That's the Little America area right now, all that general vicinity, Jack.

LMP Okay. It looks like the prime recovery area and the Samoa Island region is clear, and my guess would be from the fairly subdued zero phase point, that they might have fairly nice seas out there. The boys on the Ticonderoga are probably enjoying themselves immensely, I hope.

CC Roger.

LMP Indonesia looks like it's having a nice day, with the possible exception of the region over just north of Australia. New Guinea and that area they - some clouds in there. I can't tell whether they are high or low clouds though. They look like they're probably fairly high clouds. But north of New Guinea, there's a strong concentration of clouds. Although small, it looks fairly dense like there might be a little tropical depression in that area.

CC Roger.

LMP The folks in Carnarvon ought to be enjoying a very nice day.

00 20 53 31 LMP I've been trying to spot tropical storm Teresa, which is - a couple of days ago was in the Philippines. But I can't - I don't think I quite have that visible to me right now.

CC Roger, Jack. Say, you might want to put something in the back of your mind here a minute. We made a run of the DSE recording just now of the TLI to get an idea of the quality of the DSE recording, and Gene came through loud and clear. Ron was very weak and almost unreadable, and we never caught you, Jack, in there. We don't - maybe you weren't saying anything during TLI, but we never did catch anything you said.

LMP Okay. I don't recall talking too much during TLI.

CC Roger. Understand. Now Gene - Gene came through real loud and clear. So whatever technique he was using went on that tape real well.

00 20 55 48 CC Hey, Jack; Houston.

LMP Hello.

CC Hey, Jack. Just a couple more comments on that DSE. I think, as you well know, it's very critical on the position of your - of your boom there, and those areas that you're critical in, why, make sure that you've - you've really got those beauties up or you're talking right in - right into it. And

Tape 16/8

this - this really makes a difference, because the DSE - The volume is - is fairly low, and if you're muddled just the least bit, why, it - it's going to be difficult to pick it up. So talk slow, and - and get right up next to the mike, because I know you - you're doing it. Just some voices come across a little better than others.

LMP Roger, Stu. Thanks for the comments. As a matter of fact, you probably called it just right. I think during - once I got the helmet off, I loosened up my chinstrap, and my mike booms had moved away from my mouth some. And I'll keep that in mind. Thanks for the reminder.

CC Yes. It's - that's probably the most critical item is that - is the position of those, and this has been true of - in the past, and it just really makes a difference in - in that - being able to pick up the data off the voice.

LMP Roger. I've - Ron and I did some experimentation with that in the chamber, and couldn't agree more. But I sometimes don't remember it. Thank you.

CDR Well, Stu, I just - -

LMP I - I --

CDR - - thought I'd -

LMP Okay. Go ahead, Stu.

CC No, I was saying I was - I'm sure you - you're aware of that, but I think the fact that the volume is - is down just accentuates the - the problem.

LMP Okay. Gene had something he wanted to ask you.

CDR Stu, I - I just thought you'd like to be aware of it, as much time as we've all spent down at the cape, probably May is one of the nicest months down there. However, having had the opportunity to - to be up here during May, I find out that it's not nearly as nice up here.

Tape 16/9

CC Okay.

CDR And I'd like to - to thank all my friends for that.

00 20 58 04 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 21 10 24 LMP Bob, you with me?

CC Roger. We wouldn't go away, Jack. We're listening. Did you call?

LMP Well, I just - Yes, I almost lost a pass here, and just a couple more words about Australia. As a - as a general landmass, it's red. Very strong red hues, except for the north and eastern coasts, where that red gradually merges into a greenish-gray. It's as - as red as portions of - of northern Africa appeared to be yesterday.

CC Roger.

LMP Very striking color. It would be more of an orange-red, really, with brown subduing it. It's not - obviously not crimson or anything like that.

CC You think it's a function of Sun angle, Jack, or is it just - just a red like we see out in New Mexico area sometimes - some of the areas?

LMP Yes. No, it's not Sun angle, because that'll hold a good red color right - right in towards sunset or sunrise. It's - it's due primarily, I'm sure, like most desert areas, to the oxidation of the iron-bearing minerals in the sands and rocks in those regions.

CC Roger.

LMP Getting limonite and hematite. Little geology thrown in there, Bob. Sorry.

CC That's all right. Got to keep you warmed up for the next couple of days.

LMP Well, I think the Flight Plan will probably keep me warmed up, too.

CC Roger. We thought that time around T&D was just outstanding.

Tape 17/2

CDR Hey, Bob. We - I think we've pretty well got impressions from you down there on that - on that night launch. I might give you a few of mine.

CC Go ahead, Gene.

00 21 13 40 CC 17, Houston. Are you there? You're right on the edge, if you read me. We're getting a lot - You're right on the edge, if you read me. We're getting a lot of static. If you'll just hang on a minute, we'll be back into some calm air.

CC Gene, Houston. Go ahead.

00 21 14 54 CC 17, Houston.

CDR Go ahead.

CC We're just standing by for your comments you wanted to make. I think we lost comm there a minute. We're back with you.

00 21 15 05 CDR Okay, Bob. The entire boost itself was not unlike what you've heard and what Stu down there understands from the physical cues, and what have you. But the significant part of going at night is that as soon as we did have ignition down there in the bottom of the S-IC stack - even though I only have a little slit out of - out of the rendezvous window here, and Ron doesn't have much of a hole in the boost protective cover out of the hatch window, we could definitely confirm ignition because we could see the reflected light on out through in front of us. It was by no means blinding, of course; we had the cockpit pretty well lit up. We - as soon as we lifted off, that light immediately went behind us. We came into just S-IC staging, and I had an opportunity to say, "I told you so," to Jack and Ron. It was just like the great train wrecks of the past. I definitely could see the S-II ignite; and, then, of course, the - I could see the significance of the reflection through the window, besides all the other cues we had for ignition, very much like the S-IC lit up the windows on the stack. Tower jett was pretty spectacular. I could see - the entire boost protective cover and some flames from somewhere - I'm not sure - maybe it was through the hole in

the windows - but I could definitely see it. Of course, it disappeared in short order. When the S-II shut down, the delay time between shutdown there and the S-IVB igniting, the entire - the entire flame overtook us, and we literally through - flew through the S-II flame when the S-IVB ignited, if you can imagine that. It's very similar to the Titan staging, where you actually fly through the fireball on the S-II. And that's something you never see - none of those things you ever see quite that way in daylight. On the S-IV, I could see - Of course, once we got going, I couldn't see any light from that plume again, but we could see the APS firing all the way through the burn. And once we got in orbit, as other guys have seen, you could see the APS firing at night without any difficulty. One of the most significant things about TLI is the fact that we, of course, started at night and flew right on up and through a sunrise, which in itself was a pretty spectacular thing. But, when you do it during a TLI burn, it even adds a little bit of momentum to your effort.

00 21 18 25 CC

Roger, Gene. Any comment you might make on the possibility of picking up your yaw, if you'd lost your platform at that time - remember the discussion we had about the yaw in the late - like a Mode IV or something like that?

CDR

Yes, Bob. I not only will comment - I was aware of it, and I was looking for it. And during parts of the S-II and parts of the S-IVB burn, I even turned the lights down in the cockpit - in hopes that I could see stars out there; but I could not make out a one. Ron, I think, may have saw Saturn out the overhead hatch; but looking through the rendezvous window, during a boost phase and during a time-critical phase like a Mode II or Mode IV, I am very much afraid that we would not have been able to pick up that reference.

CC

Roger.

CDR

As I remember it, as low as I had the interior lights there for a period of time - and I didn't want to keep them that low, of course - to see if I could get adapted very fast because we were

Tape 17/4

in a dynamic phase of the burn. But my window just gave me a very deep purplish hue, a hue of which I could not, literally, see through to look to see any stars at all. Now, that may have been due to the very low intensity of our interior flood lights.

00 21 19 53 CC

Roger, Gene.

LMP

Bob, this is Jack. A little lay impression there. I think I - saw just about everything Gene was talking about - as far as his description - and felt like it was - although everything was an amazing experience, each one in itself, after each one was over, you could think back and say, "Yes, that's what other guys said it was like." The old Saturn V has got to be a pretty consistently performing vehicle. But - with the added night-time contrast, I think it made it probably the best ride any three guys have ever had.

CC

Roger.

CDR

Bob, I might add, that the S-I was, as usual, pretty shakey on lift-off. I saw all the maneuvers as I called them out - the yaw and small reverse roll. Going through max q, I got up to 25 percent; but my yaw attitude error was zero and my pitch attitude error probably wasn't even at - oh, certainly less than 2 degrees. After max q, she smoothed out by comparison quite a bit; and the S-II was a very quiet ride, a very smooth ride. However, you are always aware, due to just a little rumbling out in the S-IVB, that she was still burning for you. The S-IVB, I think, was just a continually - rumble but smooth or consistent ride, all the way through TLI.

CC

Roger.

00 21 22 06 LMP

Gee! I think one of the big things that impressed me was the - how instantaneous the decelerations were of each one of the boosters when they cut off. That included the S-IV TLI cut-off. No physical appreciation of tailoff at all.

LMP

And, Bob, from my rendez - from the right-hand rendezvous window when the tower jett occurred, there seemed to be a lot of burning particles

streaming away from it. I could not see - did not notice or remember seeing the actual cover or tower itself; but I - we were inside the cone of the burn and with a lot of streaming. It looked very much like a sky rocket - portion of one at any rate. Reminded me of the Fourth of July out in Silver City a few years ago.

CC Roger. Say, any time you got your Flight Plan handy, I've got a discussion here I'd like to run through with you on the - how we're going to recover those 2 hours and 40 minutes from the launch delay - and you'll need to copy it into the Flight Plan. And then just wanted - want you to be advised, we're not happy with the PTC. We get a half angle of about 17 degrees; and so sometime after the P52 coming up at 23:00, we'll want to do another PTC, or initiate PTC again.

00 21 24 05 CDR Well, that was the commander who initiated PTC, and I've already heard about that.

CMP (Laughter) You bet he has. Okay. We've got the Flight Plan here, Bob. Which part of it are you talking about ...?

00 21 24 17 CC Well, let's just talk some words here for a minute, and then I'll go through some specifics that you can just write down on a page because you don't want to do it until a little later. Okay, what we're going to set up here - You will arrive at lunar orbit at the same GMT time. The landing Sun angle - Sun elevation angle - and the camera settings and everything will be unchanged when you get to lunar orbit. To compensate for the 2 hour 40 minute late launch, we're going to hack 2 hours and 40 minutes out of the timeline. And we're going to - They'll be out of the TLC timeline - and we're going to do it in two groups. And this is where you might want to start copying now, Ron. Delete 1 hour from 46 to 47. From 46 to 47, we're just going to delete the activities that are presently scheduled at 46:30 to 47:00, you'll perform at 45 - move those to 45. Let me read that again. Delete 1 hour from 46:00 to 47:00. The activities that are listed at 46:30 to 47:00, perform at 45:00.

Tape 17/6

00 21 25 41 CMP Okay, Bob, looks like we delete 1 hour from 46 to 47 hours. And then the activities that are at 46:30, we'll do those at 45:00.

CC Roger, Ron. And then starting at 47, just take - just scratch 1 hour off of each time, just subtract 1 hour from each of those times up through 66 hours. Just subtract 1 hour from 47 up through 66.

CMP Okay, we can do that. Subtract 1 hour from 47 through 66 hours.

CC Okay. And then just for your information - you won't have to do it - but we're going to play the old simulator step-ahead game at 66 hours of the old time, which will be 65 hours of the new time. So however you want to call it, we'll call you; and we're going to sync you up at 67:40 at that point. We'll play the old step-ahead game there.

00 21 26 44 CDR Okay, Bob. That means that you're not going to actually do any clock updates or syncs until - until somewhere in the 60's there and not in the 40's.

CC Roger. It'll be 65 hours of the new time or 66 hours under the old time; depends on how you want to look at it. But that's when we'll sync you up.

CDR Okay.

CC You'll be in sync all the way out to that time; just - we're just going to delete and jump you to 67:40.

00 21 27 17 SC Okay.

CC And just another note of interest - You don't have to write this down - what - let's see; I'll read it to you. The awake periods will be - on day 3, you'll be 15 hours, 8 hours sleep starting at 11:33 CST; then at day 4, you'll be 14 and 20 hours, with 8 hours sleep. So - it actually just shortens a couple days there.

00 21 27 49 CMP Okay. Mighty fine.

CC The beauty of that - that Tommy came up with on that, Ron - is that all you have to do is go subtract those 1 hours and no more reading or anything else; just subtract them and we're in business.

CMP Yes, it looks real fine.

CC We're going to give Tommy a gold star for that one.

00 21 28 20 CMP (Laughter) You bet.

LMP (Cough) Bob, this is Jack. I'm going to try and get a little exercise. I'd be interested to know how high I can get my heart rate just fooling around up here.

00 21 28 44 CC Okay, if we can - We'll keep you posted, Jack.

CDR Bob, just to keep you and the people there thinking a little bit, today is a relatively short day; but it is a good day because it gives us a chance to again get acclimated finish our stowage and just generally go through all the things that have to be gone through for the rest of the mission. We've got 3 eating days today, and judging from what we're thinking and talking about now - that the last two are going to be sort of stretched into one eating period because three meals on this particular day just is not really going to be stomachable.

CC Roger. We understand that.

SC I think you'll find out that our eating and drinking, for the most part, is starting off relatively slow; but - I think we'll pick it up here by tomorrow.

00 21 30 24 CC Roger.

00 21 33 18 CDR Bob, one other thing while I'm thinking about it. The PU shifts were all noticeable, but probably the one that really caught me a little bit by surprise was the PU shift on the S-IVB during - during TLI.

CC Roger.

Tape 17/8

CDR It just felt like you lit in the other burner.

00 21 33 41 CC Roger. Understand.

CC Just for Jack's information, you're running in the 80s on your heartbeat. We saw a 91 or 2 there for a few minutes. Are you working - still working out?

IMP (Laughter) Yes. That's sort of discouraging.

CC I'm sorry, babe (laughter).

CDR Hey, Bob, what was Jack running before he started that?

CC He was running in the 60s; the count's somewhere in the mid 60s.

00 21 34 40 CDR Okay.

00 21 35 29 CC Okay, Jack. You're running about 105 and 103 right now.

CC Kind of interesting, Jack. You slowed down, and then you're back up to 105 right now. Now you're slowing down again.

00 21 40 11 CDR Hello, Houston; 17.

CC Go ahead, 17.

CC Go ahead, 17; this is Houston.

CDR Hello, Houston; this is 17.

CC Roger. Go ahead.

CC 17, Houston. Go ahead.

CDR Hello, Houston; this is 17.

CC Roger, 17. Go ahead. Roger, 17. Go ahead.

CC Hello, 17; Houston. You read?

00 21 41 20 CT Honeysuckle comm tech, Houston comm tech, net 1.
Goddard voice, Houston comm tech, net 1.

CT Goddard voice.

CT Roger, Goddard. I'm reading you loud and clear,
Honeysuckle. I'm not getting to him.

00 21 41 36 CDR Hello, Houston; this is America. Over.

CC America, Houston. Stand by. If you read us,
don't change anything in the cockpit yet.

CT 17, Honeysuckle.

CT Roger, Honeysuckle. I read you - -

CMP Hello, Honeysuckle. 17's reading you loud and
clear.

CT Roger. We have a comm outage and I'll be right
with you.

CMP Okay. Very fine. How are things down there
today?

CT Fine. Your ...

SC ... from here.

00 21 42 22 CC Okay, 17; Houston. How do you read now?

00 21 42 28 CDR We got you, Bob.

CC Okay. That was our network problem, not your
problem on board.

CDR Okay thank you, I just figured out what happened
on my PTC. Here - with his exercises, Jack is
shaking all of America in all three axes, here.

CC Roger. He finally got to 115 on the heart rate.

00 21 42 52 LMP Yes, my rate needles are bouncing back and forth
a half a degree (laughter).

CC Roger. Got to find something to pin it on.

Tape 17/10

00 21 44 48 CC Jack. Surgeon over here says you got a 120 on the heartbeat for a moment there - 122 right now. Okay, 130, Jack. 130. 140, Jack, 140.

00 21 47 18 CC 17, we've got a serious one here. You might be interested. All that exercise banging around in there has destratified tank 3 O₂, so it stirred it all up good.

LMP Yes, glad we brought him along then. We found some use for him. Once an EECOM, always an EECOM. I have to cre - create my own g in order to run in place.

CC Roger.

LMP How high up did the heart rate get, Bob?

CC We got you at 140, Jack. Were you running in place? Is that - -

LMP 140 was - Yes, I was - I'm underneath the right-hand couch holding on to the main Y-Y strut with my hands and running against the LEB.

CC Roger. It worked real well. 140 and you were running in the mid-60's, so you picked up about - almost 70 beats there, no problem. The surgeon is very happy.

LMP Roger. Well, I'm happy too. You know, it took a while to find a technique I was - initially, I got up to 90 with just isometrics - pushing against the couch, and the running is obviously what it takes.

CC Roger.

LMP But I don't - Bob, I don't I really don't feel - I guess I lost you.

00 21 51 33 LMP Hello, Houston; 17. You still there?

CC Roger. We're with you. We had a little comm problem there as - you know, coning on this - as we were changing on the antenna - but we're with you.

LMP Okay. What's the heartrate right now?

CC Right at - Stand by. We had a data dropout, Jack, that's why I'm holding up. And it just came on and we'll tell you in a second here. About 60, Jack. Right about 60 even.

LMP Okay. That's where I was when I started, so that's - you certainly recover fast. I don't know whether that's faster than in one g or not.

CC Well, we're happy with it - the Surgeon is happy with it, so it's good.

LMP Well, I just - How does that compare - do they have any data on how that compares with the recovery - say, the 5-minute recovery time on the ergometer?

CC We can look it up, Jack, if you're interested. We - we'll have to check your records, they don't have it right in front of us.

LMP No big deal. I was just curious.

00 21 52 54 CC Roger.

00 21 55 47 CC Jack, just for your information - the Surgeons pulled out the recovery rate data and it's the same with our data, which is a little rough here. It's the same for zero g as your one-g ergometer data.

LMP Okay. That's very interesting.

00 21 56 12 CC Roger.

00 21 59 43 LMP Bob, since we've got a few moments to talk - which I know we won't have later in the mission. Something I don't ever remember happening, but it's happening now in the windows. That's the 1, 3, and 5, but not 2 and 4, is that in the center of the window about 6 or 8 inches in diameter, as you come through the night side of the rotation, you pick up a very light - oh, you might call it even a frost. Very light frost on the window - more like a - a moisture frost, film of moisture,

Tape 17/12

or film of frost - not very thick like crystals at all. As you come through the sunlight, it tends to sublime away, but never - you never fully lose it until you go back into darkness again. The very artistic definite ice crystals that we had on my number 1 window over here yesterday - I think we reported to you this morning that they were gone or they sublimed away. But the impression they left on the window is still there; it's very sharp and very evident.

00 22 01 14 CC Roger. We copy that.

00 22 02 38 LMP Bob, I don't know whether you were copying Honey-suckle's call to us, while you lost comm there for a while.

CC Roger. We copy.

LMP But they said that they had - -

SC ...

LMP Okay.

CC They kind of concurred with your - -

LMP Okay - -

CC - - weather report there, Jack.

LMP Oh, lucky guess. I might say that the sub - the zero phase point that we're looking at is right at the northeast coast of Australia, and it's much brighter. Very - it's a very bright point now - oh, it's hard to say how far across. But, quite unlike what I mentioned being in the vicinity of the Samoan Islands earlier. And it's right at the shore, and it could be just that the shore area has somewhat choppy seas. So maybe - maybe the brightness of that point is a function of sea state, although I don't know exactly what type of seas it would take to brighten it up. I suspect choppy seas are better than long swells.

CC Roger, Jack.

00 22 04 15 LMP That front is - seems to have slowed down its progress. It's about in the same position, possibly slightly farther north than when I started talking about it this morning. The wave that has - seems to be developing off the - now off the southwest coast of New Zealand is much more pronounced than it was. Definitely seems to now have a slight cyclonic pattern - clockwise pattern. And I wouldn't be surprised if the next couple of days that moves along the front over towards Sydney. And maybe a little farther north than that might - Brisbane is probably more likely.

CC Roger, Jack.

LMP Except I got the movement wrong again. Although it does seem to have progressed west from New Zealand.

CC Roger.

LMP I take back what I said about forecasting Sydney's weather. I think that will - I would suspect that would move to the northeast like - now that I look - it seems like an earlier front, which is partly dissipated, had the same kind of motion, and now lies considerably north and east of the one I've been talking about.

CC Roger.

00 22 06 46 LMP Thinking back on some weather briefings we had last week, Bob - Are you there?

CC That's affirmative.

LMP I'll talk to you later. I think you're - We're losing you for a little bit here.

CC Okay, Jack. We're reading you loud and clear right now. Oh, you're going out a little bit now.

00 22 10 36 LMP You back with us, Bob?

CC That's affirmative.

Tape 17/14

LMP Okay, I was going to try to recover there from that last few statements. As I recall, the weather briefings that we had at the Cape last week, that - talking with Ken Nabor and Jim Nicholson down there, that the patterns we were seeing from the satellite pictures in their forecast - or analysis anyway, charts in the New Zealand part of the Pacific, those waves formed along the front would move north and then curve east. And that appears to be the pattern that was visible in one of the older fronts. And I suspect if that pattern would hold with the wave that's developed off the coast - right on the coast of New Zealand now, that it might move on up the western coast of New Zealand. We'll probably have a chance to watch that the next few days and see what happens to it.

00 22 11 52 CC

Roger, Jack.

00 22 12 44 CDR

Houston, how are you reading now?

CC

Reading you loud and clear.

CDR

Okay, Bob. As I look at the clock, we're - just 24 hours ago we were about within our hold somewhere. For this period yesterday we were in our hold, and I think it goes without saying; but we'd sure like to pass on our bit of gratitude and thanks for the response that the people down at the Cape came up with. And particularly at Marshall. I think we all knew no one would be going anywhere unless everyone was satisfied that we were going all the way. And that's certainly the way we felt, but we do want to thank everybody who had a part in making that come true.

CC

Roger, Gene. I think it was a superb show between the Cape and Marshall and Houston and probably even Goddard, with the Network and just about everybody concerned, really, had to do some work there to bring it off. And it went off real smoothly.

CDR

Yes. After flying with Stafford a couple of times and having that happen a few times back, I thought maybe he was aboard.

CC (Chuckle) Okay. I think that was a first for getting a Saturn V to 30 seconds before ignition and - or rather actually 30 seconds before lift-off and holding there.

CDR It got mighty quiet onboard about 30 seconds.

CC I sure imagine.

LMP We all felt like old hands the second time around, though.

CC Roger.

CDR Bob, I've been at that 30-second count one other time and it's no different the second time around.

CC Roger.

CDR But we do appreciate the work, and I think it's typical of - of what made this manned space program such a superprogram. The response of people like that.

CC We concur with that, Gene, wholeheartedly.

CDR And with that in mind, tell everyone to stick around because there's a lot yet to be done.

00 22 15 24 CC You better believe it.

00 22 20 28 LMP The old accumulator cycle again, I guess, gang.

CC Roger. We're seeing it. It looks like you got a MASTER ALARM. Is that affirm?

LMP Yes, sir. That's how we tell these days. Although it doesn't happen all the time, and I guess as long as - Whenever we have that WASTE VENT, CLOSED, we probably wouldn't be bothered by it at night.

CC Roger. That's - that's our feelings here, Jack.

00 22 21 24 CC Say, Gene and Ron, I talked to your fraus on the phone here a little while ago, and they gave me a very interesting observation you might appreciate. They were standing close to some water

Tape 17/16

when launch and they noticed that when the booster lit up, something scared all the fish because the water literally began to boil with fish jumping from the light, I guess, or from the shock wave or something. It must have made a very distinct impression because that's the first thing both of them told me about.

CMP Yes, that's pretty neat.

CC A neat way to go scare up the fish, I guess.

CMP (Laughter) Right.

CDR How are they doing today, Bob?

CC Really fine, really fine. They're just - like I said, they're just really tickled pink, and Barbara said that she wants you to know she's going into quarantine until after the weekend here, until after landing.

CDR If she goes into quarantine, it'll be a space first.

CC Roger.

CC You got to be careful - -

CDR Well, you know what to tell them - -

CC - - about all this.

CDR Go ahead, Bob.

CC You got to be careful now - The hotboxes are open - the hotlines are open at the houses there, so everything you say is being listened to.

CDR Yes; okay. In that case, just want to say hello and we're having a super good time looking forward to what's coming, and we thank you for the news, Robert.

CC Roger.

CDR And my impression of the world, philosophically, I suppose you'll be getting from time to time, but it sure hasn't changed.

CC Roger, Gene.

CDR It's sure beautiful. It's sure beautiful and, looking back at it, there's several billion people who have got a lot to work for because it's one of the most beautiful sights we've ever seen here.

CC Roger, Gene. You guys are sounding great and doing real great. We're pressing right on here.

CDR I just want to emphasize, Bob, that these first 2 days - of course, yesterday was a pretty good day, but today we're catching up and - and, as I say, on the food consumption, don't be expecting too much.

CC Roger.

CDR Acclimation and familiarity, and stowage and preparation, and enjoyment and relaxation - are ready to call it a day today, which is probably the most ideal day in the Flight Plan to put it, because it's probably the only one we'll have.

CC Roger.

CDR Not that they aren't all going to be enjoyable.

LMP Hey, Bob, your hourly weather report is due and - (laughter) I'll wait awhile. I keep losing your comm.

00 22 25 14 CC Okay.

00 22 26 06 LMP Bob, you there?

CC Roger, Jack. We're standing by.

LMP Okay, I had a quick - quick look and just to bring you up to date, we're starting to be able to see the coast of Asia. The Philippines are wide open today. And the - that tropical storm Theresa that I mentioned I thought I could see - indeed, I'm sure that's what that little concentrated mass of clouds was north of New Guinea. And, I suspect, although I didn't get a good fix on it, that the folks in Guam may be in for some heavy weather.

Tape 17/18

CC Roger.

LMP Oh, and, Bob, I got another pair of pictures. And that would be up to 134.

CC Roger. That's on November November, is that affirm?

LMP That's affirm.

CC Good. Good show.

LMP And that was taken - the last pass, about 10 minutes ago, if you want to keep track of GET.

CC Roger. Thanks, Jack; I'm doing that.

CC Just for some information for Ron, in particular. We've evaluated the data from the mapping camera and the pan camera cycling there and it looks real good. Everything looks right normal.

00 22 28 45 CMP Hey, that's outstanding. Good deal.

00 22 35 01 LMP Bob, how do you read 17?

CC 17, read you 5 by.

LMP That's the strangest-sounding Bob I ever heard.

CC He's taking a short break.

LMP Okay. Good. Nice to talk with you. Hey, I don't know whether you were around, Gene, the other day when I was talking about the circulation patterns around Antarctica. We were looking then at the Indian Ocean - actually, South Atlantic in the Indian Ocean region. And you see the same pattern at about the same latitude, say 60 degrees south, where all the linear cloud patterns which presumably are - reflect the various cold fronts have - are arcuate with their convex sides, or more actually, almost pointed sides are all lined up in a west-to-east direction around that latitude. It's quite a spectacular appearing circulation pattern. And the little wave that I mentioned on New Zealand seems to be beginning to form another

arrow or another convex point on that front that's fitting right into the same circulation pattern.

CC Okay, copy.

LMP That would make four of those major convex fronts that I can see from this view crossing - south of Australia up into the South Pacific.

CC Okay.

LMP On - on that tropical storm that was Theresa, I don't know whether they're still calling it now - that now, but I'm not sure it may be a little south of Guam. Guam may not be in trouble with that one.

CC It looks like it's just a bit to the west of Manila there - about 5 or 6 degrees, no more than that about. It looks like it's about 5 degrees west of Manila and about 5 degrees south. And it is still called Theresa.

00 22 39 54 LMP Okay, Gene, if you're still there, I don't like to argue with you but I think our analysis chart is a little more up to date.

CC Okay.

LMP That center - that area that you just mentioned is very clear now - east of the Philippines. Did you say west or east of the Philippines?

CC West of the Philippines.

LMP Okay, that area that you mentioned, 5 degrees east, is very clear and the center of the - what appears to be the storm that I'm speaking of, would be about 142 longitude and maybe 8 degrees north latitude.

CC Okay.

LMP Which would put it south of Guam.

CC Okay, yes, you're over in the area between Guam and the Carolines, then.

Tape 17/20

LMP Say again, Gene?

CC You're over in the area between Guam and the Carolines, then. You're saying it would be just about due west of the Carolines, then.

LMP ...

CC Okay.

00 22 40 54 LMP Yes, you're probably looking at a - oh, I don't know - maybe a what - a 12-hour old prog, or something?

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

00 22 40 58 LMP 12-hour-old prog, or something.

CC Yes, that's the one I had for launch date.

LMP Okay. Well, it's - it's - moved quite a bit now, and I guess it's the same storm; still seems to be very well organized but quite concentrated and small.

CC Okay. I'll get a new prog in and compare your estimate there.

00 22 41 30 LMP Okay. I think that's pretty good - those - 142 and 8 degrees would be pretty good center of that storm. I've got some pretty good coord - I can see Mindanao, and I can see the - let's see - just a second - what is that on Australia?

00 22 42 12 LMP Yes, of course, that is Port Moresby. I can see that point there, and between those two - I can pin that one down probably within a couple of degrees.

CC Okay. We'll get a satellite photo and bring it in here in just a bit.

00 22 50 23 LMP Houston, canister number 4 is in Bravo now.

CC Roger. We copy that.

00 22 56 36 LMP Houston, 17.

CC Go ahead, 17.

LMP Okay, Bob. That storm off the - just off the southwest coast of New Zealand is still intensifying and has both high and low level clouds as you can see by shadow lines. It looks like it may go into pretty - pretty fair storm system. Borneo is very clear today; and, as is the Philippines. And as I mentioned, there's a - looks like a very strong frontal system that stretches

Tape 18/2

from, oh, let's say, the south coast of - or southeast coast of Vietnam up - up between and across Tai - between the Philippines and Taiwan and across Taiwan. And right along, and I can't tell I think, just off - just south of Japan. I can't tell whether Japan is in the front or not. I'll look at it some more. The strongest storm center that I can see on that is - is way north, and probably - Hokkaido is - has a fair amount of weather from that storm system. There seems to be a tropical depression just north of Borneo. A very strong circulation system north of Borneo and, I guess, just south of - of Vietnam.

CC Roger.

00 22 59 01 LMP Probably south - probably southeast. I hadn't noticed it before, but it's extremely concentrated northern hemisphere cycl - cyclone pattern. I don't know whether that's on your prog or not. That's not what's left of Sally, is it?

CC Stand by. Let me look at the prog over here a sec. Okay. We - it doesn't show on the old one; the new one is coming in there shortly, Jack.

LMP Okay. If that is a developing depression, it's approaching Luzon and not very far away - 2 or 3 degrees of longitude now, although Luzon is clear.

CC Roger.

00 23 00 02 LMP I can see Korea quite well, Bob. It's clear today.

CC Yes, we - we've got the fronts. The leading edge of the front on our prog was past Korea and on Japan, and you've got it moving quite a bit further east there.

LMP Well, I'm not absolutely sure -

00 23 00 22 LMP MASTER ALARM on the accumulator.

CC Roger. We copy.

00 23 00 33 LMP I can't make out Japan spe - specifically yet; but it's clearly past Korea, and, by - by inspection, it looks like it would be also past Japan by now, the trailing edge of the front. However, the circulation center on farther north-east may be affecting Hokkaido, as I said.

CC Roger. Like I said, the front on the old prog for yesterday showed that front on the other side of Japan, so it's moved across pretty well.

00 23 01 26 LMP As I recall, they had a tropical storm called Sally that went into - ... a few days ago, and so I suspect this new one that seems - that I think I see between Borneo and Vietnam maybe something else; a new depression or I may be - be fooled by it.

00 23 02 16 LMP Mainland China, Bob, was the last pass here. I can't see the Ear - see the Earth now, but Mainland China looked like it was clear as far as I could see. There might be another front quite a ways inland, but that gets right at the LM, and I can't tell. But Korea, Yellow Sea, and the regions of China south of there - Shanghai, Nanking and those places are - look as if they are quite clear today. I'll check that again next time around.

00 23 02 50 CC Roger. And, Jack, we are ready to terminate the charge on BATTERY B and start the charge on BATTERY A.

00 23 03 04 LMP Okay. That's in work.

00 23 04 23 LMP Houston, for your information, system test 7A is about 0.6.

CC Say that again, Jack. I missed that. 0.6 on system test 7A?

00 23 04 36 LMP That's affirm. Battery compartment pressure.

CC Thank you, Jack.

Tape 18/4

00 23 05 13 LMP Okay, Bob. BATTERY A is being charged now.
CC Roger, Jack.

00 23 07 02 LMP Bob, you got any of the LMies in there today?
1 CC Any of your LMies? Roger. They're all sitting
by. Just gave me a big thumbs up, Jack.
LMP Okay. Give them a thumbs up on the rendezvous
radar antenna. It looks real good.
CC Roger.
LMP I'm nose-to-nose with it practically here at about
2 feet, and it's extremely clean. And I see
absolutely no sign of any - anything abnormal
with it.
CC Roger.
LMP Matter of fact, compared to some of the flaking
problems and things like that we've heard about
in the past, I never saw a cleaner piece of hard-
ware that that LM looks right now.
CC Roger.
LMP Appropriately, finally we're getting - we're
starting to use it during the Christmas season.
It sure looks like a Christmas package with all
the orange tape on it.
CC Roger.

00 23 08 38 CC Ron, we got your NOUN - NOUN 05.

00 23 08 42 CMP Okay. I'll go ahead and accept that one this time.

00 23 09 29 CC We got the 9 degrees, Ron. You can torque.

00 23 09 36 CMP Okay. I'll torque at 940.

00 23 09 44 CC Okay. We got it.

00 23 09 56 CC And, Jack, we've been looking at our records. We don't have a previous SYSTEMS TEST reading for 7 Alfa. Do you recall any previous readings on that one?

00 23 10 34 LMP Okay. That looks like another accumulator cycle - got a MASTER ALARM.

CC We dropped data just then, Jack, so we can't concur or confirm it. That's exactly the right time - -

LMP ... all right.

00 23 11 05 LMP Bob, you cut out about your SYSTEMS TEST meter discussion.

CC Roger, Jack. Do you have any previous 7 Alfa readings? We don't have any in our log here written. We're just wondering what the past readings on that were.

LMP No, I think that was the first one we would have been called to make after a battery charge, right?

CC That's affirm, Jack.

CC Go ahead, Jack. I - you're coming in very weak.

LMP Well, I didn't intend to be transmitting. We were just discussing the battery vent and things. We may have missed something in the dump checklist. We'll check it out.

CC No, sir. We don't think so. We just thought maybe you might have read it earlier.

00 23 12 22 LMP Oh, yes, you want the battery vent - It should be closed now, right?

CC Stand by, Jack.

LMP Okay. Ron says it ought to be open.

Tape 18/6

CC That - that's affirm.

LMP ... checked the checklist.

00 23 12 38 CC It should be open. That - there's no question about that. It should be open.

00 23 12 41 LMP Okay. It's open.

CC Really, there's no problem, Jack. It should be open, but the value appears a bit low to us, and we'd like to read it again before you go to sleep. We may want to close it. And a nominal reading would be 1.7 - -

LMP ...

CC - - on that.

00 23 13 06 LMP Okay. We - we closed it when we were doing all our dumping some time back and neglected to open it again. So, it was closed when I gave you the reading, and it has been closed during some 2 hours, anyway. I'll - you can figure out how long.

CC Okay. We - we copy that.

00 23 13 57 CC Jack, would you mind opening the vent and watching the system meter concurrently with it?

LMP Stand by.

00 23 15 11 LMP Well, it's - it's CLOSED now, and it's still reading what it - 0.6. Do you want us to open it again?

00 23 15 21 CC Roger. Open the VENT and - -

00 23 15 23 LMP I mean, it's open now. I'm - I'm sorry, Bob. It is now open and reading 0.6. It read 0.6 when it was CLOSED.

CC Okay. Just leave it open now.

LMP Okay.

CC And we will want to still check it prior to your sleep period.

LMP Okay.

00 23 15 07 LMP Okay, Bob, a little update on the coast of Asia. It looks like some residual cloudiness would be affecting the Pusan region of Korea. And, also, that's residual after the frontal passage. And it looks like maybe Shanghai, after all, may have some storms associated with it, but it's really hard to pick out exactly - the exact coast line of Asia, but I - there are some clouds in the Yellow Sea behind the front. Look like they might be possibly some high cirrus is all.

CC Jack, do you still see that storm that you said was sitting between Guam and - Borneo in that area?

00 23 17 07 LMP Okay. I see there is this cloud concentration between New Guinea and Guam. The more I look at it the less well developed it appears to me compared to some of the other circulation patterns. It could be just a residual depression from Teresa that has moved out into that area. It is an isolated, a relatively isolated cloud pattern, fairly small, but apparently fairly dense. But has - does not have a strong cyclonic pattern to it. Nothing at all like the pattern that now exists above Borneo and seems to be moving towards Luzon.

CC Roger. We copy.

SC Okay.

00 23 22 09 CMP Okay, Houston. We're moving in the pieces of a Presleep Checklist. Here's some more read-outs for you. BATTERY C is 37.0; PYRO BAT A, 37.2; PYRO BAT B, 37.2; RCS A, 95; Bravo, 94; Charlie, 94; Delta is 96.

Tape 18/8

00 23 22 45 CC Roger. We copy that. And if you've started it, we don't want you to reinitialize the PTC until about 2400 on the time line.

CMP Okay. We're - we're just getting a little ahead - we - took us longer last night on the presleep than we expected. We're trying to work it out again.

CC Yes. We don't to - we want to terminate the waste stowage vent at that time, because we think that that vent is what's contributing to our PTC coning.

CMP Okay. We're - we're not - we're not really ready to go to sleep yet, but we're just moving ahead.

CC Roger.

CMP And if it's okay, I'll cycle the H₂ fans.

CC Roger. We're standing by.

00 23 24 53 CMP Okay. The fans are off.

CC Roger.

00 23 29 06 CC Say, Jack, we got a request in here from our ARIA friends.

LMP Go ahead.

CC They were just wondering if your looking out that way, if you could give them some sort of update of what the weather in the Wake Island - Kwajalein - the south of the Wake area looks like.

LMP Okay. Let me work on that one.

CC Okay. You're going to mearn - earn your American Meteorological Society badge here pretty quick.

00 23 29 46 LMP Okay. Let me get the monocular, and we'll look at Wake Island. I miss having all those nice latitude and longitude lines on the globe.

CC ... there.

00 23 34 26 LMP Okay, Bob. I'll probably have to work on this one a little more, but - but it looks like around Wake, or in the vicinity of the Kwajaleins and north of Wake, about all you have is a lot of cloudiness although - and in a generally - over wide part of that Pacific, I'm talking about 15 or 20 degrees of longitude and latitude, there's a - roughly a clock - a clockwise circulation pattern. But the clouds do not look very dense or concentrated in any one area. And at leading off to the southeast from that general cloud mass, there're cyclonic - anticyclonic cloud mass is a - is one of the old fronts - or at least one of the old linear cloud patterns that extends down into the South Pacific.

CC Roger, Jack. I'm sure that the ARIA troops are listening down at Patrick and caught all that.

LMP Well, my guess is, Bob, and it's purely a guess, is that there - probably - if they were out there right now, would be experiencing an intermediate layer of clouds with scattered showers. And a not too strongly developed circulation system, so I can't predict the winds. But I wouldn't expect them to be anything - anything what might be down - associated with the remnants of the tropical depression Theresa. Now that Theresa - what's left of it, if I'm correct in - in picking it out there, probably is - is moving in that direction, although it looks weak enough. But right now I don't think it would be any big problem. And it may, in fact, go south of there.

00 23 36 55 CC Roger. The prog I got in my hand for 3-hour-old weather has Theresa located just about in the Manila area. Did you concur with that, or do you think it passed the - the Philippines?

00 23 37 09 LMP Well, I don't - Manila's clear. The only thing approaching near Manila is - is this other storm center that now is north of Borneo. And to the east of Manila, it's clear all the way over to this little cloud mass that I was guess might be Theresa.

Tape 18/10

CC Roger. All I say, this is 3 hours old so - -

LMP - - And that's about - I gave Gene Kranz some coordinates on it. You can look it up. Those were pretty good coordinates for that cloud mass. Now whether that's really Theresa or not, I don't know.

00 23 37 45 CC We got one thing with - for the last couple of hours here, we've been getting high-bit-rate data through our new facility - a new facility at Tidbinbilla. Tidbinbilla is to a 210 dish, and they're covering the first - -

LMP - - between Wake in the Kwajaleins, Marshall Islands, in that area, it doesn't look like a very concentrated weather pattern, although it looks like you'll have ceilings in that region. And they're overcast ceilings rather than broken. Except around the fringes of it.

CC Roger.

LMP We'll keep an eye on it of course.

00 23 38 35 CC Jack, how do you read us now?

LMP You're loud and clear.

CC Okay, 17, for the last 2 hours, we've been getting high-bit-rate data from a new facility, the facility at Tidbinbilla and they're working their first Apollo flight ever, you might give them a cheery hellow.

LMP Tidbinbilla, is that correct?

CC That's affirmative. It's very close to the Honeysuckle base - -

LMP Where is that?

CC Very close to Honeysuckle.

00 23 39 19 LMP Well, how you doing - how you doing mikes? We certainly appreciate you guys being on the loop for this one.

00 23 40 46 CC 17, Houston. We'd like ACCEPT, and we'll update your gyro drift, the pitch, roll, and yaw drifts.

00 23 40 57 CDR Okay, got ACCEPT and POO.

41 01 CC Roger.

00 23 45 57 CC 17, Houston. The computer is yours. And you can go back to attitude and reinitialize PTC whenever you want to.

CDR Go ahead, Bob.

00 23 46 06 CC The computer is yours, Gene - -

CDR Go ahead. We're reading you.

CC You can go to attitude and reinitialize PTC whenever you want to.

00 23 46 19 CDR Okay. Did you mean to leave the computer with VERB 21 NOUN 01 up?

00 23 46 23 CC Roger. That's your computer with that - as you got it.

CDR Okay; that's right. That's 14 62. Okay.

CC 17, Houston.

LMP Roger. Go ahead.

00 23 50 15 CC Roger. We've got a recommended configuration for your H₂ fans and H₂ heaters. We would like the H₂ HEATERS 1 and 2 to AUTO and H₂ FANS 1 and 2, OFF; 3 to AUTO. Your O₂ heaters look good.

Tape 18/12

LMP Okay. Let me verify that I've got these right.
H₂ HEATERS 1, 2, AUTO. O₂ HEATERS, 1 OFF; 2, OFF;
3, AUTO. H₂ FANS - H₂ FANS, you want OFF; OFF;
and AUTO. Is that correct?

CC That's what we want on the H₂ FANS. And the O₂
is fine, as you've got it.

00 23 51 14 LMP Okay. They're OFF, OFF - Okay; H₂ FANS: OFF, OFF,
and AUTO.

00 23 51 19 CC That's affirmative, Jack.

00 23 51 35 CDR Okay, Bob. I just cleaned the suit circuit return
valve screen, here. It was probably, as expected,
a little crud on it. A few things have collected,
but really not too bad.

CC Roger, Gene.

00 23 53 30 LMP Bob, a little more about Wake and the Marshalls
and Kwajalein. That large pattern of what appear
to be broken to overcast clouds in a - a clockwise
circulation pattern - crosses the equator region
now that I've tried to project that through.

CC Roger, Jack.

00 23 57 27 CC 17, Houston.

CMP 17, go ahead.

00 23 57 36 CC Roger, Ron. When you stop the present roll on
the PTC to reinitialize, pick a roll angle of 315
or 130 for stopping, so that we have good comm
during the damping period.

CMP Okay. 315 or 120, okay?

CC 130, Ron.

CMP Okay. 315 or 130.

CC Roger. That'll give us good comm to watch the data on the damping.

CMP Okay.

01 00 00 34 CDR Hello, Houston. How do you read?

CC Read you loud and clear, 17.

01 00 00 40 CDR Okay. We're at 300. Do you want us to go to 315 yet, or is 300 going to be okay?

CC That's good enough, Gene. And we'd like you to close your waste vent at this time, please.

CDR Okay.

01 00 01 12 CDR Okay. It's CLOSED now.

CC Roger.

01 00 01 37 CC And, 17, Houston. We've got the same recommendation. We recommend Alfa and Bravo for damping; Bravo and Delta for spinup. Over.

CDR That was Alfa and Bravo for damping and Bravo and Delta for spinup.

CC That's affirmative

01 00 04 51 CC 17, Houston.

CMP Go ahead.

CC If one of you want to break out the Flight Plan Supplement, we have a change to the E-LOADS on page 143 due to the change of gyro-compensation parameters. If you want to copy them down when you get the Supplement out.

CDR Okay. We'll give you a call.

CC Roger. We'll be standing by.

Tape 18/14

01 00 06 27 CDR Okay, Bob. We're in our - we're on our damping
cycle now.

CC Roger. We're watching you, Gene.

01 00 12 13 CDR Bob, I just hit the control stick. It's locked
again in roll; it may have bumped it a little bit.

CC Roger, Gene. We copy.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 00 12 11 CDR Bob, I just hit the control stick. It's locked again in roll. I may have bumped it a little bit.

CC Roger, Gene. We copy.

01 00 17 15 CDR Houston, 17. Okay if we CLOSE the waste stowage vent now? Oh, okay. I'm sorry. It's CLOSED.

CC Roger, 17.

CDR Forget it. We got it. I - I was left out.

LMP Okay, Bob. On the film status, we're still where we were, November-November, 134. And I'll probably take two more pictures before we go to sleep.

CC Roger. We copy.

CC Okay. And, 17, if one of you are down in the LEB, could you give us a read-out on SYSTEMS TEST 7 Alfa?

CDR Stand by.

01 00 20 58 CDR Houston, 17. 7 Alfa is 0.6.

CC Roger. 7 Alfa equals 0.6.

01 00 22 54 LMP Okay, Houston; 17. Are we configured properly now for comm?

CC Stand by, Gor - stand by, Jack.

LMP Okay. I've got - I'm going OMNI Bravo right now.

CC We're in good shape on the comm, and we'll be controlling the omnis.

LMP Roger, Bob.

CC 17, the rates look great. We're ready to initialize PTC.

Tape 19/2

CDR Okay, Bob.

01 00 27 14 CDR Okay, Bob. PTC is initiated.

CC Roger, Gene. We copy, and we watch the roll start.

01 00 33 06 CDR Hello, Houston. I think we've got everything done on the checklist. The chlorine has been - water has been chlorinated, we're in PTC, and I think Jack picked up everything else. How does it look to you?

CC Roger, Gene. Let's - let us make a check through the room here, and then just a reminder that I've got that addition on the E-LOADS for the - in the Flight Plan Supplement.

CDR Yes. Stand by. Jack's going to keep the headset on and the biomed, and he'll close you out with that and if there's nothing else, I'm going to go off the air.

CC Roger, Gene.

CDR Okay, say good night to my friends back there.

CC We certainly will.

CDR Hey, just so that we know, it is about midnight, right?

CC It's about 7 minutes after midnight, Gene.

CDR Okay. Just didn't want - wanted to make sure it wasn't noon.

CC Roger.

CDR Good night there, Robert.

CC Good night, Gene.

CMP Okay. Say good night, Dick.

01 00 36 48 LMP Bob? This is Jack. Your last report for the day as the Earth goes past window 5. The first thing I noticed was that our zero phase point is not nearly as bright on the west coast of Australia as it is on the - was on the east. And it's looking right at the coastline now and see no bright spot in the center. Also, that circulation pattern or tropical depression possibly that I saw earlier north of Borneo is now even more strongly developed at the tail end of the front that stretches up toward Japan. And it - it really looks like a humdinger from here. Beautiful circulation pattern and very concentrated. And it is now east of Vietnam, and again between Vietnam and - and the island of Luzon.

CC Roger. We copy.

LMP And I'd be very - be very curious to know tomorrow morning if you - you people are carrying that one on their progs or on their analysis chart.

CC Roger.

01 00 41 33 LMP Okay, Bob. You want me to erase something on page 1-43 and insert something else?

CC That's affirmative, Jack. On 1-43 under column A, down at line 11 and 12 and 13. Just to make sure you're at the right spot, the line 11 0-data is 00115. Do you copy that? Do you see that?

LMP I'm with you.

CC Okay. Change that line to 00377.

LMP Go ahead.

CC Change line 12 to 00050.

LMP Go ahead.

CC And line 13, 00523. Over.

Tape 19/4

LMP Okay, I got that and (laughter) as you might imagine, when I said erase, I did. And do you have the 04 and the 05 again, please? That is, if they're pertinent.

CC Stand by, Jack. I'm lost myself here a second.

LMP See, you gave me an update on 30704 and 31005, and I just erased it.

CC Okay. The 04 under column B is 34761, and the 05 line under column B is 15403. Over.

LMP Okay. Here we go. In line Alfa, 314 11, 00377; 315 12, 00050; 316 13, 00523. In line Bravo, 307 04 is 34761; 310 05 is 15403. Over.

01 00 44 13 CC Roger. We copy, Jack. Just a reminder to be sure and configure the comm per the presleep checklist. And, just for your information, Jack, I - I hold you at 100,116 miles. I was going to give you a call at 100,000 even, and then I got talking to you. So you've crossed the 100,000 mark right now. Tomorrow, you're probably not going to be giving us our weather report. You'll be too far out, but we'll probably be starting to hear from the Moon, huh?

LMP We're not going to see much of the Moon, you know. It's going to be pretty dark, so I'll have to keep looking at the Earth.

CC Roger.

LMP Pretty good - pretty interesting place. Very interesting place.

CC I'm real sure.

LMP And I guess - I guess, maybe, I - 100,000 miles. My goodness gracious. That's impressive.

CC Yes, sir. You're slowing down all the way, Jack.

LMP Well, it's sure downhill all - all the way back, isn't it?

CC That's for sure.

CC Jack, did the CMP get off the line, and is he sacked out now, too?

LMP Yes, I lost both those guys. They - they decided they wanted to sleep, and I may be rumbling around here for a while but I took - we all three took Seconal, so I think we'll get to sleep before long.

CC Roger. Just give us a call if you need anything, and we'll be watching everything there, and pleasant dreams.

LMP Now, you don't really mean that, do you?

CC Well, I can't come up and tuck you in so - hope you have a good sleep. You need lots of rest up there, gang.

LMP I'll tell you, Bob, about halfway through this day, I think I acclimated. And I really feel good. I've been eating a lot better, and I'm not - the only thing I ever really felt was a slight headache. It really - not the fullness of the head that people described, I guess, but just a little headache. I could have been looking at the Earth too much. I don't know.

CC Roger, Jack. You've been sounding good.

LMP Oh, actually, I feel - I've been feeling fine. Just - none of us have felt like eating. And that's probably normal, and everybody's eating more now, and we'll start getting to sleep, I think.

CC Roger. Jack, just a reminder on that comm for the presleep checklist. It's important to us because we can get the - we can get high-bit-rate data more.

LMP Bob, he cut out, but I'm in the comm sleep configuration now. I'm working that way.

CC Okay. Ed Grindell was shaking his head for a minute. Now he says as long as you're working that way.

Tape 19/6

LMP Bob, you still cut out. Let's try it again.

CC No - no problem, Jack. Just a reminder on the comm; that's all. We're watching you go through the checklist here.

LMP Okay.

01 00 49 19 LMP I'm on HIGH GAIN now, and OMNI Bravo selected.

LMP How do you read, Bob, on the HIGH GAIN?

CC Read you loud and clear, Jack.

LMP Okay. And it's in REACQ and NARROW.

01 00 49 50 CC Stand by. Stand by on that, Jack.

CC Say, Jack, can we refer you to the checklist on S/1-27, a sleep configuration there, where you S-BAND SQUELCH, ENABLE, et cetera?

01 00 50 50 LMP Roger. I'm ENABLED.

LMP Oh, et cetera. Yes.

CC Roger.

LMP Okay. I'll get to that in a minute, Bob. Who knows, I might have something else to say.

CC Okay. (Laughter)

LMP Bob, I just probably ought to qualify all those remarks about the Earth's weather. It's purely novice talking about something he is very unfamiliar with, except for having a longstanding interest in it. And I think the one philosophical point, if any, that comes out of it is that somebody, probably 3-1/2 billion years ago or so, could have looked at the Earth and described patterns not too dissimilar. And it was within those patterns that life developed, and now you see, I think, and obvious to everybody, what that life has progressed to doing. And I certainly think all of us feel that it has not stopped doing that progression, and we'll probably see it do things that even you and I can't imagine them doing. I certainly hope so.

CC Roger, Jack. We concur.

01 00 54 11 LMP Bob, you always wished that you had a poet on board one of these missions, so he could describe things that we're seeing and looking at and feeling in terms that might - might transmit at least a part of that feeling to everybody in the world. Unfortunately, that's not the case. But he certainly couldn't look at that fragile blue globe and not think about the ancient sails of life that are crossing its paths and wonder ahead to the - up to the present, to the modern sails of life that are represented by men that developed out of that life that are sitting there next to you and that are the country in all sorts of different guises and working towards the same end, and that is to put that life farther into the universe. I certainly hope that someday, in the not-too-distant future, the guy can fly who can express these things.

CC Roger, Jack. You're doing a pretty good job expressing them.

01 00 58 29 CC Jack, Houston.

LMP Go ahead.

CC Jack, we'd like to go to select OMNI Bravo, and stow the high gain the the normal stowage. It's customary we do not use the high gain for PTC going TLC.

LMP Okay, Bob. I'm sorry, but the checklist indicated that you do all go back to OMNI Bravo.

CC Roger. It's probably ambiguous. If you end up going up on the checklist, up to the top of 1-28, it shows you where you want OMNI Bravo.

LMP Ambiguous is the best word I can think of for it.

CC Say again, Jack.

LMP Ambiguous is the best word I can think of for it.

Tape 19/8

CC Roger. We - I concur. I should have probably called you earlier and just pointed out on the Flight Plan where it says presleep checklist. And then there's the word "comm," and it says "omni," and that leads you into the checklist and makes sure you use the OMNI setup for - for the sleep configuration.

LMP Ho, ho, ho. Tricky fellows. I guess you're right.

CC Yes, it's something we don't - we don't - sim PTCs, TLCs, and TECs very often. That's for sure.

LMP Well, that's because we have a whole day to learn out here.

CC That's affirmative.

LMP OMNI Bravo.

CC Roger.

01 01 25 44 LMP Okay, Bob. I think I'll hit the hay. How does everything look to you?

CC Looking pretty good, Jack. We'd like the S-BAND NORMAL VOICE to OFF, and S-BAND SQUELCH ENABLE, please.

LMP Yes, I'll get that. I just want to make sure that PTC and everthing looks good.

CC Yes, it looks real fine, Jack.

LMP Okay. Talk to you in the morning - or to somebody, anyway.

CC Roger. Par - Parker will wake you up, I think.

LMP Oh, gosh.

01 01 26 26 CC Have a good sleep.

END OF TAPE

Tape 20-23/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 09 00 38 CC Apollo 17, Houston. Good morning.

01 09 01 06 CDR Is that the best you could do?

CC That's not very good either. Give us a call when you want to talk to us.

LMP Good morning to you.

CDR How's everything look, Bob?

CC You guys look absolutely super. No problem at all.

CDR Nice way to wake up. Maybe we'll just sleep in for a few more hours.

CC Stand by. I'll check on that.

01 09 02 25 CDR (Laughter).

01 09 21 09 CDR Bob, 17. How do you read?

01 09 21 12 CC 17, this is Gordo. Bob just finished up his work-day with that last call, and I'll be on now.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 09 31 23 LMP Houston, 17. How do you read?

CC Loud and clear, Jack.

LMP Good morning, Gordy. How you doing?

CC Real good. How about you?

LMP We all feel pretty good this morning. Got some reports for you.

CC Okay. Ready to copy.

LMP Okay, on the CDR. PRD is 17025; 6-1/2 hours good sleep. One Seconal, which is the one I reported last night, so that's just one now. Had a - yesterday, midday or so - he had a nausea pill for gas. And we hadn't found the other gas pill, so he tried that one. And he drank, since I last reported, two and a half containers of water.

CC Roger.

LMP The CDR food intake, as with all of us, is a little bit random, and I don't know exactly the best way to report it, unless you want it all in detail.

CC Let me check while you - Go on, and I'll see if they want a detailed description of the food or not.

LMP Okay. LMP medical. PRD 24036; 5-1/2 to 6 hours good sleep, 1 intermittent. Again, I had a Seconal but that's the same Seconal I mentioned last night. And since last report - I guess one - two and a half containers of fluid. Water.

CC Okay.

LMP And just for checking on the water intake, you should have me down for six containers of water.

CC Roger. Six total.

Tape 25/2

LMP That's affirm.

LMP CMP medical. PRD is 15023; 7-1/2 hours very good sleep. He had the same Seconal we had. And, since last report, has three water containers for a total of six now.

CC Roger.

CC Jack, I guess we do want an accounting of all the food. Whatever you think is the best way to report it.

01 09 35 19 LMP Okay, Gordy. Back on the CDR, and I'll just tell you what we ate. For the day 2. CDR: mixed fruit, that's the can, instant breakfast, one vitamin pill, a bag of tea, turkey and gravy, the wet pack, and orange juice.

CC Roger.

LMP Okay. The LMP: cinnamon toast bread, mixed fruit, instant breakfast, coffee, lemonade, peach ambrosia, one vitamin, one slice of bread, grapefruit drink, gingerbread, orange drink. And I have one complaint. Somebody slighted me on a caramel candy in meal C.

CC Roger. We'll start an investigation.

LMP Yes, it was not there. Okay. CMP: the spiced oat cereal, mixed fruit, instant breakfast, and coffee, potato soup, and peach ambrosia. That's all for breakfast. And then later on, he had chocolate pudding and a grape drink. And let's see - we all - You might log him for a vitamin pill and me for a vitamin pill.

CC Okay.

LMP Oh, yes, I forgot. It's here; one frankfurter, for lunch.

CC Roger.

LMP And we just changed LiOH canister as per the Flight Plan.

CC Okay.

LMP And in a minute, I'll have weather report for you.

01 09 37 57 CC Very well.

01 09 40 58 LMP Hey, Gordy.

CC Go ahead.

LMP Gordy, the null bias check. Plus 0.9 and 100 seconds.

CC Okay, one question G&C had. Do you do that null bias at plus 100 or minus 100 on the EMS counter?

LMP Plus 100.

CC Okay, and it's increased up to 101.9, right?

LMP No, it increased to 100.9.

CC Roger. Miscopied you; 0.9. Okay; thank you.

LMP Yes, okay. Seems to me like last night it was 100.7.

CC Roger.

CC And for our part of the postsleep checklist, I have the consumables status, if you'd care to listen.

01 09 42 22 LMP Stand by, Gordy.

01 09 45 11 LMP Gordy, we'll take your consumables in a second. Let me bring you up to date on the weather around the world, if you're interested.

CC Yes, we are; go ahead.

Tape 25/4

LMP Africa, looks in pretty good shape. There is a - except for an area probably around Zambia and Rhodesia in the tropical convergence zone there, where it looks pretty cloudy and probably quite rainy. There's a very strong circulation pattern and presumably a storm off - just off the coast of northwest Africa. Very spectacular spiral formation of clouds in a cyclone development. It looks like there are probably two fairly weak cyclones - Southern Hemisphere cyclones in the South Atlantic. One, southwest of Cape of Good Hope, and the other about due west of - of the Falkland Islands, maybe a little bit north of that. South America looks to be in quite good shape weatherwise, except possibly Uruguay and maybe northern Argentina which appear to have a - at least some fairly thick clouds there, although no strong circulation associated with this. ...

01 09 48 01 CC Okay, Jack. We got all that up to Argentina, then the omni switch kind of cut you off.

CC Jack, we got the - at least the first part of your weather report fine up through the clouds in northern Argentina, and then the switch in omnis cut you out.

LMP Okay, that was about it, Gordy. That's - I'll talk to you some more later about it. I guess the main thing I need now is - are your consumables.

CC Okay. By the way, you were looking back from more than halfway to the Moon. You're about 125,000 out now. On the consumables, the RCS is running at 1.3 percent over the Flight Plan line. On the O₂: tanks 2 and 3 are right on the line, and tank 1 is about 4 percent below the line. But it's been there all the way since launch, that same bias on tank 1. On the hydrogen: tanks 1 and 3 are right on the line, tank 2 is about 3 percent above the line. All in all, you're looking real good consumablewise.

LMP Okay. That's hardly worth writing down, I guess.

CMP That's the way we like to see it.

CC Same here. The only other thing I have in the way of updates is a PIPA bias update. You can load it yourself, or we can load it when we come up with the up-link prior to the burn. Your choice. And then we'll have an update to the erasable load update and a supplement to correspond with that bias update.

CDR Gordy, why don't you go ahead and load it yourself when you send up the vector?

CC Okay, and I'll give you that update for the supplement. It's on 1-43 whenever you're - whenever it's convenient.

CDR Okay, Jack's getting that out. I ran another PIPA bias at minus 100, and it confirmed the first one. It ended up at 99.2.

CC Roger.

LMP Go ahead with your update on 1-43, Gordy.

CC Okay. It's in the load A of the octal ID of 03, which now reads 77252. Change that to 77655.

LMP Did you copy, Gordy?

CC I didn't copy your readback; no. Okay, 306 03 and Alfa 77655.

01 09 52 42 CC That's right.

01 10 03 17 LMP Gordy, how do you read?

CC Loud and clear.

LMP Okay. For the reference on - on those menus, at least for the LMP, I think I'm probably putting 8 or 9 ounces of water in the citrus drinks and those kind of things, rather than 7, which has probably upped my water intake some.

CC Okay.

Tape 25/6

LMP And I think that probably goes for everybody. That probably goes for - it goes for Ron and probably Gene also.

01 10 03 52 CC Roger.

01 10 10 05 CC 17, Houston. I have a little synopsis of the news here, if you'd like to listen during breakfast. Let me know.

CDR Okay, mighty fine. Send it up.

CC Okay, front page first. In Paris, Henry Kissinger met for 30 minutes this morning with French President George Pompidou at the Elysee Palace just hours before his scheduled conference with North Vietnamese Politburo member Le Duc Tho - Tho, that is. North Vietnamese spokesmen accused Kissinger of attempting to force a peace settlement by threatening further escalation of the war. As both U.S. and North Vietnamese negotiators expressed disappointment at the continued deadlock, Chief American delegate William J. Porter traveled to Brussels to brief Secretary of State William B. Rogers. Rogers will - will return later today from the NATO Conference of Ministers. This one is datel - date - datelined Brussels. Diplomatic sources indicated today that NATO allies will request negotiations with the Soviet Union and its allies on mutual troop reductions in central Europe. Exploratory talks expected to begin about January 31, with full-scale negotiations to follow sometime next fall. In Kansas City, vital life signs for Harry S. Truman appear to have stabilized. But the 88-year-old former President remains on the critical list at Kansas City's Research Hospital. Truman is suffering from lung congestion and heart weakness. In Argentina, aides to popular Argentine politician Juan Peron said that Peron will refuse the nomination to the presidency of Argentina and will return to exile during the coming week. And, on the sports page, Rice coach Al Conover is expected to reveal today - sometime today his decision to either remain at Rice as head coach or move to his alma mater Wake Forest in a similar position. The Owl head coach has said that he has been offered the job and promises a yes-or-no decision today.

There is some speculation that head coach Joe Paterno of Penn State may move to a head coaching job in the pros next year. Paterno is busy preparing his Nittany Lions for a Sugar Bowl meeting with Oklahoma and is refusing to discuss the matter until after the game. Locally, the state high school football playoffs - -

CDR Lost you, Gordo.

01 10 12 47 CC Say again?

01 10 14 26 CC Okay, 17. Continuing after being rudely interrupted by the omni switch, the state high school football playoffs here in Texas are underway and - with a whole host of games scheduled this weekend. And the final item, the Major League Baseball Players' Association and the Commissioner's Office are going at it again. It must be getting close to spring training time.

LMP Gordy, you cut out since the Nittany Lions.

CC Okay. Did you hear about the - the high school playoffs?

LMP No, the last we heard was the Nittany Lions.

CC Okay. (Laughter) Paterno, the head coach at Penn State, may move to a head coaching job in the pros next year. He's busy setting up his Nittany Lions for a Sugar Bowl meeting with Oklahoma and is refusing to discuss the matter until after the game. Here locally, the state high school football players are - playoffs are underway with a whole host of games scheduled for this weekend. And the final item, the - the Major League Baseball Players' Association and the Commissioner's Office are going at it again, which means it must be getting close to time for spring training.

01 10 16 00 LMP No editorials, please (laughter).

Tape 25/8

01 10 29 25 LMP Gordy, film update on mag November November. I'm on frame 138, and that includes a couple of pictures I mentioned to Bob I took just before I went to sleep. And also, two pictures this morning at about 33:30. Those are the Earth.

01 10 29 51 CC Okay, Jack.

01 10 35 18 CC 17, Houston. A reminder. We need the H₂ PURGE LINE HEATERS, ON, now. And I do have a maneuver pad for the midcourse when you're ready to copy. Over.

01 10 35 33 CDR Okay. I've already got the HEATER, ON. And give me about 5 minutes, and I'll get the pad.

CC Okay. And if you'll give us ACCEPT and POO, we'll get the up-link started just after the next antenna switch. We want to catch it between switches. Over.

01 10 35 55 CDR Okay. You got POO and ACCEPT.

01 10 35 58 CC Thank you.

01 10 46 16 CC 17, it's your computer. You have a state vector, VERB 66, and a target load, and a PIPA bias update.

01 10 46 25 CDR Very good.

01 10 49 46 LMP Believe it or not, Gordy, I'm ready for your pad.

01 10 49 52 CC Okay, Jack. It's a midcourse 2, SP^S/G&N; the weight is 66786; plus 1.21, minus 0.13; ignition time is 035:29:59.09; minus 0003.4, plus 0002.1, minus 0009.8; attitude is 132, 194, 343; H_A and H_P are NA; DELTA-V_T 0010.6, burn time is 0:02, 0006.5; sextant star is 25, 233.7, 16.4; rest of the pad is NA. Ullage, none. Other remarks: LM weight, 36281. High gain angles: PITCH, minus 21; YAW, 181. And this will give you a perilune of 53.1. Should make everybody onboard feel a little more comfortable. Over.

01 10 51 57 LMP Okay, Gordy. We haven't been particularly uncomfortable, but knowing no way we would hit the Moon. Here's MCC-2, 7 - SPS/G&N; 66786; plus 1.21, minus 0.13; 035:29:59.09; minus 0003.4, plus 0002.1. And you cut out on DELTA-V_Z. Give me that again, please.

CC Okay. DELTA-V_Z is a minus 0009.8.

LMP Okay. DELTA-V_Z, minus 0009.8; 132, 194, 343; NOUN 44 is NA; 0010.6, 0:02, 0006.5; 25, 233.7, 16.4; rest of pad is NA. No ullage. LM weight, 36281. High gain PITCH, minus 21; YAW, 181. Perilune, 53.1.

01 10 53 20 CC Okay. That's a good readback.

01 10 54 18 CC 17, Houston. You can go back to BLOCK now.

01 10 54 31 CDR Okay. We're in BLOCK.

CC Jack, a couple of quick items. We would like for you to terminate the BATTERY A charge now, and also turn the H₂ tank HEATERS for tanks 1 and 2 OFF.

01 10 55 31 LMP Okay. H₂ tank HEATERS 1 and 2 are OFF, and I'll terminate the charge.

01 10 55 37 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 11 02 51 CMP Okay, Gordo, there's all balls and 05 on that P52.
CC Roger. That looks good.

01 11 03 02 CMP And you're looking at NOUN 93. Okay, you're looking at NOUN 93.

01 11 03 04 CC Okay, and we go to torque it.
CMP Houston, Apollo 17. When we ran the DELTA-V test, we - we're reading minus 22.2 and I'm having a little trouble finding the SPS cue card. Wonder if FAO know exactly - knows exactly where that is?
CC Stand by; I'll check.

01 11 07 07 LMP Houston, if you saw a MASTER ALARM, it was the POWER SCE NORMAL switch getting hooked to OFF.
CC Roger.

01 11 07 33 CC As far as we know, the SPS burn card ought to be in with the rest of the cards in R-2.
LMP Gordy, we finally found that thing. It was way back in the back; sorry.
CC Okay.

01 11 08 24 LMP We're starting our purges, Houston.
CC Roger.

01 11 14 50 CMP Okay, Houston, We'll get to the attitude in about another 4 minutes or so. Then we'll whip in the P30 and go right into P40. We're doing a waste water dump, urine dump, and - man, the sky is just full of little bitty particles.
CC Roger, Ron.
CMP Hey, I doubt if we can get the star sextant check, but you can try it.

Tape 26/2

01 11 18 42 CMP Okay. Okay, 35:29:59.09 for the time. NOUN 81 -
okay, NOUN 81s are loaded good.

CMP Just the burn time's good.

CMP Okay. We'll see if we can get the DET started
here.

01 11 20 04 CMP Okay; got the DET started.

CC Jack, you can bring up the high gain any time now.

01 11 20 10 CMP In 10 minutes, Jack's ... good shape. Okay, got
that. ...

CMP Yes, he's dumping waste water. It's about 15.
Yes. Yes, straight up to RELIEF, Jack.

CC And, Jack, also we're showing 10 percent on waste
water, now.

01 11 20 44 CMP ... 86, LM weight. Okay, ..., OFF; ..., OFF.
That's what I'm doing now. To what? One three,
okay. Here we go. Set ... IMU. Okay. Realign
the old GDC a little bit.

01 11 21 45 CMP Okay, GDC is aligned. STAB control breakers. All
IN and good shape.

01 11 21 54 CMP MANUAL ATTs are RATE COMMAND; DEADBAND, MIN; RATE
to LOW. Yes.

01 11 22 07 CMP Okay, TVC is in RATE COMMAND. LM/CSM is in
LM/CSM. GIMBAL DRIVE is in AUTO. Okay.

CC Jack, this is Houston. We're ready for the high
gain.

SC (Laughter)

CC 17, Houston. Do you read?

CMP I think there's no trim on this ..., ...

SC Okay.

CC Apollo 17, Houston. How do you copy?

CMP Okay, so that's ... trim, to 0.2.

CDR No trim if it's greater than 2 feet per second.

01 11 23 26 CMP Yes, we're down to 6 minutes.

CC Apollo 17, Houston. How do you read?

01 11 23 34 CDR Okay, Gordo. We got you.

CC Okay, we weren't getting through there for a minute or 2. We're ready for the high gain now.

CMP Okay. Minus - minus 21 and 181.

01 11 24 06 CC ***, 17. You're GO for midcourse 2.

CMP Okay. Sounds good.

CMP And, Jack, you ready for GIMBAL MOTORS - I mean the BUS TIES?

LMP Ready for the BUS TIES.

01 11 24 41 CMP Okay, TAPE RECORDER, HIGH BIT RATE, RECORD, FORWARD, and COMMAND RESET.

CMP Check your HELIUM VALVES and check your N₂.

01 11 25 01 CMP Okay. SERVO POWER 1 and 2, we got.

01 11 25 11 CMP Okay, got SERVO POWER. AC1 and AC2.

01 11 25 16 CMP AC, DIRECTs are OFF.

01 11 25 20 CMP BMAGs, 1/2. Okay.

01 11 25 26 CMP No hardovers. Okay. We'll go to SCS. Okay, PITCH 1, Jack -

01 11 25 32 CMP MARK it. YAW 1 -

01 11 25 35 CMP MARK it. Okay. Got a minus - plus 1.1, okay. A minus 0.13; that's almost zero. Okay. Whoo! Man, bounces it around! (Laughter) little difference.

Tape 26/4

01 11 26 01 CMP Okay, we'll give it to the computer. Clockwise.
Go TVC TVC. Okay, PITCH 2.

01 11 26 10 CMP MARK it. Got it. YAW 2.

01 11 26 13 CMP MARK it. Got it? Okay, got the trim, about a
plus 12 and a minus 0.1. TVC, TVC, TVC, TVC.

01 11 26 29 CMP Okay, give it to the computer. Returns to zero.
Go TVC TVC. Okay.

01 11 26 37 CMP AC/DC. DIRECTS are MAIN A/MAIN B.

01 11 26 41 CMP Okay, zero BMAGs.

01 11 26 47 CMP Okay, 50 18. PROCEED.

01 11 26 52 CMP ENTER it.

01 11 26 57 CMP Okay. Uncage BMAGs.

01 11 26 02 CMP Okay. Let's try a gimbal test. Plus 2, minus 2,
0, plus 2, minus 2, 0.

01 11 26 22 CMP Okay, she went to trim. 02:38 to go. Okay, we'll
reach - SCALE was 5 what?

SC 39.

01 11 27 33 CMP Okay. RATE to HIGH.

01 11 27 37 CMP Okay, EMS NORMAL at 1 minute. Yes, we use bank A.

CMP This second burn, use bank A only. Okay, so in
3 seconds, Jack.

01 11 28 18 CMP Okay, cycle to ..., MIN, RATE to HIGH, DIRECT,
CMC AUTO; uncaged, RATE COMMAND, GIMBAL MOTORS,
LM/CSM and GIM - AUTO.

01 11 28 33 CDR Okay, Houston. 01:30 and we're going on board for
the burn.

CC Roger.

01 11 28 40 CMP Okay, Houston. No ullage.

01 11 28 45 CDR Houston - Houston, I'm sure you've seen it. We're reading below the green band oxidizer pressure, about 163.

CC Roger.

CMP (Singing) Okay. Let's wait until 30 seconds and ...

01 11 29 08 CMP CONTROL POWER is ON. ... DELTA-V THRUST A switch. Get it and EMS at 30 seconds. Ullage - no ullage.

01 11 29 28 CDR ... an average G is coming.

01 11 29 35 CMP EMS to NORMAL. DELTA-V THRUST A is ON. Okay, no manuals to it. You'll get the 99. Okay?

01 11 29 50 CMP 10 seconds, Houston.

CC Roger.

01 11 29 59 CMP 99.

01 11 30 00 CMP Uh-hoo! There we go. Lift-off!

01 11 30 03 CDR Okay. The burn is on time and - au - auto shutdown.

CC Thank you.

CMP Okay. Let's see what kind of trim we got. Yes, we trimmed it. Trimmed it to 0.2. Yes. Less than 2. Okay, plus 7 on the EMS.

CC Roger - -

CMP I mean on the R-1. (Laughter)

CMP Okay, we'll trim it out to 2. Plus 0.3. One more chance. Okay, there we go.

01 11 30 44 CDR Okay, Houston. You're looking at NOUN 85, and the EMS is minus 3.3.

Tape 26/6

CC Roger, Gene.

01 11 30 49 CMP Okay, gimbal motors check. Two -

01 11 30 52 CMP MARK it. Two -

01 11 30 55 CMP MARK it. One -

01 11 30 58 CMP MARK it. One -

01 11 31 01 CMP MARK it.

01 11 31 04 CMP Okay. SERVO POWER is OFF.

01 11 31 08 CMP TRANS CONTROL POWER and DIRECTs are OFF.

01 11 31 14 CMP ULLAGE circuit breakers are OPEN. Hey, we just caught up with all the particles. They're all ... with us.

01 11 31 33 CMP DIRECTs are OFF. PITCH and YAW. PITCH, ROLL, and YAW 1 are OPENED. Okay, you got the DELTA-V counter?

01 11 31 57 CMP Okay. BMAGs are caged. BUS TIES, JACK?

01 11 32 23 CMP Okay. BUS TIES are OFF. BIT RATE to LOW, while you're up there.

01 11 32 57 CMP That shouldn't change, I don't think; should it?

SC Okay.

CDR Houston, America.

CC Go ahead.

01 11 33 32 CDR Okay, the burn was on time. Looked like it was about 2 seconds. DELTA-V_{GX} was 0.7. ROLL was 132, PITCH was 193, and YAW was 342. Residuals after trim were zero - plus 0.1, zero, and minus 0.1, and DELTA-V_C is minus 3.3. OX 007. FUEL is 009 and DECREASE 50.

CC Thank you.

01 11 34 57 CMP PAN CAMERA's OFF. MAPPING CAMERA's OFF, huh?
And SM/AC POWER will be coming OFF, shortly.

01 11 35 54 LMP You know, Houston, we must of caught up with every
one of those particles. Because we're right in
the middle of them. They're going kind of in a
random fashion. Most of them are drifting right
along with us. Some of them are going against us
and away from us. But before we did the burn -
you know, the propulsion, they got out of the
vent. Sent them all away from us in what looked
like - in more or less the X-direction.

CC How about that.

01 11 36 26 LMP *** we really got a star field out there now.

CC Roger.

01 11 36 30 CDR Say, Gordy, the LM/CM DELTA-P is 1 - That's 1.0.
You want me to go to TUNNEL VENT?

CC Stand by.

01 11 36 55 CC Yes, that's affirmative, Geno. You have a GO for
TUNNEL VENT valve, VENT.

CDR Okay.

01 11 41 11 CC 17, Houston.

CMP Roger. Go ahead.

01 11 41 16 CC Okay, we do want to put BATTERY A back on CHARGE
as shown in the Flight Plan. And, also, I have a
new flyby pad. No hurry on this one, but it's a
flyby pad post-MCC-2.

CDR Okay, Gordo, how quickly should this tunnel vent?

CC Let me get a reading on that.

01 11 42 11 CC Geno, that should take about an hour. We'll
try to remember to occasionally remind you to
look at it.

Tape 26/8

01 11 42 24 CDR Okay. I'm glad you said that because I don't see any indication of it moving here yet, at all.

CC Roger.

LMP Houston, 17.

CC Go ahead.

01 11 43 54 LMP Never got to give you a 7-Alfa reading on a - after the last charge. It was 0.6 - decimal 6 as before.

CC Okay. Ed Mitchell - Ed Mitchell must be working now. I was just about to ask you for that. And for Geno, one reminder, you will have to switch back to LM/CM DELTA-P in order to read the DELTA-P. Over.

CDR Yes, Gordo, I'm - I'm aware of that, and I've done it. But in the about 3 or 4 minutes that I vented, I didn't see any change yet.

CC Okay. It's a pretty slow process.

01 11 46 30 LMP Okay, Gordy, battery A is being charged.

CC Roger, Jack.

LMP And I checked that 7-Alfa in the VENT position, and it's 0.6 also.

CC Okay.

01 11 52 16 CMP Okay, Houston. How's the CMP's "zippen" or ZPN?

CC Let me take a check to my left here.

01 11 52 27 CMP I'll take a deep breath for you.

01 11 54 29 CC Okay, Ron. Your ZPN looks good.

CMP Okay, I don't have the other one on yet. But I was a little bit curious because I left the electrodes in this thing, and - you know, the little sponges, I left those inside the electrodes, but they stuck to - to the back of the electrodes and kind of corroded the inside of it there a little bit.

CC Evidently, it's working okay.

CMP Okay, mighty fine.

CMP I'll put some new ones in.

01 12 07 43 CMP Okay, Houston, is my heart beating?

CC I'm sure it is, Ron, but I'll check to my left.

CMP Okay.

CC We'll wait a couple of minutes. It takes that long to settle down and give you a reading on it.

CMP Okay. No problem.

01 12 09 13 CC Ron, your EKG looks real good.

CMP Okay. Thank you much.

CMP That's all new, what you call it - those sponges and stuff, you know. And, Houston, I'm not - I'm not putting - putting any cover tape on it, so if it quits - you know, comes loose or something like that, well, let me know and I'll push it on again.

CC Okay, will do.

01 12 10 50 LMP You might make a note that Dr. Evans was assisted in that operation by Dr. Schmitt.

CC Roger, Doctor.

01 12 11 05 CC Jack, I've still got this flyby pad standing by.

LMP Nag, nag, nag.

CMP Can't talk with a mouthful of bread cubes, it all comes out.

LMP Okay, what kind of pad you want to give me? Flyby, right?

Tape 26/10

CC Right. A regular maneuver pad.

LMP Okay, and I guess the other one I can cross out, right?

CC That's affirmative. That's obsolete now that you've done midcourse 2.

LMP Okay, Gordy, I'm all set.

01 12 12 12 CC Okay, it's a flyby. SPS/G&N; 66678; plus 1.21, minus 0.13. Ignition time is 081:14:43.49; plus 0043.3, plus 0211.8, plus 0453.2. Attitude is 128, 146, 317; H_A is NA. H_P is plus 0021.1. DELTA- V_T is 0502.1. Burn time, 1:18, 0497.6. Sextant star is 25, 189.3 27.4. Boresight star is NA. NOUN 61 is a plus 15.60, minus 175.00; 1101.6, 36242. GET at .05G is 153:24:03. GDC stars are Sirius and Rigel; 256; 152; 069. Ullage, none. Remarks: 1, burn docked; and number 2, assumes PTC REFSMMAT. And that's it. Over.

01 12 14 51 LMP Okay, Gordy. Here's your readback. Flyby, SPS/G&N; 66678; plus 1.21, minus 0.13; 081:14:43.49; plus 0043.3, plus 0211.8, plus 0453.2; 128, 146, 317. H_A is NA. Plus 0021.1; 0502.1, 1:18, 0497.6; 25, 189.3, 27.4. Boresight, NA. Plus 15.60, minus 175.00; 1101.6, 36242; 153:24:03. Sirius and Rigel; 256; 152; 069. There's no ullage. Remark 1, burn docked - docked; and 2, PC - PTC REFSMMAT is assumed.

CC Okay, that's a good readback.

01 12 17 49 CDR Gordy, I might mention for future reference that we've established a new list of consumables, or at least added it to the old one. Now includes gray tape and tissues.

CC Okay, you want us to track those?

CDR It might help. We have a heck of a time finding them in here.

CC Roger.

Tape 26/11

CDR Oh, you meant quantitywise.

CC Yes, we'll set up in a special back room.

CDR We could call it the T-T room. Tissue and tape,
of course.

CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 12 41 58 CC Apollo 17, Houston. It's been about an hour. You might check the LM/COMMAND MODULE DELTA-P again.

01 12 42 07 CDR Okay; thank you. We'll do that.

01 12 43 04 CDR It's 2.2, Gordo; I put it back in VENT.

01 12 43 09 CC Okay.

01 13 00 09 CMP Hello, Houston; America.

CC Roger, America. Go ahead.

01 13 00 17 CMP Okay, Gordo. We're up to 2.5 on the tunnel and still venting.

CC Okay. Is that music we hear in the background?

CMP Yes, sir. (Music: Up, Up, and Away by Brazil '66) They've been making fun of some of my music. ...

CC Yes, it's coming down to us in living stereo.

CMP Reminiscent of yesteryear. (Music: Up, Up, and Away by Brazil '66).

CMP Music from America.

01 13 02 36 CC Roger. Thank you for the concert. That was very appropriate.

01 13 09 56 CDR Gordo, Ron went off the air for a minute, and LM DELTA-P is now 2.6.

01 13 10 04 CC Okay, Gene.

01 13 10 23 CC Geno, we'd like for you to let it get up to 2.8 before closing off the VENT. (Music)

01 13 10 31 CDR Okay, Gordo. We'll make it 2.8.

01 13 10 36 CC Roger.

01 13 20 32 CC ..., Houston. That was a slight handover, the reason we lost signal for a second there.

Tape 27/2

01 13 20 37 CDR Okay.

01 13 32 40 CDR Houston, 17.

CC Go ahead.

CDR Say, are we going to have a pretty good view of the Earth out of any CSM windows at the LM checkout altitude?

CC I'll check on that.

CDR We're sort of blocked right now.

01 13 32 59 CC Roger.

01 13 42 31 CC America, Houston. We're predicting that your LM/CM DELTA-P ought to be about right now, about 2.8.

CDR Okay.

CC We would like a reading.

CDR We'll check it.

01 13 43 16 CDR Gordo, 2.9.

01 13 43 19 CC Okay. Sounds good.

01 13 44 31 CDR Gordy, the reason I asked about that view of the Earth, we were sort of thinking maybe we might go early, if it was all right with you, and watch the Earth a little bit more.

01 13 44 45 CC Okay. We're still trying to get the answer on whether you'll have a window. Stand by. I might have it here.

01 13 50 06 CC America, Houston.

CDR Go ahead.

CC Okay. The LM inspection attitude that you'll go to results in kind of a marginal view of the Earth out of window 1, about 60 degrees away from it, bore-sight line of sight. And we're - we can - what

we've started to work on and if you wanted to do is you can go to kind of intermediate attitude, which will be the LM attitude except for roll which will be off by about 60 degrees, which will - will give you a good view of the Earth out of window 1. And then when we get ready to do the LM entry, you can roll that additional 60 degrees to get to the proper attitude, if you wish. Your choice. Over.

CDR Yes, if that doesn't bother anybody down there, we'd like to do that.

01 13 51 06 CC Okay. We'll have something for you here in a few minutes.

01 13 54 02 CC Okay. If you're ready to copy, I have a VERB 49 maneuver for you that will let you look at the Earth.

CDR Wait a minute, Gordo, and I'll just let you load it as we go here.

CC All right.

CDR Okay; ready to copy.

CC Okay. Roll is 240, pitch is 089, and yaw is 0. And the high gain for that attitude, we think it'll probably track to this attitude, is plus 29 and 27.

CDR Okay. Plus 29 and 27.

01 13 55 03 CC Roger.

01 13 59 17 CC America, Houston. Until you get the attitude, OMNI Charlie will probably work better.

01 13 59 34 CDR Okay, Gordy. We got you OMNI Charlie now.

01 13 59 37 CC Okay; loud and clear.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 14 05 13 LMP Gordy, for your information, we have our LM transfer items in the jettison bag ready to go over. And we're pretty well squared away on the - all the command module stowage now, with minor exceptions.

CC Okay.

01 14 12 58 CC America, Houston. We'd like you to go ahead and get on the high gain again since - and stop it just wandering around aimlessly. And how does the Earth look now?

LMP Sorry, Gordy, to be so slow. Earth looks great, and we'll get the high gain up in just a second.

CC Okay.

01 14 19 31 LMP Houston, 17. How do you read?

CC Go ahead. You're loud and clear.

LMP Okay, Gordy, going from south to north on noon-time, at least our noontime weather, it looks like there is a fairly strong mass of polar air moving from the southwest up towards Tierra del Fuego. It's mixed with some cloudiness that extends from that area all the way down to the Antarctic ice shelf. But it looks like some pretty good movement patterns from the southwest, north - north-east. No strong weather waves or cyclone development on that yet, although one may be picking up about halfway between Tierra del Fuego and the coast of Antarctica, the - where the front, or at least the cloud masses, curve from the east-west direction to an almost due south direction. Most of South America still looks like pretty good weather. There is cloudiness along the Andean Ridge and also in the Amazon Basin, stretching from the eastern coast of South America on up about, oh, two-thirds of the way towards Central America. It doesn't look like frontal weather there. It's probably tropical convergence weather. Now there is this - still this small, moderately

Tape 28/2

developed cyclone pattern that's hanging pretty much over Buenos Aires now, I think. Uruguay and Buenos Aires. I think I mentioned that earlier in the day. And that still is there, and I suspect those folks are getting a fair amount of weather out of it.

CC Roger.

01 14 22 00 LMP

Except for scattered clouds, Central America and Mexico, for the most part, are clear - as is most of the Caribbean Islands. Cuba and the others are - all look like they've pretty good weather. There's a little clouds off - cloud pattern off to the east of those islands, but it doesn't look like any major weather in that area. The eastern half and Midwest of the United States is completely cloud covered right now. There - however, the - extending from Mexico to Sonora and up into Arizona and New Mexico, and possibly as far north as Colorado, is a clear band. But then there is more cloudiness to the north of that. The Pacific regions west of - The West Coast of the United States is cloudy, at least west of Southern California. I cannot see Baja, so that cloudiness extends down south of - into Baja California. I see no strong new frontal patterns, although I'm looking right across the limb at the Earth now. There may be one that would be lying maybe across northern California and - and into Colorado, with a little clear area ahead of it, possibly in Kansas. But then into this, a solid bank of clouds that stretches from Brownsville, at least, clear up to - well, along the Gulf Coast across the panhandle of Florida, up the East Coast and on out past Nova Scotia, I'm sure. Florida is clear. Florida - the peninsular portion of Florida is - it looks very clear and some of the deep turquoise green waters to the south and southeast of that area are - are very obvious at this time.

01 14 24 43 CC

Roger, Jack. I'm following along on the satellite weather picture here that's taken from about your same vantage point and - although nowhere near the detail that you're describing.

LMP Have you seen today's analysis charts of the United States or North America?

CC No, I haven't. I was just told, Jack, that the - the weathermen and a lot of other people around here, too, are following your weather reports with great interest.

LMP Yes. Does that mean they're right or wrong?

CC You've got the better view, by far.

LMP That doesn't prove much. Okay, Gordy, I'm - I suspect that that's a pretty healthy front. I don't know. Your weather must be cloudy and bad today. Is that right?

CC It is. We've got about a half-mile vis and drizzly rain.

LMP Okay. Well, I suspect comparable weather extends all the way across the eastern United States. That looks like awful dense clouds, although there's no obvious frontal pattern. It just stretches from the Midwest to the East Coast. And, also, there's no good indication of stratification of those clouds, as if they'd be fairly - fairly thick up into the cirrus levels.

CC Roger, Jack.

LMP Looks like Arizona, New Mexico, and northern Sonora probably have some - one band of high cirrus. But other than that, probably a beautiful day out in that area.

01 14 27 20 LMP There's some transverse cloud patterns over the Mississippi-Alabama area. It suggests maybe that the jetstream may be just north of that region. But otherwise, there's no good indication of jetstream position right now.

CC Roger.

Tape 28/4

01 14 29 11 LMP

Gordy, there is one minor weather disturbance, possibly just about over Puerto Rico or maybe just - just to the east of that island. No strong circulation patterns, although there's a hint of a cyclone development. There might be just a small depression in that area. I don't know whether your maps are carrying anything down there or not.

CC

I think I see what you're talking about on the satellite picture, but I don't have a surface analysis that goes that far. I do - I just now got a copy of the surface charts for the United States. And there's - there's a front stretching from northern Texas northeastward up through Tennessee and Virginia and another one sort of parallel to it. But, this ... southward from Louisiana along the Gulf Coast across northern Florida and on out into the Atlantic. And I guess the two are kind of blending together to make that irregular mass of clouds you mentioned.

LMP

Okay, Gordy. If I'd been a little more observant I could see that there was a little bit, looks like a decrease in at least the thickness of the clouds, vertical thickness, between the two areas you just mentioned. So, there is some indication here of those two fronts, although they are contributing to a general weather pattern in the eastern United States.

CC

Roger.

01 14 31 06 LMP

I think, with a little experience in this business, you might have picked those two out of that mass. But it's not immediately obvious.

CC

Roger.

LMP

You got anything on there coming in from the northwest now, say up in Wyoming and Colorado?

CC

The way it's drawn on this surface charts shows that - that northern front that I mentioned, just now, sort of curving on up through central Colorado, and then bending westward toward - through Utah. That's about the only other frontal activity. There's one, probably dry front, then a short one through central Arizona and southern Utah.

LMP Okay. Well, that makes sense. That would match with that - what I was thinking was high cirrus in Arizona. And also I can see how you could bend - that's the northern front up through Colorado and then back westward to explain the patterns we're seeing in the clear areas south of that.

CC Roger.

01 14 33 04 LMP Gordy, the zero-phase point now is off the coast of Chile and Ecuador - oh, maybe 10 or 15 degrees of longitude, and it is fairly dull. It does not seem to indicate any great amount of choppiness or wave action in that area.

CC Roger.

LMP And about 15 minutes ago, Gordy, I took two more Hasselblad shots of the Earth.

CC Okay.

CMP And, also, Houston, frame number - let's see, that's 16 and 17 - were taken of the Earth about 15 minutes ago, too. And that's magazine Sierra Sierra.

LMP Okay, Ron. We copy that.

01 14 34 55 LMP Gordy, with respect to the icepack off the coast of Antarctica, it's difficult to distinguish pack ice from clouds, in general. However, the clouds seem to pick up reflection patterns with respect to the Sun. And using that as a - and some shadows in below as the criteria, it looks as if the pack ice in the South Atlantic would extend to a latitude almost comparable to that of Tierra del Fuego. I don't know whether that - that's reasonable or not.

CC Okay. I don't either. But maybe someone who's more of an expert can clear up your question on that. I'll let you know.

LMP Now to the southwest of Tierra del Fuego there's a - looks like a small cyclone developing, clockwise rotation, just off the edge of the pack ice,

Tape 28/6

and - but it does not seem to be closely associated with the frontal activity that I mentioned when I started out speaking at this - this particular time.

CC Roger.

01 14 36 36 LMP There is another - there is another one, maybe a front, a little bit ahead of that cyclone that's now extending north-south. Starts in the pack ice area and extends up - oh, about halfway from there to Buenos Aires - in the direction of Buenos Aires. It doesn't look like a very major mass of air or frontal system. It may develop into something over the next couple days though.

CC Okay.

01 14 38 08 LMP And centered, Gordy, at about 45 south and say 30 west, there is another cyclone area that's ahead of the last front I talked about that doesn't look - I think I talked about it yesterday - still does not look too strong, although the clouds, as I recall, the cloud cover is somewhat more well developed, and circulation patterns seem to be better developed. It may be an intensifying storm over what we saw yesterday.

CC Roger.

LMP I cannot see that it's associated with any clear frontal activity, however.

CC Okay.

LMP That, I presume, should be migrating in the direction of the - of the southeast coast of Africa, so we'll keep an eye on it.

CC Roger.

LMP And that reminds me, did you get any information on the - that - what looked like a very strong, concentrated typhoon or hurricane in the South Pacific between Borneo and the Philippines?

CC Let me check and see what we got on that. I wasn't here when you first talked about it evidently.

LMP Well, it was one that they didn't seem to be carrying, and it looked extremely well developed from here.

01 14 40 34 LMP Gordy, yesterday that - the one I'm speaking of - was centered at about 15 north and a hundred and - make that about 117 east.

CC Okay. I've been informed that they are - the satellite people are carrying that one now. I'm not sure whether they had seen it before or didn't see it until after you did. But they are aware of it now and are tracking it.

LMP Well, we're not competing. They just didn't have any information for me on it yesterday. We'll probably be able to see that again late this afternoon.

CC Okay. The one that you just gave the coordinates on is - does have a name, - that's Therese. Hurricane Therese. And - so the - the other one must be the - must not have the name.

LMP Okay. Now which one has - is Therese.

CC The one you just - the coordinates you gave almost exactly pinpoint Therese.

LMP Okay. That's near the Philippines.

CC That's affirmative. Between there and Vietnam.

01 14 42 38 LMP Okay. Well, then that sounds like - if that's an up-to-date position, it has relatively little movement since yesterday.

CC Roger. They show it moving just very slightly westward.

LMP Okay. Are they carrying anything south of Guam now that we talked about yesterday?

Tape 28/8

CC Take a minute to get something on that. They don't have a current map showing anything in Guam right now.

LMP And we also had a storm developing south of - or southwest of New Zealand. Might look at that one, too.

CC Okay.

CC Jack, are you making these observations through the monocular?

LMP Yes, sir.

CC Okay.

LMP Although most of them - well, at this distance, Gordy, the circulation - detailed circulation patterns to say what's a cyclone and what isn't are not visible to the naked eye, at least not to mine.

CC Roger.

LMP The major frontal patterns are, however.

01 14 46 49 CC Jack, that disturbance you mentioned near Guam isn't being carried on the current charts here as anything significant. They do show some cloudiness north of the tropical convergence zone, but just that.

LMP Okay. Well, I had a feeling what I was seeing yesterday might have just been the remnants of Teresa [sic], which I think went - got into that area a couple days ago. It was not a very well-developed system, but did seem - seem to be isolated from the other cloudiness that I would have put into the tropical convergence zone. That was between Wake and Kwajalein.

CC Roger.

01 14 49 03 LMP Gordy, let me try to give you a description of something that is a little bit unusual than what we've been seeing. The - there's an axis that runs from, say, the outer portion of the Ross ice shelf along the - and just off the coast of Antarctica, then bends up so that it would pass just to the east of Tierra del Fuego and - and then continues on that heading so that it would intersect the far east coast of South America, if it continued. Now along that axis, the - what appear to be multiple frontal patterns or at least linear cloud bands, bend very sharply and change from a heading that roughly parallels the axis around the one that is roughly north-south. And some of the front - frontal direction changes that I gave you earlier, down in that area, are - also bend around that axis.

CC Okay.

LMP And there just, oh, there are probably a dozen, if you tried to pull them out, cloud bands between the Ross Sea and Tierra del Fuego that bend around the same axis. Quite striking.

CC Roger.

01 14 51 06 LMP Now there's some indications, to me at any rate, that the jetstream in that area may be essentially east-west - oh, maybe 20 degrees of latitude north of the Ross Sea, and then bends down very sharply so that it intersects the - or approaches the coast - Antarctic ice shelf to the east of the Ross Sea, and then maybe it bends up and forms the axis that I just described that's causing that bending of the cloud patterns.

CC Okay. Sounds like a good theory.

01 14 52 08 LMP There's a linear clear area in that area north of the Ross Sea that - and to the north of that is a sharply defined front that I talked about earlier. And then, both the - that front continues. The clear area is cut off by the axis that I described, a cloud axis.

Tape 28/10

CC Roger.

LMP Now that should show up real well on the 250-millimeter pictures we took. Gordy, I'm back looking at zero-phase. And now, apparently, the exact zero-phase was partially obscured by a cloud pattern earlier. Now, when I - There is a very, very small bright spot in the center of the zero-phase area. Nothing comparable to what I described off the coast of Australia yesterday, but an extremely small spot. I suspect that the size of your bright spot in zero-phase has some direct - or indirect, at any rate, relationship to sea state.

CC Roger.

01 14 55 49 LMP Gordy, as you might expect, the whole coastline of Chile is - or all of Chile, practically, is clear. Beautifully exposed to us here, particular the Atacama Desert, which is noted for that particular characteristic, and - at least among geologists it is. And the coast of Peru is also clear with clouds following the Andean Ridge, probably the - certainly the coast side of the Andean Ridge. Lima ought to be enjoying a very nice day today. The - Ecuador, however, looks like it might have a little more cloudy weather, although it doesn't look like any major storm activity.

CC Roger.

01 15 03 12 CC America, Houston. We have a couple of words here on medications. Is everyone listening?

CDR Yes; we're on, Gordo. Go ahead.

CC Okay. Geno, you mentioned taking a nausea pill for some gas yesterday, and we were looking into some of the side effects. You definitely don't want to use that particular pill for gas. One of the side effects is that it's an appetite depressor. And there are some pills loaded in A-7, along with the vitamin pills, specifically for the purpose of eliminating gas. We would appreciate if you'd give us a call in advance prior to taking any medications except the Seconal and aspirin. Over.

CDR Okay, Gordy, will do. I was aware that those gas depressors were around. At the time, we couldn't find them in A-7. And so I took one of those other things, whatever it is. And while you're talking about that, as per the preflight food check, gas is very evident on - particularly on me - and I think I'm suppressing it slowly. But is there any problem, or what do you recommend on that Mylinol [sic] or Mylicon or whatever it is?

CC Okay. Stand by 1.

CDR This goes hand-in-hand with the amount of gas that I experienced preflight.

CC Okay.

CDR And it's the kind of gas - it's the kind of gas that just stays in your stomach.

CC Roger.

01 15 05 43 CC Okay, Geneo. The recommended use of those gas pills is to chew one after each meal. And then, if needed, chew up another one before going to sleep at night.

CDR Okay; fine. I chewed one after breakfast.

CC Okay. A little water after you chew it up, I guess, helps its effectiveness.

CDR That's a basic requirement, I believe. The effect of it has not been too obvious yet though.

CC Roger.

01 15 07 51 CDR Gordy, you want the O₂ HEATERS 1 and 2 to AUTO now?

CC That's affirmative.

01 15 08 06 CDR Okay. They're there.

01 15 09 05 CDR Gordy?

CC Go ahead.

Tape 28/12

CDR I don't want to cause any concern on that gas. It's no real great problem. It's just a slight discomfort; that's all.

CC Okay, Gene. I think we understand.

01 15 10 31 CDR Gordy, I have just eaten my first peanut butter sandwich in orbit around the Earth.

CC Roger. How was it?

CDR What's that? Well, it was just as good as it was when I was growing up - which means it was great. I grew up on those things, as I recall.

CC Charlie Duke's here with me and he - -

CMP Miss the lettuce. Sure have missed the lettuce and mayonnaise on mine though.

01 15 14 30 CMP And, Houston, we'll go ahead and maneuver onto the LM attitude.

CC Okay. We're watching you. Punch it in there.

CMP Okay.

01 15 27 20 CMP Okay. DIRECT O₂ is coming OPEN now.

CC Okay.

01 15 30 09 CMP DIRECT O₂ is OFF.

CC Roger.

01 15 30 55 CC America, before you open the equalization valve, we'd like one final reading on the LM/CM DELTA-P.

01 15 31 07 CMP Okitydoke.

01 15 31 17 CMP Okay. With this cabin pressure now, it's up to 3.5, almost 3.6.

CC Okay, Ron.

Tape 28/13

01 15 33 58 CC

Jack, Houston. We're ready to terminate the charge on battery A.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 15 35 30 CMP CSM/LM pressure equalization, huh? Okay. CRYO PRESSURE INDICATOR to SURGE/3 and verify the cryo. Wait a minute. See if I got the right one here. DIRECT O₂ is ON.

CDR Okay, Gordo, I cycled the CRYO PRESSURE INDICATOR from up to down, back to SURGE/3. And we got a MASTER ALARM and there was no O₂ HIGH FLOW with it at all.

CC Okay.

01 15 36 32 CDR Okay, I just did it again to verify it. And that picked up - it picked up the MASTER ALARM, although it might be associated with the fact that the surge tank is down and coming back up.

CMP No, I don't think so.

CC Roger, Gene. Although, the surge tank shouldn't have caused it.

CDR Okay, let me give you one more try on it. Well, that time it didn't ... it. All I did was go up to 1 slash 2 and the ALARM came on.

CC Roger.

CDR Okay, I went back to surge/3; it did not. So maybe it's coming on when I go up to 1 slash 2.

CC Roger.

CDR Yes, there it is, Gordy. It's definitely repeatable. I can go up to PRESSURE CRYO QUANTITY 1 slash 2 and the ALARM comes on.

CC Okay, Geno; understand.

CDR You might note that - hey -

CMP Okay.

CDR Gordo, you might think about the fact that we were getting them when the cabin pressure was high after launch. And there might be some association there, also.

Tape 29/2

CC Okay, a good observation.

01 15 38 05 CMP EMERGENCY CABIN selector to OFF. We got to unbolt it down there somewhere. Underneath the commander's couch. Okay.

01 15 38 38 CMP REPRESS PACKAGE valve OFF, should be OFF.

01 15 38 51 CMP Okay; verify DIRECT O₂ is CLOSED. Okay; TUNNEL VENT VALVE, LM/COMMAND MODULE DELTA-P. Okay, it's greater than 3.1. It's up around 3.6.

01 15 39 38 CMP Okay, we're going to open the pressure equalization valves.

01 15 41 08 CMP Okay. DELTA-P is 2-1/2.

01 15 41 12 LMP And, Gordy, battery A charge has been stopped and the battery compartment pressure is still reading 0.6.

CC Roger, Jack.

01 15 41 36 CMP Okay. There's the DELTA-P of 2. We'll close the equalization valve. Yes, we'll monitor for 3 minutes now.

01 15 44 01 CC Geno, Houston. We just wanted to verify that no - none of the lights in the matrix were - flashed when you operated that switch and got the MASTER ALARM.

CDR That's affirmative, Gordo; none of the lights flashed at all.

CC Roger.

LMP When we get the cabin pressure down, Gordy, here, we might try one more time. Which Gene just did.

CC Okay, and nothing happened?

CMP That's affirm.

CC Roger.

01 15 45 40 CMP Okay, still holding at 2.0 on the DELTA-P.

01 15 45 48 CMP Okay, we'll open the pressure equalization valve and when the cabin pressure gets to 4.0, hit the REPRESS O₂ ...

01 15 46 57 CMP DELTA-P is about 0.6, we might make it this time.

01 15 47 20 CMP DELTA-P's - Okay, I'm going to open her right up. DELTA-P is 0.2 now.

01 15 48 29 CDR Okay, Houston, the hatch is open.

CC Roger.

01 15 50 39 CMP Okay, the EXTEND LATCH is ENGAGED. Red is not visible. GN₂ BLEED button. (Singing) Okay; GN₂ BLEED. Not too much in there.

01 15 51 06 CMP Okay, PRELOAD SELECTOR lever - rotate parallel to the orange stripe. Okay. PRELOAD HANDLE, torque clockwise to unload the old support beams.

01 15 51 32 CMP (Clanking noise) the probe is big. Whoops - Oh, okay.

01 15 51 36 CMP Ah-hah, the probe is loose in the tunnel. Okay, rotate away from the orange stripe. (Singing) Torque -

01 15 52 25 CMP Okay, we'll probe umbilicals. Is the LM POWER OFF? Proceed - doesn't make any difference. DOCK PROBE CIRCUIT BREAKERS undone? ... That's good and tight.

01 15 52 56 (Clanking noise)

01 15 52 57 CMP Oops. Get the sergeant. Okay.

01 15 53 22 CMP Son of a buck. Okay, I'm trying putting those things back on now, just for the heck of it. It's brand new; nice and tight.

01 15 53 48 CMP Can you smell nitrogen? Smell something up here.

01 15 53 56 CMP Okay, probe umbilicals disconnected and stow. Electrical connector covers are closed. Yes, yes,

Tape 29/4

those are yellow ones. PRELOAD HANDLE, position against - against the umbilical connector. Okay, that's done.

01 15 54 18 CMP SELECTOR LEVER is in the mid position. INSTALLATION STRUT.

01 15 54 31 CMP Okay, INSTALLATION STRUT is unstowed. CAPTURE LATCH RELEASE HANDLE LOCK. Okay, the RELEASE HANDLE is unlocked.

01 15 54 57 CMP Okay, RATCHET HANDLE unstowed to the full extension; boost to the first detent. That's good and tight going back to the first detent. Okay. Fold probe, looks like. Yes, it's out. (Singing)

01 15 55 31 CMP Ooooh! There it comes. That's just like in the simulator. It comes down by itself. It comes - pushes me out of the way, as a matter of fact. Okay. I'll get it a little better.

01 15 56 00 CMP Okay, RATCHET HANDLE pulled to full extension and then ratchet one stroke. Gets it so it gets it off the thing.

01 15 56 25 CMP Okay, that's one stroke backwards now. Okay, RATCHET HANDLE and INSTALLATION STRUT are restowed. CAPTURE LATCH RELEASE HANDLE.

01 15 57 08 CMP Okay, CAPTURE LATCH RELEASE HANDLE is rotated 180 degrees and it's back in the recess. Okay, let's see if it comes out.

01 15 57 20 (Clanking noise)

01 15 57 22 CMP Ooops. There it comes. I couldn't see it awhile ago. Let me look - the PROBE STRUT in the way. That's why you can't see it until now. Where do we want to go with this thing down over here at the -

01 15 58 23 CMP Houston, it's a nice clean ... and release there on top of the probe. It's nice and clean down there. The button is depressed. There's play around the little button on the end of the probe there, too.

CC Okay, Ron. In about 1 minute, we're going to have a site handover. You'll be talking through Hawaii after that takes place.

CMP Okay. What's the docking angle? Blew it, I guess. 1.2 degrees, huh?

CMP Yes, I think I better ver - verify that, just to make sure. COAS looks great.

01 15 59 41 CMP Hold a minute, Gene - wait a minute. You got - there we go.

01 16 00 00 (Clanking noise)

NOTE: During the period 01 16 00 XX to 01 18 21 XX, the CMP aboard America was switched to the GOSS 2 net, for which time-annotated recordings are not available.

CMP Am I not looking in the right place?

CMP Let me look. I don't know where one is, right offhand. I'll check here.

CMP Well, just help me with some terms here. I was just looking again at sight of - underneath the power bungee.

CMP Okay, Gordy; we're at the top of 1-13 and all switches, valves were in proper configuration.

CC Okay, you could have asked me and I could have told you that.

CMP We were just trying to give you a plug - Well, if you don't want them - Well, we'll take it back. (Laughter) I shouldn't have said anything to the world's most experienced DLMP. Right?

CC Roger.

CMP ...

Tape 29/6

CC Ron, at first glance, it doesn't look like you have one on board ... We're still looking though, but I don't think we have one.

CMP Well, it's kind of the conclusion I came to when I didn't find it in the system data - Hey, I got a little bit to tell you about that. Oh, those little ones underneath the power bungee.

CC Okay, go ahead.

CMP Okay, if you look at the docking lights, number 4 up beside of that - Oh, kind of a ... looking thing. There is a snowman. In other words, a great big fat thing with a head on top of it. And if you consider the fat thing with the head on it as a snowman, well then, the snowman's head is pointing out a 09:00 on that one. Whereas one that's fully cocked and latched over there, the snowman's head points up at about 11:00. And - Okay, there is a lever that comes right out of the bottom of the power bungee, it looks like, and then it comes out of the bottom then left out of that lever, is another silver slot or silver bar that goes from the lever to the J-hook with the snowman on it. That particular thing that connects the J-hook to the lever coming out of the bottom of the bungee is visible. In other words, it's not sticking back underneath the J-hook. It's visible.

CC Ron, we've got just a line drawing here and we've still haven't got with you on what's what according to the drawing. Maybe you can hold off until we get a model of the latch, then we can stay with your description.

CMP Oh, okay, Gordy.

CC I'll give you a call.

CMP Okay.

CMP It's up to you. ... I want to float up in the tunnel. Do you want to float up and look?

CMP You know, the congestion I had all day yesterday is just about gone.

LMP Gordy, you'll be happy to know that putting the LMP's camera together is 500-percent easier in zero gravity.

CC Roger.

CMP It becomes a two-hand process.

CMP Is that temporary stow?

CMP Hey, Jack, if you get a chance, take a picture back this way.

LMP Okay.

LMP Putting the cue cards up now, and the camera, by the way, Gordy, operated for two frames and the Reseau clean lens looks clean and everything's fine with it.

CC Okay, Jack; sounds good.

SC The regular type, huh?

CDR Okay, Gordo, on the top of 1-15, we're ready to go ahead and transfer the power. We'll give you a call.

CC Okay, Geno.

SC Okay, the LM POWER circuit breaker is IN. What the - let me know what you want, okay? Okay, going to OFF, RESET. Okay, back ON. And, I have to open my ... again. The pressure's been? I don't know what it is.

SC Okay, Houston; we got a good transfer.

CC Roger.

SC Got it again by hitting the panel.

CC Ron, this is Houston.

CMP Yeah, go ahead, Gor.

CC Okay, we've got considerable conversation going on here about that docking latch, and it's not at all

Tape 29/8

settled yet. The primary thing we want to guard against is the possibility that it is malfunctioning and that we get it latched down on the ring and can't unlatch it, and, therefore, have problem with undocking, or possibly even prevent it. So, we'd like you steer clear of that until we come up with a final solution. No experimentation, please. Over.

CMP Okay, I understand. I'll leave them alone. And just one little other bit of information to let you know the handle itself is not free at this point to come on back down like it's - you know. Like, if it were fully cocked, the handle itself would be free to come back down. It is not free, I did not try to put a whole lot of pressure on it, but it's not free.

CC Okay. I understand.

LMP Okay, Houston. GLYCOL PUMP 2 is ON, it's been on about a minute, and we've got good talkbacks from batteries 1 and 4.

CC Roger, Jack.

SC ... CDR buses are 262.

CC Roger.

SC Okay, Jack, you can go ahead and switch onto high taps 1 and 4.

SC Yes, it works. Okay, 1 and 4 on high taps.

CC Roger.

LMP Houston, glycol pressure is 22.

CC You faded out, Jack. Say again on glycol pressure.

LMP Roger. It's 22.0.

CC Okay.

LMP Well, you can cut off the decimal.

CMP Okay, stand by 1. Okay, it's on, Jack. No, wait a minute, I got to go get it. Which one you on?
A. Okay. Okay, Jack, I'm SIMPLEX Alfa. Okay, try it again. I got the - How me? Okay, Jack, you're cutting out on everything, and all I'm getting is the end of your transmission there. Okay, I'm counting - 1, 2, 3, 4. Jack, you read me? Okay, you - you were unclear after your first two words in every case, just like you were cutting out on Bob. Got it all that time. You read me too? Well, that's interesting. Let me adjust the squelch on this one here.

SC Okay. They used to work. I can't hear the squelch on any of those.

CC Jack, ... your main TRANSMITTER and RECEIVER, OFF, and B TRANSMITTER ...

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

Note: During the period 01 16 00 XX to 01 18 21 XX, the CMP aboard America was switched to the GOSS 2 net, for which time-annotated recordings are not available.

01 17 16 06 LMP Well, it shouldn't make any difference on transmission. Could be we're so close that - that I - Ron, it might be that we're so close that it has something to do with overdriving something in here. We'll try - check it out again later. But it's loud and clear now, right?

CMP ...

LMP Okay. VOICE, ON. Okay. T/R.

LMP Okay. You're loud and clear, Ron. How me?

CMP Okay. ...

LMP Okay. And my - my VHF Alfa had to go to 2 on the SQUELCH, and I'm in 3 on Bravo.

CDR ...

LMP You're loud and clear, Gene.

CDR ... okay?

LMP Okay. How do you read now?

CDR ...

LMP Okay. I took it V to 2, so it's the same kind of thing, I guess.

CDR ...

LMP Okay, Houston. How do you read Challenger? Counting 1, 2, 3, 4, 5. Over.

Tape 30/2

01 17 18 03 CC Challenger, this is Houston. You're loud and clear, although we have a lot of background noise. Not sure whether that's getting through. Do you know if Ron is still on VOX?

SC ...

SC Hello, Houston; America. How do you read?

CC America, this is Houston. Over.

SC Okay. Stand by, and Challenger is going to give you a call on S-band, and VHF checks are both GO on A and B.

CC I think I side marked on Challenger. We are getting some data. We'll stand by for another check.

01 17 19 21 CMP Do you acknowledge that?

LMP I heard him the first time.

CDR Okay. ... me get S-band in ...

01 17 19 29 LMP Okay, Houston; this is Challenger. Counting 1, 2, 3, 4, 5. How do you read?

CC Challenger, Houston. You're loud and clear, with the background noise.

LMP They don't have a good up-link, Gene. I - I had signal strength. And now I don't have any at all.

CDR Okay. Houston, Challenger. ...

LMP There it is. Now I do; 2.2.

CDR Okay. ...

LMP Tell them I heard their transmission to you.

SC ...

LMP No, a few minutes ago.

SC ...

01 17 20 34 LMP I was at zero signal strength, and I heard their transmission ... One of them. The first time they acknowledged that your - that I was going to do it.

LMP Did you shift my hose back? Oh, ...

01 17 21 13 CC Hello, Challenger; this is Houston. Do you read me?

LMP Okay, Houston. I read you. You're weak but clear. Signal strength is fluctuating. When you called me, it fluctuated down to about 1.6. Over. And it's 2 now.

CC Okay, Jack. You're loud and clear. The background noise I've been mentioning, although I guess you haven't heard me mention it until now, is what we expect in DOWN VOICE BACKUP and LOW BIT RATE. How have you read this transmission all the way through? Over.

LMP Did he say "say again?" Gene? Gene, did he say "say again?"

SC ...

LMP I got a little bit. Oh, he's got 3. - -

SC ...

LMP What? Okay, Houston. I've got 3.4 on the signal strength, and try me again.

01 17 22 18 CC Okay, Challenger. You're coming in loud and clear. How do you read me?

LMP Okay, Houston. I know you tried to transmit. I could just barely tell that. I could see the signal strength vary down to 3. You were modulating, apparently, but you're not getting through to me.

CC Okay, Challenger. I'm transmitting simul now in both S-band frequencies, and it sounds to us like for some reason when I transmit, the up-link signal starts to break up. It's just the way you see it. Over.

Tape 30/4

01 17 22 59 LMP Okay, Gordy. You're breaking up there. Still modulating, but I cannot read you. Would you - would you tell America what you said?

CDR Yes, Gordy, we read you in America loud and clear on that simul.

01 17 23 15 CC Okay, Geno.

LMP Is he talking, Gene?

LMP As soon as he starts trying to talk, the signal strength drops off about 0.4. Now, I have had - I heard him loud and clear one time when he called you guys.

01 17 24 31 CC America and Challenger, we're going to hand over to a different site and try that here in about 30 seconds.

CMP What else do we have to do, get some of these mags stowed?

01 17 25 01 CMP We've got to stow the mags. Here, put the PPK where it belongs.

01 17 27 40 CC Hello, Challenger; this is Houston through Bermuda. How do you copy?

CC Challenger, this is Houston. How do you read me?

SC ...

CC Back in Houston?

SC Right, Gordo.

CC Okay, Jack. I think he answered us, but he was completely lost in the noise. I could just barely hear somebody talking. Could he hear us okay?

SC No. If he did hear you, he didn't answer.

CC Okay. It was my imagination then.

01 17 29 00 CC Challenger, Houston. How do you read?

01 17 29 13 CC Hello, Challenger; Houston. How do you read?
SC ...

01 17 30 59 CC Hello, Challenger; this is Houston. 1, 2, 3, 4,
5. How do you copy? Over.
SC ...
CC Can you tell Jack - ask him to verify he's on
AFT OMNI?
SC Okay. I'll have him verify he's - That's affirm.
He's verified.
CC Okay.
SC ... earlier when he was ... that he ...
CC Roger.
CC But on this last set of checks, we didn't hear
anything ...
SC Apparently not.
CC Okay.
SC There was one time earlier when he had zero signal
strength where he said he could hear you transmit-
ting to us very weak but clear.
CC Okay.

01 17 34 04 CC Hello, Challenger. Hello, Challenger; this is
Houston. How do you read?
LMP Okay. You're loud - well, you're about 3 by,
Gordy, but very clear.

01 17 34 16 CC Okay, Jack. We can hear about 1 by 1 in the
midst of a lot of noise, but we could tell you're
sounding much better.

01 17 36 33 LMP No. I've got 2 now, ... 3.

Tape 30/6

01 17 37 23 CC Challenger, this is Houston. Going up to you through Bermuda, and your - you should come down through Goldstone. How do I sound now?

01 17 37 48 CC Challenger, Houston. How do you read?

01 17 37 57 LMP You're 1.8, 1.8. Yes. Never heard him.

01 17 38 41 CC Hello, Challenger; Houston. How do you read?

01 17 39 52 LMP Gordy received me, didn't he? Well, he started to say something; then he dropped off.

01 17 41 13 LMP Now he's up. Haven't heard him.

CC Roger, Houston.

CC Okay. We're going to go back to Goldstone, both up and down, and we'd like Jack to do step 406 on the checklist; in other words, go to VOICE. S-BAND VOICE to VOICE, the BIOMED to RIGHT. And we're going to give it a try in the normal configuration. Over.

SC A 174 and 76, gentlemen. BIOMED, RIGHT; and S-BAND VOICE to VOICE.

CC That's affirmative.

SC ...

CC Roger.

LMP Houston, do you read Challenger?

01 17 42 08 CC Roger, Challenger. Read you weak but clear. How do you read?

LMP Okay, Houston. You just came in loud and clear. How do you read?

CC Okay. And that time, you're loud and clear, Jack and sounds read good.

01 17 42 26 LMP Okay, Gordy. Let me say once again, way back when we first started and Gene was talking to you, I heard one of your answers, weak but clear, with zero signal strength showing here. Now, that might have been through Ron's VOX, I don't know. Since then, you've been able to modulate the signal strength, with occasional weak words. And - and then, when that signal strength was up around 3.2, where it is now, then you came in loud and clear with a broadcast. I answered you, you said about three words, then dropped off completely. And then we - we changed configuration.

01 17 43 09 CC Okay, Jack. That correlates with what we've seen here in the way of signal strengths dropping in and out. Stand by, and I'll see where we want to go from here.

01 17 44 25 CC Challenger, Houston. We'd like you to do step 7. We'll check out the telemetry and have that ready.

 LMP Okay; step 7.

 CC And, Challenger; Houston. Making a voice check. How do you copy?

 LMP Roger. You're loud and clear. How me?

01 17 44 54 CC You're loud and clear.

01 17 45 57 CC Challenger, Houston. We're looking at the HIGH BIT RATE for a minute here while we're waiting. Would you check the CROSS TIE circuit breakers, panel 16? Verify they're open.

01 17 46 09 LMP That's verified. CROSS TIEs BUS and BAL LOADS open.

01 17 46 14 CC Roger.

01 17 46 56 CC Challenger, Houston. We'd like you to accomplish step number 8.

01 17 47 09 LMP Roger. Step 8.

01 17 47 28 LMP Okay, Houston. How do you read the Challenger? 1, 2, 3, 4, 5. Over.

Tape 30/8

CC Challenger, you're loud and clear. How me?

LMP Loud and clear.

01 17 47 38 CC Roger.

01 17 49 07 CC Challenger, Houston. Go ahead with step 9. Report the ED BAT VOLTAGES.

01 17 49 16 LMP Wilco. Stand by.

01 17 50 07 LMP Okay, Houston. ED BATs A and B are 37.2.

CC Roger. Okay. And go ahead with step 10, and then we'll go back and try to find out what's wrong with DOWN VOICE BACKUP.

LMP Gordo, say again, please.

CC Go ahead and check the sequence camera, if you haven't already, Jack, and then we'll have some steps for you to check out what was wrong with DOWNVOICE BACKUP.

01 17 51 00 LMP All righty. Stand by.

01 17 51 19 LMP Sequence camera - sequence camera is GO.

CC Okay.

LMP And I'm ready for your step.

01 17 51 30 CC Stand by 1.

01 17 53 41 CC Challenger, Houston. We'd like the RANGING switch to OFF/RESET, and the VOICE switch to DOWNVOICE BACKUP, then give us a call. Over.

LMP Okay. OFF/RESET on RANGE, and DOWNVOICE BACKUP on VOICE.

CC That's affirmative.

01 17 54 05 LMP Okay, Gordy. On DOWNVOICE BACKUP, how do you read? 1, 2, 3, 4, 5.

CC Okay, Jack. You're readable. You're - okay, Challenger. We read your transmission, but you're just about - just about lost in the noise. Give us another count, please.

01 17 54 34 LMP Okay, Houston; this is the Challenger. You were loud and clear, loud and clear. No different from the transmissions in VOICE, and counting 1, 2, 3, 4, 5. How do you read? Over.

CC Okay, Jack. It got a lot better. You're - you're perfectly readable now. Sounding good.

01 17 54 57 LMP That sounds good.

01 17 55 13 CC Okay, Jack. Would you go to HIGH BIT RATE?

01 17 55 17 LMP Roger. Challenger's HIGH BIT RATE. How do you read HIGH BIT RATE?

CC Okay. Still the same. Loud and clear.

01 17 55 40 CC Okay. We'd like BIOMED, OFF now, Jack.

01 17 55 49 LMP Roger. Going BIOMED, OFF. Okay, Houston. How do you read the LM? DOWNVOICE BACKUP; BIOMED, OFF; PCM, HI. Over.

01 17 55 58 CC Okay, Jack. You're loud and clear.

01 17 56 04 LMP Okay, Gordy. And that was hot mike, so that's working fine up here. And you're loud and clear, also.

01 17 56 16 CC Okay, Jack. Let's try PCM, LO, now.

01 17 56 23 LMP Okay. Talking to you DOWNVOICE BACKUP; BIOMED, OFF; and PCM, LO. How do you read? Over.

CC Okay. Same old loud and clear.

LMP Okay, Gordy. Certainly is clear up here. You're coming through 5 by at signal strength 3.2, and - all appearances up here, that previous problem was an up-link. But I guess you were not reading me. Is that correct?

Tape 30/10

CC Well, I was - The answer is yes and no at various times. We think, though, we have a good handle on the problem.

LMP Okay; very good.

LMP Are you ready for us to press on here, Gordy? We're all stowed and - in pretty good shape in the LM.

01 17 57 29 CC Okay. We'd like you to check one more switch first before moving on. Check the UPDATA LINK switch to OFF.

01 17 57 40 LMP Okay. That is verified OFF.

01 17 57 43 CC Roger.

01 17 58 01 CC Want you to stand by a minute or 2, Jack, until we verify a funny-looking parameter here on that up-link switch.

01 17 58 17 LMP Standing by. What's that? No, they want - they got something looking funny on the up-link - they're - I guess on the up-link switch.

CC Challenger, Houston.

LMP They want to look at it.

CC That was a bad call. We were reading the data wrong. You're clear to press on with the check-list now on page 1-20.

01 17 58 50 LMP Okay. We'll press on. Geno, here is your jettison bag. You can get back to Ron.

SC ...

01 17 59 08 LMP Okay. S-BAND T/R, OFF; VHF, OFF. I can hear you.

01 17 59 24 LMP PM, OFF.

CC Roger, Geno.

SC Okay, Houston. We just transferred to CSM power, and the caution warning light did go off.

CC Roger.

01 18 21 25 CT You going back to air-to-ground 1?

01 18 21 32 CMP Okay. I heard somebody go to air-to-ground 1 that time, and -

SC Gordo, we're about wrapped up here in Challenger. It looks like there's some life in the old bird, huh?

CC Roger.

CDR Okay. We'll give you a call when we get the hatch closed. Ron's doing some housekeeping in the command module, and we're going to take it slow getting back in.

CC Okay, Gene.

CMP Okay, Houston. The drogues are going in.

01 18 21 40 CC Roger, Ron. Got a couple of questions on those - that latch number 4, if you can answer them for me.

01 18 22 00 CC America, Houston.

01 18 22 43 CC America, Houston. We're back with you after some site changeover. How do you read?

CMP Okay; loud and clear. How me, Bob?

CC Real good, Ron. On that number 4, latch number 4, is the hook back away from the ring about 1 inch as opposed to resting against the ring? Do you have about an inch clearance on that hook right now?

CMP Well, there's about 1/2 inch.

Tape 30/12

CC Okay. Understand about 1/2 inch. In what position was the latch handle when the hook was first moved back, Ron? We it kind of like in a normal stroke-back, or was it just flopping back?

CMP No, when I first looked at it, the latch handle was - see, the hook itself was over the ring when I first looked at it.

CC Roger. We understand that.

CMP The hook was over the ring, and the - and the latch handle was flush, you know. It looks just like a normal - hooked docking latch, you know.

CC Roger. Understand.

CDR And, Bob, this is Gene. I can confirm that it did not fold back easily, because I - I checked it yesterday. I didn't check - I checked to see that the hooks were over as well as where the handles would fold back, but I obviously didn't check to see whether that one was seated. But the handle was locked.

CMP That's right.

CC Roger. Understand. And the first thing you saw was the depression in the Bungee. Is that - is that affirm?

CMP Yes, that's affirm. And the bungee is depressed about 3/8 - 3/8 to a 1/2 inch.

CC Roger.

CMP You can push the - you can push the hook about an inch away from the ring, but the normal - just a resting position on the thing is about a finger's width or 1/2 inch from the ring.

CC Roger. In other words, the loose - The hook is loose so it flops a little bit; you can move it back and forth. Is that affirm?

CMP Yes. I can move it from about 1/2 inch to an inch from the edge of the ring - clearing the edge of the docking ring.

CC Roger. Ron, when you pulled the hook - when you pulled the handle back, did you reach and pull the hook back with it, or did it come back with the handle like a normal pullback then?

CMP No, the - the hook did not come back with the handle. The hook did not come back with the handle. Although, when I - when I pulled the handle back to - you know, which is - which is kind of a normally uncocked position - and then it wouldn't go any further, you know. It wouldn't go any further. And then the latch itself - or the hook - the J-hook; I'll call it the hook. I moved it off the docking ring back to this position that was about an inch or 1/2 inch from the docking ring. And it stays right there now. And I can't push it back up into the docking ring at all. Can't push the hook back up to the docking ring at all.

01 18 26 28 CC Okay. We copy that.

CC Okay, Ron. Our plan here is to leave it like it is. And we're going to think about it tonight, and we'd like you to just keep pressing on. Just leave it alone, okay?

01 18 26 56 CMP Okay. Sounds good. It'll clear the docking ring; no problem.

01 18 27 06 CDR Houston, America. While Ron is putting in the probe and getting the hatch back in, I'm going to go ahead and maneuver. How does that sound?

01 18 27 19 CC That's real fine, Gene.

01 18 29 17 CDR Bob, are you all going to want OMNI or HIGH GAIN on this?

01 18 29 24 CC Stand by on that.

Tape 30/14

CC We're all locked on the HIGH GAIN. We'd just like you to leave it on HIGH GAIN. The angles you see in the Flight Plan are in case it breaks lock. That's what you need for - with this attitude.

01 18 29 56 CDR Okay.

01 18 33 11 CMP Okay, Houston. The probe is installed. We'll get the hatch in now.

CC Roger, Ron.

CMP I'm not going to connect the umbilicals unless you really want to look at probe temperature.

CC Stand by on that, Ron. We concur on that, Ron.

01 18 33 44 CMP Okay; good.

01 18 39 29 CMP Okay, Houston. The hatch went in nominally, once the probe installation strut was stowed in the right position.

01 18 39 42 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 18 43 46 CC 17, Houston. We - we are recommending quads Bravo and Delta for spinup.

01 18 43 56 CMP Okay; Bravo and Delta. Thank you.

01 18 57 53 CMP Okay, Houston. At 042:56:52.04, I started the stop watch, and also the watch read 18:30:01.

CC Okay, Ron. We got that.

01 19 02 24 CMP Okay, Houston. We've started on the heat select radial and lineal part - part of it. The little pie-shaped things are changing color as we go out. The lineal part of it - all of the chips seemed to have been concentrated on the front edge of the glass, and they're all pretty much in the linear direction or in XX-direction. At this point in time, I haven't seen any movement yet.

CC Roger, Ron. Aren't they on ... heads the same way they were on the backup unit the other evening in the White Room - on the lamp?

CMP Yes, all those chips seem to be - well - in an XX- I got the lineal direction, the lineal part of the experiment in the XX-direction. And all the chips are lined up in that XX-direction on the front or the top of the glass.

CC Roger. That's just the way ou were in the backup unit the other day in the White Room.

CMP Yes, that's right.

01 19 11 36 CMP Okay, Houston. We've started the cooldown in LIGHT 5 position there. The radial cells, they all started to change color except the one from about 10 o'clock to 12 o'clock.

CC Roger. Except from 10 to 12. We've got it. Did the lineal ... stay right in line there, Ron?

Tape 31/2

CMP Yes, the crystals or chips that are inside there didn't move at all. Yes, they're ... - -

CC Roger.

CMP On the color patterns behind there - the one on the left, as you look at the unit - the color crystals only changed down to about 0.9 of the first square as you come down from the top. The rest of them are all black on that partic - on the left row.

CC Roger, Ron.

01 19 12 44 CMP So that's the maximum extent of the - that's the max extent of the heating.

01 19 12 59 CMP You might check and see if the guys want to heat it a little bit longer the next time, when they do it in the PTC.

CC Yes. Roger, Ron. We're copying everything you're saying, and we've got all kinds of support here; we - in fact, we've got one backup unit here watching what you're doing, so we'll keep you posted on what we think.

CMP Oh, okay. Is the backup CMP operating it?

CC Matter of fact, that's affirm.

CMP That's the way to do things.

CC And, Ron, we'd like you to stay nominal on the heating time due to the film limitation.

CMP Okay; will do.

01 19 15 09 CMP Okay, Houston; 17 here. Is there enough film in there to allow me to keep the camera running while I try to fill up that flow pattern.

CC Stand by on that, Ron.

CC It's affirmative, Ron. You can leave it running.

CMP Okay.

01 19 16 51 CMP Okay, Houston. The first thing I noticed, as soon as I opened the FLOW four turns, it started running out a little bit, even - even without doing the inject. Okay; that's because the INJECT thing was open just a little bit, but it's all right.

CC Roger. We copy.

01 19 17 22 CMP Okay; I'll try to squirt some fluid in there -

CC Okay.

CMP With the fluid inject thing.

01 19 18 11 CMP Okay; I'm taking it in quite slow. It's noted there are quite a few small bubbles coming out with it. So far, so good. It hasn't overflowed the - the first capillary ring. And it's taken off, and it's going by capillary action toward the bottom and toward the top.

CC Roger, Ron.

01 19 19 26 CMP Okay; it finally met together at - that part going around the top and around the bottom - met together 180 degrees opposite of the inject port and now is starting to go out across the middle and fill up from the inject port.

CC Roger.

01 19 20 58 CMP We're getting a lot of big bubbles coming out now. That's after about a turn and a half.

CC Roger. We copy.

01 19 21 41 CMP Okay; that's two turns now. the meniscus is still holding on the first inner ring - it looks like all the way around, at least as far as I can see. The bubbles - big bubbles that have been coming out now, and also the fluid have taken over the right half of the bottom of the dish. We're starting to fill in a little bit, maybe a fourth

Tape 31/4

of an inch - fourth of an inch circumference coming around from the left side opposite the injection port.

CC Roger.

01 19 22 31 CMP Okay; I'll keep going here. We're about two and a half turns now. And it looks like all of the bubbles have already come out. We're getting real fluid now coming out. It's a real pretty picture anyhow.

CC Roger.

01 19 22 55 CMP Okay; that's three turns. I don't believe we're going to be able to cover the entire bottom with the four turns.

01 19 23 27 CMP Okay. That's four turns, and - it's covered up the right - oh, three-fourths of the floor of the thing and about three-eighths of an inch on the left side of the - of the floor - three-eighths of an inch annulus all the way around, except for the right - oh, say right two-thirds of the floor.

CC Roger, Ron. You can use more than four turns if you need it.

01 19 24 02 CMP Okay; let's go ahead and try to cover up the whole floor on the thing before we do it. The bubbles are in there, and I'm afraid they're going to stay un - unless they disappear when we heat it.

CC Roger.

01 19 24 35 CMP There now it's - it's coming out with no bubbles now, and it looks like it almost formed a meniscus on top of itself - on top of where the bubbles were.

CC Roger, Ron. Is it continuing to spread out?

CMP Yes, it's continuing to spread out now, and without pumping anything into it at all - I did that last turn fairly fast - and it seems to be

spreading of its own accord now, and it should go on over and cover up the bottom, I think. Once it completely covers up the bottom, I think we should go ahead and start the heat HIGH on this pattern.

01 19 25 59 CMP Okay. Now the - Everything's all hooked together now. We completely filled up the bottom of the floor.

01 19 26 15 CMP Hey, for some reason, the bubbles seem to be starting to break now.

CC Roger. We copy that, Ron.

01 19 26 53 CMP Okay. I don't know if it's coincidence or what, but all the bubbles are formed together, essentially in the center - in more or less at least - I mean - yes, along the plus-X-axis direction. And they're about 1 inch wide. And then they start about three-quarters - I mean three-eighths of an inch in from the circumference.

CC Roger.

01 19 27 58 CMP Okay; I was going to try to break the bubbles with a pencil, but if you try to push a pencil into the bubble, it just moves aside.

01 19 28 23 CMP So that being the case, I'm going to go ahead and start the - start the timer.

CC We concur on that, Ron.

LMP That's called the old push-a-bubble-with-a-pencil trick.

CC Roger. Just need a sharper pencil, Jack.

LMP Either that or a thinner bubble.

01 19 29 18 LMP This is the best Friday afternoon matinee I've ever been to.

CC How about Friday evening, Jack?

Tape 31/6

LMP Well, I've lost track. I don't think - I don't think there's any ... -

CMP Stand by.

01 19 29 38 CMP MARK. That was 1 minute after the start.

CC Roger.

CMP I'll give you another mark when I go to HIGH on the - with the SELECT switch.

01 19 30 38 CMP MARK it.

CC Roger.

01 19 31 36 CMP Each bubble looks like it's locus of - it looks like it's starting one of the Bernu - Bernudi cells.

CC Say that again, Ron?

CMP Okay; each one of those bubbles looks like it's the locus - or the start of one of the Benard cells.

CC Roger.

CMP So far, the bubbles aren't breaking.

CC We copy that.

LMP Is Stu getting - did Stu get bubbles on his pattern, Bob?

CC We're not running it down here. We're just demonstrating on the demonstrator there, but Stu can tell you.

LMP Oh, I thought you were running - -

MCC Roger, Jack. Yes, I - you're talking of the one that - that we did, right?

LMP That's right. Well, I am now. I thought you were running it down there also.

MCC No. Okay. The one that we did in flight - Yes, I had - I had a lot of bubbles, but I couldn't get mine - Krytox out across the center. So, you all are already well ahead of what I did.

LMP Gee, I'm sorry you had to admit that, Stu.

MCC Oh, you all just do such good work.

01 19 33 05 CMP Okay, the thing is, it seems to me like, in one g, the Benard cells started completely back to the edge, you know, right back to the edge of the circle. And in this case, at least, they haven't filled in yet back to the edge of the circle at all. They all started out in the center and are working around the bubbles, and then it's now - just now starting to form a few of them where there aren't any bubbles.

CC Roger, Ron.

01 19 33 37 MCC How large are the cells, Ron?

CMP Well, they're varying considerably in size. I can see one that's about a half an inch across, and then the other ones - they've got a great big bubble in it, and yet the cell itself is down to maybe an eighth of an inch. The bigger ones seem to be on the outside; and, of course, there are very few bubbles on the outside also.

CC Okay.

CMP And the bigger ones, generally right now, are averaging about - oh, a fourth to three-eighths of an inch in their cross - cross section ...

01 19 34 57 CMP The cells tend to be somewhat polygonal. Let's see, we've been going 6 minutes - 4 minutes into the heating part of it, and the - the cells are polygonal, but they don't seem to be quite as - as straightlined as they were on the ground.

Tape 31/8

CC Roger. We copy.

01 19 36 18 CMP It almost looks like it's reached a steady state now. It's 9 minus 2 - 7 minutes.

CC Roger.

01 19 36 30 CMP Hey, I think the one thing I neglected to mention is that we essentially have a convex surface from the - the material; in other words, con - convex with the high part in the middle; and, of course, that's where the bubbles are, too, but I think you'd generally have that type of a surface anyhow. And, it hasn't broken the meniscus of the lower, or the thinnest ring.

01 19 37 35 LMP We should have had some popcorn on our stowage list.

CC Roger.

01 19 39 48 CMP Okay; now the Benard cells are starting to form in that outer annulus that went all the way around.

CC Roger.

01 19 45 55 CMP Okay; we went back to light 4 now. And we never did get any real beliginal [sic] cells formed around the outer annulus. And even the cells that were formed on the thing, it seemed like the particle flow within the cells was very slow when you compare that with the way it was in one g.

CC Roger, Ron.

01 19 48 03 CMP Okay; I'm trying to - such the stuff back in the - the entry tube there, and it looks like part of it's going in.

CC Roger, Ron. We copy that.

01 19 49 07 CMP And the camera is down to about 50 percent here, so I'm going to go ahead and turn it off now.

CC Roger, Ron.

01 19 49 40 CC Ron, if I didn't tell you, we concur with turning the DAC off there.

CMP Okay; yes, I got you. I'll turn it off.

01 19 50 06 CMP You know, I just happened to think, after I've already sucked part of those bubbles back in there, we've got enough fluid in there to pump it out the next time without sucking that back in there, don't we?

MCC I'm sorry, Ron. Say that again.

CMP Don't we have enough of the Krytox fluid without sucking that back in there? Maybe I can just wipe the Krytox off with some Kleenex, and maybe there won't be any bubbles the next time.

MCC Okay; stand by.

01 19 51 00 MCC Ron, I guess we understand you've pulled some back in, but you haven't pulled any of the bubbles. Now, if you pull any more in, you're going to start the bubbles back in. Is that correct?

CMP Yes; that's correct.

MCC Okay; why don't you stand by here on that then?

CMP Let me see - I'll see if I can push the bubbles out of the way here with something.

01 19 51 29 MCC Okay. The consensus is that we would like to not pull the bubbles back in. I think you've got a good idea.

CMP Okay.

MCC It's the old keep-the-bubbles-out-of-the-Krytox trick.

01 19 51 48 CMP (Laughter) Okay; I'll see if I can do it.

01 19 52 09 LMP I see you're finally getting caught up in the humor of the thing there, Stu.

Tape 31/10

MCC Oh, I've always been in good humor. It sure sounded like that batt did the trick, Ron.

CMP Yes, I think it did, too. It looks like it worked real well.

01 19 56 21 MCC And, 17, just so you say we didn't give you our cue, we're standing by for the 1-17 procedures there in your Experiments Checklist - the film cycling.

CMP Okay; we'll have to get that shortly.

MCC Okay.

01 19 57 53 LMP Okay, Stu, we got you on that. The Saturday afternoon or Friday evening matinee was absorbing us so, we almost missed it.

MCC Okay.

01 20 03 28 LMP Okay, Houston. DATA SYSTEMS coming ON.

CC Roger.

01 20 03 39 LMP AUX TV's to SCIENCE, and SM/AC POWER is coming ON.

CC Roger.

LMP Okay; MAPPING CAMERA is STANDBY -

01 20 03 51 LMP MARK it.

CC Roger. Mark it.

LMP PAN CAMERA MODE, STANDBY -

01 20 03 59 LMP MARK it.

CC Roger.

LMP I guess that's verified.

01 20 04 21 LMP PAN CAMERA POWER to POWER.

01 20 04 23 CMP Barber pole and a gray.

CC Roger.

01 20 04 34 CMP SELF TEST is going to HEATERS.

01 20 05 06 LMP Okay; we're standing by for your cue on MAPPING CAMERA, ON, and SELF TEST.

CC Roger. Stand by on that.

01 20 05 51 CC 17, you're GO for cycling the pan camera and the mapping camera.

01 20 06 00 LMP Okay.

01 20 06 13 CMP Okay; MAPPING CAMERA has gone ON; PAN CAMERA to SELF TEST. Barber pole and release.

01 20 06 45 CC Looks lik 10 seconds on the PAN CAMERA there.

01 20 07 28 CMP Okay; PAN CAMERA POWER is coming OFF.

CC Roger, Ron.

01 20 08 21 CMP Okay; MAPPING CAMERA going OFF.

CC Roger, Ron.

01 20 09 04 CC That's 30 seconds off on the mapping camera, Ron.

01 20 09 11 CMP Okay; SM/AC is OFF.

01 20 09 19 LMP S-BAND AUX TV's OFF, and BIT RATE, LOW, now?

CC That's affirmative.

01 20 09 43 LMP Say, Bob, say again those jetts you're commended for PTC.

CC We recommended Bravo and and Delta for spinup - B, D.

LMP Okay; do the rates look okay to you?

CC That's affirmative.

Tape 31/12

01 20 11 02 CC Jack, Houston.

LMP Go ahead.

CC Jack, when you get done with the PTC area here, we'd like you to get out the Flight Plan Supplement. We'd like to get a food report from you all on your food intake for today.

LMP I thought we gave you that in the morning. Happy to do it, but - -

CC That's affirm, Jack - -

LMP You want a special report? Is that what you want?

CC We'd just like to have it - prefer tonight.

CMP It sounds like you don't think we're eating enough.

01 20 11 42 CC Ron, would you check your NOUN 78?

CMP Ah-ha! Thank you.

CC Roger.

01 20 13 30 CC Jack or Ron, when you come around, we'll ask you to stow the high gain on our call, and we'll be wanting OMNI Bravo.

LMP Roger.

LMP And are you ready for the trotting gourmet's report?

CC roger. Everybody's here with all ears.

01 20 14 02 LMP Okay. The CDR today had scrambled eggs and three bacon squares and a can of peaches and pineapple drink for breakfast. And then later on in the day, he had peanut butter, jelly, and bread with a chocolate bar and some dried apricots. The LMP had scrambled eggs and four bacon squares, an orange drink, and cocoa for breakfast, and potato soup, two peanut butter and jelly sandwiches, and

a cherry bar, and an orange drink. And that hero of the matinee, the matinee idol of Spaceship America, had scrambled eggs, bacon squares, peaches, cinnamon toast, orange juice, and cocoa for breakfast. That's how he keeps his form. And, for lunch, he had a peanut butter sandwich and citrus beverage. And that's it, since there's nobody else up here.

01 20 15 45 CC Roger. We copy that. We'd like you to stow the high gain at this time and OMNI Bravo.

01 20 16 41 CC Jack, we appreciate all your information, and we'd like to just pass on some recommendations here from the ground that we'd like you to keep on with your regular menu as much as possible. And, if you do cut anything off, we'd like you to concentrate on eating the meats, the juices, and the fruitcake, which are the most effective for maintaining your electrolyte balance.

01 20 17 32 LMP Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 20 17 33 CDR Okay, Bob. We understand what you're saying. We're showing at eating - eating it all. It's just a lot of food, that's all.

CC Roger. We understand, Gene. Also, on that group of foods, peanut butter's great for the bal - electrolyte balance, also; so you're doing okay.

CDR I knew it was good for something. It couldn't be that good without being good for something.

LMP I think we're all trying to make a concentrated effort also to keep quite a bit of water down.

01 20 17 46 CC Roger. I understand. Real fine.

01 20 26 14 CMP Houston, 17.

MCC Go, 17; Houston.

LMP Okay. Got a little information on what we were talking about yesterday with respect to southern Pacific weather, if you've got nothing else going on.

MCC Go; speak to me.

LMP Okay, looks like a little - cyclonic circulation we had over New Zealand is still there. It's - looks like the front it was associated with is broken up a little bit; however, that pattern is - seems to be hugging the New Zealand area, and - but not - has not intensified. If - if not - it may have even weakened a little bit since yesterday. It's hard to be sure exactly. The front does not look as strong, and it still seems to be hanging just stabilized and with all of Australia clear now and the western edge of that front being just offshore north of Brisbane. The - there is - east of New Guinea - in the vicinity of the Solomon Islands, it looks like a fairly moderate-sized cyclone developing at the western edge of the - of a front that was somewhat farther north and west than the one over New Zealand. North of that - Wake/Kwajalein region that was of interest

Tape 32/2

yesterday to the ARIA people - still seems to be in general overcast condition, but the clouds do not look very heavy or impacted at all. New Guinea is just on the limb, so -

01 20 28 27 LMP Oh, I think I lost them.

01 20 31 56 MCC Okay, I think we've got you now, 17.

CMP You're loud and clear, Stu.

MCC Okay.

01 20 32 46 LMP Stu, I think we lost you about the time I lost view of the Earth and mentioned the Wake/Kwajalein area; right?

MCC That's affirmative. We didn't get much of the Kwajalein report.

LMP There was nothing new to add over yesterday. There just seems general cloudiness in the area, but they do not look too intense or well organized. Just probably a general overcast.

MCC Okay.

LMP I'll try to get some exercise, and then I'll be back at you with some more information. Maybe we can see the Philippines by then.

MCC Okay.

LMP And, Stu, I've got my biomed hooked up. Are you guys bringing it in during this exercise thing? This is Jack.

MCC Yes, Jack. We'll check on that.

MCC Okay; you're coming in loud and clear, Jack.

01 20 34 15 LMP Okay.

01 20 35 46 CDR Stu, are you reading?

MCC Roger. We're reading you loud and clear.

CDR Okay, I think that big storm that Jack was referring to - that has moved off to the - well to the east of Australia. Very definite counterclockwise rotation and then it stretches to the south or what might even be the southeast. And then just rolls right - we ... a big frontal pattern and then rolls right into another - another clockwise - clockwise rotating low down there near Antarctica. It gives me the impression of a - of a parrot's comb when he's got his feathers ruffled. And it, in turn, has another low trailing it, arcing and then flowing into another - another low that is very near the continent down there of Antarctica. They form a chain, as I just described froming - coming from - well, possible southeast of Antarctica - it's hard to really tell what east is down there - on up to due west of Australia by several hundred miles.

CC Roger.

01 20 37 20 CDR South of Australia, you get a hint of a very large cloud mass, from there all the way down to Antarctica, that has the tendency to - -

01 20 39 44 CC 17, Houston.

CC 17, Houston.

CDR Go ahead.

CC Just wanted to get comm there again. We had some switchover there. You might be interested; we've got an ATS map in here from this morning. Just - you're just about on - We can see the flow patterns in the Antarctic just about at - 120 degrees west, which is a little closer to South America than what you're calling, I guess. But we do - we do see that activity down there.

CDR Okay, Bob. And there is a very large cloudy air mass between Australia and Antarctica. It has a tendency to want to start a rotation, and you can see a hint of that; it's not too strong right now. We're seeing about three-quarters of the Earth, I guess. Judging from our clocks and what we can see, it looks like the Sun is setting out over the west coast; and it leaves us with about three-quarters of the Earth available to us.

Tape 32/4

01 20 41 21 CC Roger. It'll be about 06:15 Los Angeles time right now, so it's probably sunset out there.

01 20 42 41 CC Ron, just a reminder from the Flight Plan change last night. You'll have a P52 coming up here at 45 hours in your Flight Plan.

CMP Roger. Mighty fine; thank you.

01 20 42 58 CC Roger, Ron.

01 20 46 32 CC Jack, just for information, you've got your heart rate to 103.

01 20 48 25 CC Jack, you've got your heart rate to about 103; and we lost data right now.

CC Jack, just for information, the last heart rate we had was 103; and it's - we lost data right now, so 103 is max we saw right now.

LMP Okay, I was just doing some isometrics. I was tired running in place again then.

CC Roger. Do you want us to call you your heart rate if - if we get data in here now?

LMP Sure.

01 20 49 14 CC Okay.

01 20 50 25 CC Okay, you're up to 115, Jack.

01 20 56 20 SC ...

01 20 59 55 CC What are you doing, Jack, - resting, or did you quit?

LMP No, I'm resting right now. Didn't seem like my arms have the stamina they did yesterday to hold the artificial g. What - -

CC ... understand.

LMP - - did I get to?

CC We copied about a maximum of about 118 - -

LMP What heart rate did - -

CC - - on the heart rate.

CC About 118 max, Jack.

LMP Roger. Understand.

CC Don't let me - let me harrass you. I just was kidding you on that. Whatever you think is fair.

01 21 00 30 LMP You're not harrassing me. When my arm's rested, I'll try again.

01 21 00 52 CC Couple of interesting data points for you, Jack. We saw the - while you were doing that, we saw the PP CO₂ go up; and we saw the tanks destratify again the same way.

LMP Very good. Next mission they'll have to Flight Plan it.

CC That's affirmative.

LMP You saw the P CO₂ go up?

CC That's affirmative. Let me get the numbers here, if you want. It took a jump from 1.3 to 2.4 on that.

SC ...

LMP Okay. That - that was with two of us going, and, part of the time, three of us going.

CC Roger. Understand.

LMP Now we've still got one going.

CC Well, it's not unexpected. I just thought you'd be interested.

01 21 01 52 LMP Sounds sort of normal.

01 21 03 03 LMP Hey, Bob, with this change in the hour, what time does penumbra start?

Tape 32/6

CC Say again the question, Jack. What time does what start?

LMP With the change in hour, what time does the penumbra - what time do we enter the lunar penumbra?

CC Right now, we don't - Tommy doesn't think we're going to go into the penumbra, and we're verifying that.

LMP Okay.

CC Hey, Ron, could we ask a question about the heat-flow experiment setup?

CMP Sure. Sure, go head.

CC You mentioned that the lineal chips were all on the - in the XX plane, and we're just wondering - do you mean along the XX axis of the spacecraft?

CMP Yes; along the XX axis of the spacecraft.

CC Is the long XX axis of the lineal cell along the XX axis, Ron?

CMP Yes, that's affirmative. It's right-side up, if you're looking at the connect panel, you know?

CC Yes. That's - we'd - they'd like it so that that - the axis of that lineal cell was - would be parallel to the bottom of the panel 100, as an example. It's prob - right now, it's perpendicular to the bottom of panel 100, isn't it?

CMP Now, wait a minute.

01 21 05 17 CMP Yes, the lineal thing is, right now, perpendicular to the bottom of panel 100.

01 21 07 36 CMP Hey, Houston; America.

CC Go ahead, Ron.

CMP Okay, I think I see what you're saying. I'm sorry; I read the thing with lineal cell in a plus-X direction. But what they mean is, lineal cell in the - in - (laughter) -

CC Lineal word, I guess, is the - -

CMP ... lineal cell up.

CC Roger.

CMP Okay, I'll turn around the other for this PTC part of it then.

CC Wait a minute on that, Ron. We're having a debate whether we want to, maybe, continue the next part in the same attitude or just rotate it.

CMP Okay. Seems to me like you'd like to - maybe leave it in the same attitude.

CC Ron, the only rational reason to change it right now is we're hearing words that if you had rotated to the other way, that you'd get better pictures out of the DAC due to the lighting reflection on it. The PI would like to change it back to the other way.

01 21 09 07 CMP Okay.

01 21 12 31 CC 17, just for information, we will not be going into the penumbra.

01 21 12 41 LMP Okay. Sorry to hear that.

01 21 15 45 CC Ron, we see your 52; and you can go ahead and torque.

CC Ron, Houston. We're watching your 52, and you can go ahead and torque.

CMP Okay, Houston; 17. Thought you said go ahead and torque. Is that correct?

CC That's affirmative, Ron.

CMP Okay. We'll torque at 1630.

01 21 16 30 CC Roger.

01 21 23 50 CC Ron, a couple reminders - The LOI [sic] - -

Tape 32/8

01 21 24 59 CC 17, Houston.

01 21 25 53 CC 17, Houston.

CMP Roger. Go ahead.

CC Roger, Ron. Just a reminder on the LOI [sic] canister change - Have you gotten into that?

CMP No, not yet. We're - probably get started on this -

CC Okay. On the - -

CMP On the heat flow first.

CC Roger. Understand. We'd like to know when you start on that heat flow, Ron, because we need to get the DSE to high bit rate.

CMP Okay. I'm having a little trouble getting them mounted - in a stable position this way.

01 21 26 44 CC Understand.

01 21 29 50 CMP Okay, Houston; this is 17. I'm about ready to start it here in about 45 seconds here; let me know when you get the tape recorder going.

CC Roger, Ron.

CC Okay, we got the tape recorder in HIGH BIT RATE.

CMP Okay.

CC Hey, stand by 1, Ron. We got a little change here we'd like to make on the plan on page 2-6.

CMP Okay. Stand by for zero. 3, 2, 1 -

01 21 30 36 CMP MARK it. It's reset. Start the stop watch.

CC Roger. And, Ron, on the checklist on page 2-6 after the 16-minute "End of test and proceed to next test," we'd like to turn the DAC OFF at that position.

CMP Okay. Will do.

CC And, then, you turn it back on at the re - where it says "Reset stop watch and start." The time zero there - point. Prior to that, turn it on. I'll remind you of it.

CMP Okay. You don't want to watch me fill that pan again, huh?

CC Say again, Ron.

CMP You don't want to watch me fill the pan again.

CC Yes. Roger. Yes, it'll be up before then. We'll watch you fill the pan. We just - while you're taking time wiping it and all that, that's when we - we don't want to use up the film there.

CMP Okay. I'm with you. Actually, I've already cleaned out the - the little area there.

CC Roger. I've got 1 minute on my timer right now - about 01:27, actually.

CMP Oh, thank you.

01 21 32 24 CMP Well, we'll start at 2 minutes.

SC ...

01 21 33 37 CMP You're still on the front page with the lineal cell.

01 21 47 50 CMP Okay, Houston. The DAC is OFF now.

CC Roger. DAC OFF.

CC Say, Ron.

CMP Go ahead, Houston.

CC Yes, Ron. If it's not too much bother, it's one of those nice things to have. The PI would like you to take a picture with the - with the 35-millimeter indoor of the orientation of the heat flow as it's mounted. See if you can get that, if it's not too much problem.

Tape 32/10

CMP Okay. No problem. Good idea.

CC And that should be magazine SS, which is the same one you'll use for - with the ALFMED tomorrow.

CMP Affirmative; okay.

CMP Okay. I opened the flow about four turns. A little bit is running out - one big bubble in it. And I still have a little bit left over, even though I wiped it out pretty good awhile ago. The meniscus is up to the bottom ring, and I think we put in eight things in there where it's going to try to get the meniscus up to the top baffle. Is that correct?

01 21 49 55 CC That's correct, Ron.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 21 51 17 CMP There must have been a few more bubbles down in there again. That was two turns now, and I've got it about half full all the way across.

CC Roger.

CMP But, maybe there's just about eight or 10 bubbles in it.

01 21 52 36 CMP That's three turns. The fluid is essentially ... And we're still going on the first - fourth, so for turn now, and it's still develops a meniscus around the lower baffle - the smaller baffle.

01 21 54 58 CMP Okay. Looks like about six of the bubbles have developed into three, for some reason.

CC Roger.

01 21 55 57 CMP Oh-oh. It was doing real well there. Then on seventh turn, a bunch of bubbles came in again.

CC Roger.

01 21 57 25 CC Ron, I might have given you a bad call before. We don't want the DAC on until just before that 2-minute mark here, where just prior to going EXPERIMENT/HEAT SELECT - FLOW PATTERN - LOW. At that point, is where we want the DAC on.

CMP Okay. You want the DAC on when it starts heating up.

CC That's affirm.

01 21 57 52 CMP Okay. You, know - I may have lost track of the turns here, but I think we've got 7-1/2 or 6-1/2 turns in here. And it still hasn't overflowed that first lower baffle. I've got a tremendous concave - convex surface on the fluid, but it still hasn't broken the meniscus of the first bas - baffle.

Tape 33/2

CC Roger. We copy that.

01 21 58 57 CMP Okay. I'm going to go ahead and take it another turn, because it was my understanding we wanted to try to get in the second baffle, anyhow. So, I'm going to take another turn of Krytox and put some more in there.

CC That's correct, Ron.

01 21 59 37 CC Ron, if that - if that doesn't do it, they're saying you might want to take a pencil or something and stir it up a bit and try and break it up from lower baffle into the upper baffle.

01 21 59 51 CMP (Chuckle) Okay. I'm afraid, I may have it all over the place if I do that, but I'll try it.

CC Roger. Very slowly.

CMP (Laughter) Right.

01 22 00 56 CC Ron, just a question while you're watching it here. Do you have any bubbles in the lineal cell?

01 22 02 57 CMP Yes. This one is going to be interesting. There are about, oh, a dozen, nine to a dozen - small bubbles right next to the inject board and then about the same number right in the center of the convex portion of it.

CC Roger, Ron. Did you - we didn't copy your answer to our question about any bubbles in the lineal.

01 22 03 27 CMP No, I didn't get to your question on that. In the lineal unit there are no bubbles whatsoever.

CC Roger. Thank you.

01 22 03 35 CMP And there might have been very slight movement. Matter of fact, I can see just a very slight movement, even now. The particles, in there, they're still lined up in the YY direction essentially though, although it looks like some of them may have deviated from the front of the lineal unit back toward the center, or toward the back of the lineal unit, as you call it.

01 22 04 09 CMP Well, I missed the 2-minute start time there, but I can keep track of it here.

01 22 04 15 CMP So we'll start the DAC, and then I'll turn this to LOW at 02:45.

01 22 04 31 CC Okay. We got a hack on it, Ron. If you started it, we started our clock.

CMP Okay. You know, just for future reference here, if we like to do things in zero g and without jarring or jiggle, we want to make sure that the switch actuates with a minimum of pressure.

CC Roger. A good point.

CMP (Laughter)

01 22 06 17 CMP Okay. That's just now starting to develop. Look like circular cells, great big ones. And then some of the bigger ones are subdividing now.

CC Okay. We got that.

01 22 06 34 CMP That one's ... Some of them are even getting bigger. One of them is - oh, about three-quarters of an inch in diameter, and it hasn't divided yet, at all.

CC Those are real good comments, Ron. I was in just talking with the experimenters, and if you've got nothing else to do, giving us some sizes of those cells would certainly be very beneficial.

CMP Okay.

01 22 07 21 CMP Okay. Frame 27 was taken at an elapsed time of about 4 minutes.

CC Okay. We got that.

01 22 07 42 LMP Stu, this is Jack. I was taking the pictures. I took four pictures about 20 seconds apart - of the sequence just after he started it. And that ended with - or started with frame 26.

Tape 33/4

CC Okay. Frame 26 for 4 seconds - I mean for four frames.

01 22 08 15 CMP Okay. That one cell I spoke of that was about three-quarters of an inch in diameter now is about an inch long and maybe three-quarters of an inch wide. Each - All of the cells seem to be bigger, in general. They're bigger this time. There is two small ones at about an eighth of an inch and - and along one side. The other one is a half-inch, a half-inch - oh, a quarter of an inch, a half-inch, and then a circular when you get around the outs - out - annulus of the cup. Then you start getting circular sides instead of straight sides. All of the flow comes from the little center spot and flows outward from the center toward the outside of the cells.

CC Okay. We - we copy that.

01 22 08 09 CMP ... all of the bubbles have disappeared, except two.

01 22 09 20 CC Ron, is the smallest cell you see about an eighth of an inch across?

01 22 09 27 CMP The smallest cell I see is a four-sided one; it looks like a diamond. And it's an eighth of an inch on one side, an eighth of an inch on the other side, and maybe 3/16 on the other two sides.

CC Okay. That sounds - that's a good description, Ron. I know on mine some of the smaller ones didn't show up in the - in the film, and we were not - not sure what size they are. So you might, before you quit, bracket the - the smallest or the biggest cells by your estimate of the size.

01 22 11 27 LMP At any rate, frame number 31, frame number 31 ...

01 22 11 38 CMP And the information first half of the experiment. The orientation was 90 degrees from this one. (Laughter) In that the lineal cell was on the right, and the lineal cell was aligned with the XX axis.

CC Okay, Ron. We got - We had a drop in our signal strength there, and we did get your last comment about the orientation. We missed some comment about the frame numbers; I think came from Jack.

01 22 12 15 CMP Okay. Something's a little different on this one here. Right at the top of the flow circle, it looks just like a finger. It's a curved surface that goes out and almost touches the - the circumference of the dish. And it looks just like if you're holding your finger up and looking at it. It's that type of a shape to it. It comes back down, and it's about a half an inch wide. The flow again emanates from a source that is almost on the fingertip, you might say.

CC Okay. We copy.

01 22 13 11 CMP Okay. Somehow, that fingertip finally touched the complete circumference, and the tip of the finger disappeared.

CC Okay.

01 22 13 24 CMP Okay. My - my small one-eighth inch - or one-eighth of an inch sided diamond joined with another one, now, and one side of the diamond is gone. I still have three sides of the diamond and the fourth side of the diamond, or the upper right-hand corner of the diamond, you might say, has disappeared and goes on with another little square - or rectangle. One - one end of the rectangle is about $3/16$ of an inch long; the other two sides are about three-eighths of an inch long.

01 22 14 07 CC Ron, what's the location of that - of that diamond and rectangle in the - in the circular dish? And is it near the edge, or is it towards the center?

01 22 14 18 CMP There are almost - No, it's almost in the center. Towards the center. Almost in the center. On the left edge, as you look at the piece of equipment, as you're looking at it, there are absolutely no patterns at all. There is a flow. You can see

Tape 33/6

a stream of flow. Whoops. I can get up then and start looking at it. I blew on it when I was talking. You can see a stream of flow from the circumference in toward the outer group of cells. The outer group of cells is at least half an inch from the circumference, though, at that point.

CC Okay, Ron. We copy all that.

01 22 15 20 CMP Yes. I think there is a general migration of - of the cells. Kind of toward the bottom of the circle, if you want to look at it that way. They seem to be stretching kind of in that direction, too.

01 22 15 42 CC Okay. You're saying that's toward minus X?

01 22 15 45 CMP ... No, toward the plus Y, as you're looking at it.

CC Okay. They're migrating toward plus Y.

CMP I'll - I'll try to make all directions, with respect to - with respect to the right-side-up of the equipment, you know.

CC Okay. We've got you.

01 22 16 06 CMP And the first finger I talked about was at 12 o'clock. It has joined the edge now and almost disappeared. The second finger was - still essentially the way it was - is getting slightly closer to the edge. There's maybe - oh, less than 1/32 of an inch between the tip of the finger and the edge. And it goes out at - at 2 o'clock. Okay, from 3 o'clock on around to about 7 o'clock, the cells - It's in a shadow, and I can't see for sure if they're touching the edge or not, but it looks like they're probably essentially touching - the sk - the edge.

CC Okay.

01 22 16 58 CMP And then from 7 o'clock on around to 12 o'clock again, none of the cells are touching the edge at all. And they're - oh, an average of three-eighths of an inch from the outside circumference.

CC Okay. We're getting all that, Ron.

01 22 18 03 CC And, Ron, we'd like to verify that the fluid is up to the second baffle.

01 22 18 11 CMP That's verified. It's up to the second baffle.

CC Okay.

CMP All I had to do was start it in one position, and as soon as I started it - started it in one position, it whipped all the way around it. From the point I started it, it went all the way around in both directions.

01 22 18 28 CC Okay. That sounds beautiful. That ought to be a good data point for something.

CMP Yes. Right.

01 22 18 38 CMP I think that in the low flow here evidently things are even a little bit slower than they were in the high rate - in the high - in the high heat rate. But my little diamond, now, is almost joined with the rectangle. And I think given half a chance, it's tending to go into another five-sided figure.

CC Okay. We copy.

01 22 20 44 CMP And we start to cool down ...

01 22 21 14 CMP Okay. As we're cooling down, the flow patterns tend to join together, so far. The ones on the outer periphery dissolve into straight lines. Straight lines are emanating in a radial direction from the center of the circle.

01 22 24 12 CMP And, Houston, if you're listening; or DSE if you're listening. Had a little bit of film - oop, there's the end of film right now. May as well stop it. Hey, I went to HIGH for a little ways.

Tape 33/8

CC Okay, Ron. You came back in; I didn't get all of that. Understand you ran out of film. And say the other.

01 22 24 36 CMP Well, I still had a little bit of film when the cooldown - the 2-minute cooldown period was left, so I went back to HIGH on the FLOW PATTERN just to see what would happen. And it looked like they were starting out with - again larger-sized cells developing into smaller ones. And, initially, all of the cells were about a half an inch in diameter, and they were closer to the periphery of the dish than they were in the LOW FLOW position.

CC Okay. We copy that, Ron. After - after you went to HIGH - after the 19 minutes - how long was it before you started seeing a change?

CMP It was within a minute there. See, it cooled down fairly rapidly at the end of the 2 minutes. All of the cells had essentially dissolved. You had some radial lines on the outer perim - The cells that were on the outer side degraded into a strictly radial lines, back to the second row of cells. The row of cells that were on the inside kind of joined together and all ended up into one or two large cells about an inch - or about 3-3/4 of an inch across.

CC Okay. Sounds like real good data - -

01 22 26 21 CMP Still got the HIGH going.

01 22 27 42 CMP I still have it in HIGH, and the pattern that's developing is almost identical to the - what was happening in the LOW except it seems to be happening at a faster rate.

CC Okay. We copy that.

01 22 28 01 CMP ... triangle or a little diamond developed down there and then - and it disappeared. Only this time, it kind of joined with a different little cell, but it was the same cell next to it. I still have the big one. It's about an inch long - at 11 o'clock - as I had before. I still have a

finger that's developing about 12 o'clock, and another one about 2 o'clock. And they seem to be migrating again toward the bottom of the dish.

- 01 22 29 57 CC Okay, Ron. It sounds like you've really wired that experiment in great shape, and all the - and everybody's real happy with the - with the data. I guess now you might as well tear it down and press ahead.
- 01 22 31 33 CC Okay, Ron. We're back with you now, and everybody's real happy about the data and experiment. And it looks like you did a super job, and you might as well tear it down and press ahead.
- 01 22 31 48 CMP Okay. I still got it in HIGH, and I'm kind of sucking the fluid back down the - the intake. And as I get the fluid thinned out, low and behold there's a whole bunch of bubbles underneath there. And each bubble is a source for one of those little cells. It's the internal source.
- CC Okay, Ron. We got that. You may have made a breakthrough for science.
- CMP (Laughter) Okay.
- CC 17, Houston.
- CMP 17, go ahead.
- 01 22 34 14 CC Ron, just a reminder that we're scratching that page 3-45 that - from 46 to 47 - that's scratched out. And from then on all the times, you just subtract an hour from it, if you haven't done that already.
- CMP Let's see. Yes, we've already done that, Bob. Thank you.
- CC Roger. Just a reminder on that. And EECOM is over here trying to figure out if you changed the canister or not. Just a reminder on that one.

Tape 33/10

CMP Okay. We'll get that as soon as I get this out of the way. Okay?

01 22 34 47 CC Sure. While you're back there - Panel 100 and that - you might park the optics. We see they're not in zero.

CMP Okay.

CC And along that same line, Ron, we did notice several times while people were watching through the optics that they went to ZERO. And it's no problem if the rates are low, but just a reminder that we don't want to bump them into the stops with any kind of a rate.

CMP Yes. I concur with that, Bob. I guess I didn't realize we were doing that.

CC We just picked up some data points down here that people - You were all looking around, I guess, and you might - It's easy to miss that TRUNNION going to ZERO, I guess.

LMP Houston, 17.

CC Go ahead, Jack, or Gene.

LMP I'm ready to update your weather in the Western Pacific, if you're interested.

CC Roger. Go ahead.

01 22 36 07 LMP Still can't quite figure out what that circulation around New Zealand means. It looks like it's merging with some more weather to the south-east. I suspect it's stormy there, but I still - It's not a terribly well-developed storm, although it seems to be broadening in its extent. Australia is completely free of any significant weather and almost completely free - free of clouds. The - There appears to be a front - although right now it does not look too intense - approaching from the southwest. And it looks like it's about 5 degrees of longitude south of the southwestern tip of Australia. The typhoon Cirrus - or Therese, I guess it is - appears to be just about the same position it was yesterday. And that is north of Borneo and between Vietnam and the Philippines.

CC Roger. We see that on the prog here, Jack.

01 22 37 39 LMP Okay - -

01 22 40 02 CC Jack, we've been out of comm here - ... we've missed any of your last report here!

01 22 41 37 CC Ron, did you ever get your P23 data from today.

CMP That's negative; never did.

CC Okay. Just got some updating information for you, if you want to listen to it. I don't think you need to copy it down.

CMP Very good. Go ahead.

01 22 41 56 CC Okay, Ron, the effective horizon was 25, plus or minus 6 nautical miles, which is real fine. The substellar pointing error was 1 arc-minute, plus or minus 1 arc-minute, which is less than the 1-SIGMA error. The marking data was extremely consistent, and all techniques and procedures were excellent. And the horizon updates from the current onboard value of 28 - is not required, so you're extremely good P23. Outstanding.

CMP Hey, that's good to hear. Great. Thank you.

CC And I do have one input from your other half. There's a concern that if you spill grape juice on your flight suit, it's hard to get out. So be sure - and when you're eating - drinking grape juice - you want to make sure you learn to drink it right.

01 22 42 55 CMP (Chuckle) Okay. We - we'll try that, for sure.

Note: During the period 01:22:45:55 to 01:22:54:12, time-annotated recordings are not available.

CC Ron, this is Houston. We'd like to confirm the tunnel index angle - that's a positive plus 1.2, is that right?

Tape 33/12

CMP Stand by. I don't believe it yet. I want to check it myself. Yes, Gordo, that's what I read, but I figure it's his privilege.

CMP I was checking for any scratches on the drogue, but it doesn't look like there is any on there.

CC Roger.

CMP See ...

CMP Okay, Houston. The roll docking index is on a 1.2 - a plus - 1, a plus 1.2.

CC Roger. Plus 1.2.

CMP And - let's take a look up there in the docking latch number 4. The bungee is parallel. Roger. Bungee is parallel, but it's not fully extended. You look down in the end of it and - you know - and it's not fully extended. And - and the - capture - the docking latch itself or the docking lever is loose on the docking ring. So, it looks like to me that's when I ought to recock and fire it again.

CC Okay. We copy that, Ron. Stand by.

CC Ron, can you estimate in inches how far down the bungee piston is?

CMP Yes, it's down about a half an inch.

CC Roger.

CMP And - a - when I take the - and move the handle back away and I can take the - hook. There I did it ... I took the hook and I pulled it back off the docking ring and then it caught again, so now it won't go back over the docking ring. Maybe - I just lifted the hook off the docking ring with my finger.

CC Roger.

CC Say, Ron, I would like to caution you again, sticking your finger around or under that hook - there may still be some spring energy stored up there that could release.

CMP Oh, you bet you. Yes, I know that. No, I was just touching the top of the hook when I pulled it back off the docking ring. I'm pulling back onto the docking ring, and it looks like it's back in the cocked position now.

CC Okay. I think we've got the picture.

CMP Do you want me to open the hatch here, Jack, or do you want to - while they're thinking about that I'll get out of the way and come on and open the hatch.

CMP (Laughter) Can't get up and can't get down - Okay - -

CC We're having a long conversation about that latch, Ron. Why don't you all just press on down the checklist and leave it as it is while we think about it?

CMP Okay. That's what we're doing here Gordo.

CMP Okay, Gordo, do you want the O₂ HEATERS 1 and 2, OFF, and 3, AUTO? That's what you've got.

CC Yes, that's fine.

CMP Okay. He's going to open the hatch and IVT. Gordo, let me tell you a little more on that docking latch. When I looked at it, of course, my handle was flush against the edge and it was also - essentially - locked in position. But since the bungee was down on the thing I took hold of it, and I felt that the hook itself was loose. Okay, so I took the handle and the handle will come back - would come back once you pressed the little button, you know, to release the handle. The handle would come back to about a 45-degree position just like it normally does when you try

Tape 33/14

to cock the latches. Okay, with the handle back in that 45-degree position, then I grabbed hold of the hook and brought the hook off of the docking ring with my finger and back to about that 45-degree position again just like it was comparable to the first cocked position. And that's the way it is right now.

CC Okay, Ron.

LMP Okay. One piece of tape coming up shortly, provided I can find the tape. Here it is. Okay, Gordo, I'm running up through the tunnel from America to Challenger.

CC Roger.

CDR Piece of tape coming up. I'll tell you, Gordo, it's remarkably clean up here. It doesn't look like the snowstorm that I remember coming into last time.

CC Roger. Understand.

LMP ... up here. Hey, you did a good job, friend. Hey, that's good. Where is it? Oh, you ... straight out there? Let me see; I want to see. I want to take a look at it, too. Hey, there it is; sticking straight out. Okay, Houston, America has a VHF antenna - looks deployed perfectly.

CC Roger.

LMP ... upside down in there. ... The commander's window has a slight amount of condensation on the lower left edge - that's the left-hand edge, really. It seems to be just there when the Sun warms the window.

CC Roger, Jack.

SC Okay, Houston. 74 on 1-3.

CC Okay.

LMP Geez, what was that? What was that from? What the heck is this?

CC Sounds like the cabin ... is working up there.

LMP Holy smole. ... Sun's out - there's Sun out in the AOT.

CC Roger, Jack.

LMP Okay. I'm looking out the AOT, and I see a VHF antenna and part of a umbra radar antenna in position 1. Position 2 looks right in the radar antenna, and, as I said yesterday, it was beautiful.

CC Roger.

LMP Position 3, I see the other side of America and very, very clean air, very clean. Okay, I got a good view of the side of the service module, and you can see these little blisters in the side of the covering there quite distinctly. I think people were talking about those before.

CC Roger.

LMP Yes, I take that back. That's the side of - that's the side of the command module we're looking at that has the little blisters on it. Got to get oriented up here. Got a great view of the hatch - you ... watch your eyes and everything. Look up, rather than into the Sun ...

SC Okay. Step 1 on 1-4.

SC Okay, Gordy. The LMP OPS is 6100 psi, 6100.

CC Roger.

SC And the CDR OPS is 5900, that's five-nine-zero-zero.

CC Okay.

SC Okay. Zip bag coming up.

Tape 33/16

SC You won't scare me any more if I come on up here with you, will you? (Laughter).

SC I got to go back in there.

SC Okay.

SC Yes. Do you want to stack part of it over there?

SC No, wait a minute. There's strips of the stuff, you know, I'll just give you a strip of it. Take it over there.

SC Okay. Here you go. That's ... of them is that enough?

SC Yes, go ahead, Jack. Yes, in the tunnel. What do you need.

SC Okay.

SC Okay.

SC Checking circuit breakers now, Gordy.

CC Roger.

SC ... both circuit breaker panels were as advertised, Gordy.

CC Okay.

01 22 54 12 LMP Houston, 17.

CC Go ahead. 17, Houston. Go ahead.

01 22 54 22 LMP I need to make a correction. Roger. I need to make a correction. It looks as if that storm area that was in New Zealand yesterday has moved up across the two islands and is now sitting northwest. It's getting a little hard to identify the smaller islands in the Pacific, but - pretty sure I've got it in the right place now looking at the map. And it is northwest of New Zealand. And it looks like New Zealand is probably having reasonably good weather today, although I suspect it rained last night.

CC Roger, Jack. That's interesting because on my prog it doesn't show a thing down that area. This just may not be up to date here yet.

01 22 55 43 LMP Well, there may be nothing down there except some cloud patterns and - but that's all I can see, of course. The front that's south of Australia now - I presume front - just looking at a fairly well-developed, although narrow, cloud line, is about 5 - about 10 degrees south of Perth right now, southwest of Perth and runs on a northwest-southeast line - over to a point about 10 or 15 degrees southwest of Tasmania. And then it intersects a curved front that runs from there up to - to Tasmania, and then back around down south of New Zealand about 10 degrees.

CC Roger, Jack.

01 22 56 24 CDR Say, Bob, this is Gene. I got some new sensors on. You might want to take a look at them.

CC Roger. Good show, Gene. We were just wondering about that, and I'll bug the guys on my left here and make sure they're looking at them.

01 22 56 51 CC We're not getting any data yet, Gene.

01 22 56 55 LMP Bob, we're starting to get ... from just off Luzon on the northeast trend ... seen so far a shadow line of fairly thick high clouds overlying some thick lower clouds behind the front.

01 22 57 52 CC Roger. You might have - be of interest on board there, the FIDOs - -

01 22 58 52 CC Jack, we've been having comm dropouts here on this OMNI. Have you swing around on us?

01 22 59 06 LMP Okay. What - where did I leave you, Bob?

CC Well, I'm not sure because we picked up a number of different bits, and then we dropped it all.

LMP Did you get the overcast over Korea and Manchuria bit?

CC Negative. I didn't get that.

Tape 33/18

01 22 59 36 LMP

Okay. That generally - South China looks clear. I haven't had a real good look at it yet, it's out on the limb. It's clearly, however, overcast over Korea and Manchuria. It does not appear to be frontal weather there, though. The dominant front in the northwestern Pacific stretches on a north-west line from just off Luzon on up as far as I can see to the terminator. And it seems to be an extremely strong front with what I would guess is heavy air-mass weather all along it. And up to the east-northeast of Japan, there's an excellent example of a shadow line from some fairly thick high clouds on solid overcast of lower clouds. Don't see any major cyclone development along it, or wave development. It just looks like a very strong air-mass front.

CC

Roger, Jack. We've got it on our prog here. We don't show the one on the northeast part of Japan, but we do show a front prog for tomorrow morning going off of Taiwan and - right from Taiwan eastward - past the Ryukyu Islands and just on into the northern Pacific there. Looks like pretty heavy cloud mass over there.

LMP

Roger. That's the one I'm - Roger. That's the one I'm looking at. Extremely heavy. And right now it - in fact starts about at Luzon. It looks like Taiwan is almost on the back side of it.

CC

Yes. That's what our prog - it shows it right on Luzon and then Taiwan's clear.

LMP

Very good.

CC

We'll keep up with you yet there, Jack. Say, you may be interested. We've got 9 hours of good tracking on the - after the midcourse - and we show a perilune of about 52 miles which confirms a good midcourse.

CDR

Sounds outstanding.

CMP

That's great.

01 23 03 05 CDR

You can cross off the canister, by the way; it's changed.

CC Okay. EECOMs happy about that now, finally. And, Gene - the CD - your data looks good.

01 23 02 19 LMP Okay. I never had a chance to tell you, Bob, but you - as you see - I presume - I - the LMP no longer has sensors on.

CC Roger. We confirm that.

LMP By the way, those were the - I guess you know - the sensors that we put on at the Cape. And they still seemed to be in good shape when I took them off. I figured I'd let things rest a while, and then I'll put them on again tomorrow.

01 23 02 55 CC Roger. Looks like you've got eat period scheduled here for an hour, and then into the presleep checklist.

LMP Whoopee! The old preslip [sic] checklist.

01 23 12 19 CC Apollo 17, Houston.

CDR Go ahead, T.P.

CC Yes. I was going to say, is that talkative commander on board?

CC How are you doing down there?

CC Well, I feel lots better. Like I told you, Geno - I think that you were the jinx on Gemini 9 for all the delays. Over.

CDR No way; you got a longer history than I do.

CC Everything's looking great.

CDR Yes, it's looking good on board. We're - I think we're pretty well squared away. We've got our stowage in shape, and we're in the house-cleaning routine. And that's about 50 percent of the battle.

CC Right.

CDR The weather down there didn't look too good today. How's it been?

Tape 33/20

CC Well, as it started out, it was below minimums this morning and finally, this afternoon, it cleared up. But it was strictly zilch this morning and starting last night. There's another front due in here later tonight.

LMP Yes, we've been watching that one.

CC Well, Jack, you're turning into a very trained weather observer besides being a geologist.

LMP Oh, I'm enjoying it immensely, Tom, as you may have gathered.

CC Right.

LMP Very interesting place to watch; I'll tell you.

CC Absolutely superb.

01 23 19 44 CDR How are things on the home front, T.P.?

CC Geneo, things couldn't be better.

CDR Well, you might sound all the good words from us.

CC Oh, will do. I plan to drop by and bum a cup of coffee tomorrow.

CDR I'd love to invite you up here for supper.

CC And I wish I could join you. I could make another couple of remarks, but they'd be X-rated; so I shouldn't.

CDR Okay. I'll accept that.

CDR You notice I haven't yet.

01 23 21 04 CC (Chuckle) I'm very well pleased, Geneo. Your - your language is superb.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

01 23 27 37 CC 17, Houston. Just a couple words. We'd like you to know we're real satisfied with all the LM data that we saw during the LM activation work today. And, looking at it, the data looked real good.

LMP Great, Bob. I was - you had me worried there for a while with the comm. Do you have a good idea what caused that?

CC Yes, we're sure about 99.9 percent of it was just ground linkup.

LMP Yes, that's certainly the way it acted onboard.

CC I guess there won't be any need to go back and change the Checklist on that, but there's a lot to be said for maybe going to a real good stable condition and then getting a good firm checkout before you go into that downvoice backup mode and things like that. And I think that's what we'll do in the future.

01 23 28 35 LMP Understand.

01 23 45 50 LMP Houston; 7 - 17.

CC Go ahead, Jack.

LMP Say, I'm just a little curious about the difficulty on holding the omnis. Is that about the same as past missions, or are we losing a little bit more than usual?

CC We're going to have Ed here give us a description for a minute, so let me stand by.

LMP Okay.

CC Jack, according to that - to our stalwart INCO over there, due to this new 210 down at Tidbinbilla we're holding actually longer than in the past history.

Tape 34/2

LMP Okay. I just guess I've never been on this end before.

CC Roger. Do you - do you hear it onboard when we break lock there?

LMP Yes, matter of fact, with our SQUELCH ENABLED, we lose all the background noise. And we know when we're picking you up because we start to get background noise again.

CC Roger. In other words, you - you are able to stop talking or something when you - when you know we're breaking lock then?

LMP Well, if we happen to be talking when you break lock - no, unless we're watching the meters we won't. We lose you when you get about 55 - say 60 percent signal strength. And apparently we're not talking to you when we have less than that.

CC Roger. Yes, INCO gave me a briefing tonight and showed me what chart to watch so I can look at numbers when to talk. I've been talking to myself too much, lately.

01 23 48 09 LMP Yes, they have a beautiful chart there for that purpose.

CC I never really wanted to be an INCO, but I guess I was forced to tonight.

LMP There are lots of comments for that one, Bob; but I'd better not say anything.

CC Roger.

LMP You'd never speak to me again.

CC Well, that's all right. We can't X-rate the transcripts, so we'll just have to take - take it easy.

LMP Say, Bob, I've got another question about the Challenger.

CC Go ahead, sir.

LMP (Music) Yes, sir. The battery voltage on low taps, strangely enough, was just like the simulator; but I had expected that the simulator might have been wrong - that we would have seen higher voltage there. Is that - is that about what you guys expected?

CC Roger. They said they expected that because the extra time on the pad that they're running. That 2-hour-and-40-minute delay is coming into play again.

LMP Oh, yes, yes. That's right. Good. I forgot all about that. Something made that slip my mind.

CC Well, things have been going so well that I can't blame you forgetting that.

LMP ... Stanley Holloway's crazy Flight Plan updates that we've just forgotten that we were ever late.

CC Roger. Say, by the way, we like the music in the background. Sounds pretty good.

LMP Yes, we sort of - didn't - we didn't get it out at all until today. [Music: Whipped Cream by Al Hirt] I don't know whether we forgot about it or too many other learning things going on. It's - it's quite pleasant.

CC Roger. I don't think you forgot about it. I think you were just glued to those windows.

01 23 50 32 LMP Well, I still am, as a matter of fact. The old Earth's coming by. And, say, I mentioned a couple of fronts that joined together about 20 degrees south of - of - the south coast of Australia. And it looks like that's a fairly healthy storm center developing down in there - conceivably may migrate up across Tasmania and maybe up - up the Sydney-Brisbane coastal area in the next few days.

CC Roger. Where is the exact center of that, Jack? It took me a second to get my prog out here.

Tape 34/4

LMP Well, just a second. Let me give you better ...
from the map.

01 23 51 20 CC Roger.

CC While you're looking at your map, I just might
mention to Gene. I just talked to your - your
better half over there, and everybody's fine and
happy.

CDR Great. Always like to hear news like that, Bob.

CC Roger.

LMP Bob, did you get that - 15 to 20 degrees south
southwest of Adelaide?

01 23 52 45 CC Roger.

01 23 53 21 CC 17, Houston. Are you into your pre - presleep
checklist yet?

CC 17, Houston. Are you into your ...

CC 17, Houston. Are you into your presleep check-
list now?

CDR We're just about ready to get started, Bob. We're
running a little bit behind, but - we'll catch up
here.

CC Okay. No sweat.

LMP (Music) Trying to get some more of this good
food down.

CC Roger. Keep saying those words. The people on
my left appreciate that.

CDR Yes, but it does take awhile.

CC I'm sure of that.

LMP You know what we really need is Rita to fix it
for us.

CC That's affirmed. I'll go along on that.

01 23 56 19 CDR Okay, Bob, I'm going to cycle H₂ FANS 1 and 2.

01 23 56 25 CC Okay, we're watching.

01 23 57 50 CDR FANS are OFF.

CC Roger.

LMP Bob, we're still on November November frame 140, and I'm going to take two more pictures before I go to sleep.

CC Roger, Jack. We copy that. November November frame 140. And you ought to be on 142 when you go to sleep, I guess, huh?

01 23 59 37 LMP That's affirm.

02 00 14 48 LMP Houston, 17.

CC Go ahead.

LMP Roger. One final word. I got those pictures; and, I tell you, that typhoon off - north of Borneo - looks like it's right off the coast of - the east coast of Vietnam now. And it's about as tightly organized and solid as anything I can remember seeing in photographs. It looks as if, from yesterday, it's moved quite a bit to the west.

CC Roger. We concur. The prog for 12:00 - Let's see, that's about 6 hours from now - shows it to be right over the Vietnam area, the Viet - Vietnam peninsula there. So it looks like it's moving the way they're propping it, huh?

LMP Yes; well, it's right there. Yes, it certainly is. It's - it's moved from just a little bit west of Luzon over to the coast there. So it's a pretty healthy storm.

CC Roger. It looks - on the prog chart here - it looks real tight. It's a very - very centralized thing and real tight circular.

Tape 34/6

LMP Oh, yes, you better believe it. It is really - it is tight. It - it's really - really no bigger than the - in terms of cloud pattern - no bigger than the - say, South Vietnam itself.

CC Roger. How're you getting that, Jack? Are you looking with the monocular now?

LMP That's affirm. Monocular still gives real good resolution on the cloud patterns. [Music] Naked eye, you just see the masses; but with the 10-power monocular, it's perfectly adequate for seeing the kind of patterns we're talking about.

02 00 17 02 CC Roger. I understand.

02 00 20 00 CC Well, guys, I guess I won't get the chance to say goodnight to you because Parker's going to come in to put you to bed.

LMP Heavens.

CC And we'd - we'd like you to clear - -

LMP You can still say goodnight, Bob.

CC - - the DSKY, if you will.

LMP Say goodnight, Bob.

CC Say goodnight, Dick, huh? One last word. You know, we're always hounding you guys - really don't mean to - but we - we'd like to see a clear DSKY so something doesn't burn out. Don't know the exact words on that, but -

CDR Okay, we - we'll give you a clear DSKY.

CC Roger.

CDR Goodnight, Robert.

02 00 20 50 CC We'll see you tomorrow, troops. And we had a good show today, and we'll have more tomorrow.

LMP Ron says goodnight, Bob.

02 00 21 23 CC Roger.

02 00 28 25 LMP Robert Parker, are you there?

CC That's affirmative.

LMP Well, you're just in time to put us to sleep, and I'll give you one last little old observation here. Extremely bright zero phase point right off the northwestern corner of Australia right at Carnarvon. It's as bright as I've seen. They must have a pretty good surf or something going in there.

CC Okay; that sounds good.

CC Okay, 17, we copy all that; and I gather you're going to sleep at this point.

LMP Well, we're going to try, Bob. I don't think any of us are real sleepy right now, but we're going to give her the old space try, here; and I'm sure we'll be asleep before long. Ron is on watch; and, if you don't wake him up with your voice, give him a crew alert. He says he'll wake up with a MASTER ALARM.

02 00 30 00 CC That's a healthy sign. All right, guys; if I stick around long enough in the morning, I'll wake you up.

02 00 33 25 CDR Okay, Robert, are you happy with your high - antenna configuration?

CC That's affirm. INCO is happy.

CDR Okay, you have anything else for us? I'll take care of our sleep configuration if you don't.

CC Okay, stand by. I'll go around the MOCR here with white.

SC (Laughter)

CC Okay. A lot of happy people down here with nothing to ask you.

Tape 34/8

CDR Okay. Nice to have everybody happy. And you -
 that includes the - the biomed on the commander,
 huh?

CC Okay. I guess they're happy.

CDR Okay, are you going to sing to Ron in the morning
 to wake us up?

CC Depends on how soon you guys decide to wake up in
 the morning. I'll be around for 8 hours anyway.

CDR What's your expected JEM of awake?

CC Stand by. Okay, 17, it should say 56 - -

CDR ... 56.

CC Go ahead.

CDR Yes, we're just going to say the same thing.

CC Okay. Should show 56 on your clock.

CC In fact, Dr. Kranz, here, just decided that you
 guys get another half hour in the morning if you
 wanted it. But you better tell us now because
 we'll wake you up at 56 and ask you if you want
 the other half hour then, unless you tell us.

CDR Yes, why don't you give us another half hour; and
 if we happen to wake up and want to move around,
 well, we'll do it.

02 00 36 12 CC Okay; we'll wake you up at 56:30.

END OF TAPE

Tapes 35-39/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 08 35 43 (Music: Jayhawk Fight Song)

02 08 37 00 CC Good morning, Apollo 17. It's Houston. Over.

02 08 38 17 CC Apollo 17, Houston. Good morning.

02 08 39 18 CC Apollo 17, this is Houston. Good morning.

02 08 41 17 CC Apollo 17, Houston. Good morning.

02 08 45 55 (Music: Jayhawk Fight Song)

02 08 47 58 CC Apollo 17, Houston. Good morning. Are you with us this morning?

02 09 05 04 CC Good morning, Apollo 17. It's time to rise and shine. Over.

02 09 23 14 CC Apollo 17; oh, Apollo 17; it's morning. Time to get up. Over.

02 09 23 33 CC Hello, Apollo 17; do you read? Over.

02 09 39 39 (Music: Jayhawk Fight Song)

02 09 40 36 CC Hello, 17. Hello, 17. How do you read us this morning?

02 09 40 46 LMP We're asleep.

CC That's the understatement of the year.

LMP Never let Evans be on watch.

CC I think we'll go along with that from here on.

SC ... good morning.

LMP (Laughter) That was some party last night, Gordy. Man, that was a humdinger.

02 09 41 16 CC Must have been.

Tape 40/2

02 09 45 11 CC 17, Houston. Over.

SC Go ahead ...

CC Okay, we're starting out late, as you know; but there's nothing ahead that we can see that's time-critical. So you might try to hurry a little, but don't - don't go to any great lengths to try to catch up with the Flight Plan. We can slip the LM telemetry activation without any problem. Over.

LMP Okay, we got you. Our biggest problem this morning is keeping Ron from going back to sleep.

CC Roger.

CMP By the way, my sleep report is - looks like I had about 7-1/2 hours of pretty good sleep.

SC And if you believe that, you're really a ...

02 09 52 20 LMP Okay, Houston; 17. I don't know if you're ready for this or not, but we have a few reports for you.

CC We're ready. Go ahead, Jack.

LMP Okay. On your CDR: PRD, 17028; he claims 7-1/2 hours of good sleep. He had a Seconal before going to bed, and since the last reporting, has had four containers of water.

CC Roger.

LMP Okay, with respect to food - Let's see, we gave you a - intermediate report yesterday. Do you want that repeated?

CC Negative.

LMP Well, I'm not sure I can differentiate what I said yesterday, so I'd just better give it all to you. This is yesterday's complete report.

CC Okay.

LMP CDR was scrambled eggs, three bacon squares, peaches, pineapple-grapefruit drink, peanut butter, jelly, bread, chocolate bar, orange drink, apricot - that's dried apricot - one frankfurter, a third of a fruitcake, half a beefsteak, butterscotch pudding, orange drink, and tea.

CC Okay, we got that.

LMP Let me know if I'm too fast for you.

CC No, we've got it all on tape. Go ahead.

LMP Okay, with respect to food yesterday - LMP: scrambled eggs, four bacon squares, orange-pineapple drink, cocoa, potato soup, two peanut butter, two jelly, two bread, cherry bar, orange-grapefruit drink, beefsteak, orange drink, and tea.

CC Okay.

LMP Okay, and the PRD is - -

CC Jack, we're just about to switch antennas now. Why don't you wait until we get through it before continuing.

02 09 55 40 LMP Roger.

LMP Okay, Houston. You back with us?

CC Okay, Jack. I think we're back with you again.

LMP Okay; got you. LMP: PRD, 24064; 7-1/2 hours very good sleep, 1 hour intermittent. Had a Seconal. I took two aspirins yesterday. And since the last reporting, I've had four containers of water.

CC Roger.

02 09 58 29 LMP Okay. Old CMP - the man of the hour, one might say. Scrambled eggs, bacon squares, peaches, cinnamon toast bread, orange juice, cocoa, peanut butter, jelly, bread, cherry bar, citrus beverage, fruitcake, butterscotch pudding, orange drink,

Tape 40/4

turkey and gravy, two frankfurters, and tea. You might say he was a little logey. Okay. CMP: PRD, 15027; 7 and a - let's - Make that 8 hours of very good sleep. He claims he didn't get to sleep for a while. Seconal, and he's had five containers of water since the last reporting.

CC Okay.

CC Jack, if - future reports if it's any easier, we can go to negative reporting. If you're fairly close to the menus, just tell us the differences. Whatever is easiest for you is fine with us.

02 10 00 40 LMP Okay. Well, now that we're eating well, that may be the best way to do it.

CC Okay. I have the - your consumables status, if everybody that's interested is listening.

LMP Go ahead, Gordon.

CC Okay. Your RCS is running right along at 1.3 percent above the Flight Plan line. On your cryos, the O₂ tanks 2 and 3 are right on the lines. Tank 1 is still, as before, about 4 percent below - below the line but looking real good. On hydrogen, you're a little above on one tank - on tank 2 - a little bit below on tank 3, but the average is right with the Flight Plan lines. So consumables look good. Over.

LMP Okay. That's good to hear. And, I see that our old SPS oxidizer pressure has dropped some more. I guess the old - the helium is working it's way in there - or out of there.

CC Okay. That's the way it looks to us. One final thing. Management has informed me that since you've been so late getting to work this morning, we are going to have to dock you all a day's annual leave.

LMP All of us! I can understand - I can understand that for the commander, since he's always the commander, but I do not understand why the LMP loses a day - an hour.

Tape 40/5

CDR Hello, Houston. This is America.

CC Hello, Geno. Good morning.

CDR Hello, Gordo. Request is that I handle the disciplinary problems up here; how's that?

CC Okay.

CC Geno, we'll have FAO work on a good time in the Flight Plan later here to work in a captain's mast.

CDR Okay; (chuckle) that'll be great. Hey, Gordy, for the record; I swallowed three of those - those gas pills yesterday.

02 10 04 04 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 10 18 27 CMP Houston, 17.
CMP Houston, 17.
CC Okay, Ron, we see the 93s; and you're clear to torque them.
CMP Okay, we'll torque them at 19:20.

02 10 19 17 LMP And, Houston, I've started the dumping.
CC Roger.

02 10 20 07 LMP And, Houston, we're going to dump A on the water dump - WASTE WATER DUMP.
02 10 20 11 CC Okay.

02 10 28 30 LMP Houston, we're starting a - O₂ purge.
CC Okay, Jack.
CDR Hey, Gordo, we'll get everything cleaned up in the Flight Plan, including eating up to 59 hours, where we start checking the DELTA-P and pressurizing the CSM for LM entry.
CC Okay. We see you doing all that now, and we're just checking things off as you call them. Sounds good.
CDR Okay. And then when we'll clean all that up - regards to what the time will be - We'll pick up the 59-hour mark then.

02 10 29 34 CC Okay.

02 10 31 30 LMP Okay. Waste water dump is terminated.
CC Roger.

02 10 35 23 LMP Fuel cell purge complete.

Tape 41/2

CC Roger on the fuel cell purge.

02 10 39 23 LMP Hello, Houston; 17.

CC Go ahead.

LMP Roger. While we're getting organized to eat a little bit here, I'll give you your morning weather report, if you want it.

CC Okay, go ahead.

LMP Okay, Gordy. That little storm - fairly big storm - that was off the coast of northwest Africa yesterday, has moved inland and presumably is giving those people up there some weather. Might even be getting some snow up in the Atlas Mountains. It's still fairly well organized and inland a few hundred miles - or the edge of it is inland a few hundred miles. The people at the Cape of Good Hope ought to be seeing some clouds that are forerunners of a large circulation system that's south-southwest of them - that, although large, it seems to have most of its heavy clouds to the southeast of the center. And they may not get any major weather out of this one. But they'll probably have cloudiness for a few days. The storm that was over Buenos Aires yesterday has apparently moved out to sea and is now west - or east-southeast of that area. Otherwise the - except for those three storm areas, the South Atlantic looks relatively calm. The zero phase point is now off the - east coast of South America, and it looks fairly dull and gray. And I suspect no extensive choppiness in that area.

02 10 41 50 CC Jack, take a breather there. We got an antenna switch coming.

02 10 45 10 CC Okay Jack, we're back with you and listening.

LMP Okay, Gordy, I can't see you right now. I think that was about the extent of it. We'll get some food; and, while I'm eating, I'll look at it and see if there are any more details.

02 10 45 30 CC Okay.

02 10 51 45 CC 17, Houston. I have the morning news here, whenever you'd like to hear it - if you would.

CDR Go ahead, Gordo. We'd like to hear it now.

02 10 51 58 CC Okay. First, a look at the weather in the local area. It's going to be mostly cloudy through Sunday, with a chance of showers here today - but much warmer. I'll have to wait until we get through the omni switch here, and then I'll be back with you.

02 10 55 04 CC Okay, 17, continuing on with the weather. It should be - get up to the upper 60s here in Houston today. It was foggy when I came to work, but I understand the Sun is out now and the fog is burned off. On the international-national scene: There's another reported snag in negotiations between Dr. Henry Kissinger and North Vietnam's Le Duc Tho. The two have discussed the peace terms since Monday; but, so far, little news concerning the talks has been released by either side. They meet again today. A judge in the Pentagon Papers trial of Daniel Ellsberg has declared a mistrial. Judge Matt Burn has asked that a new jury be selected. Both sides in the cases must now go back to the beginning and prepare their arguments again. Former President Harry Truman is still hospitalized with a serious heart condition. Although listed in critical condition, the 88-year-old former Chief Executive has shown some improvement, according to his daughter, Margaret Truman Daniel.

President Nixon has completed selection of his new cabinet by announcing that he will keep Richard Kleindienst as Attorney General. There will be a number of major changes, though, in upper levels of the Justice and Interior Departments. Life Magazine will be no more as of the end of December. The pictorial magazine lost over 30 million dollars during the past 4 years. No doubt some of the final pictures to appear in the famous 36-year-old publication will be those of the Apollo 17 mission. An airliner crashed at Midway Airport in Chicago, Friday. Of the 61 persons aboard, only 18 survived

the crash. In other national and international highlights: Unemployment figures show a drop to the lowest level in 2 years; 5.6 billion dollars has been released by the Federal Government in the first revenue-sharing payment to the state and local governments; and the NATO foreign ministers have urged the Soviet Union to cut down troop strength and allow freer movement of people over the east-west borders. In local and regional news: New hijack control devices have been installed at Houston Intercontinental Airport. The new metal detectors are being installed in many airports around the United States. New inspection procedures will also begin in January - of all hand luggage carried aboard airliners. And on the sports page: Al Conover is not going to return to Wake Forest as rumored. The Rice coach has met with University President Dr. Norman Hackerman to discuss a firm 5-year contract agreement. Professional football highlights today's sports; the "Over-the-Hill-Gang" from Washington with Billy Kilmer and Larry Brown will take on the Dallas Cowboys at Texas Stadium in Irving. The Cowboys will, no doubt, go with Craig Morton at quarterback. Dallas can ensure itself of a "wild card" slot in the playoffs with the Redskins, if they win. For Dallas, it's a revenge game. The Skins have won nine straight.

CC

Johnny Bench, the Cincinnati Reds all-everything catcher, has been hospitalized for tests. X-rays showed a spot on a lung. Doctors feel sure the lesion is benign, though. The University of Houston basketball team takes on Xavier tonight. The Cougars, with four wins and one loss, will face a Xavier team that likes to play slowdown basketball. The Houston Rockets beat the Portland, Oregon, Trailblazers last night in Hofheinz, 114 to 108. The Big Eight Athletic Conference has joined the Big Ten and the Ohio Athletic Conference in breaking relations with the U.S. Olympic Committee. Back in Houston again: Bill Peterson, the Oiler coach, says he's not planning on new assistant coaches. He says, "The Oilers need more togetherness with their coaches, not new ones." And a final item: the Des Moines, Iowa, post office was emptying a mail pouch. One package

fell on the floor, broke open, and spilled all over the place. The contents were Postal Service instructions on how to wrap and mail packages to insure safe transit and delivery."

02 11 00 02 LMP Very good news report, Gordo -

CDR Yes. That crash in Chicago, can you tell me a little bit more about it?

CC I read real briefly in the paper, just before I came in, that it did crash in a populated area. It was a very brief report. I don't think the final details have been published yet. I'll check to see if we've got anymore in.

CDR Okay. And I guess you know where - at least my wishes go for that Cowboy game, don't you?

CC I'm not sure that I do.

CDR I'll just let you make an assumption.

02 11 00 59 CC Okay. We've got an antenna switch coming here.

02 11 04 22 CC 17, Houston. I have a little more on the plane crash, if you'd like to hear it.

CDR Yes, sir, Gordy. Go ahead.

CC Okay. It was a United Airlines jet, 61 people aboard. And it crashed into a south-side Chicago neighborhood while trying to land at Midway. Most of the 55 passengers - There were - well, I'm not sure I'm getting all the numbers right here. But it said here that most of the 55 passengers were found dead in the debris of a - and it was a Boeing 737 about a half a mile away from the airport. One of the victims was representative George Collins, a Democrat from Illinois - who was returning from Washington to organize a children's Christmas party. The weather, at the time, was a 500-foot ceiling and 1-mile visibility. And sleet and snow were falling at the time. There were no report that any occupants of the houses were injured or killed. I turn back to the back of the paper, here. A United spokesman said one of the

Tape 41/6

six crewmembers, a stewardess, was among 16 persons admitted to Holy Cross Hospital. She said there were two infants among the passengers. Jet apparently missed runway 13 at Midway on - and cruised over the neighborhood of bungalow homes at heights of 500 to 1000 feet and then with his nose up and tail down tore into the dwellings. Witnesses said the plane scraped the roofs of two bungalows and sheared through six houses, setting them aflame. The fuselage of the airliner split, but the nose remained intact. A tail section was sticking out of one house. The plummeting airliner sheared through utility lines and a 2-square-mile area was blacked out. Telephone service was knocked out. A power company spokesman said 5000 homes were affected.

CDR Okeydoke.

CC And a little news about your trajectory. Since the midcourse 2, you've been looking real good. You've - you're homing in on 53-1/2-mile parallel. We're discussing midcourse 4, which - if we do it all - it's going to be very small. It's looking like about a foot and a half per second right now. And I guess if we do it, it will only be because it will save us DELTA-V at LOI. Over.

CDR Okay, I was just looking. Those dumps really knocked us for a loop, didn't they?

CC Yes, it - it's driving your PTC out.

02 11 07 41 CDR Yes, we're at almost 40 degrees now.

LMP Gordy, has the temperature been pretty cold down there?

CC Here, in Houston, it warmed up considerably last night - yesterday afternoon and last night. And this morning, it's probably in the 60s somewhere.

02 11 11 20 LMP Makes it - -

02 11 18 33 CC 17, Houston. I have some words about the troubles we had during the LM comm checks yesterday, if you have a free moment to listen.

CDR Go ahead, Gordy. We're listening.

CC Okay. We think we've got a pretty good handle on what the problem was - and that was, that the - the LM communications gear, we think, was jumping on the voice subcarrier, rather than the main carrier. And the symptoms that we had point to that. What would happen is, when I would try to transmit, then it would lose lock as soon as I put modulation on the voice subcarrier. During the checks today, we're going to try to verify that the system is indeed working okay. And we can do it without any changes in the onboard procedures by - purely by procedures that will be handled at the ground site and here at Mission Control. And so that's what we're planning to do. We really don't - The problem that happened has been seen before, evidently; and it's not that unusual. We really don't think there's anything wrong with the onboard equipment. Over.

LMP Sounds good, Gordy. We'll just take her slow and easy when I get over there today and make sure we understand it.

CC Okay, Jack. And there's no - real no voice check scheduled, and we don't think any are required. We can tell what we need to do without any voice checks ...

LMP Gordy, you're breaking up. Talk to you as soon as we get another omni.

02 11 20 34 CC Okay.

LMP While I got you, I took three pictures of the Earth. I thought I might have moved one of them. And we're on frame 145.

LMP Did you copy, Gordy?

Tape 41/8

CC That's affirmative, Jack. I copy. You may not be reading me through the omni switch.

LMP Okay, that was mag November November.

02 11 21 21 CC Roger.

02 11 23 50 LMP Houston, 17. Do you want us to go into a battery B charge?

CC Let me check, Jack. That's affirmative. Go ahead.

LMP Okay.

02 11 25 24 LMP BATTERY B is being CHARGED. And, Gordy, different than the last time - the charger amps is moving up very slowly. Started out at about 0.02 and now is 1 amp - little more - It's still going up. Before, it jumped right up to about 2 amps. Is that expected?

CC Oh ... we'll check on that. Stand by.

CDR Gordy, the LM/CM DELTA-P is 0.6. You still want us to take the command module up?

CC Geno, that'll be fine. You will not have to jack up the command module pressure.

CDR Okay, I think I'll maneuver at attitude then.

02 11 26 40 CC Okay; sounds good.

02 11 28 07 CC Jack, the way the amps are going to look when you put the charger on is the function of the state of the charge of the battery. And what you described is about what we'd expect, considering where the battery should be.

LMP Okay; that's what I figured. It's up about one and three-quarter amps now.

CC Roger.

LMP And it appears to be stable.

CC Okay.

LMP Gordy, I'm in the process of - I'm in the process of putting biomed sensors on.

02 11 28 45 CC Roger.

CMP Hey, Houston; 17. Thanks to a little South Carolina boy we had up here last time, we've got some grits up here. And they're really not too bad. A little butter on them and - A little bit dry. Of course, you could add a little more water to them and they'd be a little better, but not bad at all.

CC I can't believe I'm hearing that from a real Yankee.

CMP Of course, Kansas is not exactly Yankee.

CDR Let me tell you, that does not apply to the little old farm boy from Chicago.

CC Roger.

LMP As you students of American history may recall, Kansas caused a lot of the problem we had with those two people.

CC Roger.

02 11 31 48 CDR And grits is causing the rest of it.

02 11 32 39 CC 17, Houston. We see that you're making a maneuver uncoupled in pitch, and we'd rather you make it coupled to keep FDO happy. Over.

LMP Okay.

02 11 33 56 CDR Yes, that was my fault, Gordo. I screwed up here.

02 11 42 50 CMP Houston, EMERGENCY CAB REPRESS is OFF.

CC Roger.

Tape 41/10

02 11 43 03 CMP Okay, REPRESS PACKAGE valve is OFF.
CC Say again, Ron.
CDR Hello, Gordy. You with us?
CC Yes. How do you read?
CDR We're reading you loud and clear. The EMERGENCY
CABIN PRESSURE SELECT is OFF. And we're about
ready to open the EQUALIZATION valve.
CC Okay. And we're ready for the high gain.
02 11 43 31 CMP Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 11 44 42 CDR Okay, Gordy. That's the highgain. How do you like it?

02 11 44 45 CC Looking good.

02 11 45 19 CDR Okay, Gordy. I was reading 0.2 on the DELTA-P and the hatch is cracked.

CC Roger, Gene.

02 11 48 39 LMP Hey, Houston; 17. How do you read the LMPs biomed?

CC Let me check.

02 11 49 09 CC Jack, the EKG looks great. Your ZPN looks like a sensor may be loose.

CC And we'll be handing over here in - -

LMP ... loose sensor ...

CC - - about 30 seconds.

02 11 49 31 LMP Okay. We're in the process of getting the probe and drogue out. I pushed on the sensors real hard again, and see if that helps it.

CC Okay. We'll take a look.

02 11 49 52 CC That helped it. Don't worry about it, until we call you again.

CDR ... on that one, Gordy. You've always been one of those smooth talkers.

02 11 54 51 CMP There's all - yes - they're down there somewhere.

02 11 54 53 CMP Okay. The probe is out. And we'll try the drogue now.

CC Okay, Ron.

02 11 57 50 CDR Okay, the - the drogue is out, and we're going up to take another look at Challenger.

Tape 42/2

CC Okay, Gene.

02 11 59 30 LMP Somebody left their lights on in here.

CC Roger.

LMP It's just like a refrigerator.

CC Roger.

02 12 00 36 LMP Docking index is unchanged.

CC Okay. It's a plus 1.2. Right?

02 12 00 44 LMP That's affirm.

02 12 03 17 CC Ron, Houston. Over.

CMP Go ahead.

CC Okay, Ron. When you get a - a moment, when it's convenient, we'd like you to go up to the latch number 4 there, the one that's been giving us trouble, and we'd like you - well, we think it's just half cocked and we'd like you to stroke it. We think it will probably cock on one - with one more stroke. We'd like you to stroke it at least twice more to verify that it is really cocked. And as you do stroke the handle, we'd like you to notice approximately what point in the - in the throw that the resistance increases. I think that summarizes what we want you to do, if you keep us advised as you go along.

CMP Okay.

CC We - we're going to leave it cocked then from here on until redocking after rendezvous. Well - we don't want to - we don't want you to fire it.

CMP Sure. Understand.

02 12 05 08 LMP Houston, we're transferring to LM power.

CC Roger.

LMP Okay, Houston. I'm going to give them LM POWER. I'm going to go RESET and OFF.

02 12 05 21 LMP And we have LM power.
CC Roger.

02 12 05 49 CDR Gordo, this is Geno.
CC Go ahead, Gene.

02 12 05 54 CDR Okay. While my compatriots are carrying out their respective tasks, I'm going to go off the air here for a - a few short minutes. And give you a call when I get back.
CC Okay.

02 12 06 12 LMP And I'm in step 3, Gordy, on 2-2.
CC Roger.

02 12 07 25 CMP Okay, Houston. America here. I'm on my docking latch number 4 now.
CC Okay, Ron.

02 12 07 50 CMP Okay, the handle itself is free swinging at - to a point about 1 inch beyond the backside of the J-hook.
CC Roger.

02 12 08 10 CMP And, I'll go ahead and try to cock it now.

02 12 08 21 LMP Gordy, ED BATs are 37.2 and 37.2, and the BUS VOLTAGES are 26.2 and I'll bring on the high taps.
CC Okay, Jack. Sounds good.

02 12 08 42 CMP And, Houston, as we all suspected, it has one cock on it, or it had one cock. Now it's fully cocked. And the handle itself is free swinging. The plunger has depressed, oh, almost three-quarters of an inch from the top. And it is no longer parallel with the surface.
CC Roger, Ron.

Tape 42/4

02 12 09 19 CMP Okay. When you look back in the side of it there, that little J-hook with the snowman in it, the snowman's head points - as you look directly at the side of it, it points - the snowman's head is at 8 o'clock and the connecting link from the one that connects - the one that goes into the plunger to - to the little fat J-bar there, is parallel with that slot, so that the point of the J sticks out. So it is, indeed, fully cocked.

CC Okay, Ron. Sounds good and that's where we'd like to leave it.

CMP Okay. Will do.

02 12 10 20 LMP Okay. Step 5, 2-3.

CC Roger.

02 12 11 21 LMP Okay, Houston. Step 5 complete. Glycol pressure is 21. It's down about a psi from yesterday.

CC Okay, Jack. Copy.

02 12 11 32 CMP And, Houston, is magazine II a good one to use for a - some opportunity interior photos?

CC Let me check, Ron.

02 12 11 56 CC That's affirm; II sounds good.

CMP Hope so. Looks like that's the only one I have.

CC Do you - do you recall when you did the heat flow on HH, if you used all of HH up on that experiment?

CC Don't get it out to look, but I just wondered if you remembered.

CMP ... No, it ran out. It didn't - I got the complete cooldown part of the ex - of the experiment on HH and then switched to HIGH. And I got about 2 minutes of HIGH before the film ran out again. Had that at HIGH power on the - on the - -

CC Okay, Ron. Thank you.

CMP After the main part of the experiment was complete.

CC Roger.

CC And, Jack, we're copying LM data now.

02 12 13 02 LMP Okay, Gordy. Beautiful. I was just going to say step 6 is complete.

02 12 16 45 LMP Houston, 17.

CC Go ahead.

LMP Roger. I just was thinking while I was waiting here that the cleanliness of these two spacecraft is certainly a tribute to the - all the people at Grumman and Downey and at the Cape, who worked so hard to put them that way.

CC Okay. We'll make sure they hear about it.

02 12 19 31 CC Challenger, Houston. We're - we've looked at the LM data and it looks perfect, no problems at all. What we're doing right now, though, is - is - the checkout on the carrier and subcarrier lockups on the LM comm. So far, we've had no trouble with it, but we haven't quite completed the routine we wanted to try. Over.

LMP Okay. I understand, Gordy. No - no hurry here.

02 12 25 34 CC Okay, Jack. We've completed our investigation of the comm, there. It all looked good. You can press on page 2-4.

LMP Roger.

02 12 27 13 LMP Say, Gordy, I see I neglected to pull the BAL LOAD circuit breaker when I went to - after going to high taps. You want me to go back and show you that again?

CC Stand by.

02 12 27 36 LMP That's the BAL LOADs breaker on 16, so the buses were tied together.

Tape 42/6

CC Roger. I understand.

02 12 27 50 CC Jack, there's no need to go back. Just keep on going.

LMP Okay. Sorry about that.

CC No problem.

02 12 31 42 CC America, Houston. We're all ready for the E-MOD dump, if it's convenient to you.

02 12 32 18 CMP Houston, this is America. I guess that's for me, isn't it?

CC That's right, for Captain America.

CMP (Laughter) Okay. We'll get her here.

02 12 32 39 CMP Okay, VERB 74 ENTER.

02 12 32 44 CC Okay, we're getting it.

CMP Okay.

02 12 33 11 CMP And, Houston, we have 50 percent remaining on magazine India India.

CC Roger.

CMP And they're all taken at 6 frames a second.

CC Okay.

02 12 33 54 CC Okay, America, we've got the dump.

02 12 34 05 CMP Okay. Understand; you have the dump.

02 12 37 35 CDR Hello, Gordo. This is Geno. I'm - back on the line.

CC Okay. Welcome back.

CDR Yes, I was just testing out the survival techniques in space.

CC Roger. Did you survive?

CDR Well, so far.

02 12 38 00 CDR And we've got the LM back on CSM power.

CC Okay.

CDR Gordo, it's called education of necessity.

CC Roger.

CDR Okay. I guess the LM looked pretty good to you, huh?

CC Yes, sir. It looked perfect. And we also went through the little communications main carrier subcarrier lockup check, and the - and the comm system worked perfectly, so there's no problems at all to report.

02 12 39 07 CDR Okay, fine. We'll start in - with the - Jack donning the PGA, and then I'll follow him.

CC Okay.

02 12 40 38 LMP Gordy, how'd that ZPN turn out?

CC Let me get another check, here.

02 12 41 21 CC Okay, Jack. It looks fairly good right now. Don't bother changing anything.

LMP Well, I'm just going to be in a position to work on it in a little while and if the occasion arises, I could.

CC Okay, we'll keep that in mind, although it looks reasonable at the moment. It has shown some - at some times, it's gone to - from edge to edge on their scale but it's come back in right. Find out later if they want to do anything.

02 12 42 00 LMP Okay, the - the electrolyte pads may be still expanding a little bit so I'm going off the air briefly to start getting into the suit. And I'll talk to you in a little while.

CC Okay.

Tape 42/8

02 12 53 48 CDR Hello, Gordo.
CC Hello.

02 12 53 57 CDR Okay. We're up to frame count 151 on magazine
November November. They've been pictures of the -
primarily of the CSM out the LM windows by the CMP.
CC Okay.
CDR He's been up there fooling around for a while. We
may have to check it out and see what he did.

02 12 57 42 CC America, Houston.
CDR Go ahead, Gordo.
CC That dropout there was because Ascension had a
problem. We're now over on Madrid, and you're
sounding good.

02 12 57 59 CDR Okay.

02 13 01 14 CDR Okay, Gordo. Jack is in his suit, unzipped at this
time. I'm going off the air, and Ron will come on
and keep you informed as to how we're going.
CC Okay. Fine.

02 13 03 07 LMP Houston. How do you read the LMP?
CC Loud and clear, Jack.

02 13 03 13 LMP Okay. I'm in my suit, presently unzipped. Didn't
seem to be any problem at all.
CC Okay.

02 13 04 07 LMP And, Gordy, I think I found the problem with the
biomed sensors. And when I come out of the suit,
I can fix it. I put a little of that bacterial
cream on the sensor places last night as a pre-
ventive mechanism, and I think it's just a little
greasy to hold the sensor.
CC Okay.

Tape 42/9

02 13 09 08 CMP Okay. Gene's got his suit on and he's going
across to the LM now.

CC Roger, Ron.

02 13 15 26 CMP Okay. This is CMP. I'll go off the line here,
for a little bit, until I can get my suit on again.

CC Okay, Ron.

CMP And Jack's still on the line up there in the LM
though.

CC Okay.

02 13 17 37 LMP Okay, Houston. We're both zipped now, and it went
quite easily.

02 13 17 44 CC Okay, Jack. Sounds super.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 13 29 37 CMP ... CMP. I finally got my suit on now.

CC Go ahead.

CC America, Houston. Did you call?

CMP No, I was just saying - the CMP. Got my suit on now. And I had a little trouble with the donning liners getting stuck - stuck in the zipper; but I figured out how to get them out of the way now.

CC Okay.

02 13 38 40 CMP Okay, Houston. Gene has his suit pretty well on now.

CC Okay, Ron.

CC We reviewed the data on the E-MOD. Everything looks normal. One thing you might do is - no big thing, but you might zero NOUN 26. It's still loaded, left over from the EMP you used in the P23 yesterday.

CMP Okay. Thank you much.

02 13 39 49 LMP Gordy, this is the LMP. How do you read?

CC Loud and clear, Jack.

LMP Say, when I was switching batteries, I noticed switching from low to high taps that there were some reverse-current indications. Sure that's nothing to be concerned about; you probably expected those, right?

CC That's affirmative, Jack. That's normal.

LMP Right.

02 13 55 31 CC America, Houston. We'd like to terminate the charge on battery B.

Tape 43/2

CMP Okay; stand by 1. Okay, we'll get that in a minute, Gordon.

CC Okay.

02 13 58 51 CMP Okay, Gordo, the charge should be terminated on BAT B.

CC Okay.

02 13 58 57 CMP And 7 Alfa's still - 7 Alfa's still 0.6.

CC Roger.

02 14 04 03 CDR Okay, Gordy, I - I'm looking around, but I can't figure out what that MASTER ALARM is. I didn't see any O₂ HIGH FLOW and I didn't see any lights, and we did get it down in the LEB.

CC Okay, Gene.

02 14 04 20 CDR And there it is again.

CC Roger.

02 14 04 32 CDR And again.

CC Roger.

02 14 04 37 CDR Okay, I saw SPS PRESSURE blink on that one.

CC Roger.

02 14 04 48 CDR Yes, Gordy, she's triggering continually on SPS PRESSURE.

02 14 05 01 CDR Yes. I can't reset it, and a minute later she's coming up with a blink on SPS PRESSURE.

CC Okay, Gene. We think it's the - well - well, we - we're sure that it's the oxidizer pressure is right on the trip limit. We're almost certain it's due to helium absorption.

02 14 05 28 CDR Yes, we're reading 155 right now.

CC Roger.

02 14 08 28 CDR Okay, Gordy. We got the SPS PRESSURE light on steady now.

CC Roger.

02 14 15 25 CC America, Houston. If you give us ACCEPT, we'll give you a new state vector. Nothing much wrong with the one you've got, but we're just going to tweak it up.

02 14 15 36 CDR Okay, Gordy, you've got it.

CC One other question. Do you have the LM closed up now? We're seeing some heater currents that are a little high, indicating maybe the light's still on. And we're just trying to understand where the LM is at the present time.

02 14 16 04 CMP Okay, I just closed the hatch, just about the time you started talking there.

CC Okay, we'll take a look at the currents now.

02 14 18 03 CC America, it's your computer, and we did the VERB 66.

CDR Okay.

02 14 29 03 CDR Say, Gordo, what's the trend in thinking on that SPS light - to leave it lit or to bump the pressure up?

CC Well, I - Ed Mitchell must be at work, because we were just talking about that subject. I'll call you when they come up with a final decision.

02 14 29 33 CDR Okay. And Ron has put the - has closed LM hatch. He's put the drogue in. He's put the probe in, and he's putting the CSM hatch in as a one-man exercise - suited. So he's doing the whole thing, and he's still in his suit. Our suits are stowed.

CC Okay, Gene. We got one question here, that - just - just waiting for a convenient time to ask, and that was - wondered if, with reference to the

Tape 43/4

wakeup problems we had this morning, if you'd clarify just exactly why Ron didn't hear our crew-alert MASTER ALARM. You know exactly why?

02 14 30 22 CMP

Well, it's not the Seconal. As much as I hate to admit it, the POWER AUDIO/TONE was OFF (chuckle) in my headset.

CC

Okay. We kind of suspected that - that one.

CMP

Okay; that lets you rest a little bit easier. And just to prevent something like that from happening again - or if it should happen again - what we'll do, we'll hook up the tone booster, which we didn't have hooked up last night.

CC

Okay. We concur. Sounds good.

02 14 31 24 CMP

Yes. I woke up and I saw that light there and I thought, "Gee-whiz, I just got it in time." Until I tried to push - push out that caution and warning MASTER ALARM. And burned my end of my finger.

CC

(Laughter)

CMP

I was also in a sleep restraint and upside down with a zipper in the back. And I had a little problem getting my hands up to start with, also.

CC

Roger.

02 14 32 40 CMP

Hey, Houston, CABIN REPRESS is back to BOTH now - I mean EMERGENCY CABIN REPRESS.

CC

Roger, Ron.

02 14 36 20 LMP

Gordo, if you don't have any objections, we'd like to go ahead and secure the high gain, and go on to PTC while Ron's doffing his PGA.

CC

Let me check and see if we have any.

02 14 37 21 CC

Sounds good to us. Go ahead and, per Flight Plan, spin it up.

LMP

Okay.

02 14 37 34 CC Okay, I didn't want to mislead you. I mean, you can get ready to spin it up. We'll give you the GO to spin up.

LMP Okay.

02 14 39 06 LMP Okay, Gordy. You want to leave the high gain until you call?

CC Stand by.

CC Okay. Jack, this is a good attitude to go to OMNI Bravo, and you can go ahead and secure the high gain.

LMP Okay.

02 14 44 45 CC America, Houston. The rates look good; you're GO for spinup.

CDR Okay; great, Gordo; we're GO for spinup. We've - we've got a show in here that very few men have ever seen, and that's a CMP trying to get out of his suit by himself.

CC Wish I was there to watch.

LMP It really is a story to behold.

CDR Needless to say, we're both very impressed.

CC I can tell.

02 14 45 53 CC America, Houston. Use B/D roll for spinup.

CDR Okay.

02 14 46 31 LMP Okay, Houston. This is the LMP on biomed. How do you read?

CC Okay, Jack. Let's take a point check here.

CC America, D-2 ROLL is not on. You need the Delta ROLL jet.

Tape 43/6

CDR Yes, I'm still working on it, Gordo. I was just deciding whether to spin minus or plus; but I guess we ought to spin minus, as per the Flight Plan.

CC Okay.

02 14 48 14 CDR We're on our way.

02 14 48 17 CC Okay. Okay, - the LMP's EKG and ZPN look good. And on the SPS light, we recommend not doing anything with the system. We want you to go to ACKNOWLEDGE so the - get the light out of your eyes, and then just fly there in ACKNOWLEDGE on the CAUTION and WARNING.

02 14 48 54 CDR Okay, Gordy. We're in ACKNOWLEDGE, and - I presume, probably after LOI, we'll be able to go back to NORMAL, right?

CC That's affirmative.

02 14 49 14 CDR Is that an abnormal amount of helium ingestion [sic], or do you think that's about right?

CC It's - it's absorption, and that's normal.

02 14 52 06 CDR Hello, Houston. You read?

CC Loud and clear.

02 14 52 12 CDR Okay, now that we got another look at you, Gordy, it looks like Houston might be right on the fringes of either being clear or clearer. The entire Gulf is pretty nice. Florida looks pretty clear, and Mexico looks pretty clear. There's a big air mass of clouds that looks like it picks up somewhere around the coast at Houston, heads on up north, and then covers most of the Midwest and the East - from about the middle of Mississippi, Alabama, and Georgia on north. It's clear enough now to even see the coral reefs down off of Florida.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 14 52 54 CDR And it looks like west Texas is probably also pretty clear, at least in a run from east to west. We can see Baja, and on up the coast of California up north.

CC Okay, sounds like the whole crew is turning into weathermen.

CDR It's one of the better views we've had of the States, I think, even though we're quite a ways out.

CC Roger. Looks like your subso - subspacecraft point is just about at Peru right now.

CDR Yes, we're - looks like we're looking straight down on the center of South America, pretty close to what you're saying.

CDR Gordy, you want to bring us up to date briefly on how you plan on handling this time update again?

CC Okay. I'll do that. Let me - but let me practice before I start here. Just a minute.

CDR Okay. I'm primarily interested in those parts of the Flight Plan which we're going to eliminate.

02 14 55 16 CC Okay. Just one second.

02 14 57 33 CC Geno, I'll read you the PAO release; they summed up pretty well, and I'll just use their words here. The time has been made up in two increments. The first one of 1 hour and 45 minutes in the Flight Plan. The crew activities were jumped ahead by 1 hour, and they essentially began doing those things that were called for 1 hour later in the Flight Plan. They will again jump ahead an hour and 40 minutes, and that will occur at 65 hours. By that time they will have completed all those activities required up through 67 hours and 40 minutes in the Flight Plan. Or, in other words, they will have completed all the activities required to get them into lunar orbit 2 hours and 40 minutes

Tape 44/2

early, and in order to make the clocks then agree with where the crew will be in the Flight Plan, we'll jump the clocks ahead 2 hours and 40 minutes. This clock update, which can be likened to going on daylight saving time, only 2 hours and 40 minutes worth of change instead of 1 hour of change as we do on daylight saving time, will occur at 65 hours when the crew will have completed all of those Flight Plan activities up through 67 hours and 40 minutes. (Chuckle) This simply involves setting our clock to 65 hours in the Control Center and aboard the spacecraft to 65 hours, moving them ahead to 67 hours and 40 minutes. Then, barring any further changes in the mission time line, from that point on, the elapsed time clocks, which are used as a cue to Flight Plan activities, should agree with the Flight Plan and events that, in the Flight Plan are called out for a certain time will happen at that time on the elapsed time clocks (laughter) in Mission Control and aboard the spacecraft. (Laughter) This is a convenience factor.

CDR You're lucky; we're going to lose an omni.

CC Okay. I'll hold off there for the rest.

02 14 59 26 CDR Gordy, never mind. I think I got the gist of it.

02 15 04 16 CDR Did you give up, Gordy?

CC Okay. What we're really going to do - (chuckle) really is simple. At 65 hours we're going to do the update of 2 hours and 40 minutes. And the procedures are shown in the Flight Plan at 67:35. There just happens - happens to be really no - no activities we have to reschedule in the intervening time. So, after the update is complete, we'll be right on the Flight Plan, both timewise and activitywise. Over.

CDR Okay. We're looking at it. Going to have to squeeze my shave in somewhere else, I guess.

02 15 07 38 CC Hey, Gene; Houston.

CDR Go ahead.

Tape 44/3

CC Hey, you got to break - you can cast the tying vote. Which is the best description: the water bag or the clock one?

CDR Oh yes. Now I remember. You got a little - give a little credit on this last one, I guess, to - to Public Affairs, because I don't think Gordo could have thought that one up all by himself.

CC Very diplomatic.

CDR ... Considering I - I was trying to do - to do Charlie's technique step by step, I guess I got to give him little bit more credit from the gymnastic point of view.

LMP That sounded like one of Gordy's aircraft schedules.

02 15 09 07 CC Amen.

CDR One thing they didn't ... They were moving another Saturn V out on the pad.

CC Jack, we lost all of that due to the antenna switch. Say again.

CC Jack, we missed your last transmission - -

CDR Gordy, you listening?

CC - - due to the antenna switch.

CDR You say you got it, or you're getting it?

CC No, we missed it.

CDR Okay. I said you can look right down at the Cape area - that's the Cape that we know - in Florida, and it's little disheartening because the last time I was up here looking back from this angle, they were moving another Saturn V for another Moon trip out on the pad already. But I guess they're working pretty feverishly out there on B.

02 15 11 53 LMP Gordy, this is Jack. I think Gene was right. You got some - probably scattered cloud weather, but not very far away from you there's a pretty heavy

Tape 44/4

mass of clouds. It may be the forerunner of that dry cold front you were talking about yesterday, which I can see stretching over into Sonora. But where it hits the stateside, it's got quite a mass of clouds associated with it. It looks like they're moving in your direction.

CC Okay, Jack, thanks for the warning.

LMP Clear behind it, in Arizona and New Mexico and maybe southern Colorado, it looks like there may be another front stretching, or maybe it hits northern Arizona and Utah and up through northern Colorado, and on in to Canada, trending northeast.

LMP You're calling it right on, Jack. I'm looking at the surface chart, and that's about what we see.

LMP Looks like a low might be developing on that one - a wave up in northern Colorado and - although the clouds are a little hard to read.

CC Roger.

LMP Our sub - or our zero phase point - About 20 degrees west of Bolivia, our sub - our zero - zero phase point, and it is quite a bit brighter than yesterday and looks as if, and more general, as if maybe the seas have picked up in that region a little bit.

CC Roger.

LMP One of the more unusual features is developed - as I see - developed in the southeast Pacific just north of the Ross Sea and that is a very striking mushroom pattern on a very large scale. It has north/south clouds streaming streamers from the Ross Sea. And when it gets up about the latitude of Tierra del Fuego, but quite a bit west of that land, it branches out to the east and west in a large mushroom pattern. And, it looks like the top of that mushroom may be a curved cold front that's pushing its way up into the southeast Pacific. It currently - the eastern edge of that front is probably 10 degrees longitude from Tierra del Fuego, and it looks like that land in southern Chile is picking up high clouds, probably associated with that front's movement.

CC Roger.

LMP I'll get some shots of that next time around. That's a spectacular pattern. You almost get the feeling that the cold airmass moving out of Antarctica streams for a while north/south. And then it picks - The cloud patterns change and as it starts to migrate, the winds start to change from east to west. Maybe that's where it encounters the jetstream.

02 15 16 29 CC Roger.

02 15 19 45 CC America, Houston. I have a couple of miscellaneous items here.

CMP Okay; go ahead.

CC Okay. We'd like you to disable B2 and D2 just for a drill here.

CDR Oh, thank you, Gordo.

CC Also, the SHe tank looks exactly nominal, as far as the rise rate goes, to us.

CDR Can't argue with that.

CC And to summarize your film budget situation, have three magazines: KK, LL, and MM are budget for the scheduled photos such that they have only five, 19, and one, respectively, frames left over after you've done all the scheduled pictures. And November November, we think, has just - has just nine frames remaining now. The two nonscheduled magazines are OO and PP; 160 frames each. Those are the ones provided for optional use. We have 44 additional frames scheduled out of November November, scheduled during lunar orbit. There is only nine left in it now, so we'd like to save at least 60 frames out of either Oscar Oscar or Papa Papa, the two optional magazines, to cover the scheduled frames. Guess what we're saying is there is no problem. We've still got plenty of film, but you will have to use some of your optional mags for scheduled pictures. Sixty frames is what we want to save.

Tape 44/6

CMP Okay; mighty fine, Gordo. Plan on Oscar Oscar for that magazine.

02 15 22 12 CC Okay.

02 15 34 12 LMP Gordy; this is Jack.

CC Go ahead, Jack.

LMP I - Cal Tech will never forgive me; I'm a little hesitant on my elementary optics. But I just put Ron's polarizing filter in front of the monocular, looking at the Earth and rotate 90 degrees, and from max to min in terms of brightness, there's a remarkable change. And I suspect that means that the Earth is polarizing light enough to see it. The main thing that happens is that the oceans get considerably darker when I rotate the filter towards the dark position anyway. The continents don't seem to show any obvious change, but the oceans and the zero phase point darken - oh, I would guess by a factor of two in brightness. Maybe that's an extreme, but I think it's that.

CC Roger. I was just trying to think of a reason. Is it uniform change over all ocean areas, or is it more of a change in some areas than others?

LMP Well, I'd say that the subsolar point shows the greatest change, but you can still - the zero phase point shows the greatest change. But all the oceans get darker.

02 15 35 51 CC Very interesting. We are just about to switch omnis.

02 15 42 15 LMP Houston, 17.

CC Go ahead.

LMP Gordy, I figure you're getting an optics briefing ready for me, right?

CC I haven't had anybody volunteer one. Strictly some layman theories going around, but nothing official.

LMP Okay.

Tape 44/7

02 15 46 05 CC America, Houston. Just got started on the Cowboy-Redskin game, about 5 minutes into it. The Cowboys are ahead 7 to nothing. They scored the first time they got the ball.

LMP Gordy, you started talking before we had an omni. Try it again.

CC Okay. The Cowboy-Redskin game just got started. It's now 7 to nothing, Cowboys. They scored the first time they got their hands on the ball.

LMP Okay. I think we got most of that. It happened again, though.

CDR Did you say it was 7 to nothing, Cowboys?

CC That's what I said. They scored the first time they got the ball. It's - the game's just about 5 minutes old.

CDR Outstanding. I thought this was Saturday. Isn't - isn't today Saturday?

CC It is, but the college is all through, so the pros are playing on Saturday now.

CDR Beautiful. Seven to nothing, huh? Go get 'em, Cowboys.

LMP But, he would say the same thing for Washington, I'm sure.

02 15 47 45 CDR Nosiree. Go get 'em, Cowboys.

02 15 48 57 CMP Houston, 17.

CC Go ahead, Ron.

CMP Okay, Gordo. My apologies on the CMP's insult drinking bag. There was, in fact, water in it. However, somehow, when we put the suit on, the water bag had gotten turned sideways, I guess, is the way to explain it. It had gotten turned sideways such that the suction tube was crimped sideways. And, as a result, there was no way that you could get any water to go through the tube.

Tape 44/8

CC Okay. You're talking about the problem we had there just before launch, right?

CMP That's affirmative - prelaunch.

CC Okay, and for your information, the PTC looks good. It ought to hold.

CMP Okay. Mighty fine. I lost my scissors. If there is anything you can do to help me find them, I'd be - appreciate it.

CC Okay.

02 15 50 22 CMP Okay (laughing).

02 15 52 40 CC Got a game plan update for you here. It's now 14-nothing, Dallas; still in the first quarter.

CDR You're sure a bearer of good news, Gordy. That's great.

LMP Gordy, I just - this is Jack. I just tried the red filter on the front of the monocular and about the only major thing I noticed was that the cloud patterns over the landmasses seemed to be enhanced. The contrast between cloud and land, particularly green land is enhanced. Otherwise, all it does is make the red - the Earth look a little red.

02 15 53 37 CC Roger, Jack.

02 16 04 13 CDR Hey, Gordo; this is Gene.

CDR Hey, Houston; this is 17.

CC Roger, Geno. I think we've got you now. Go ahead.

CC Okay, Geno. I think we got you - -

CDR ... 17.

CC - - Now. Go ahead.

CDR Okay. I just happened to be throwing a few switches, and I see our helium tank temperature on quad A is about 95 or so. And the others are quite low. Is that because of our attitude there during the LM checkout?

CC That's affirm. That's the reason.

CDR Okay. I also see the tank that - package temperature a little higher on that quad too. But, being close to a hundred it seems a little unusual. You're - you're happy, right?

CC That's affirm. No problem. We've been watching it, and it seems to be coming down now.

CDR Okay. Fine. Thank you.

02 16 09 07 LMP Houston, you want the H₂ HEATERS to AUTO and the FAN 3 OFF now?

CC Stand by, Jack.

CC That's affirmative, Jack. Go ahead.

02 16 09 54 LMP Okay. That's done.

CC Now 21 to nothing, Cowboys. Second quarter.

CDR Super Bowl, here they come. Watch out now.

CC Should remind you that the Commander in Chief is a Redskin fan.

CDR I read about that. That's why the Cowboys need as much help as they can get.

LMP Gordy, in the continuing saga of looking at the Earth through rose-colored glasses, I tried a blue-colored glass, and it - as you might expect, completely masks out the continent. The land areas are just not visible through the blue. Otherwise, the ocean and clouds - or the contrasting ocean and clouds remain about the same.

CC Roger, Jack.

LMP And, Gordy, I tried putting all the filters we had together to check the Sun for sunspots, but just not quite enough light attenuation to do that.

CC Okay. For a while I thought you were a human weather satellite. Now I think you're a human Earth resources satellite.

Tape 44/10

LMP Well, about all I can say is I'm a satellite I guess.

LMP Gordy, it looks as if the distribution of water and ice in the ri - Ross Sea has changed in the last day or two. I don't remember looking at it yesterday specifically, but it seems to be different today than it was the first day.

02 16 12 46 CC Roger.

02 16 19 53 LMP Houston, 17.

CC Go ahead, Jack.

LMP Yes, about this icepack in the Ross Sea. The - as I remember a couple days ago, there were two clear areas, triangular in shape and quite elongate, that were projecting out into the sea from the innermost part of the bay, or the - from the continent. Today those are not apparent, at least the first look I made. And it looks like there is an elongate, more irregular clear area that is roughly parallel to the Antarctic coastline within the sea itself. We'll check that a little more closely and see if that's right.

CC Okay. Seems like kind of a quick change for something like ice, doesn't it?

LMP Yes, and that's what bothers me. That's why I wonder if I'm not being fooled by cloud patterns or something.

02 16 21 16 CC I'm looking at a satellite picture here, which I guess is around 12 hours old though. But over to the east of Australia, maybe about a continent width east of Australia, there is really striking long frontal system - striking because it's so long and so straight, sort of west-northwest, trending west-northwest and east-southeast trending. Can you see that?

02 16 23 38 CDR Gordy, are you there?

CC Yes, sir, right here.

CDR Okay. Now Jack and I may be talking about two different frontal systems or patterns, but the one I think you might be referring to is the one I referred to yesterday as a ruffled parrot's beak. Actually two of them tied together, one starting up probably southeast of Australia and - and then heading down with a long arcing frontal system to another clockwise rotational parrot's - parrot's cone, I should say, down around - near the tip of South America, between it and Antarctica. There is one strong tributary front heading up to the north-northwest from the western side of this big, arcing, frontal mass. And I think that's probably what you're referring to. I'm not sure. I can't quite see Australia coming up over the - over the horizon yet.

CC Okay. I - my picture cuts off right about the - oh, two-thirds of the way south in Australia, that latitude. So most likely we're talking about the same thing, but I can't verify the southern part of it.

02 16 25 19 CDR There is some tremendous - western side of that curve front is a tremendous clockwise rotational airmass. It must cover hundreds of square miles. The one down near - near the continent of Antarctica, down there, near the tip of South America, seemed to be squashed slightly as if there is possibly some - some squashing or effect coming off - off the South Pole area near Antarctica. I think, if I turn around and look at it the way Jack was looking at it, it's a cap of a mushroom. Only instead of simply curving in underneath the cap, it has clockwise rotations on both sides as it curves under.

CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 16 28 28 LMP Gordy, I just took two pictures of the Earth at the present time. And those are - Right now the camera is on frame 153.

CC Okay; 153.

LMP Gordy, where did you say your ATS satellite picture left off to the west?

CC Okay. To the west, it goes clear on over to Africa. But to the south, it cuts off about 30 south, or not quite all of Australia.

LMP Okay. Yes, that mushroom pattern we've been talking about, on either edge - either end of the cap - and the mushroom points north - is a major cyclone circulation system. And also taking - moving, in one case - or trending, in one case, to the northwest and the other to the northeast, there are linear cloud patterns. Gives it a very symmetrical and a striking appearance. I hope it shows on those pictures.

02 16 30 43 CC Okay. It doesn't show on the one I got. Maybe a later version will have that one. Because it cuts - it's cut off on this one.

CDR (Chuckle) Hey, Gordo. This is Geno.

CC Go ahead.

CDR To put this update in simple terms - at 65, I guess on our clocks, you'll update us to about 67:40, right?

CC That's affirmative.

CDR Does that mean we have to eat 2 hours and 40 minutes earlier?

CC Oh, you got me there. I - You haven't been eating - you haven't eaten since breakfast. Is that right?

CDR Oh, yes, sir. We just finished. We'll take another go at it, but I feel I've spending my life here eating.

Tape 45/2

CC Yes. Well, we'll leave it up to you on this special case here.

CDR Okay, I think we'll take - a - a jab at supper here later in the day as per the Flight Plan.

02 16 34 02 CC All right.

CDR Gordy - the whole suiting operation - I was really very pleased with. Jack and I both got in our suits very easily. And one by one we went into the LM. And that's where we zipped each other up. And we really had little or no trouble. We took our time. We got all configured in terms of changing our pockets around and whatever else we needed to do. And, actually, I think it's much easier to get suited than it is to get unsuited, personally.

CC Okay. Sounds good.

CDR Ron stayed suited and did the entire tunnel work. And then went - did it by himself - and then totally doffed his suit and stowed it by himself, also, to sort of extend that little exercise.

02 16 35 16 CC Roger.

02 16 46 31 CC America, Houston. Halftime score is 28 to 3 - Cowboys.

CDR Keep talking, Gordo.

CC Okay, I'll keep talking (laughter). The - I've learned that when you get to the ALFMED and pull it there, you'll see some tape around the emulsion shields. Those are three rectangular areas in front of your eyes and to either side that contain the photographic emulsion. This tape is around the edges of each of those three areas to help seal out light leaks. You haven't seen it before. Leave the tape on there. Don't pull it off. Over.

CDR Okay.

02 16 48 12 LMP Gordy, just took a series of pictures of the Earth with the 35-millimeter using the polarizing filter

in the two positions. And the frame count is now 39. I took six pictures. And with the filter, on the first of each pair, in the DOWN position. The second's in the UP position. And I changed the f-stop from - the first set at f/4, the second set at f/2, and the third set at f/8.

CC Okay; we got all that, Jack.

LMP And, Gordy, you might ask one of the experts around there in - Is the lightmeter in the 35-millimeter integrating over the interior spot, or over the hairline spot? The larger one.

CC Okay, I'll ask.

LMP It acts as if it's the interior one, but ...

02 16 49 52 CC Okay.

CC Jack. The answer to your question is the center spot is weighted for 60 percent of the reading and the rest of it for 40 percent. Over.

LMP Okay. That - that makes sense. That would explain why the needle moved as I moved it across the series of spots.

02 16 51 48 CC Roger.

Note: At 2 days 17 hours, the GET in the MCC was updated. To correlate times from this point on, add 2 hours 40 minutes to those shown in this transcript to make them correspond to MCC GET.

02 17 00 42 CDR Gordo, we're - we're ready any time you are for that update. And after we get the T_{ephem} and everything squared away, we'll go into ALFMED.

CC Roger. Stand by on that, Geno; and we'll be with you in a minute.

CDR Hello, Robert. How are you today?

CC Real fine, Gene. You're sounding great.

Tape 45/4

02 17 01 06 CDR Doing great out here.

02 17 03 43 CC Geno, we're ready for the clock update. We'd like POO and ACCEPT. And we're got two loads to put in, so it will take a couple of minutes here.

CMP Okay, you got it?

02 17 03 58 CC Thank you, Ron.

02 17 06 08 CC 17, Houston. I've got an update on your flyby maneuver pad due to this clock update. Would you like to copy it?

CDR Stand by just 1 second (music).

LMP Okay, Houston. Go ahead with the flyby pad.

CC Okay, stand by 1 on that - on our end. We're done with the - we're done with the up-load. The computer is yours, and we need a read-out on the 'T ephem'.

LMP Okay, that's in work.

CC Okay, we've got the read-out.

02 17 10 05 CC 17, Houston. The data looks good, and you're GO to copy it, and recommend you copy it into the Flight Plan Supplement. And that's on page 1-43 of the supplement.

02 17 10 27 LMP Okay, Houston. We have it.

02 17 11 49 CC And, 17, we got that flyby pad now. If you're still ready, we're ready.

LMP Okay. Is this a full pad or just a change to the other one?

CC It's just a change, Jack. It's a change to NOUN 83, the GETI, and a change to the bottom line, the GET of .05G. Just two changes.

LMP Okay, go ahead.

CC Jack, if you'll just add 2 hours and 40 minutes to each one of them, that's it. The GETI is 081:54:43.49. The GET of .05G, 156:04:03. Jack, I guess I read 81. I was looking at the old pad. It's 83 - 083 - on the GETI.

LMP You're too fast for me. I was just going to chew you out.

CC Sorry about that, Jack. I got it around the room.

LMP 083 - (laughter) 083:54:43.49; 156:04:03.

CC Roger.

02 17 14 10 CDR Okay, Bob. We got all of our clocks set on board.

CC Roger. Understand.

CDR What was the exact amount of that update time?

CC Two hours, 40 minutes; 2 plus 40.

CDR Okay, 2 plus 40, exactly. Thank you.

LMP Okay, Bob. We're going to work up an appetite with the ALFMED today.

CC Roger.

CDR Hey, Bob. May be a little premature - but I don't think so - but I think there was some good thinking into that update, looking at the Flight Plan up until now and where we go from here. I don't think we - we overlooked a thing.

CC Roger. Like I said the other night, we gave Tommy a gold star on that one.

CDR Except I think he and Rita got in - in cahoots.

CC A little soon for supper, huh?

CDR Yes. We just finished lunch, and it's about time to eat again.

CC That's known as the simulator step-ahead.

Tape 45/6

LMP Can you give us our distance from the Moon - from the Earth?

CC Roger. Stand by on that.

LMP Are we about 5000 miles closer now?

CC Don't you wish.

LMP Well, isn't that what - isn't that the way these step-aheads work?

02 17 16 58 CC Normally, yes. But this one didn't work that way. Jack, you're at 183,000 miles. It's really amazing how time flies when you're interested in your work, isn't it?

02 17 18 36 CC Jack, Houston. Did you read your - my last call with the distance?

02 17 24 32 CDR Houston, 17.

CC Go ahead, 17.

LMP Okay, Bob, we're getting ready for the ALFMED. I just took a red-filter and a blue-filter pictures, - On frame 41 now, with a 35-millimeter - pictures of the Earth. And I took them one stop smaller - that is, more open - than the lightmeter said, hoping to compensate for the small Earth. The Earth just barely fills the most inner - the innermost circle of the spotmeter. Also, there's a very strong band of clouds, shaped sort of like a narrow fir tree, with a base about 20 degrees of longitude west of Baja California, that extends up, I believe, into the vicinity of Hawaii. And the top terminates in a very strong northern cyclone pattern.

CC Roger, Jack. Was your magazine Sierra Sierra?

LMP That's affirm. Sierra Sierra.

CC Roger, Jack. And you say that cloud is right - that cloud area is right near Baja California? I've got a picture of it here in front of me, from one of the satellites.

LMP No, it's about 20 degrees west - longitude degrees west of that.

CC Yes. Okay, we've got it on the spot here.

02 17 26 13 LMP And maybe even more than that. Okay, maybe even more than that. It's - it might be as much as 40 degrees west, and - Actually Hawaii may be on the west side of that. It's a little hard to tell. It's close enough to the LM that it's hard to say.

CC Roger, Jack. I think I've got it on our map here. It shows a pretty heavy dense cloud area right down in that area you're talking about.

02 17 27 26 CDR Okay, Bob. For the ALFMED, CDR will be in the left seat. CMP will be in the center seat with the ALFMED. For our reporting, when we get the VOX, we'll just call out our first names to shorten it and the comments following. And Jack will be recording.

02 17 27 49 CC Roger. We'll be listening.

02 17 31 00 CMP Okay, wait a minute. Houston, how do you read on VOX with the lightweight headset?

CC Read you loud and clear, Ron.

CMP Okay.

CMP Yes. Wait a minute. Let me get this little old box set to go here, first.

CC Okay.

CMP Yes.

02 17 32 09 CMP Okay, UTILITY POWER is OFF.

SC Yes. POWER switch is OFF. Okay, it's connected, now.

02 17 32 33 CMP Okay, UTILITY POWER is ON. Okay, let me get strapped in here, somehow, or I'll float all over.

CMP (Music) Okay, let's see.

Tape 45/8

CMP Uh huh, I think I can.

02 17 35 02 CMP Okay, my blindfold's going on, now.

CMP Okay. Sounds like they clipped. Okay, somebody will have to help me put this thing on now; yes, just kind of like so; yes. It goes around the old - -

SC Yes, but you ought to ... kind of maintain your head in the same position, if you can.

CMP ... to operate now?

02 17 37 57 SC No, Just turn it down a little bit.

CMP Go to operate while you're taking the pictures there (chuckle).

CDR Hello, Houston. CDR put his blindfold on at 68:18.

CC Okay, we copy that.

02 17 39 12 CDR And how do you read me in VOX, Bob? This is Gene.

CC Read you loud and clear, Gene.

CDR Okay, I'm conducting the experiment. And the - frame Sierra Sierra is now at 45. I got two shots. One - two from the side and two from the bottom.

CC Roger. Copy.

CMP Hey, looks like a countdown for ready to go, Jack?

CDR Hey, Bob, does it make any difference if your eyes are opened or closed?

CC (Chuckle) It may be a personal thing, Gene. I - This is Stu. I had to have my eyes closed but give it either way.

CDR Okay; thank you.

CMP Okay, we'll count down to start. 3, 2, 1 -

02 17 40 28 CMP MARK it. It's buzzing.

02 17 40 52 CDR Yes.
SC ...

02 17 45 35 CDR Change it. The other side is not very good.
CMP ... two.

02 17 46 08 CDR MARK. Gene. I've got a series of random lines, which do not appear to be the width of my field of view, that are moving like a flashing horizon with thunderstorms on the horizon. They're dimly flashing, and they're moving across the eye from left to right and from top to bottom, individually. Both eyes. It's stopped now.

02 17 47 03 CDR MARK, this is Gene again. Going from the upper left to the bottom right. Lines of the same sort of thing. Dimly lit flashing horizon-type flashes. But they're linear. They're linear, and they tend to come from the - either the upper left or the upper right and work their way downward. Now they've stopped. Both eyes.

02 17 48 50 CDR MARK. Gene again. Both eyes. This time the same flashes on the horizon, but they don't seem to be moving out of both eyes. Tend to be up at the tops of both eyes. Just rapid, sequential, lightninglike flashes. And they've stopped.

02 17 50 00 CDR MARK. Gene again. Similar type of flashes. They don't seem to be moving, but they're coming from the right of the right eye and from the upper left of the right eye. And I can actually see an outline of a - of a curved horizon, and the flashes are coming out from behind it. They've stopped.

02 17 50 46 CDR MARK. Gene again. I see - peripherally out of my right eye - I cannot see these flashes - but I can see peripherally the right-hand and upper-right-hand side of my right eye being lit up.

CDR Pardon?

SC ...

CDR This last one? They were peripherally. I couldn't see them. All I know is that there was some light out - peripherally out - yes, but a flashing glow.

Tape 45/10

02 17 52 08 CDR Oh, man, there is a good one. The left eye, right in the middle, it's - almost a purple flash. It's still going. Right in the middle of my eye, and it's coming out from behind a - a horizon that is almost - It starts out as a semicircle and then folds into a point like on a pencil. And then it disappears. That's the horizon, and the light is flashing from behind it. It's gone.

02 17 53 31 CC Hey, Gene, Houston.

CDR Go ahead.

CC Okay. According to all our experts here, the phenomena you're describing is pretty much the phosphene effect - sort of like when you rub your eyes or squint your eyes too hard - because the effect is lasting too long. The streaks or the flashing that we're looking for are very fast, and they do not remain as a scene to your eye. And I guess the only thing we could say would be to maybe either relax your squint a little bit or to ... the blindfold's on exceptionally tight. I know this sounds kind of screwy, but those are the words that we would like to - like to say to you. But the actual phenomena we're looking for will be a very short-lived phenomena. It will either be a flash or a very fast streak. Something along this - We're not trying to load the data, but we feel you're describing a different phenomena.

02 17 55 20 CDR Stu, we lost all that last conversation. You better repeat it.

CC Okay, Gene. Sorry about that, and here I thought I had waxed so eloquently. But the - the effect you're describing is an effect that can come from rubbing your eyes or perhaps squinting too hard. But the effect we're looking for - and I guess we're really not trying to load the data - but the effect that we're looking for is a very short-lived phenomena and would not - -

02 17 55 50 CMP MARK. Ron. I got one. In the right eye. Coming from - back - going towards ... Very narrow streak.

Tape 45/11

CC And, Gene, our only words of wisdom are try to
relax the - the eyes a little bit or if you have
the blindfold on exceptionally tight, you might
work on that. But the - just - I guess sort of
relax and see if we can see the other - the other
phenomena.

02 17 56 28 CDR Okay.

02 17 59 26 CMP MARK, Ron. One about 12:00 in the right eye;
looked like it was just a spot.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 18 02 43 CMP About 15 seconds ago. It's so dim I hardly noticed what it was, but kind of starting in the left eye and then - just a flash in the left eye and then a flash in the right eye; very dim. Going left - from left to right.

02 18 04 38 CMP MARK. Can't tell if it's right or left eye. Looks like it's almost between the two eyes. There's a -

02 18 04 47 CMP MARK. One in the left eye. Just about right in the center. Spot; no streak or anything, just a spot. First spot seemed to be right between the two eyes, upper half of the field of view.

02 18 08 43 CDR MARK; Gene. Streak from the upper right, of the right eye, down to about the middle.

02 18 10 24 CMP MARK; Ron. About 8 o'clock ... diameter out, just a bright flash; it's the brightest flash I've seen yet. Left eye.

02 18 10 45 CDR Just about a second or two after Ron said "Mark," I saw a vertical bright line in the left side of the left eye; just flashed.

02 18 11 36 CMP It was the greatest intensity - the intensity on that last one I had - but - the brightness was there, but it was kind of dull glow to it. It wasn't a - a spot that you could really focus on.

02 18 13 22 CMP MARK; Ron. Left eye, about 09:30, half way - -

02 18 13 29 CDR MARK - -

CMP - - to the left.

CDR - - Gene. Left eye, very bright spot; left eye, left side about halfway in towards the middle. That was the brightest one I've seen, and it was just a spot.

CMP Ron. The intensity of the last one I had was - oh, a fourth of the bright one I had before that.

Tape 46/2

CMP Spot. Yes, on the left eye.

02 18 15 08 CMP MARK about 5 seconds ago, about 6 o'clock in the right eye.

02 18 15 15 CMP MARK. Right between the two eyes, seemed like. Both spots.

02 18 15 27 CDR MARK; Gene. A sharp line from the center of the left eye to the upper left-hand - upper left-hand side.

02 18 16 41 CDR MARK; Gene. It's a very short - very short line, upper left hand of left eye going towards the right.

02 18 17 32 CDR MARK; Gene. Upper right eye, tangential to my eye, just a very short line. Moving - -

02 18 17 44 CMP MARK; Ron. Oh, a fourth of a diameter out in the right eye. Bright spot. Seemed like it was coming in. I could see the spot and then the streak. It went from that point kind of in - or up, I guess.

02 18 19 53 CDR MARK; Gene. A dull flash on the bottom inside corner of the right eye. Correction - -

02 18 20 02 CMP MARK; Ron. Go ahead, Gene.

CDR Okay. Correction, Gene. That was on the left eye, that last one.

02 18 20 11 CMP The last one for Ron was at 10 o'clock. Three-fourths of the diameter out. Just a - ... was only about an eighth of an inch in diameter. Right eye.

02 18 23 04 CDR MARK; Gene.

02 18 23 06 CDR MARK again. A flash - first flash was in the left eye on the left side. It went vertical - vertically up and away. And following that was a flash in the identically same spot. It was a line flash, up and away. On the left side of each eye, and it went up in both cases, but they were split by about 2 seconds.

02 18 28 40 CMP MARK; Ron. A fourth of the diameter out at 3 o'clock in the right eye. I mean a half a diameter - half a radius; put it that way.

02 18 28 51 CDR MARK; Gene. A flash across the bottom of the right eye coming inward from left to right.

CMP On the last one, it looked like it was a - -

02 18 29 15 CDR MARK; Gene. Just a spot flash in the bottom of the left eye.

CMP This is Ron. On my last one, it was just a spot flash. No direction to it at all.

02 18 29 57 CMP Ron; MARK. MARK; this is Ron. When I first said the word - it kind of looks like a - almost a sine wave transition from the corner upper at 10 o'clock in the right eye to about 2 o'clock in the left eye. Right between the two of them. The sine wave was - maybe two wiggles in it, and it was about a fourth of an inch long. Going from right to left, yes. And going into the left at about 2 o'clock.

CDR Turn that music higher.

CMP Yes.

02 18 31 20 CMP MARK; Ron. Seems like I looked up, and as I looked up, there was one in the left eye about 12 o'clock just a flash. On the outer periphery.

02 18 38 01 CMP MARK; Ron. ... down about 06:30; just a flash. Right eye.

02 18 38 42 CMP MARK; Ron. Left eye, about 03:30, three-quarters of the radius out. A very dim flash. About 03:30.

02 18 39 44 CMP MARK; Ron. Left eye. Starting at 5 o'clock on the circumference going to 3 o'clock at about three-quarter diameter - three-quarter radius, I mean. Just a straight line.

CMP Did I say left eye? I guess I meant did. Okay, let's - Okay, the motor quit.

Tape 46/4

02 18 41 11 CDR Okay. Is that it? Yes, I can get that, Gene.

 CMP Okay, you want to take a picture of it first?
 Okay, POWER ... Okay, stand by. 3, 2, 1 -

02 18 41 59 CMP MARK it. POWER switch OFF.

 CDR Say, Bob or Stu.

 CC Roger. Go ahead.

02 18 42 34 CDR Okay, add - to ad to today. Not last night, but -
 I guess the first night I was in bed - I definitely
 saw some of these - because I had a hard time going
 to bed, to start with - I saw some of the same
 peripheral horizon-type things you said were not
 the type of data you were looking for; but I also
 saw a - some sets of the streaks. And probably
 the one most imposing thing I remember is - and the
 last one I remember before falling asleep - was
 the fact that there was a very bright spot that
 flashed right between my eyes like a very bright
 headlight - like a train coming at you, only with
 a flash. It's difficult probably to estimate the
 frequency of any of those because I was in a -
 sort of a sleep-hazy mode.

 CC Roger.

 CDR But then, as today, I saw some that flashed and
 lit up the horizon and some that lit up peripher-
 ally; and I guess, as you say, that's a different
 kind of data, but I did see them there and they
 impressed me.

 CC Okay. We got all that, Gene.

 CDR Okay.

 CMP And it might be interesting to know I've never
 seen it before today.

 CC Hey, Gene, we appreciate all the data. We were
 just trying to make the data fit the curve; you
 know the old trick.

02 18 44 40 CDR Okay, I just wanted you to - just told them like we saw them. That's all.

CC Roger.

CDR I will say one thing, though; no question in my mind but that they're there. Last trip I took, I guess I just wasn't looking for them or paying any attention to them. Maybe they were there and I ignored them because of other things. But they're there.

LMP Okay, all you flash bugs down there - or flash-bulbs I guess is the word - frame 50. I just took four pictures to show - two on the side and two on the bottom - to show the position of the ALFMED, and one of them of each set was focused on the ALFMED. The others were focused on the - the other set was focused on the struts.

CC Roger, Jack.

LMP And when you don't have anything else to do, why don't you have somebody predict where the S-IVB is. I think I've got her spotted - behind us and above us with respect to the Earth and our travel from it.

CC FIDO just went out and shot himself, but we'll get working on it.

LMP Oh, don't worry about it. Shoot. I thought you guys might have an idea off-the-cuff there.

CC No, what's humorous on this, Jack, is they have really been working on that S-IVB impact point -, and they've really been - it's been a - a real difficult problem for them so far.

LMP I'll tell you, I bet you Ron could give a star sighting on it (laughter). I looked at it through the monocular and sure looks like the S-IVB.

CC Jack, we're not doubting you at all. We could probably start cranking it right now.

Tape 46/6

02 18 46 46 CC Jack, are you sto - you all stowing the ALFMED now or are you done?

CMP What's that, Bob?

CC Are you all done with the ALFMED now, Ron?

CMP Yes, I've got to get it to - get the plate moved back down there yet.

CC Okay, Ron - -

CMP ... get the blindfold off first so I can see what I'm doing.

CC Roger. I just want you to know. We've got a real long update coming up to you here on the LOI abort charts and that - and it's going to be, probably, a difficult readup. And you're the most familiar with the charts; you probably would want to take them. But whenever you want to take them, they are on - charts on page 3-81, 3-82, and then the cue card for LOI limits. Whenever you want to take them. It will be a lengthy one.

CMP Stand by, Bob. Let us get squared away from the ALFMED; then we can get going on that.

CC No, I don't want to hurry you, Ron. I just want you to know what - when - just get yourself comfortable and be ready to take them whenever you want them. It's going to be a lengthy time, though.

02 18 47 51 CMP Okay.

CDR Hey, Bob, I'm looking at what - what Jack was talking about; and it's definitely not a particle that's nearby because there is another one I can look at and get a three-dimensional comparison with. It is a - it is a bright object, and it's obviously rotating because it's flashing. It's way out in the distance, as I say, because there are particles that are close by and it's obviously not one of those. It's apparently rotating in a

very rhythmic fashion because the flashes come around almost - almost on time. And it's as we look back at the Earth, it's up at about 11:00 about - oh, maybe 10 or 12 Earth diameters. I don't know whether that does you any good, but there is something out there.

CC Roger. We don't doubt it, Gene. And we might work out a set of gimbal angles or something here; maybe we can get a look at it through the optics.

02 18 49 02 CDR Okay. And I - I - I just want to emphasize that it's definitely not - not one of these particles that tends to look like a star out there. It's something physical in the distance. (Laughter) Oh, yes.

SC ... thing off.

02 18 50 13 CMP Yes, guess I am.

CC Okay, Gene. If you can call up a NOUN 20 so we know the spacecraft attitude, and if you can reference the object you're looking at out of your window, with - with respect to body axis and let us look at your - your - give us a mark, somehow, and give us your NOUN 20s, we can try and get a tie-in and start locating - locating this object down for you.

02 18 50 58 CDR Okay, I'm looking it out - looking at it out the center window - the hatch window - and I'll give you a hack when it crosses the XX axis at the center window; and I guess it's up maybe 45 degrees.

CC Okay, give us a hack and we're copying your NOUN 20s right now.

CDR Okay, Jack says pitched up about 30 degrees but - -

LMP No. 45, because -

CDR Yes, he agrees. It's 45 degrees pitched up, and I'll give you a hack when it crosses the XX axis.

CDR Okay -

Tape 46/8

02 18 51 32 CDR MARK it. It just crossed through the - -
CC Mark. We got it.
CDR - - let's call it the XZ plane of the spacecraft. One unique thing about it, Bob, is that it's got two flashes. As it comes around in - in rhythmic fashion, you get a very bright flash; and then you get a dull flash. And then it'll come around with a bright flash, and then a dull flash.

02 18 52 18 LMP That's the side and - of the S-IVB - and then the engine bell, Gene.
LMP The commander doesn't think that I can see the engine bell on that thing.
CC Roger, Jack. Is that with the monocular you're looking at it?
CDR He couldn't see the engine bell if he had 10 monoculars.
CMP Okay. I've got the cable restowed now.
CC Say again, Ron.

02 18 53 10 CMP And, Gene, where's your blindfold? ...

02 18 55 24 LMP Bob, couple of revolutions ago when I was looking at it, I had a much brighter view and I believe I was looking at it broadside. It looks to me like it may be flashing more or less end-on now. It's much, not - not as bright, although it's getting brighter. But it's not as bright now as it was awhile ago.
CC Roger, Jack.
LMP ... we've been noticing that, I think, for about 24 hours or so. I just - hadn't put it together as maybe being the S-IVB. I thought it was just some other particle out there.

02 18 56 27 CC Roger, Jack.
CDR Hey, Robert, what's the final Cowboy score?

CC Okay; I was just going to update that. The Cowboys won it 34 to 24. And by winning it, they wrap up the wild-card slot in the NFC; and so both Washington and Dallas will be in the playoffs.

02 18 56 53 CDR Sounds good.

LMP Bob, that line of clouds I called a fir-tree pattern that swings up towards Hawaii - Hawaii, if you will - has - also has a mushroom pattern on the top. It has the appearance as if two major air masses - one going from west to east and the other from east to west - have converged along that line, and the joint movement of air at the interface being south to north. And up in the area of Hawaii, I think, it tends to mushroom so that the pattern then goes back to flow from west to east on the east side and from east to west on the west side.

CC Roger.

02 18 58 27 LMP In a little while, we'll probably get a pretty good look at a - what looks like a very concentrated intense storm that, I think, is just - east -

CMP *** And then we'll put them. once we get updated a little bit. Yes, I'll get out of VOX in a minute.

LMP I was looking for the Flight Plan and stuff. And the little books.

LMP Say, Bob.

CC Go ahead.

LMP Houston, 17. How do you read?

CC Go ahead, Jack. Read you loud and clear.

CDR Okay, Bob, you want to update the LOI card and Flight Plan 3-82 and 3-81; is that right?

CC That's affirmative.

CDR Which one do you want to start on?

Tape 46/10

CC I would say 3-81 is the most difficult one to start on.

CDR Okay, in that case, why don't you start on the board - on the cue card?

CC Okay. We can start on the cue card. Your - your druthers.

CDR Yes, go ahead. I'm ready.

CC Okay, on the LOI limits. The VGO column - let's go right down the VGO column; I think that would be the easiest way to do it. Where it says, "VGO 2980," change that to "2986."

CDR Why don't you just keep going?

CC Okay. The next one going straight down the line, "2721, 2521, and 2316." That's all the changes on the VGO line.

CDR Okay; and all those changes were in Mode I?

CC That's affirmative.

CDR Okay, I got 2986, 2721, 2521, 2316.

CC Roger. Now under the burn time column, the first one opposite the 2986, the burn time remains the same. Do not change that one. The next one changes -

CDR Go ahead.

CC Zero plus 40.

CDR Which one is that, Bob? I missed you.

CC Okay. Where it says, "0 plus 28," change that to "0 plus 40."

CDR Okay, press on through them all now.

CC Change the "0 plus 53" one to "1 plus 10." Change the "1 plus 31" to the number "1 plus 40". Over.

CDR Okay. I got - in order - burn time 0, and then 0 plus 40, 1 plus 10, and 1 plus 40.

CC Roger. V-measured column: the first one, the zero does not change. The next one - in this order: "265, 465, and 670." Over.

CDR Okay. I got 0, 265, 465, and 670.

CC That's affirmative, Gene. That's the changes to the LOI limits cue card.

CDR Okay, Bob, I think we got all that. I guess DELTA-V measured down there in the bottom - 2980 - should be 2986, huh?

CC Roger. We felt that wasn't - that - that is - correct. To be technically correct, it should be 2986 at that last one.

CDR Okay, I guess we're coming in just a sukosh hotter, huh?

CC That's affirmative.

CC You'll see from the curves that we're going to have to update, that you're a lot closer to the free-return trajectory.

02 19 06 17 CDR Okay, why don't you go ahead on 3-81?

CC Okay, this is the tough one. The first thing we're going to do is plot a couple or three points here in the Mode I - 2-hour - the Mode I 2-hour line changes, also. So you might want to draw a line at a LOI DELTA-V DVM of 265, 265 and draw that straight up the curve. That'll be the no - the new - -

CDR Okay, the LOI DELTA-V magnitude of - DVM of 265, huh?

02 19 07 01 CC Roger. That will be the crossover point from the Mode I 2-hour to the Mode I 30-minute.

Tape 46/12

CDR Bob, are you there?

CC That's affirmative. Go ahead.

CDR Okay, Bob, I've got a - 265 vertical line drawn and I expect I can extend the Mode I 2-hour abort to that limit.

CC That is affirmative, Gene.

CC Now you're going to have a new curve, so don't bother to draw in the old curve. We're going to give you three points to plot and draw a straight line in between them that will create a new curve.

CDR Go ahead.

CC Okay. The first one is at - the point is defined with a DELTA-VM of zero and an abort DELTA-V of 1525, 1525.

CDR Okay.

CC Okay, the second point is defined by a DELTA-VM of 150; an abort DELTA-V of 1810. Over.

CDR Bob, that last was 1810?

CC That's affirmative.

02 19 10 37 CDR Okay. I got it.

CC Okay, and the last point is defined by DELTA-VM of 265; an abort DELTA-V of 2105.

CC The curve - -

CDR ...

CC - - defined by those three points will be your LO - LOI plus 2-hour abort DELTA-V.

CDR Okay, and that - that last point is just the DPS available curve with 265.

CC That's affirmative.

CDR Okay, it's drawn in and I - -

CC Okay, now we got a curve 1.

CDR - - guess at 2. Okay, go ahead.

CC I'm sorry I cut you out. Did you have something
 else you want on that?

CDR No, it's good. Our curve's in.

CC Okay. Curve 1 is two points defining it. The
 first one is DELTA-VM of 265, abort DELTA-V of 1855.

CDR Okay.

CC And the second one is a DELTA - DELTA-VM of 400,
 abort DELTA-V of 2065.

CDR Okay.

CC Okay. Those two points from the curve 1 of the
 Mode I 30-minute.

CDR Okay, I got it.

CC Okay, now curve 2 has three points defining it.
 The first point is identical with the end point
 of curve 1. It's 400 on the DELTA-VM and 2065 on
 the abort DELTA-V.

CDR All right.

CC Okay, the second point is 530 for the DVM and 2245
 for the abort DELTA-V.

CDR Okay.

CC And the last point is DVM of 670 and a DELTA-V -
 abort DELTA-V of 2475.

CDR Okay.

Tape 46/14

02 19 14 49 CC Okay; and if you draw a line up the page at the DVM of 670, that is the end of the Mode I 30-minute and everything to the right of that you are in Mode II.

CC Gene, Houston.

CDR Stand by, Bob.

02 19 16 05 CC Roger.

02 19 20 14 CDR Hello, Houston. Are you reading yet?

CC Roger. Go ahead.

CDR Okay, Bob, curve looks good. I just checked the DPS/APS crossover on the DPS available, and it comes out with what you gave me on the card - about 2521.

CC Roger. And just one minor point. Across the top, on the velocity to be gained, you can bias all those numbers - add a six to every one of them across the top, to be technically correct.

CDR Okay.

CC The next thing we have on that, Gene - -

CDR ... correct, I could have done that before I - before I plotted the curve; but that's good. We understand, and we got it down.

CC Okay. The next thing I've got is - that whole update column in the little block there is all updated; and we probably ought to get a readback on all these numbers, Gene. I can give it to you right like a regular pad, just from the - right down from the top to the bottom, and then read it back to me. I think that'll be the best way, don't you?

CDR Okay. Ron's going to go ahead and take them; and we'll doublecheck them, and he'll read them back.

CC Okay.

CMP Okay, just go ahead and start at the top and go down.

CC Okay. I'm starting at LOI ignition time. 88:54:26.8. Pitch is minus 43, yaw 112. GET abort ignition, 89:24:26.8; roll 217, pitch 6, yaw 25. Minus 42 on the Pitch, 110 on the yaw. 216, 6, 18. High-gain angles again. Minus 75, Yaw 250; GET abort ignition there 90:54:26.8; 153, 17, 19. Next time there is GET abort ignition for the LM FDAI angles there - 90:54:26.8; Roll, Pitch, and Yaw angles, 202, 29, 330. Over.

CMP Okay, Bob, here we go on the readback. I'll just read them right down the line. 88:54:26.8; minus 43, 112, 89:24:26.8; 217, 6, 25; minus 42, 110; 216, 6, 18; minus 75, 250; 90:54:26.8; 153, 17, 19, 90:54:26.8; 202, 29, 330. Over.

CC Roger, Ron. A real good readback. The - on the next page, on page 3-82, the data there is exactly the same as the LOI limit cue card - the changes. We can read it up to you individually or you can take it from your cue cards; your choice.

02 19 25 00 CMP No, we'll change it from the cue card.

CC Okay.

LMP Bob, since they won't let me write anything, I tried looking for the Moon near the Sun with the filters and could not see it.

CC Roger.

LMP You sure you're sending us to the right place?

CC Roger, Jack. Hey, I've got some information on that S-IVB that you're looking at. The azimuth was in - within 1 degree of what you called when we looked - checked out on your angles.

CC Hey, Jack. Houston.

CC 17, Houston.

Tape 46/16

CMP Go ahead, Bob.

02 19 27 54 CC This was for Jack and Gene. The trench has computed the S-IVB location in reference to your body axis; and the azimuth was within 1 degree, very close, and the - we calculate it should have been out of that window at 62 degrees from the X-axis, and you reported 45 degrees, which is just a 17-degree error. It's real close there. You know, just eyeballing it like that.

LMP That's great. Then that is the S-IVB, huh?

CC Okay. Well, we - you might check it this way, Jack. Line up the star Denebola and Rigel - say again, Regulus; I'm sorry, Regulus - Denebola and Regulus. And then, on that line, go perpendicular to that line right above Ri - right above Regulus, and that should be the S-IVB. It forms one point of a right triangle with Denebola and Regulus.

LMP What you're saying is, it's the eye of Leo the Lion.

CC That's firm.

LMP Except we can't see Leo the Lion very well.

02 19 29 11 CC Okay.

CC And, 17; Houston.

LMP Go ahead.

CC We've got a rather lengthy Flight Plan update series here. We can read up to you any time you want. Just a reminder that we are sitting here waiting with it. Your call.

LMP Generally what is it, Bob?

CC It's changing a number of attitudes all through the Flight Plan, 84:32 - 84:35; changing VERB 49 maneuver, things like that, due to the TLC change here on times and that.

LMP Okay, where are you going to start?

CC Okay, it's at 84:32. Stand by 1. Jack, FLIGHT just told me we can wait on this if you want until some other time in the Flight Plan. We want to get into this Experiment Checklist with the pa - pan camera, mapping camera film cycling. Or we can do both of them concurrently.

02 19 31 24 CDR Hey, Bob, let's get the camera cycling out of the way first, and then we'll pick up the Flight Plan updates.

CC Roger. We concur with that.

LMP Okay, Bob, I'll get to that camera in just a second. The coast of Australia is starting to come into view. Still looks pretty clear. We'll give you more on that later, probably. That cyclone I talked about yesterday in the vicinity, I believe, of the Solomon Islands, looks even better organized than yesterday. It's really tightening up. Starting to look very bright and dense right in the core, not too dissimilar from Therese. Although it has a little broader extent in the southeast quadrant.

CC Roger, Jack.

CC Trying to match that up in my prog here. I can't find it.

LMP Well, you didn't have it there yesterday either. It certainly looks like a tight little storm now though.

CC Roger. I understand.

CC Jack, would you mind repeating that location of that.

LMP Can't give you much on the progress - -

Tape 46/18

LMP Well, I'll try to give it to you a little better later. It's the one I was talking about yesterday as being in the vicinity of the Solomon Islands. That's somewhat east-southeast of New Guinea.

CC Yes. Roger. I've got it.

LMP I think before we go to bed, we'll probably be able to update the progress of the - that front south of Australia, also.

CC Oh. Roger. I've - I've got a pretty disorganized area to the east of New Guinea. It's probably right over the Solomons. Looks pretty disorganized on our satellite photo - from, let's see, I guess that was this morning sometime.

LMP Well, there is a lot of cloudiness in the equatorial regions, the intertropical convergence zone in there. This is south of that, sort of on a - I'll talk to you later.

02 19 35 26 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 19 38 27 LMP Houston, how do you read 17?
CC Loud and clear, Jack.
LMP Okay, S-BAND AUX TV to SCIENCE.

02 19 38 40 LMP MARK it.
LMP Okay, SM/AC POWER is coming ON.

02 19 38 59 LMP MARK it.
LMP MAPPING CAMERA to STANDBY.

02 19 39 13 LMP MARK.

02 19 39 39 LMP PAN CAMERA POWER is POWER; barber pole - gray.

02 19 39 50 LMP SELF TEST is to HEATERS.

02 19 39 58 LMP And, do you want the high gain?
CC That's affirmative. Minus 50 on PITCH and 270 on YAW.

02 19 40 53 LMP Okay, there she is, all locked up. PCM RATE's going HIGH.
CC Roger.
LMP Okay. When you're ready, I'll do the big deal here.
CC Roger. Stand by for my cue on that, Jack.
CC Okay, Jack; we're ready.

02 19 41 28 LMP Okay, MAPPING CAMERA - MAPPING CAMERA is ON.
CC Roger. We mark it.

02 19 41 41 LMP Okay; and PAN CAMERA SELF TEST - going SELF TEST. Got a barber pole.

02 19 42 37 LMP And the PAN CAMERA SELF TEST - or talkback is gray.

Tape 47/2

CC Roger. We'd like REACQ on the HIGH GAIN. Check.

LMP You got it.

CC Thank you.

LMP Sorry, I didn't read the checklist.

02 19 43 39 LMP MAPPING CAMERA is OFF.

CC Jack, say your last.

LMP MAPPING CAMERA went OFF at 2 minutes, and the PAN CAMERA POWER is OFF.

CC Roger. And we'd like to select your checklist angles now on the high gain, please.

LMP Okay.

LMP Do you want those on the dial? You don't want me to try to acquire there, do you?

CC That's affirmative.

02 19 44 38 LMP Okay, SM/AC POWER is going to come OFF here, now.

CC Roger.

02 19 44 50 CMP Okay, SM/AC POWER is OFF; and how is my ZPN doing?

CC Jack, say again your question, please.

CMP This is Ron. How is my ZPN doing?

CC Oh. Roger. Let me take a look here.

CC Hey, Ron, we don't - we don't want to say it's bad, but we're glad you're talking to us because we want to make sure you're with us.

CMP (Laughter) Okay. Let me ... a little bit then.

CC Roger. We think we've got a bad skin - skin sensor interface there, Ron.

02 19 49 36 LMP Bob, how do you read 17?

CC Read you loud and clear, Jack.

LMP Okay; that storm I'm talking about - a little more precisely is maybe centered at 2 degrees latitude, north of the Solomon Islands.

CC Yes, that kind of matches up, Jack. Does it look like New Guinea and that is pretty well clobbered?

LMP No, not really. New Guinea is at the western edge of a cloud zone that is part of that inter-tropical convergence zone that starts at New Guinea and swings east-northeast in an arc for about half the visible Pacific, and then that arc crosses back down over the equator and heads generally towards Central America, I suspect, although that's beyond the terminator now. The storm I'm talking about is clearly south and separate from that inter-tropical convergence cloud - pattern.

CC Roger.

LMP It's getting very tightly wound in the - the clockwise sense, and - and is - is just where there was a less well-organized pattern yesterday. Although maybe it's moved northward a little bit.

CC Roger. We understand, Jack.

LMP Our zero-phase point, Bob, is about 10 degrees - make that 15 degrees longitude east of the Solomons and has a - is a - fairly - low intensity at this time. I'll keep an eye on it as it approaches that storm area and see if it changes.

LMP Okay - I'll be ready for them. Bob, just one last thing on that line of clouds that stretches up toward Hawaii. They're very - they look very thick and dense based on the structure you can see as that - as the terminator approaches them. They cast a pretty strong shadow to the west.

CC Roger. I see those on our satellite photo. They look pretty - pretty thick in there. I'm strictly an amateur talking to you, Jack, but it looks pretty thick in there.

Tape 47/4

LMP Yes, right.

LMP How about some flight - when you come around again, can you start the Flight Plan updates?

CC Any time you want them, I can start them.

LMP Go ahead.

CC Okay, the first one is at 84:32 in the Flight Plan.

LMP 84:22. Go ahead.

CC 84:32. 32. Add the following.

LMP Okay.

CC "Roll right 12 degrees," in parentheses, "To a roll of 150." The purpose of this change is to avoid - -

LMP Say again the - say again the number in parentheses.

CC R, roll of 150, 150.

LMP Okay, at 84:32, "Roll right 12 degrees to roll 150."

CC Roger. And in parentheses here, just a comment, it's to avoid gimbal lock during VERB 49 maneuver directly below it.

LMP Okay; go ahead.

CC Okay. At 84:35, the VERB 49 maneuver, change the attitude to "Roll 320, pitch 010, yaw 324." And we want the high gain antenna angles: PITCH, minus 29; YAW 17. Over.

LMP Okay. 320, 010, 324. High gain: PITCH, minus 29; YAW, 17. And that's at - that's for the VERB 49 maneuver at 84:35.

CC That's affirm. And it goes without saying, scratch ou - scratch out "OMNI Alfa" there.

LMP Got you.

CC Okay, the next one is at 85:42. 85:42.

LMP Go ahead.

CC This is just a couple of notes here. The P52 stars we got in the CMS are 16 and 17. Gyro torquing will take 10 minutes 47 seconds, 10 minutes 47 seconds.

LMP Okay, the stars will be stars 16 and 17. Torquing will take 10 minutes 40 seconds - 47 seconds.

CC That's affirmative, Jack. Okay, at 85:44, over there on the right where it says, "LOI REFSMMAT attitude," change that - "roll 064, pitch 135, yaw 005." Over.

LMP Okay, got you. Change is to roll 064, pitch 135, yaw 005.

02 19 58 23 CC Okay, Jack, and let's take a break here, and you can go ahead and secure the high gain and give me OMNI Bravo, and call me when you're ready for some more of these.

02 19 59 05 LMP Okay, go ahead.

CC Okay, Jack. The next one is an addition at 86 hours, 86 hours. We just want the following words: "Manually pressurize SPS." Over.

LMP Go ahead.

CC Okay; did you get that last one, 86 hours?

LMP Roger. 86 hours, "Manually pressurize the SPS."

CC That's affirmative. And just for your information, that's because we need a couple hours of data on it. Like to look at it a couple of hours prior to LOI. Okay, the next one's at 87:20.

LMP Go ahead.

CC Okay. Where it says, "Manual roll left to 30 degrees," change "30 degrees" to "63 degrees," 63 degrees. Change the roll angle - -

Tape 47/6

LMP All right.

CC - - from "050" to "001."

LMP Okay, that's roll left 63 degrees and the roll is 001.

CC That's affirmative. And the new high gain angles will be PITCH, minus 27; YAW, 339.

LMP Okay, minus 27 and 339.

CC Okay, just a little bit below that - where - at about 87:27 or 87:30, where it says, "Manually roll right 30 degrees," change the "30" to "63," 63. Change the roll to "064."

LMP Okay, roll right 63 degrees. Roll will be 064.

CC That's affirmative. And scratch out "OMNI Alfa" and add "High gain antenna: PITCH, minus 29; YAW, 17," YAW 17.

LMP Okay. That's high gain: PITCH, minus 29; YAW, 17.

CC Roger, Jack. And the next one is over at 89:03. We've got a comm attitude.

LMP Okay, 89:03.

CC Okay, that attitude there should - it's pretty close. Roll 165, pitch 060, yaw 338.

02 20 04 08 LMP Go ahead, Bob.

CC Did you get that last - the attitude change there? It's a real trivia change; we probably shouldn't have called it, but it's - -

LMP 89:03 ... to me.

CC - - 165, 060, and 338.

LMP 89:03; excuse me.

CC Roger. Did you get that attitude at 89:03?

LMP Repeat 89:03.

CC Roger. Roll 165, pitch 060, yaw 338.

LMP Okay. New comm attitude: 165, 060, 338.

CC Roger. That seems hardly worth it on that, Jack. Sorry on that one. Just one last note, general note on all this we gave you. Everything has been checked in the CMS. You probably figured that anyway.

CMP Roger. Always know those fellows are working with us.

CC Roger. And, Ron, we've got good data on you now.

LMP Is that it?

CC That's affirmative, Jack.

CMP Okay; thank you, Jack

02 20 05 43 LMP Bob, Gene just told me I may have confused you on the clouds that I told you I could see near the terminator with a good shadow - and the shadow's on the eastern side as the - the terminator approaches.

CC Roger.

02 20 09 40 LMP Bob, how do you read 17?

CC Read you loud and clear, Jack.

LMP Okay, I mentioned earlier, I can't remember exactly when, that it looked like the wa - pattern of water in the Ross Sea - clear areas within the Ross Sea icepacks had changed, and I feel more strongly about that now. It looks like it's opened up considerably. The tri - long - elongate triangular areas, two of them that were there a couple of days ago, seem to have merged, and you also have clear water along most of the inner portion of the shoreline of that sea.

CC Roger. Must be getting towards summertime down there.

Tape 47/8

LMP Well, I'm very surprised that it's changed shape as much as that, and it could be that that triangular pattern was caused by a cloud bank that split what is now open water and made it look as if it was icepack.

CC Roger. Understand.

02 20 11 10 LMP Hey, Bob, can one of the guys there give me a - a hack on when - when the terminator should cross Hawaii?

CC Roger. We'll work it out.

LMP Do it in either GET or CST, either one.

CC We'll crank it up to you in GET.

02 20 13 43 CC Ron, we missed a NOUN 05 in there. Can you give us a NOUN 05?

CC Ron, Houston. We missed the NOUN 05 on the data - can you give us what your NOUN 05 was?

CMP Would you believe five balls?

CC Oh, I'd believe that.

CMP Okay.

CC You can go ahead and torque, Ron.

CMP Roger. Roger. We'll torque at 30 - 54 30.

02 20 16 17 CC Jack, Houston.

LMP Go ahead.

CC Roger. We've been listening to the playback of the DSE tape from the ALFMED period, and all three of you sound pretty good on that. Gene is still clearer than the rest, but all three of you sound real clear and very readable.

LMP Excellent. That'll make up for my note taking.

CC Roger. And also, Jack. You had a question earlier about the different response of sea and continental areas when viewed through monocular polarizing filter, and I've got a note here from John Dietrich that kind of explains it.

LMP Okay, let's hear what John has to say.

CC Okay. This is pretty much referencing the time you were looking at it, and here it is. "Ocean scenes near the bright area off Bolivia, which is the spel - specular point, include a high proportion of polarized light. The spacecraft-Earth-Sun geometry now is approximately equal to the Brewster angle which is nearest 53 degrees, where maximum plane polarization due to reflection occurs. Therefore, a high response of scene brightness to changes of filter position can be expected. Continental scenes are dominated by Lambertian or diffuse reflectors, which are characterized by low proportion of polarization in the reflected beam. For such scenes, changing position of the polarization filter produces changes in scene brightness that are near or below the threshold of detectability." Over.

LMP Okay. That sounds very good. It's sort of like the contrast between the lunar surface response and - the oceans being more like that, I guess, and the - between the lunar surface and terrestrial land surfaces.

CC Roger, Jack.

LMP That's very good, very interesting. Thank - thank John for me. I should have thought about that, but I've been away from it too long.

CC No problem. Okay; terminator over Hawaii at 73:45 GET.

02 20 19 09 LMP 73:45; thank you.

02 20 25 47 LMP Houston, 17. How do you read?

CC Go ahead. Read you loud and clear, Jack.

Tape 47/10

LMP Roger. Gene and I are going to stir your cryos -
Gene and I are going to stir your cryos for you.

CC Okay, we'll be watching for it.

02 20 29 21 CMP Okay, Houston; Apollo 17 here. We have canister
number 8 in the Bravo.

CC Roger; 8 in the Bravo. We got it. You made EECOM
happy tonight there, Ron.

CMP Okay, and I'm still looking for my scissors.

CC For your what?

CMP My scissors.

CC What did you do, misplace them? Or do you want
me to look up and see where they're supposed to be?

CMP (Laughter) No. They were stuck in the hand con-
troller number 1. That little thing you're supposed
to put the lap belt and things into. It was stuck
in there last night when I went to bed, and I got up
this morning, it was gone.

CC Scissor, scissor, who got the scissor, huh?

LMP ... waiting for him to get up.

CMP Yes.

CC Well, I've got a - I've got a feeling they're still
with you somewhere.

CDR All sorts of things happened on his watch.

CMP Yes; we won't talk too much about that.

02 20 35 31 CMP Houston, are you watching Jack's EKG?

CC Say again, Ron; we missed that.

CMP Roger. Are you watching Jack's and my EKG?

CC Roger. Let me punch the Surgeon here.

Tape 47/11

CMP We're doing a little - we're doing a little bit of exercising, now.

CC Oh, we can see that in the cryos. We know you're doing exercises. Let me go over and get the numbers here.

CC Jack's at 120 on the heart rate.

CMP Okay.

CC And, Ron, you're about 90.

CMP Okay.

CC And, Jack - guess you can pass the word to Jack we refined that Hawaii terminator number through the Pacific fleet and called it all around. It is actually at 72:55 GET.

CMP Okay. 72:65 GET.

CC No, 72:55, 55.

02 20 36 45 CMP Roger. 72:55.

02 20 37 56 CC Okay, Jack. We got you at 130 right now.

02 20 40 51 LMP Houston, this is the LMP. What was the last number you saw on my heart rate?

CC Okay, you peaked at 135, and we had you at 130 for several minutes.

LMP Okay.

02 20 42 07 CC Jack, just for interest, in that time you got banging around so hard there, you caused the heaters in the H₂ to shut off. The - the pressure went up until the heater shut off.

LMP Well, that's what you wanted, wasn't it?

CC That's affirm.

LMP Good thing there's not another mission or we'd have to flight plan this kind of thing for your EECOMs.

Tape 47/12

CC That's right. Got to conserve at all cost.

LMP Who's sitting on your right tonight?

CC Got a big Moon over there.

LMP He's always there, isn't he?

CC Roger.

02 20 44 33 LMP Say, Bob, I took another picture of the Earth and forgot to give you the GET on it. That was about 15 minutes before the end of the ALFMED experiment, if you can go back that way.

CC Okay.

CC Let me see, Jack. We - the last thing we had was right about the end of it. We had you in Sierra Sierra, frame 50. And you had four pictures then. Is that before that or after that? Okay, those four were for the ALFMED, weren't they?

LMP That's affirm. No, this was with the - the Hasselblad, the EL camera.

CC Oh, okay; got you.

CC We had FAO working on matching that one up.

02 20 45 34 LMP Okay.

02 20 48 28 LMP Houston, 17.

CC Go ahead, Jack.

LMP Roger. That weak front that I talked about south of Australia yesterday has moved north, but it looks considerably weaker than it did yesterday even. Just a very thin line of clouds - very thin line of clouds that now is touching the - the tip of Australia, south of Perth.

02 20 51 06 LMP Houston, 17. I think maybe you dropped out before I said that little weak front moving north-northeast, south of Australia. The western end of

it is just touching the coast of Australia, south of Perth, but it looks much weaker; and I, right now, would not expect very much weather out of it.

CC Okay. That - I can't tie up with you on that one, Jack, because my prog doesn't go down that far; it only stays up in the landing area. And my satellite photo doesn't go down that far south either. So, I can't touch up with you on that one.

LMP Okay. Well, it - it looked stronger yesterday, and it might have developed. Now there is a larger disturbance at the southeastern end of that front, still south of Tasmania; although, I suspect, unless it stays on a pretty northerly course, it will not affect the weather on the east coast of Australia very much.

CC Roger.

02 20 53 05 CC Jack, just thought you might be interested. I called some friends of yours in Tucson, and everybody's fine there and wanted to say hello and tell you everybody's fine and getting along real good.

LMP Thank you very much. Good to hear. They've learned to take care of themselves pretty well, haven't they?

CC They sure have. They - they're - they're having a little trouble with the squawk box, and we'll get working on that and it's - they're having trouble reading a little bit, but they're keeping up with us.

LMP That's nothing new.

CC Roger.

LMP But try to fix it, please.

CC Oh, we'll - definitely on that one.

02 20 53 59 LMP Bob, Ron got you all - the Earth down there zeroed in in the sextant, and it puts my little binocular to shame. I tell you, it's a fine instrument.

Tape 47/14

And I'll just confirm that the - that disturbance over the So - Solomon Islands is an awfully tightly wound little storm system. And right now, I finally have see New Zealand for the first time in a couple of days, for sure. And the South Island's got some, probably high cirrus over it. North Island looks pretty clear. That's the end that I can get right now.

CC Roger. We saw you looking at Regulus there; we didn't realize you were looking at the Earth instead.

LMP Ron's been looking for the booster. And he called me down and asked me to look at the Earth. He's been holding out on me.

CC Roger.

LMP Pass the torch of weather forecasting to Ron.

02 20 55 22 CC Hey, Jack. I also have some words for you and Gene. Got some advice from the home front. The thing to do with Ron in the future is to hook up a Baby Ben and a metal dishpan. It works every time, if you want to wake him up.

CMP No. I think that's not a good way.

CC Ron, everybody's fine over at El Lago. They are doing great. Listening to every word.

CMP Very good, Bob. Thank you very much.

CDR Hey, Bob. We got two of those flashers out there. They could be SLA panels. I don't know. They're alike in intensity and pretty regular in the - in the intensity, bright and dim flashes they come out with, and they're widely separated. One is about the position we called at the first time; the other one is - oh, as I'm looking at the Earth, far to the left. Closer to the center window now.

02 20 56 52 CC Roger.

02 21 01 07 LMP Houston, 17.

CC Go ahead.

LMP Yes, Bob, what is your - analysis chart, if you have it - surface terms analysis chart show for Hawaii today?

CC Stand by on that.

CC Jack, according to the - -

LMP The reason I ask is that for using your term - Go ahead.

CC No, go ahead on that, Jack.

LMP I was going to say, using your terminator time as a partial - mark for where Hawaii ought to be, Hawaii ought to be, it looks like that cyclonic circulation at the north end of the cloud bank I described, approaching that area, would be just about on the Hawa - Hawaiian Islands. I'm curious if they're getting some weather down there now.

CC Stand by right now; I've got my weatherman right beside me here.

LMP Also, that major front we talked about last night as being east and south of Japan has progressed even farther and is, oh, maybe 20 degrees longitude - about 20 degrees longitude from the Hawaiian Islands. And I'm making some guesses on exactly where Hawaii is.

CC Roger, Jack. We've got nothing adverse in the Hawaiian area at all. Just a lot of winds, high winds and surface winds and surface roughness, but we don't have any bad cloud area in the Hawaiian area. I'll get the Hickam sequence report here shortly, Jack.

LMP Okay, ... a little bit. The - our zero-phase point is now centered just a little south of the disturbance near the Solomon Islands. And I see no distinct change in the intensity of that zero-phase point over what I had talked about a couple hours ago.

Tape 47/16

02 21 04 23 CC Roger, Jack. The Solomon Islands disturbance and everything is confirmed on this chart that I've got. It's very definitely confirmed in there.

LMP Okay. Well, it's a lot more obvious today than it was yesterday; but even then it was showing pretty strong circulation. It is starting to wrap up, look very much like Therese did yesterday.

CC Roger. I'm sure of that. The one right off of Vietnam is also pretty tight, isn't it still?

LMP Well, we can't see that one yet.

CC Okay.

LMP Australia in general is still very clear except in the northeastern portions where it looks like they have got scattered clouds; but it looks like a pretty night - over Australia.

CC Roger. Looks that way from the satellite photo from the last couple days. Looks pretty nice down there.

02 21 05 34 LMP Right.

02 21 07 05 CC Jack, in looking at the sequence reports for Hickam and Hilo and that area, it looks like they just got their standard 3500 scattered, 4500 broken clouds, maybe a rain shower or two. But just their standard tropical fluffy clouds.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 21 12 35 CMP Houston, Apollo 17.

CC Go ahead, Ron.

02 21 12 45 CMP Bob, I don't know whether I told you or not, but we ended up with the LMP and the CDRs suit in the bottom of this suit bag. My suit is in the top, and I sure don't have any idea how in the world the other crews got three suits in there. I guess they never did because these things are plumb full right now, of suits, ... suit bag. And it's a good thing we lengthened them. I don't have room for anything else inside the suit bag. The water bags and, you know, contingency water bags, and my g-suit, and those flight things are - I found a place to stick them all around the wall on the outside of the suit bag.

CC Roger, Ron. Good work.

02 21 13 50 LMP Bob, you made some comment earlier about the weather. It may have been Hawaii, but you broke up.

02 21 13 56 CC Roger; I just got the sequence report for Hawaii, and Hickam had 3500, scattered; 4500, broken with minor rain showers; and Hilo had about the same. And basically, it's just their tropical puffy weather out there. The typical nothing. No frontal-type weather - no cyclonic-type weather.

LMP Okay. Well, it may be just patterns induced by the - the wind currents, or maybe I don't have the position of Hawaii quite right.

CC Well, it's - it's possible. You know they do have high winds out there, and I've seen it, just flying in that area in the past, where those broken clouds get pretty close together at times. It almost looks like a solid overcast. And especially when you look at it from an angle, they all blend together.

Tape 48/2

LMP I hope you're going to save all those charts you're gathering together as we talk about it on this outbound leg. Be interesting to compare them and the pictures we take sometime in January.

02 21 15 18 CC Jack, the Weather just was out here, and they told me that's exactly what they're doing. And if your time will permit in January, they'd like to go through and maybe help piece them all together, but they're going through these transcripts and they're gathering all their satellite pictures and plotting what you're seeing versus the satellite pictures etc., etc. And they'd like to go over it with you when you get back.

LMP I'd love to do that. I hope, in general, we're getting the directions right. At least, I know I thought I'd worry about the descriptions, and it's hard to place points on the globe, particularly in the Pacific, if you can't identify land masses near them or have those nice little latitude and longitude lines painted on the Earth.

CC Well, that's right. We'll - we'll put in a request for some lat - long lines out there.

02 21 17 15 CC Jack, we're going to have a slight changeover from Goldstone to Honeysuckle at 72 hours, so we will probably break by.

LMP Okay. Bob, you know you're just the last turn or so, you started to break up occasionally as if you might be getting a bad mike button or something.

CC Okay, I'll check it out.

02 21 22 49 CC 17, Houston through Honeysuckle. How do you read?

CDR You're loud and clear, Bob.

CC Roger. Samo, samo.

02 21 28 15 LMP Houston, 17.

CC Go ahead.

02 21 28 23 LMP I's just playing with the polarizing filter again, and it looks as if - when you have the knob on the filter parallel to the - roughly parallel to the polar axis of the Earth, - you get maximum darkening. And, of course, the opposite 90 degrees to that you get maximum lightening of the globe. And, in the - in the case of Australia, it also appears to lighten and darken, but not to the extent of the - of the ocean areas.

CC Roger.

LMP It could be that in the more desert climate you get finer grain material on the ground and give you the response that John Dietrich had talked about.

CC Roger.

02 21 31 02 LMP Houston, 17.

CC Go ahead, Jack.

LMP I rechecked that little story I was trying to give you about the ice pack there in the Ross Sea.

CC Roger.

02 21 31 16 LMP And whether I was right a couple of days ago or not - whether I was right a couple of days ago or not in the patterns, right now there is a lot of open water between the ice pack and the inner or, let's say, southern and south - eastern shore of the sea that I don't recall being there the other day.

CC Roger.

LMP I don't know whether you have any connections with all the Marines stationed in Antarctica, but maybe somebody knows what the ice pack's been doing the last few days.

CC I'll - I'll see if we can find out, Jack. I don't think we've got any gates in Antarctica, though.

Tape 48/4

LMP Well, that way you can't lose any.

CC Roger. Well, they never stole the continent.

LMP Sounds like pretty good duty, Bob.

02 21 51 13 LMP Houston, 17.

CC Go ahead, 17.

LMP Yes, I - may have misled you earlier about a storm system south of Tasmania. It's - If there is one, it's just developing, and it's probably 20 degrees of longitude south. As I recall yesterday, there was some indication that a couple fronts were joining forces and moving in that direction. Today, the weaker and more western front appears to have dominated the system, and the only area where there seems to be cyclonic circulation developing is - is that point way south of Tasmania. That conceivably might move up and affect New Zealand in a few, in a couple days, but right now I don't see how it could affect Australia.

CC Roger, Jack.

02 22 15 30 CC 17, Houston.

LMP Go ahead, Bob.

CC I just wanted to give you fair warning, Jack. In case you all feel a bump there when you're about ready to go to sleep there. At 73:17:45, you'll cross that magic line into the lunar sphere of influence.

02 22 15 53 CDR What's the number, Bob?

CC 73:17:45.

02 22 16 06 CDR Bob, do you read us?

CC Roger. We read you loud and clear. We're reading you, Jack. How me?

02 22 16 23 CMP You're reading Gene. How me?
CC Okay, sorry. I'm reading - reading 17 loud and clear.

02 22 16 33 CDR Okay, this is Geno. What was that number on the lunar sphere of influence?

02 22 16 37 CC 73 hours 17 minutes 45 seconds: 73:17:45.
CDR Okay, Bob. You're a little intermittent. Anyway, what you mean is we start hauling the mail I gue***.
CC Roger.
CDR I guess we hit our slowest point. How fast are we going now?

02 22 17 47 CC Gene, you're pretty slow today. You're at 2354 feet per second.
CDR Yes. That's - that's quite a drop from the 35 K that the S-IVB put us on.
CC That's for sure.
CDR Say, Bob. What do you hear from my home front? Anything?
CC Talked to Tracy a little while ago, and she's listening to the box quite often and enjoying it, and everybody's fine there.

02 22 18 33 CDR Bob, you're continuing ... We're getting every third word.

02 22 18 55 CC Gene, do you read me any better on this one?

02 22 19 13 CC 17, Houston.
CDR Go ahead, Bob.
CC How do you read me now?

02 22 19 27 CDR I think you're still ... off.

Tape 48/6

02 22 19 30 CC Roger; you're breaking up on us, too. Let's check it through here a minute.

CDR Okay.

02 22 19 47 CC We were wondering who was going to be wearing the headset tonight, Jack. Who's got the duty?

02 22 20 15 CC 17, Houston.

02 22 24 35 CDR Hey, Bob. You reading us now?

02 22 25 10 CC 17, Houston, did you call?

CDR I just wondered if you're reading us now, Bob.

02 22 25 25 CC Roger. Reading you now loud and clear. I was just off a minute there, talking to Barbara on the phone. Everybody's fine on the home front, Gene.

CDR Okay, what did you say Tracy said earlier?

CC She just said she's tickled pink and listening - listening on the squawk box.

CDR I guess that's the way a 9-year-old daughter should be in a case like this, huh?

CC That's affirmative.

CDR In case she's not listening, tell her not to forget to feed the horses.

CC Roger. Barbara said I should find some nice young female voice around here to tell you she loves you, good night. But I figure we'd better not do that.

CDR Okay; enough said. I guess what we don't need right (chuckle) right now is a nice female voice.

CC I'm sure of that.

CDR We're just happy, health - healthy, hungry, and homesick.

CC You got a lot of work to do, and you better not say you're hungry. The doctor about went through the overhead over here when you said that.

CDR That's a cliché.

CC Roger.

CDR Bob, just in general, how is the spacecraft looking to you? Pretty good, I hope.

CC That's affirmative. We - we haven't found anything. I guess we're - stopped getting those spurious MASTER ALARMS here for a while. So that - that was the only witch hunt we were having right there, was trying to find that.

CDR Yes, they disappeared. The ones we've had recently seem to be real ones.

CC Roger.

02 22 27 58 CC Hey, guys, we were just still trying to figure out who is going to wear the headset and got - who has the duty tonight?

CDR Oh, I'll wear it tonight, Bob.

CC Is that Gene?

CDR Yes.

CC Okay.

02 22 28 30 CMP And, Houston; 17. You ready for some onboard read-outs?

CC You better believe it.

02 22 28 39 CMP Okay. BAT C, 36.8; PYRO BAT A, 37.0; and Bravo is 37.0. RCS Alfa, 93, 91, 91, and 94. Over.

CC Roger. Got them all, Ron.

Tape 48/8

02 22 31 38 CMP Houston, we're cycling the H₂ FANs, now.

CC Roger, 17. Go ahead.

02 22 31 54 CMP Okay. We're cycling the H₂ FANs.

02 22 31 58 CC Okay; we copy.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

02 23 03 09 CDR Hello, Houston.

CC 17, Houston; go ahead.

02 23 03 20 CDR Okay, Bob, we're going to turn out the lights now and hit the sack.

CC Okay. Have you gone through the presleep checklist, getting ready on the comm and all that?

CDR Yes; that's affirm - the presleep checklist.

CC We're not getting any biomed data on - supposed to be on Ron, I guess. We're not showing any biomed data.

CDR Houston, do you read 17?

CC 17, Houston. How do you read me?

CDR Yes, I'm reading you, Bob. What did you say I might want?

CC You might check the sensors on Ron. We're not getting any biomed data. Is he unplugged?

CDR Well, that's because he's - Yes, he's unplugged. Give him a chance to get hooked up and change some leads here.

CC Okay.

CDR Everything else - the presleep check - the presleep checklist is complete. I'm going to leave the comm cap on tonight. Our tone boost doesn't work, so I'll just be on comm all night.

CDR Do you have any biomed on Ron?

CC Stand by on that, Gene.

02 23 07 07 CDR Good night, Robert.

Tape 49/2

02 23 07 10 CC

Good night, Gene.

02 23 07 15 CC

Got a busy day tomorrow, and we'll - we'll be with
you then.

END OF TAPE

Tapes 50-53/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 06 50 09 CDR Good morning, Houston. How are you?
CC Apollo 17, Houston. Did you call?
CDR Good morning, Houston. Anybody there?
CC Okay, good morning. It's LOI day, Apollo 17.
CDR Hello, Robert. You gave us an extra half hour.
CC That's affirmative. We're presently still debating on midcourse 4, Geno, and at the present time, it's small, about a half a foot per second. We're expecting a final decision on whether it's necessary or not in approximately 1 hour at 8 - 82:30. We'll let you know then, but it will be small, and so we decided to give you an extra half hour of sleep.
CDR Okay, Bob, without me having to look it up, when will it come if it comes?
CC Stand by. 83:55, so we'll give you about 1 hour and 25 minutes advance notice.
CDR Okay. Well, we'll start stirring around.
03 06 52 06 CC Okay, give me a call when you want to talk to people.
03 06 59 56 LMP Hello, Houston.
CC Hello there, 17. Good morning.
LMP I'm not sure we're ready to talk yet, Bob, but I just thought you'd like to know we got a pretty spectacular view of - of Africa today. We can see the Sinai, can see the Red Sea, the Sea of Aden, and for the first time I think we can not only see the Mediterranean, but we can see the - most of the Southern European countries, Turkey and Greece and up into Italy and some of those places, can't quite see Spain because you're just about on the horizon. And for the most part, it looks like the weather throughout the Mediterranean and Northern Africa looks pretty good.

Tape 54/2

CC Okay, we're copying that. And, if you guys are willing to do a little switch flipping this early in morning, we'd like you to turn on the pan camera heaters, which means if somebody's down there in that vicinity, it's SM/AC POWER, ON, and the SELF TEST switch to HEATERS. Over.

LMP You want the SM/AC POWER, ON, and the SELF TEST switch to HEATERS?

CC That's affirm.

LMP Okay, we'll get that.

CC Okay.

03 07 01 30 SC Okay, we got both of those.

CC Gee, I didn't wake you up, did I?

03 07 02 00 LMP Well -

03 07 08 43 CDR Okay, Bob. The LM/CM DELTA-P is 0.6.

03 07 20 41 CC Okay. Copy that. Sounds good.

CMP Hello, Houston; Apollo 17. How do you read?

CC Hello. Loud and clear, 17. We're with you.

CMP Okay, we didn't get you there for about 5 minutes, Bob, with good up-link signal strength. Were you guys having a problem?

CC No, not that I know of. We were getting a lot of noise down here, and we seem to think that you guys were prob - assumed you guys were turned away from us or something. But we're with you.

CMP No, you might think about that one a little bit. We had a very strong up-link - signal strength, as good as right now. And Gene was trying to call you, off and on, for several minutes and we didn't get any response. But sounds real good now.

CC Okay, sorry about that.

CMP Hey, Bob. Good morning. It's a good chance to talk to you for once.

CC Yes, for once, yes. Talk to me now this next hour and I won't talk to you again for another 3 or 4 days, Ronald.

CMP (Laughter) Okay.

CC Nice to be able to talk to somebody for a change -

LMP Bob, your friendly medical officer -

CC Go ahead.

LMP Go ahead, if you've got something to say.

CC Speak.

LMP Okay. Your friendly medical officer has all the good words starting with the CDR and the food. Are you ready to copy?

CC Ready to copy.

LMP Okay. It was a big day yesterday, eatingwise. CDR had sausage patties, pears, and cocoa for breakfast. And a quarter - one-fourth cheese spread, one-half bread, and one-half cereal bar, and one orange beverage. For lunch. Tomato soup, half a hamburger, half mustard, vanilla pudding, and an orange-pineapple drink for dinner.

CC Okay, copy that.

LMP ... 5 hours of good sleep, and two more containers of water.

CC Okay, 17, I got the CDRs food and then you broke up, and I got 5 hours of sleep and two containers of water. Was there something between?

LMP That's firm, your - his PRD reading, 17032.

CC Okay, copy that.

LMP And I think, Bob, we're coming around different omni, so I'll wait on the rest of it.

Tape 54/4

03 07 23 59 CC Roger. That's affirm.

03 07 26 55 LMP Okay, Houston; 17. How do you read now?

CC Okay, read you again; go ahead.

LMP Okay, for the LMP, the food eaten - Well, let's see, I guess it's a tossup: eaten versus not eaten, so I'll give you what I ate. Sausage patties, grits, pears, pineapple-grapefruit drink, coffee, and let me make a note that the package of peaches in that pack had been - was broken in the package. Also, chicken - I had chicken soup, ham, bread, orange drink, and four bacon squares. For dinner, I sort of ate some leftovers and grape drink, corn chowder, chocolate pudding. And I've had - Well, stand by. The PRD reading: 24080; and 7-1/2 hours of very good sleep last night. I took a Seconal in order to get to sleep, and I've had 1 and 1 or - 2-1/2 containers of water since last report.

CC Okay, copy all that, Jack.

LMP Okay, the CMP, the chowhound of the kennel here, had: sausage, grits, fruit cocktail, orange beverage, and coffee. He had ham, cheese spread, peaches, cereal bar, and orange-pineapple drink. Later on, he had tomato soup, half a hamburger, half mustard, vanilla pudding, sugar cookies, grape drink, and tea. And he has a complaint this morning, much like mine, that his apricot package had broken in the bag; and, although not too significant itself, it makes everything else pretty sticky.

CC I copy that.

LMP Okay, CMP medical is 15031 PRD; he had 7 hours restless sleep, and he'd like a comment from the doctors on how that looked on his biomed; and he had a Seconal, and he's had four containers of water.

CC Okay, we copy all that one also. Jack, you guys still going to fit in your space suits?

LMP If you'd stick around - you'd know we tried those on yesterday.

CC Roger; copy. Tried to talk to you guys yesterday morning, but I didn't quite make it, there was a problem apparently some place.

LMP That's all right, we're stuffing him with food so he can't sleep.

03 07 30 43 CC Okay, and the comment concerning Ron's sleep from the Surgeon, Jack, is that he was restless the first hour and had periods of restlessness during the night, but we logged him for about 7 hours of sleep also. But we did see periods of wakefulness, some of which were maybe up to 10 minutes long.

CMP That sounds about right; that's good, thank you. If I can't tell how long I'm awake and, you know, how long you were really asleep.

CC I'll tell you, Ron, if you wake up during the night, you might sit there and stare at the second hand then maybe you could count and tell how long you're awake.

CMP (Laughter) Okay.

CC Okay, we owe you guys a consumable update - update. And on RCS consumables, your RCS fuel remaining is still 1.4 percent above the Flight Plan; that's a slight improvement over the 1.3 percent from yesterday.

03 07 32 19 LMP I guess everything else is about like yesterday. Is that right, Bob?

CC Roger. The consumables are still about the same. And if you guys will wind your watches, we'll consider the postsleep checklist finished.

LMP Okay, and Geno has got his null bias check for you.

CC Okay, Roger on that. We're waiting.

CDR Okay, Bob, made two checks over a period of 100 seconds. One was minus 99.0 and the other was minus 98.9.

Tape 54/6

CC Okay, we copy minus 99.0 and minus 98.9, Geno.

CDR And - -

03 07 33 21 CC And we'd like OMNI Charlie, please there, 17.

03 07 35 26 CC And, Apollo 17; Houston. We'd like to recommend you go SQUELCH, OFF, at this time, if you haven't; and we'll keep calling you the omnis to change as you rotate there. Over.

LMP Okay, Bob, we've been flying normally with it enabled; maybe you think that's the problem.

CC Stand by on that and, while we're thinking about it, can we confirm that the only medication you've had is a Seconal for you and a Seconal for Ron, and nothing for the Commander?

CDR This is Geno, that's right; I did not take any Seconal last night. One thing I wanted to talk to you about though, I - I took one antigas pill after breakfast, I took one after supper, and I took one prior to going to sleep, which were probably within an hour apart. If you've got a better solution than those gas pills, I'd sure like to hear it.

CC Understand that, Gene. We'll get back with you, I guess, on that later.

03 07 37 20 CC And, Jack, as far as turning the SQUELCH, OFF, I - they do believe that we're better with that for margins and general management at this distance with the omni. As soon as we plot a PTC and go on the high gain, we'll be much better off.

LMP Okay, Bob.

03 07 38 46 CC And, 17; Houston. You can do without your water dump now. We're in good shape. We'll dump at 94 hours.

CDR 94 hours. Okay.

CDR Bob, does that mean we can go ahead with the urine dump on schedule?

Tape 54/7

CC Say again there, Geno, on the urine dump.

CC Say again, Geno, on the urine dump.

CDR Roger. Can we press on with it on schedule?

CC That's affirmative, sir. It's just that we don't need to do the water dump, that's all.

CDR Oh.

CDR Okay, fine.

03 07 44 41 LMP Hello, Hou - Houston; 17. How do you read?

CC Roger. We have you back again, 17.

CDR Okay. We may play the S-band squelch by ear, a little bit. We got an awful lot of noise when you guys drop off the line. So, if that's all right, we'll just use it as required. Also, I'm on frame 163 on the Hasselblad, and I just completed two pictures of the Earth about 5 minutes ago. And there's one that I did not report late yesterday at about 72:30 GET. A set of two pictures of the Earth.

CC Copy that.

CC Say again that time. Was that 78:30? You were sleeping then.

CDR Negative. That was 72:30.

CC Okay. Copy that. And part of the reason we had a little problem that - this - this last time, Jack, was we planned to call the omnis and we didn't get the word around down here. And we didn't call the omni to you in time. We're still planning on doing that, and I think we'll be more coordinated next time.

LMP Okay. We'll bear with you.

Tape 54/8

CC And, Jack, I presume that's magazine November
November.

03 07 46 53 LMP That's affirm, Bob.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 07 50 24 CC OMNI Charlie, 17, please.

CMP You got it.

CC And, Apollo 17; Houston. For your information, we are scrubbing midcourse 4; and you can stay in PTC until 83:30, which will be about when you start to get ready for LOI anyway. We'll give you a call on that.

SC ...

03 07 54 31 LMP Hey, Bob, we're about three-quarters of the way through eating. You got some news for us?

CC Stand by. I'll see. Did you catch the midcourse-4 scrub?

LMP Yes, sir. Apparently, you're not getting some of our acknowledgements.

CC Okay, must be. Captain Young here wants to tell you that it's raining outside; and the paperboy apparently hasn't come in yet. OMNI Delta, please.

CDR I'm surprised he didn't get his papers delivered before he came in.

CC Roger. I suppose I should apologize to all the paperboys after saying that, but the news is still being put together for you guys. And - stand by.

CC And, Geno, some advice to you on the gas pills. I guess - suggestion down here from the Surgeon is that one thing we ought to be sure to do is chew the pills thoroughly. It apparently is - helps in their effectiveness quite a bit; and Dr. Young, beside me, also suggested if you're chewing chewing gum, you might cut down on that a bit because he thinks this might be causing some gas.

CDR Thank you.

Tape 55/2

03 07 56 41 CDR I might add that both of those alternatives have been - worked on.

CC We thought probably so.

LMP Bob, although we're getting close to concentrating our attention on the Moon, it doesn't decrease the interest in looking back at the patterns of activity we can see on the Earth. That storm I talked about yesterday that was in North Africa, looks like it has left that area and has moved in - maybe, if it's there at all, it's just over the - Iberian Peninsula. And maybe Gibraltar and that area is getting a little activity today.

CC Okay; copy that, Jack.

LMP It does not look very well organized, but - it's not very well organized right now, but - it's right out on the LM, and it's hard to get a good view of it.

CC Okay.

LMP The storm I guessed yesterday - I thought might be moving into the Cape of Good Hope looks like it's dissipating and also staying south of that area. The whole of Africa is essentially clear, except in the southern part of the intertropical convergence area where there's scattered patches of - of fairly dense clouds. They're probably getting scattered rain showers of some kind in there this morning. Some of those extend farther south than I've - than we've seen them - down into South Africa. There's a - On one of the earlier revs, although now it's at the terminator, it looked like there was a depression developing about 30 degrees longitude, east of Madagascar in the middle of the Indian Ocean. A little bit northeast of Madagascar, there's also a new area of clouds developed that looks like it's getting organized into a cyclone pattern.

CC Roger. OMNI Alfa, please.

LMP Okay, you got it.

CC Thank you.

CC Okay. And, Jack, while you guys are finishing your lunch - your breakfast there, excuse me - Are you all on your headsets?

LMP Yes, sir. Go ahead.

03 08 00 06 CC Okay. Let me brief you on a little funny that we saw last night. And I'll start the briefing by mentioning that, at the present time, it is not a great concern; but just to keep you up to date with what's going on, let me mention it to you. About 70 hours, which was probably about the time of your last exercise period, we saw three funnies with the hydrogen tanks - as I say, none of which is causing any great concern. The first of these was a shift of the limits of the pressure switch, the one that turns the heaters on and off. Remember, there are two of those switches, one on tank 1 and one on tank 2 and they work in series. And one of those switches - we can't tell which, but we suspect it's probably tank 2 because of the other funnies I'll get to in a minute on tank 2 - one of those switches went from a 13-psi range; in other words, a plus or minus 6.5-psi range. It changed its range down to plus or minus 1.5 psi. So it's now - its total range is only 3 psi. The main result of that is that it means that the pressure switches and the motor switch turning the heater on acts more frequently over shorter periods of time. The second thing which we observed following this - and we're not at all sure if there is any correlation between this and the others - We observed a high-frequency pressure oscillation in tank 2. It was about a 5-psi peak-to-peak oscillation, a frequency of about 2 cycles per second. And this lasted about 3 to 5 minutes. A third funny that we observed - and this was in tank 2 - the third funny that we observed was an erratic - and possibly correlated with the high-frequency oscillation - but an erratic total fuel cell currents, and here again we were looking at - oh, peak-to-peak variations of something like 5 amps, or of 5 to 10 amps. And the suspicion is that, coupled with the shift in the limits of the pressure switch, some acoustic vibrations were set

Tape 55/4

up in that tank - we may have seen them causing the oscillation of the motor switch, which was then reflected in the fuel cell currents. The - again, these erratic and possibly correlated fuel cell currents lasted for about 3 to 5 minutes. And since then, all during the night, they've [sic] been no further events of this sort; and the pressure switch with its reduced limits has been acting quite normally, just with the reduced limits overnight. As I say again, we're looking at it, people are studying it in great detail, with no real answer at the moment; but there is no great concern at present. And it appears that the worst that can happen is for the motor switch to "stale" because of overuse. And if this were to happen, it would force us to go to man - manual management of the heaters on the H₂ tank. But that appears at the moment to be the worst, that we can anticipate from this - from this group of funnies. Over.

- 03 08 03 40 CDR Okay, Bob. I understand that. You know, I wonder if we ought to stop stirring the cryos the way we've been doing it.
- CC That - that has been suggested, but - but, again, it's not very clear that any of these things are terribly correlated.
- CDR Okay. Also, you know, if you want to reduce the activity on that switch - depending on how much you need to have it done during quiet periods, such as eat periods and things like that - we could go to manual operation.
- CC Negative, Jack, because the switch - OMNI Bravo, please, 17.
- CC ... If you pull out your schematics there, you'll find that the - no matter what you do, the - you can turn the thing off, in fact, and the switch will continue to operate the motor switch - the pressure switch will continue to operate the motor switch off the service module buses. There's nothing you can do. The only thing you'll do if you go from AUTO to MANUAL or OFF is you'll keep the current from going to the heaters, but the motor switch will still operate.

CDR Okay. Thank you for the education.

CC And I've been corrected. The frequency of the pressure oscillation was more in the vicinity of a cycle every 4 or 5 seconds.

CDR Okay.

CC And 7 - -

LMP Bob, let me ask a couple of questions to make sure - -

03 08 06 26 CC Go ahead.

LMP Make sure I understand this. You're not sure whether the heater cycling and the pressure cycling were correlated. Is that correct?

CC That's affirmative.

LMP In a cycle very 4 or 5 seconds, is it possible for the heaters to affect the tank that fast?

CC That's not possible, so the only thing that really - we think could - The tank is too much of a heat sink to do it that way. What may have happened was that if you set up an oscillation - a mechanical oscillation in the tank - through - one way or another, that this could then have acted back up on the motor. But the motor switch in driving the heaters could not have reinforced the oscillation because the tank is too much of a heat sink.

LMP Okay. When did you say this happened with respect to our exercise period?

CC That's not well pinned down, 17. We do know it hasn't occurred since about 71 hours; and it did occur at approximately 70 hours, which was about the time of your exercise period. But we haven't been able to correlate that exactly with the start of or the finish of the exercise period.

Tape 55/6

03 08 08 56 LMP

Well, you know you should be able to do that because of the biomed on - at least on me, and Ron was on, too. But, as soon as I started exercising, you should have the biomed data on my heart rate. It was an unscheduled exercise period. We just went into it before an eat period there, I think. Let me check back.

CC

Okay. And we can check back and inform you more specific on what the times were there in terms of your exercise period, also. I'd like OMNI Charlie, please, there, 17. And we might mention that oscillations like this have been seen on the ground under somewhat different circumstances, but oscillations like this have been seen on the ground in ground tests previously. And I might say, also, that as far as other things in the spacecraft are concerned, everything looks absolutely normal or nominal, as the case may be, and in great shape and emph - I'd emphasize again that we've seen none of this oscillation again since 71 hours. Over.

LMP

Okay, Bob. That was, as you say, pretty close to the exercise. I can't pin it down in the checklist exactly, but it was somewhere after ALFMED was complete and before we changed that canister. I think we changed that canister a little early, about 70:50. So I think the medic should have pretty good data on when we were exercising. And the reason I say that was because the way we were - I was exercising anyway - I'm sort of running in place against the LEB and conceivably could have gotten an oscillation going in the tank.

CC

Roger. Understand that.

03 08 13 55 CC

OMNI Delta, 17.

CC

And, 17, we did a little - a little investigation of times down here. We found that at 71:12 you were exercising at 130 beats per minute, Jack. And we think the exercise period ended about 10 minutes later at 71:22. The H₂ tank funnies started at about 71:37 with the pressure switch shift and 71:42 with the oscillations. Over. So, there it's - oh, at least 15 minutes after the exercise period was over.

LMP Okay. I just wanted to clear my reputation, Bob. Now it's perfectly clean again.

03 08 14 02 CC As clean as ever, anyway.

CC Okay. 17, I guess we decided we'd let - we'll run the omnis down here instead of having you guys push them all the time. So if you'll select OMNI Bravo at the present time, then we'll take over and run the omnis for you.

LMP Okay, Bob. It's not too big a deal. If anytime you think you want to talk to us continuously, go ahead and call them, if we're not busy.

CC Okay. Copy that. Let us know when you're ready. I've got a pad here for you guys to copy, but there's no big hurry on it. Finish your eat period and give us a call.

LMP Okay. I'll be with you in about 5 minutes.

CC Say again there, 17.

LMP Be right with you, Bob.

CC All right.

03 08 15 36 CDR And, looking at the Flight Plan, we're going to go ahead and change a canister; and we've got the H₂ purge LINE HEATERS, ON. We're going to configure for the urine dump. We'll go ahead and do our - stop our PTC at 83:30, and then we'll do our P52.

CC Roger. Copy that.

CC And, 17, that P52 at 83:10 was primarily intended for the MCC-4. There's some more following, anyway, before LOI. So we suggest you scrub the P52 at 83:10.

CMP Okay, fine. I may just do a little OJT without torquing.

CC That's your business.

Tape 55/8

03 08 17 40 CDR Bob, when we come out of PTC, then you want us to go right to the SIM door jett attitude?

CC That's affirmative, 17.

CDR Okay, and you want us to do that about 80 - 83:30, huh?

CC Roger. That's affirm.

CDR Okay.

LMP Bob, what pad are you going to give me?

CC Okay, I've got a - coming up, pericynthion - plus-2-hour abort pad here.

CC 17, Houston.

03 08 21 41 LMP Yes, Bob. Here's 17. Say, for a while here, why don't you guys go ahead and manage the omnis. I think we can get things done a little better; and when it becomes inconvenient for us to switch, we'll let you know.

CC Okay. You want us to call them to you - Is that what you're saying by you manag - we manage the omnis?

LMP Yes, we lose 5 or 10 minutes going around here without comm, and it usually breaks up seemingly when somebody has something to say, either you or us.

CC Roger. Okay. That's fine. Stand by.

LMP That's up to you guys, but, it seems to me, it would be more convenient.

CC Okay; things are good now, Jack. Do you want to copy this pericynthion-plus-2 pad at the present time?

LMP Yes, I'm just about ready, Bob.

CC Okay, give me a call when you get it. And, while you're getting ready there, you might think back to yesterday afternoon just after the exercise period; and the question that's raised is whether you were running the DAC or some other miscellaneous equipment at that time which might have caused some high current usage - or erratic current usage.

LMP We'll think about that, Bob; but, offhand, none of us can remember doing anything like that.

CC Okay; copy that.

03 08 26 17 CC OMNI Charlie, 17.

CC And, 17, your faithful night shift capcomm is signing off. I'll talk to you on the surface tomorrow. Good luck.

CDR Thank you, Robert. Looking forward to seeing you there.

LMP Are you leaving us, Bob?

CC That's affirm; he's already left.

03 08 28 02 LMP Boy, he doesn't stick around long, does he? And he wanted to read that pad to me; well, that's too bad. Okay, Gordy, I can take the pad now.

CC Okay, Jack. It's pericynthion plus 2; SPS/G&N. Weight is 66373; plus 1.18, minus 0.14; ignition time is 090:49:55.82; plus 1787.5, minus 1891.7, minus 2396.8; attitude is 237, 126, 332; and all the rest of the PAD is NA. GDC align stars are Sirius and Rigel; 122; 354; 000. Ullage is none. Remarks: number 1, burn docked; number 2, assumes LOI REFSMMAT. Over.

LMP Okay. Pericynthion plus 2, SPS/G&N; 66373, 1 - plus 1.18, minus 0.14; 090:49:55.82; plus 1787.5, minus 1891.7, minus 2396.8; 237, 126, 332; rest of pad is NA; Sirius and Rigel; 122; 354; 000. No ullage. Remark 1, burn docked; 2 is LOI REFSMMAT assumed.

Tape 55/10

CC That's correct.

03 08 30 49 CC Need OMNI Delta now.

03 08 31 41 CMP Houston, 17. Canister change complete.

CC Okay.

03 08 35 10 CC America, switch to OMNI Alfa.

03 08 37 38 CC America, Houston. I have the morning news at the convenient time.

LMP Fire away, Gordo.

CC Okay, first of all the weather. It's raining fairly - fairly heavily all night; there's a lot of water standing around. Temperatures here are in the high 50's, but it's supposed to get a little cooler tonight with a low in the 40's. I think you know how the Dallas-Redskin game came out - the only thing additional mentioned here is that chances look good now that Washington and Dallas may meet in the rubber games for the National Conference representative in the Super Bowl. In the other pro game yesterday, a field goal by Don Cockroft was the difference in a 26-to-24 win by Cleveland over rival Cincinnati. Other sports highlights: The Pittsburgh Steelers play the Oilers today in the Dome. Other big games will be Atlanta at San Francisco, Green Bay at Minnesota, and Baltimore at Kansas City. Tennessee State beat Drake University in the Pioneer Bowl 29 to 7. And East Texas State beat Carson Newman in the NAIA football playoffs. The Southwest Conference has pulled out of the U.S. Olympic Committee. Some college basketball scores: The Houston Cougars routed Xavier last night out at Hofheinz Pavilion 114 to 73; and Rice downed George Washington 93 to 89. Geno, you'll be glad to hear Purdue ripped TCU 101 to 70, and it was Texas over Oklahoma State 86 to 66. And SMU over Oklahoma City 106 to 83. We couldn't find any score at Cal Tech, Jack, but - Switch to OMNI Bravo, please. But one final score, Ron, Kansas lost to Iowa 69 to 56. The only thing new on the plane crash Friday in Chicago - it's reported here that the plane was apparently waved

off because another plane was still on the assigned runway. The Democratic Party's stormy session in Washington saw the old-guard Democrats apparently take back control of the Party from pro-McGovern forces. Mrs. Jean Westwood was replaced as Party Chairman by Texas lawyer/businessman Robert Strauss. Former-president Truman appears to be more than holding his own at a hospital in Kansas City. There's a good chance the 88-year-old former Chief Executive may be taken off the critical list. There's been a 1-day interruption in the secret peace talks between Dr. Henry Kissinger and Le Duc Tho. The two conferred for over 3 hours yesterday. Both sides have agreed not to talk to newsmen on any substantive matters. In other news highlights, President Nixon has named Daniel Moynihan as U.S. Ambata - Ambassador to India. And Chilean President Allende has flown to Cuba to vis - to visit Fidel Castro. Here's an interesting one. A 45-year-old pilot lost in the Arctic for 31 days has been found alive and well. Three companions were killed. The Soviet Party boss Leonid Breshnev has delayed a scheduled visit to the U.S. It looks as if the visit may come in the fall rather than this coming spring. One last note: The news media says that the flight of Apollo 17 is the smoothest on record so far, and I call that last one pretty accurate reporting. Over.

03 08 42 11 LMP Thank you, Gordo, appreciate the news. Sounds like things are still happening down there.

CC Got some more parochial news here - -

LMP Houston, we're starting our -

CC Go ahead.

03 08 42 44 LMP No, we just - I just wanted to tell you we're starting our waste dumps.

Tape 55/12

CC Okay. A little more parochial news. I have your oxygen consumable status here. Tank 1 is still running 4 percent below the line; the other two are right on the line; really no news there. Same with the hydrogen; all three are essentially right on the preflight lines. Over.

LMP Okay, that's the way like to hear it.

LMP We'll bring all of it home if we can.

CC Okay.

03 08 44 08 CC We'd like OMNI Charlie, please.

03 08 48 49 CC Need OMNI Delta now.

49 08 CMP Okay, Gordy. How would you like a hydrogen purge this morning?

CC ... make sure.

CMP Go ahead, Houston; 17.

CC 17, we do want the hydrogen purge; go ahead.

CMP Okay, hydrogen purge is in process. You'd never believe it, dust collection container assembly serial number 5725 developed a hole in it. Fortunately, with a lot of dexterity, I was able to put a piece of tape over the hole.

CC Okay. I guess that's why we sent men into space.

CMP (Laughter) Right.

LMP Gordy, while the purges are going on here, I might mention, a little while ago, I looked at the Earth through a Polaroid colored glass again and had a full view of Africa. And it appeared as if, in the red and yellow portions of Africa, that the land areas darkened considerably more than those areas that are green or foliated, and that would be the central portion; that is, they darkened with the orien - handle on the lens going in a north-south rather than east-west.

CC Roger.

LMP The land areas, though, still do not show as marked a contrast as do the oceans.

CC Roger.

03 08 53 21 CC We'd like OMNI Alfa.

LMP Okay, hydrogen purge is complete. HEATER is going OFF.

CC Roger.

LMP Gordy, it looks like the cloudiness and possibly the showers associated with the intertropical convergence over Africa are moving as far south as Johannesburg right now. It's quite a distinct change from even an - an hour or so ago - a couple of hours ago. They're down into an area where, presumably, they're not normally found if vegetation indications are any criteria. And also, in the Atlantic - South Atlantic near Goa Island, there seems to be a possible storm developing as part of what was probably now a fairly weak front. And whether or not that will develop into anything and move in towards Capetown is hard to say at this time.

CC Roger, Jack.

LMP It looks as if our old friends at Ascension are enjoying a fairly nice day out there.

CC Roger.

03 08 57 44 CC OMNI Bravo, please.

CC Jack, this is Houston. We recall you mentioning the purge complete and the heaters off. We just wanted to be sure that you did leave the H₂ purge line heaters on for 10 minutes after terminating the purge. Over.

LMP Thank you, Gordy. I'll turn them back on.

Tape 55/14

CC Okay.

LMP Who's sitting over there reminding me of all these good things this morning?

CC Well, that was a combination effort by John Aaron and Charlie Dumis.

LMP Wow! You've got a real powerful team there.

CC You bet.

LMP Hey, you really ought to get them a cup of coffee though sometime this morning.

LMP Gordy, also curious who's wa - who's watching Challenger this morning?

CC Well, let's see.

LMP Not much to see, I realize, but I'm sure somebody's there.

03 09 02 36 CC We need OMNI Charlie, Jack.

CC Well, we've got the first team on - the gold team - your LOI and landing team, and the LM guys are Merritt and Thorson.

LMP You cut out on the telmu. Who is it?

CC Merlin. Merlin the Magician.

LMP I'm sorry, Gordy, you clipped off the first again.

CC Merlin Merritt, the magician.

LMP Oh, yes; of course. As I recall, he's the only one that really understands Thorson.

CC He says he doesn't think anybody understands Thorson.

LMP Well, we're sure looking forward to having a chance to make those guys work a little bit.

CC They say - well - Merlin says he is, too. I don't know about Thorson. He's out of the room at the moment.

LMP He's probably spilling coffee in SPAN.

CC Roger.

03 09 06 31 CC We need OMNI Delta now.

03 09 08 44 LMP Gordy, for some reason, it's a lot easier to tell the difference between the Antarctic Continent and the icepack.

CC Roger.

LMP Maybe the glancing Sun is picking up the breaks in the icepack and giving it a different appearance.

CC Roger.

03 09 09 32 LMP The continent itself - all you can see are very - what appear to be very gentle differences in - or subtle differences in shading, possibly indicating rolling relief due to a photometric dark beam along the - as a function of local phase angle.

CC Copy.

LMP And except, maybe, for the area just - well, no - even there, I didn't the ... - it looks like the whole visible continent is clear of clouds this morning. Possibly some clouds just east of the Ross Sea, which is just coming into view, I think.

CC Roger.

LMP I know we don't have many listeners in Antarctica, but it looks like they're having a - exceptionally fine day over the portion of the continent we can see.

CC Roger.

Tape 55/16

03 09 11 20 LMP That weak front I mentioned in the South Atlantic stretches from the apparent storm center around Goa Island - I'm not sure about that pronunciation either - up just to the coast of South America from Brazil, where it reaches its maximum eastward extent.

CC Roger.

LMP Our sub - our zero-phase point of the spacecraft is in the middle of the South Atlantic. And it's moderately bright, although there is no central bright point at all - a fairly large area, but moderately bright. The seas down there might be moderately choppy or rough this morning.

CC Okay.

03 09 14 26 LMP Houston, 17.

CC Go.

LMP Okay, Gordy. You might say "uh" before you - you start your sentences because you're clipping your first word. The question I had was the pan camera - we're on 1-6 of the Experiments Checklist and need your word on whether you want the PAN CAMERA, OFF, at this time - SELF TEST, OFF.

CC Stand by.

CC We'd like you to leave it in HEATERS.

03 09 15 20 LMP Okay, we're leaving it in HEATERS.

03 09 16 38 LMP Okay, Houston. The S-BAND AUX, TV is to SCIENCE - -

CC Roger.

03 09 16 45 LMP - - and I'm turning the IR, ON.

CC Okay.

CC Jack, we'd like OMNI Alfa.

LMP How do you read on OMNI Alfa?

CC Okay; you're readable, fair amount of noise.

03 09 17 29 LMP Hello, Houston. How do you read?

CC Jack, this is Houston. You're clear with considerable noise. Over.

03 09 18 35 LMP Houston, how do you read 17?

CC Apollo 17, Houston. Still reading you with a lot of background noise. Over.

03 09 19 03 LMP Hello, Houston. How do you read?

CC 17, Houston. Weak but readable.

03 09 19 13 LMP Okay, we'll have you up on your high gain pretty soon. I'm turning the IR, ON.

CC Roger; Roger; Roger. IR, ON.

LMP Say again, Gordy.

CC We copy. IR, ON. Over.

03 09 19 56 CC America, we'll take the high gain now. PITCH, minus 15; YAW, 188. Over.

03 09 21 05 CC America, Houston. Let's try the high gain now. I see you're moving it. Minus 26 and 199.

LMP Okay, I think we've got a main load block now on the high gain. How do you read?

CC You're loud and clear, Jack. It looks good here.

03 09 21 31 LMP Okay, Gordy. Let me keep going here. I did not turn the IR on because I thought you said something. IR is going ON now.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 09 21 43 CMP Roger. I thought you said something. IR's going ON now.

CC Okay. What I said is, "Roger. IR, ON."

03 09 21 51 CMP Coming on. MAPPING CAMERA going to STANDBY.

03 09 22 06 CC Okay; STANDBY on the MAP CAMERA.

CMP Okay. I'm waiting your cue for PAN CAMERA POWER, to POWER.

CC Roger. We're still locking up on the data. We'll give you a cue.

03 09 23 34 CC Okay, Jack. You have our cue for PAN CAMERA POWER to POWER.

03 09 23 51 CMP Okay. PAN CAMERA going to POWER.

03 09 24 13 CMP Okay, Gordo. We're in the SIM bay door jett attitude.

CC Roger.

03 09 26 17 CMP PAN CAMERA POWER is going to BOOST.

CC Roger.

03 09 29 14 CMP Oh, down there. Oh.

CMP Me to you.

03 09 30 06 CMP Okay, Houston. I'm in VOX now. Do you read?

CC Yes, sir. You're loud and clear.

03 09 30 16 CMP Okay. On panel 181, the LOGIC POWER MAIN A, MAIN B circuit breakers are CLOSED.

CC Roger.

Tape 56/2

03 09 30 26 CMP Okay. LOGIC POWER number 1 is going to JETT, number 2 to JETT. Standing by for your GO, Houston.

CC Okay. Stand by.

CMP Okay.

CC Okay, America, you're - -

CMP What happens now is - -

03 09 30 48 CC - - GO to jett the SIM bay door.

CMP Okay, Jack, let me know when you've got the camera ready.

03 09 31 02 CDR Okay, Houston. You say we are GO to jett the SIM bay down a little early, huh?

CC Well, stand by. I think we're backing down here. Stand by 1 second.

CDR Okay.

03 09 31 39 CMP No. I checked it at one frame.

CDR Might check it.

03 09 31 46 CC Okay, America. Once again, you're GO to jett the door, and you can do it early, if you wish.

CDR Okay, Gordo. We'll do it on - on Ron's mark down there.

CC Okay.

LMP Hey, Houston. You know this attitude - this attitude has the Sun right into window 5. It's probably going to be on the lens of the camera. I'll - I'll try to shade it the best I can, but I don't have an awful lot of hope for these pictures.

CC Roger.

CDR I think we're probably stuck with it, Jack, because we need to be in this right attitude, for the clearance and -

CMP Okay. SIM door jett 5, 4, 3, 2, 1 -

03 09 32 51 CMP JETT. Oh, I got a good bang. You see it, Jack?

03 09 33 00 LMP Houston, there it goes, I got it out the hatch window and it looks like it was a clean jett. It's rolling and pitching and yawing, slightly. There is a lot of garbage that came out with it.

CMP Can you take a picture, Gene?

CDR Let me see it.

CMP Ah - ah (laughter).

CDR You take a picture. Yes, there it goes.

CDR Hello, Houston. How do you read?

CMP It's really - -

CC Sounded good.

CDR Okay. Did you get the word we got a clean jett?

CC That's right, Geno. Sounds good.

03 09 33 56 CDR Okay. The door's moving - the door's moving directly away from us, mostly rolling. And it looks like it was a very clean - clean separation.

CC Okay.

CMP Yes. Boy, we got a good bang out of it. You could hear that - that pyro going, I think. It's rotating at about 5 - or 1 revolution per 5 seconds.

CC Roger.

CMP And it's rotating - what, about the long axis? Yes. Rotating about the long axis.

03 09 34 58 CDR Houston, the garbage that I said went with it was just a small amount of debris, I'm sure around the sealant pyro area. There was one, oh, about a 4-foot-length piece of, oh, 1 or 2 inch tapelike material that also went out with it.

Tape 56/4

CC Roger, Gene.

LMP (Laughter) Okay. What do we do with these LOGIC POWER switches? Don't they go back to OFF now?

03 09 35 28 CMP DOOR JETT's OFF, down.

03 09 35 32 CMP Okay. You go on to the DEPLOY/RETRACT on number 1.

03 09 35 35 CMP DEPLOY/RETRACT on number 2.

03 09 35 43 CDR FUEL CELL REACT VALVES are NORMAL. I'm sort of glad we had those in LATCH.

CMP Yes, me, too, because that's a pretty good bang.

03 09 36 25 CC You've loaded the wrong pitch angle there in NOUN 22.

CDR Well, I'm - I got 10 degrees loaded; that's what we've got copied down here in the change.

CC Maybe there's some mistake. Let us check here, Geno.

CDR Okay, we got 320, 010, and 324, and before I go into the muver - maneuver, I'll roll right about 12 degrees.

CC Bad call, Gene. Our error; you're right.

CDR Thank you, sir.

CMP Okay, and the UV SPECTROMETER is going to go ON here.

03 09 37 32 CMP MARK it.

CC Roger. Mark the UV.

LMP Okay, and the IR will be OFF on your cue.

CC Okay, Jack, that'll be 12 or 15 minutes from now.

LMP Okay, just give us a call.

03 09 39 41 LMP Okay, the 100-WATT O₂ HEATER circuit breaker's coming OPEN.

CC Okay, Jack.

03 09 40 14 LMP Okay, O₂ HEATERS 1 and 2 going to AUTO, and 3, OFF.

CC Roger.

03 09 41 51 CDR Okay, Gordo. We'll wait until 50 past the hour and pick up the LM/CM DELTA-P; we're still reading 0.6.

CC Roger. That sounds good.

03 09 42 09 CDR And we're in the process of maneuvering and I guess I'll start to see if I can't get you some biomedes.

CC Okay.

LMP I don't know whether you were watching the LMP on the door jett, did you see a jett on my heartbeat?

CC Well, we'll check this data here, Jack.

LMP I guess I was remembering erroneously 15's comment that it was very quiet, but I - of course, Ron reminded me they were in the suits.

CC Okay, Jack. John Young was talking about the same thing here, but we didn't see anything on your EKG.

LMP How stable could you get?

03 09 43 29 CMP And Houston, 17 here. Mag Bravo Bravo is indicating 20 - let's see - indicating 76 percent now - 76-percent full.

CC Okay, Ron.

CDR And, Gordo, we are watching the 8-ball.

Tape 56/6

CC Roger. We're keeping an eye on it, too.

03 09 53 05 CC America, we'd like the HIGH GAIN to AUTO, please.

03 09 53 15 LMP Okay, you've got it to AUTO. I think we may have a new discovery about microphones up here.

CC Oh, is that right? What's that?

LMP Well, Gordy, it looks as if you could improve your voice quality by putting fingers over the end of the mike booms. At least that works on the intercom.

CC How about that.

CC America, Houston. We're ready for the IR to OFF.

LMP Okay. IR's coming OFF -

03 09 55 31 LMP MARK it.

03 09 57 16 LMP Hey, Gordy. Who's operating in the trench in front of you today?

CC Okay. It's the LOI and descent team, Presley, Green, and Deiterich.

LMP They're a trio of musketeers, if I ever heard of one.

CC Roger.

LMP All they lack is a French accent.

CC A New York accent is about the best they can do.

LMP I wasn't going to exercise any value judgments, Gordy.

03 10 00 57 CC Jack, this is Houston. I have a preliminary LOI pad anytime it's convenient.

LMP Okay, Gordy. I was just checking to see if I could find the Moon, and I still can't see it out there.

LMP I'll be with you in 30 seconds.

CC Okay.

03 10 02 47 LMP Okay, Gordy. Go ahead.

CC Okay. This is a preliminary LOI, SPS/G&N. 66361; plus 1.21, minus 0.12; 088:54:22.71; minus 2798.8, plus 1045.7, minus 0037.3. Attitude is all zeros. H_A is 0170.1, plus 0052.5; 2988.0, 6:38, 2981.7; sextant star 45, 252.1, 13.5. Bore-sight star and all the rest is NA. GDC align stars: Sirius and Rigel; 122; 354; 000. Ullage, none. Remarks: LM weight, 36312; and single-bank burn time is 06:51. Go ahead.

03 10 05 09 LMP Okay. Preliminary LOI, SPS/G&N. 66361; plus 1.21, minus 0.12; 088:54:22.71; minus 2798.8 plus 1045.7, minus 0037.3. All zeros; all zeros; all zeros; 0170.1, plus 0052.5; 2988.0, 6:38, 2981.7; 45, 252.1, 13.5. Set stars are Sirius and Rigel; 122; 354; 000. No ullage. LM weight is 36312, and single-bank burn time is 06:51.

CC One correction on the ignition time. The seconds are 22.77.

LMP Okay, 22.77.

CC That's affirmative; otherwise, good readback.

03 10 07 24 CMP Okay, Houston. At 84:45, we've got about 2-1/2 to 3 minutes and 1 frame a second on mag Bravo Bravo, through the celestial adapter of the Earth.

CC Okay, Ron. We caught that. And if you're looking for the Moon, according to our figures here, it should be visible out window number 1 about 30 degrees off the boresight axis. Over.

LMP Okay, got you. I'll try again.

03 10 09 15 CC America, Houston. I'm ready with a TEI-4 pad anytime it's convenient.

Tape 56/8

CMP Stand by.

03 10 13 36 CMP Okay, Gordy, I'm ready for a TEI-4 pad.

CC Okeydoke. It's TEI-4, SPS/G&N; 40090; plus 0.50, plus 1.17. Ignition time is 097:20:47.45. NOUN 81, plus 2004.8, minus 2951.1, minus 1547.3; attitude will be 202, 083, 312. Rest of the pad is NA. GDC align stars are Sirius and Rigel; 133; 200; 030. Ullage: four jets, 12 seconds. And remark number 1: burn undocked; number 2: assumes no DOI; number 3: assumes landing site REFSMMAT; number 4: with the LOI REFSMMAT, your attitude will be: roll, 180; pitch, 220; yaw, 38 - correction - yaw is 338. Over.

03 10 16 14 CMP Okay, TEI-4, SPS/G&N; 40090; plus 0.50, plus 1.17; 097:20:47.45; plus 2004.8, minus 2951.1, minus 1547.3; 202, 083, 312. Rest of pad NA. Sirius and Rigel; 133; 200; 030. Four jets, 12-second ullage. Remark 1: burn undocked; 2: no DOI assumed; 3: landing site REFSMMAT; 4: LOI REFSMMAT attitude 180, 220, 338. Over.

CC Okay. That's a good readback.

03 10 19 28 CC America, Houston. If you give us ACCEPT, we'll pop up a state vector - a preliminary state vector and a VERB 66, preliminary target load, and an LOI REFSMMAT. Over.

03 10 19 43 CDR Okay, Houston. You have it.

03 10 21 01 CDR Okay, Houston. This is America. How do you read the commander on biomed?

CC Stand by. I'll take a look here.

03 10 22 44 CC America, Houston. Looking at the O₂ pressures, we think maybe TANK 3 ISOL VALVE got jarred closed. Would you check the barber pole over on panel 278. If it's barber pole, would you reopen the valve?

03 10 23 01 LMP Gordy, we checked that. I'll check it again. We checked it right after the jet.

03 10 23 16 LMP And, Gordy, it's gray. Would you like me to cycle it?

CC That's affirmative, Jack. Go ahead and cycle it OPEN.

03 10 23 39 LMP Okay. That's been done.

CC Roger.

03 10 24 08 CC America, Houston. It's your computer. You can go back to BLOCK.

03 10 24 17 CMP Okay, we're back to BLOCK. In the DELTA-V test, I got a minus 22.0, and I'm on a bias check right now.

CC Roger.

03 10 26 36 CC America, Houston. The biomed looks good on all three of you.

CDR Okay.

03 10 27 01 CMP And the null bias check, on a plus 100, it went to 100.4. I'm working on a minus now.

CC Okay, sounds good.

03 10 28 18 CMP Okay. The minus 100, it ended up minus 99.5.

CC Okay, Ron.

03 10 30 38 CMP Gordy, the EMERGENCY CABIN PRESSURE REGs are OFF.

CC Roger.

03 10 30 59 CMP Okay, EQUALIZATION valve in the tunnel has come OPEN.

CC Roger.

Tape 56/10

03 10 33 10 CMP Okay, Gordy, the LM TUNNEL valve is in LM PRESS,
and EQUALIZATION valve is CLOSED.

CC Roger. And was it a 0.6 DELTA-P when you started
this, as before?

03 10 33 28 CMP That's affirm. It was 0.6 and now it's down to -
we been seeing it as about 0.1.

CC Roger.

03 10 33 55 CMP And, Gordy, I've got the EMERGENCY CABIN PRESSURE
REGs back to BOTH.

CC Roger.

03 10 37 45 LMP Okay, Gordy, we're changing mags on the - the
EL camera, and mag November November is being
stowed with 59 frames on it - or 59 frames
used - 159.

CC Okay, Jack; copy.

03 10 38 27 CMP Gordy, you can record that as the second commander's
P52 that came up all balls.

CC Okay, we'll get a hard copy.

03 10 39 04 CC Okay, we got the 93s; you're clear to torque.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 10 57 35 CDR Okay, Gordo, there's the gyro torque angles.
 CC Okay, we're copying them down. Stand by.

03 10 58 07 CC Okay, Geno; torque them.

03 11 32 17 CC America, Houston. America, Houston. We've lost
 the high gain and data. Go on OMNI Alfa.
 CC America, Houston in the blind. Go OMNI Alfa, if
 you read.
 CC America, this is Houston. How do you copy?

03 11 33 29 LMP Clear, and we're OMNI Alfa. If you don't answer
 this transmission, we'll try the high gain again.
 CC Okay, Jack. We're reading you now. I heard you
 say OMNI Alfa. Say again the first part.
 LMP Roger. We've been reading you. I think you're
 on VHF, however. Would you like us to reacquire
 on the high gain?
 CC Stand by. I'll check on that.
 CC Okay, Jack. We'd like you to try the HIGH GAIN
 at a PITCH of minus 29, YAW 17, MANUAL and WIDE.

03 11 34 27 LMP Okay, Gordy, we're on the HIGH GAIN.
 CC Okay, Jack.
 LMP How do you read?
 CC I'm reading you - I can read you, but there's
 still a lot of background noise.
 LMP Like VHF would sound, but I'm not sure I believe
 it.

03 11 35 29 CC Jack, we just commanded NORMAL voice.

Tape 57/2

LMP Gordy, did we end up somehow out of NORMAL voice?

CC Jack, we'd like you to try a NORMAL acquisition. Go AUTO and NARROW on the HIGH GAIN.

03 11 35 54 LMP Okay, that peaked it up, AUTO and NARROW.

CC Okay, you're loud and clear now.

LMP Okay, Gordy. You said that you had to command NORMAL voice. Did we get a spurious command in there some way?

CC Okay, we had - we did all that ourselves to establish voice through Ascension; no problem. Over.

LMP Okay, Gordy. How did you reach us when you finally started calling?

CC Stand by.

CC Jack, we didn't do anything to cause the problem there, we were up-linking through Madrid and down-linking through Ascension. Did you see anything on board that could have caused the loss of lock?

LMP No, sir. We had good signal strength. It wasn't peaked for the high gain. It was more like an omni signal strength, about 70 percent. And we called you several times after the switch in lines, and then finally you came through clear, but with some background noise and sounded like VHF. I presume it wasn't, now. And when you called, I went to OMNI Alfa, with no change in signal strength, still about 70 percent, and you were still coming up the same way and apparently didn't hear us. And then the high gain - with high gain acquisition, it's been pretty clear.

CC Okay, that's the way - that story's the way it sounded to us. And we're looking around here to see if we can figure out a reason for loss there.

03 11 38 31 LMP Okay, and I'm ready to pressurize the SPS, if that's what you want.

CC Okay, let me make sure here.

CC Okay, Jack. We're ready for it.

LMP Okay, you want me to just use SPS HELIUM VALVE 1?

CC That's affirmative.

03 11 39 35 LMP Okay, Gordy. We're going to ON with SPS HELIUM VALVE 1. We checked the circuit breakers, they're IN.

CC Okay.

03 11 39 46 LMP Okay, pressure's com - pressure's up; FUEL PRESSURE is stable at 175 and OXIDIZER at 175, and the light is out. And we're back to NORMAL on CAUTION AND WARNING. And the VALVE now is back to AUTO.

CC Roger. And looks - looks good here. We're reading 184 oxidizer and 185 fuel.

03 11 40 47 LMP Hey, Gordy, this is the LMP. I got a question for you.

CC Shoot.

LMP I'm just wondering if - I'm showing about 85 amps, and is that a good normal power load with - I presume the O₂ HEATERS are ON now.

CC Just a second, we'll check that.

LMP I'm just trying to reestablish my references here for LOI.

CC EECOM says the HEATERS are ON and that's the normal load.

03 11 41 33 LMP Okay. Very good. Thank you, sir.

03 11 42 55 CMP Houston, 17.

Tape 57/4

CC Go ahead.

CMP Roger. We got about an hour sitting around here. We can go to wide dead band, if you want, if you'll remind me to go back to narrow again when we need to.

CC Let me check on that.

CMP Might save a teacupful of fuel.

CC Ron, we suggest just staying where you are on the dead band; there's no problem on fuel.

03 11 44 53 CMP Okay. Mighty fine, Gordo. Thank you.

03 11 47 41 CC America, Hou - Houston. We just finished a site handover. And we're seeing some excessive counts on the UV. We'd like to chase the problem a little, and to do that, we'd like you to turn the UV OFF for 5 seconds and then back ON. Over.

03 11 53 34 LMP Houston, 17; how do you read after a COMMAND RESET?

CC 17, this is Houston. You're loud and clear. Have you been calling?

LMP Yes, sir, we've been calling. After your handover, we heard your statement that you handed over and then hadn't been able to contact you after that. I just hit a COMMAND RESET.

CC Okay, Jack, that was a problem here on the ground. Over.

LMP Okay.

03 11 55 17 LMP Say, Gordy, 17.

CC Go ahead.

LMP Yes, we've got B DUPLEX - B SIMPLEX ON, apparently left over from the LM checks. I suspect I should turn that OFF. Right?

03 11 55 40 CC That's affirmative.

03 11 56 07 CMP Houston, 17.

CC Go ahead.

CMP Gordo, just an interesting observation on my part. I don't know why, but all the air bubbles in the beverage packs - you know, none of the air bubbles will come together at all. If you get it a small air bubble, it stays in a small air bubble. And they'll never co - come together. However, in my chicken and rice soup package here, I had a whole bunch of small air bubbles and now it's all one great big air bubble in the middle.

CC Okay.

CMP Most of the - most of the spoon bowl packs you know - or wet packs, whereas the juice bags won't do it.

CC Okay, that's interesting. I sure don't know why either.

LMP We're just trying to keep your day interesting here, Gordy. Now that you won't let us look at the Earth anymore, we'll start looking in the cabin.

CC Okay, while you're looking in the cabin, I've got a new hydrogen cryo configuration for you to minimize the pressure cycling and cut down the wear and tear on the motor switch. If you're ready to do it, I'll read it.

03 11 57 52 LMP Go ahead.

CC Okay, on H₂ TANK 1 and TANK 2 HEATERS, both of them, OFF. On the FANs, TANK 1 FAN's ON, TANK 2 FAN's OFF. I think they're there already. And TANK 3 FAN's AUTO. Over.

LMP Hey, there's a new configuration. Okay, H₂ HEATERS 1 and 2 are OFF. H₂ FANs - 1 is ON, 2 is OFF, and 3 is AUTO.

Tape 57/6

CC Okay, sounds good.

LMP That sounds like an EECOM special.

CC That it is.

03 12 06 31 CDR Hello, Houston, I've got the limb of the Moon.

CC Very good.

CDR I've got the limb of the Moon out the - got it out the center hatch and we're just barely seeing a - barely seeing the horizon of the Moon. But, boy, is it big.

CC Roger.

CMP Well, that must be a - what - you know, talk about a sliver of the Moon, that is a sliver of a sliver.

CDR Gordo, we're coming in right down on top of it. What's our perigee, did you say? 73 miles?

CC Roger. That's about right. Don't worry, you'll miss it.

CDR I just want to hear you say it because I'm going to hold you to it. As long as you shadow your eyes from the Sun - the Sun is just about laying on the horizon of the Moon, and as a matter of fact, as I watch it, I can watch the horizon - the amount of - of daylight terminator get larger.

CC Roger.

03 12 08 56 CDR Gordy, unless I get proven wrong here, I think we'll be able to watch it all the way in as long as we can keep shadowed from the Sun.

CC Okeydoke.

CDR I'll tell you, when you get out here, it's a big mamou.

03 12 12 02 CDR Gordy, it's a sight to remember. Not just because of the uniqueness of the view, but because we all got to ask ourselves if we really know where we are and what we're really looking at right this moment, and when you answer that question, it's yes, it certainly becomes an epic sight in your mind.

CC Roger, Gene.

LMP My congratulations to the trench for solving another rendezvous - rendezvous problem.

CC Roger.

03 12 13 43 CDR Gordy, can you tell us how far we are right now from the - from the Moon?

CC Surely can; stand by.

CC Right now, you're about 5000 miles from the surface.

CDR Okay. Thank you.

03 12 15 26 LMP Houston, 17.

CC Go ahead.

LMP I think I got a visual on the SIM bay door now out window 5. It's just about directly off our present plus-Y axis.

CC Okay. Must be way out there by now.

LMP Oh, yes. It's a long way out there; just flashing.

CC Roger.

03 12 17 31 LMP Gordy, what's the MOCR having for dinner Sun - this Sunday?

CC Well, let's see. I guess we haven't sent out for hamburgers, yet. There's a few brown bags in sight, but that's about it.

Tape 57/8

LMP My goodness.

CDR Gordy, it doesn't look like I'll have a chance to go to church today, but under the circumstances, I guess it'll be okay. Next time you see the good father, you might have him put a good word in for us.

CC Okay. I'll do that.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 12 27 56 CDR Gordy, is - in our present attitude, I'm seeing the - the limb of the Moon convex down towards our minus-X axis. That's out of the hatch window. Can you tell me which is the North and which is the South Pole?

CC Okay. Stand by.

CDR Yes, I'd be all squared away if - if the Moon were on Jack's side, because he's got that end on his head, but I'm a little mixed up now.

CC Roger. I understand your problem.

CDR Gordy, I - I'm thinking the - the top of the - the LM towards the Sun is probably the north.

CC Roger.

CDR Hello, Gordy. I - I think I got it. Window - the - the north has got to be on the right as I look at the limb of the Moon opposite the Sun. Because when we go into retrograde attitude, it's got to be over there. I think I can see Korolev without any problem. It's a little bit north of the - of the equator.

CC Roger.

CDR Gordy, are you still with us?

CC That's affirm. I'm with you, and I'm getting lots of advice here.

CDR Okay. Okay. I'll bet you are. But I - I think I got it oriented. You can literally watch yourself fall down in. As we get closer, if we're going to have a view like this, it's going to be pretty dramatic. Because we're calling the way you climb on out of the Moon when you leave it, if you can see. And I remember remarks at that time, "Gee, if we could see it like this when we came back in, we'd have to close our eyes." If we can see this thing coming in like I think we may be able to see it at 50 miles, it isn't going to look like very much.

Tape 58/2

CC Roger. We agree.

CDR And we're even considering the win - putting - Gordy, we're consider - Gordy, we're considering putting the window covers up.

CC You're chickens, huh?

03 12 32 21 CDR It's going to be one of those high - high - angle energy conversion roundouts.

CC Roger. From our information here, if you're looking at the Moon so that the - the dark limb is up, then north should be to the right.

CDR Yes. I - I concur, and that's the way it is.

CC Roger.

CDR The horizon is just steadily growing bigger.

CC Does it look about the same as last time?

CDR What do you mean, "last time?" Couple years ago?

CC Right.

CDR Gordy, we never saw it coming in a couple years ago. We saw it, as I recall, a day out, and we saw just a - a shadow of the limb. But we - to my best re - recollection, we never saw it this close. As a matter of fact, we went into darkness prior to going into LOI, and this time, much to my amazement, we don't. But I see now that we won't, and I see why. I'll tell you, everyone who's seen that view leaving knows how fast you climb out. And by golly, the closer we get to it, the faster we're coming in.

03 12 33 56 CC Roger.

03 12 39 28 CDR Gordo. The - the widest-most part of the convex horizon probably covers a good couple of degrees. I can now see relief on the - on the horizon itself against the dark space.

CC Roger.

CDR And the rim of Korolev is readily visible standing out by itself in the - in the darker or the unlit part of the - of the Moon. I can see the central peaks or mountains very well lit up.

03 12 40 50 LMP Okay, Gordy. This is Jack. Is there any reason not to start the checks at about 87:43?

CC Stand by.

CDR Okay, Gordy. What I - what I called a - a central peak or range in there must undoubtedly be that inner ring, but it - the way it was lit up in the sunlight gave you a definite impression that it had an elongated central range.

03 12 41 46 CC Roger. And for Jack, no problem starting early on the checks.

03 12 41 56 LMP Okay. They're in work.

03 12 43 36 CDR Okay, Hous -

LMP ..., Houston. Going to put the UV COVER OPEN. How long?

CC Okay, Jack. And we'd like 5 minutes of operation with it OPEN.

LMP Okay.

03 12 43 57 LMP MARK it, OPEN.

03 12 45 40 LMP Okay, Houston; 17. I've started the secondary glycol pump, and it - I neglected to make a check on the evap OP temperature. Do you have that, and did we get a decrease?

CC Stand by. Looks okay, Jack.

LMP Thank you.

03 12 48 13 LMP Okay, Gordo. There's NOUN 05.

CC Roger.

Tape 58/4

LMP And you're looking at the torquing angle.

03 12 48 58 LMP Okay, Houston. I'm going SPS PRESSURE INDICATOR to 2.

CC Okay, Jack. And you can close the UV cover, and go ahead and roll back to 064 ROLL. And you're clear to torque the P52.

03 12 49 19 LMP Okay. UV COVER is CLOSED.

03 12 49 55 LMP Okay, Houston. Going back to SPS PRESSURE INDICATOR 1.

03 12 50 02 CC Okay.

03 12 52 31 CC America, Houston. We - we still see the UV door open. Have you closed it yet?

03 12 52 51 LMP Okay. It's now CLOSED, Gordy.

CC Roger.

03 12 53 31 CC America, Houston. I have the LOI and map update pads when you're ready.

CDR Stand by 1, Gordo.

03 12 54 59 CDR Okay, Gordy. What do you have, a map update on page 3-83 of the Flight Plan?

CC That's affirmative.

CDR Why don't you go ahead?

CC Okay. It's for rev 1. AOS without burn is 089:07:46; with the burn is 089:16:29.

CDR Okay. Without the burn is 07:46, and with the burn is 16:29.

CC That's affirmative, and then I have your LOI maneuver pad.

CDR Okay. We're ready to go.

03 12 55 53 CC Okay. LOI, SPS/G&N; the weight is 66361; plus 1.21, minus 0.12; ignition time is 088:54:21.74; NOUN 81, minus 2798.8, plus 1044.9, minus 0042.5; roll, pitch, and yaw are all zero; NOUN 44, 0170.1, plus 0052.5; 2987.7, burn time is 6:38, 2981.4; sextant star is 45, 252.1, 13.5; rest of the pad is NA. GDC align stars are Sirius and Rigel; 122; 354; 000. Ullage is none. Remarks: LM weight, 36312; single-bank burn time is 6:51. Over. Stand by on the readback. Okay. We'll take ACCEPT, and give you the up-links while you're reading it back.

03 12 58 20 CDR Okay, Gordy. Here's your readback. You've got ACCEPT. It's LOI pad, SPS/G&N; 66361; plus 1.21, minus 0.12; 088:54:21.74; minus 2798.8, plus 1044.9, minus 0042.5; 000, 000, 000; 0170.1, plus 0052.5; 2987.7, 6:38, 2981.4; 45, 252.1, 13.5; rest of pad is NA. Sirius and Rigel; 122; 354; 000. There's no ullage. LM weight, 36312; single-bank burn time, 6 plus 51.

CC Okay. That's a good readback.

03 13 01 06 CC It's your computer, America. You have a state vector, a VERB 66, and a target load. Go back to BLOCK.

03 13 01 15 CDR Okay. It's in BLOCK, Gordy. We're finishing up on the bottom of 3-79.

CC Okay.

CDR And I can just roll attitude. I've got the big old Moon again, and from where I sit, it looks like we're right on target. Fifty miles above target, I'd like to add.

CC Okay. That sounds good.

CDR The limb is, of course, still growing and a little more rapidly. And what I can see of the - of the limb that's not blocked out by the Sun, it's getting obviously much larger in the window.

CC Roger.

Tape 58/6

CDR Now I guess it depends on the shadowing of the Sun as to whether or not we're going to see too much. I think retrograde, we ought to see quite a bit once we get over the terminator.

CDR Gordy, there's enough of the lighted portion of the Moon where you can see the relief - not just a shadowing relief, but the actual relief of several craters as they stretch across the terminator, both to the north and to the south. I can see even more definite relief now on the horizon, just to the north and behind Korolev - on the black horizon against space.

CC Roger.

CDR The - the unlit part of the Moon, as you might expect, is just as dark from here as is deep space itself.

CC Roger.

CDR It's black, I might say at this point.

03 13 03 58 CC America, Houston. For your information, your altitude is about 3000 miles now.

CDR Okay, 3000 miles.

CDR Gordy, the - the limb has much more three-dimensional relief now. Towards us, you can - you can get the feeling that the horizon - the lighted portion of the horizon definitely does flow in our direction. And although you can't see the unlit portion of the Moon, you get a feeling that there's a great deal more of it a lot closer than that which you can see.

CC Roger.

03 13 05 52 CDR Okay, Gordy. The pre-SPS burn sim prep is complete.

CC Roger.

CDR And I'm going to give my buddies a chance to look at it now.

CC Okay.

CDR I never thought I'd see a geologist speechless at his first near - near shot at the Moon, but I haven't heard a word from him yet.

CC Roger.

LMP This geologist turned engineer for about an hour.

CC He's probably speechless, because there's no clouds to talk about.

03 13 08 08 CDR Gordo, everything's looking good on board. We're just waiting for about 88:05. We'll be in our maneuver at that time.

CC Okay. Everything looks good here also.

CDR Okay. And is your LOS of about 45 still good?

CC I'll doublecheck that.

03 13 10 14 CC America, the Flight Plan is correct on LOS. To be exact, it will be 88:43:40.

CDR 43:40. Thank you, Gordo.

CDR If - if you guys could get an idea down there of the needle you're threading when you shoot for 50 miles at a quarter of million, you'd be mighty proud of yourselves. I'll tell you, we are.

CC Roger.

CDR I guess I really ought to wait and tell you that at 89:16:29.

CC Roger.

CDR Hey, Gordy. Do you have any idea what our relative speed is to the - to the Moon at this time?

Tape 58/8

CC Yes. It's 5000 feet per second. You're presently 2660 miles up.

CDR Okay. I assume T. P. is there, and I guess John is, too. I don't know if John saw this coming in on 16, but I know they can recall what we saw leaving on 10. And other than the fact that you can't see as much of the Moon, it's just as impressive.

CC Roger. I was just talking to John about it a couple of minutes ago. Their view on 16 was - they didn't have any sunlit Moon, but they did have some pretty good earthshine.

03 13 13 59 CDR Well, he - he knows what I'm talking about then.

03 13 16 59 CDR Gordy, it's an unbelievable view through the monocular now. You can really see down in the depths of some of the larger craters and with a great deal of clarity. And you can see the - some of the higher ridges actually rolling right over the horizon as they go away from you.

CC Roger, Geno.

03 13 25 32 CDR Hey, Houston. As much as I hate to, I think we're going to have to maneuver out of this attitude.

CC Roger. As you take your last look there, you're presently 20 - just a little over 2000 miles up, and you're coming down about 4500 feet per second.

03 13 25 59 CDR Yes. You'd better believe that.

03 13 29 33 CDR Gordo, there's only one better view than this.

CC What's that, Gene?

CDR Right at the moment anyway. Right at the moment anyway, is to be out there and watching this space-craft maneuver in attitude and - and watch it burn over the lunar surface. I get the feeling someone is watching.

CC Roger.

03 13 31 07 CC Give us OMNI Charlie, please.

03 13 33 25 CC Apollo 17, Houston. We just had a site handover. That's resulted in the LOS time changing 19 seconds. It's now 43:21.

03 13 33 40 LMP Okay; 43:21, and we are - we're on OMNI Charlie.

CC Roger.

LMP And just to round out things as we pitch back into LOI attitude, lo and behold from over the top of the LM came the Earth.

CC Very good.

LMP Got the whole thing in one big package.

03 13 35 14 CDR Pretty interesting, Gordo. We can - we can see we're right over South America and, of course, we can see up the Gulf Coast. And it looks like Houston is covered with clouds, but poetically enough, we can see the Cape, at least we can see Florida.

CC How about that.

03 13 39 04 CMP Yes, a VERB 41 NOUN 91. And I'm on VOX now. Get the commander's light. (Laughter)

CC Ron, you're loud and clear on VOX.

03 13 39 28 CMP Okay, Gordo. We're in attitude now.

CC Roger.

03 13 40 47 CMP Okay, Houston. The star sextant check is GO. We've got it in the sextant.

CC Roger.

03 13 41 48 CMP Okay. Okay. Let's go ahead and go and do the P40; 22 - about - -

CDR How many?

Tape 58/10

CMP - - about 20 minutes. Well, it looks like it's going pretty close to where we want to be anyhow.

CMP Okay - okay.

CMP ... back the other way.

03 13 44 25 CDR Okay, Gordo. We're standing by in P40.

CC Roger. We're watching you.

CDR Okay. Everything is checking out good on board.

CC Roger.

03 13 44 52 CMP Okay. Let's go over the cue cards. Okay. DELTA-V check's complete. Set the DELTA-V 2981.4. Okay. We have the pre-DELTA-V in standby. And the SIM bay's been checked, Jack?

LMP Yes, it's been checked. ...

03 13 45 29 CMP Okay. We're in RATE 2 on the BMAGs. Okay, no trim. We'll just leave 12 of them ON then. I've checked the DAP. Yes. Yes. Check it again. Yes. B/D - B/D ROLL. Get it? That's good. Plus 1.21 and minus 0.12.

03 13 46 36 CMP Okay. The DAP is loaded.

CDR Okay, Houston. The DAP looks good.

CC Roger.

03 13 46 50 CMP Okay. We're CMC and AUTO. And we're at the pad attitude now. Okay. Boresight sextant star check is complete. Yes, I did it once. Let's try it again. It kind of drifts quite a bit.

03 13 47 27 CMP Okay. The old GDC is aligned.

03 13 47 33 CMP Okay. DIRECT ULLAGE breakers are going IN. PITCH 1. YAW 1.

03 13 47 44 CMP MAIN A circuit breakers are IN. The rest of them are all IN.

03 13 47 51 CMP DAP control and SPS are all CLOSED.

03 13 47 56 CMP Okay. We have three of them in RATE COMMAND. That looks like about DEAD BAND, RATE to LOW.

03 13 48 21 CMP SCS TVC is in RATE COMMAND.

03 13 48 28 CMP Okay. CG is in LM/CSM.

03 13 48 32 CMP GIMBAL DRIVE: PITCH 1, YAW 1, AUTO. PITCH and YAW in AUTO.

CDR Okay, Gordo. We're down to 6 minutes in the checklist.

CC Roger, Gene.

CMP Okay.

CMP Okay.

CMP Okay.

03 13 50 44 CMP Okay. We keep tight limits, though, to 1 plus 10, huh? Okay. Here we go; 25 - 25 21. BR. That's not it. Getting tight - tight lim - 340. Yes.

03 13 51 31 CMP 06:38. Single-bank burn time is 06:51. I'll start off BANK A first. That - that means we may get a chug when we start on BANK B.

CMP Yes, but if - Okay.

CMP Oh, my scissors flew up and disappeared somewhere. I'll have a hard time eating if you guys take all the scissors with you.

CMP But my teeth are pretty good though.

CMP Okay.

CMP Okay.

03 13 53 57 CMP That's unless you start - start an hour and 20 minutes late, and then it's burn time plus 5.

Tape 58/12

CMP Okay.

CMP Okay.

03 13 54 47 CC Apollo 17, Houston. If - if you three are interested in sticking around awhile, you have our GO for LOI.

CDR Roger, Houston. Understand. America is GO for LOI. And let it be known that the crew of America is GO for LOI.

CC Roger that.

03 13 55 23 CMP I'm kind of worried about this camera back here. It might come banging down.

CMP It's up there yet. Yes. Yes.

CMP (Humming)

CMP Okay.

03 13 57 56 CMP Okay. Panel 8 looks good.

03 13 58 05 CMP Okay. We're 5/1, 1/2, CMC, GDC. COMMAND, RATE COMMAND, RATE COMMAND.

03 13 58 12 CMP LIMIT CYCLE is OFF. DEAD BAND, MIN. RATE to LOW. TRANS CONTROL POWER is OFF.

03 13 58 17 CMP A - AC DIRECTs are OFF CMC in AUTO, RATE 2, RATE 2, RATE 2.

03 13 58 25 CMP TVC is RATE COMMAND. GIMBAL MOTORS are OFF.

03 13 58 29 CMP LM/CSM, ELS is AUTO - I mean the ELS is MANUAL.

03 13 58 34 CMP RCS LOGIC is OFF. ROLL is OFF. .05G. AC and GPI.

03 13 58 42 CMP GIMBAL DRIVES in AUTO. Everything looks good. (Humming)

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 14 00 56 CDR Stick it in my pocket.

03 14 01 33 LMP Four minutes - a little better.

CDR Hello, Gordy. As we approach LOS, we've still got America out the view of the hatch window. We'll see you at 89:16:29.

03 14 02 08 CC Okay, Gene. About 1 minute left until LOS. You have our wishes for a good burn.

CDR Thank you, sir. We shall have one.

LMP Okay.

03 14 02 56 CDR And, Gordy, I assure you we will be out at 16:40.

CC Very good.

03 14 54 XX BEGIN LUNAR REV 1

03 14 36 58 CMP Didn't ... me yet.

03 14 37 06 CMP No, it's not in yet. Well, yes, it is. There's AOS limits right there.

CMP I think we just passed Hertz and -

03 14 37 17 CC Hello there, America. We hear you talking.

03 14 37 32 CMP AUTO and NARROW. Yes, AUTO and NARROW.

03 14 37 48 CMP Good; I thought it dropped off. Hey, it dropped off.

03 14 37 56 CMP Minus 43 and 345.

CC Hello, America; this is Houston. How do you read?

CMP Attitude? Yes, 65, 60, 8. Yes, we're in attitude.

Tape 59/2

03 14 38 22 CC America, Houston. Over.

CMP Don't tell me the old high-gain crumped.

CMP Okay. Let's see you're MANUAL -

CMP Yes, we started to get it - awhile ago.

03 14 39 13 CMP Yes, put it in AUTO and NARROW.

CMP There.

CMP The time?

03 14 39 48 CMP Yes, we're at the edge of Marginis.

03 14 40 16 CMP There's Al-Biruni over here.

03 14 41 04 CDR Okay. It came in then. There it goes. Hello!

03 14 41 14 CC Hello, America. How do you read Houston? Over.

03 14 41 19 CDR America - Houston, this is America. You can breathe easier. America has arrived on station for the challenge ahead.

CC Very good. We've been hearing you for a couple of minutes now. We've had a ground site problem, but you're loud and clear now.

CDR Okay. That's what we sort of thought, Gordo. The SPS burn could not have been more nominal. I've got some numbers for you, if you're ready to copy.

CC Go ahead.

03 14 41 56 CDR Okay, T_{ig} was on time. T_{ig} was on time, burn time was 6 plus 33, V_G is 2989.9; roll was 008; pitch, 357; yaw, 006; all at the end of the burn. Residuals minus 0.3, plus 0.1, and 0. DELTA- V_C was minus 6.8; oxidizer, 34.0; fuel, 34.5; unbalance is 110, decrease. The CMC holds us in a 170.3 by 52.5.

CC That sounds great, Gene.

CDR It was an auto ignition. It was an auto shutdown. I think any comments during the burn are on the tape. But, to me, it was probably the smoothest and quietest SPS burn I ever remember.

CC Roger.

03 14 43 11 LMP Houston, this is Jack. The PUGS was erratic. It's the only thing I noticed that was offnominal. It - it bounced around a lot, in bouncing arou - it was initially for about a minute - around - oh, 1.8 decrease, then it gradually started to diverge from that to a more decrease, down to about 2.5 or make that 3 decrease. And I went to DECREASE on the switch; and about the time of crossover, I had it at - oh, about 1 decrease and it crossed over and stabilized at zero, and I went to NORMAL and it stayed there the rest of the burn - until just near the end, it started to go decrease again.

CC Okay, we copy that, Jack.

LMP Okay, Gordo, did you by any chance get the S-IVB impact?

CC We're - Okay, the new impact time for that is 89:39, so we haven't quite got there yet.

CDR Okay. Thank you.

03 14 44 31 CMP And, Houston - Ron here. Something a little bit of a surprise to me. When I turned on bank A, the chamber pressure came up to 87 percent, and stayed there essentially. Five seconds later, I put on band B, the chamber pressure rose to 90 - about 91 - somewhere in that area. And then, throughout the burn, chamber pressure increased, which you'll see on the strip chart. But I was sure surprised at only 87 percent when we started it. It looked like the velocity gained versus time was correct throughout the burn, though. The maximum the chamber pressure ever got to was about 97 percent, and that was toward the end of the burn.

CC Roger, Ron.

Tape 59/4

03 14 46 10 CDR A little disappointed here, Gordo. I brought an airborne and a ground geologist along with me and it took them until AOS to make sure they knew where we were.

CMP Ha, ha, ha. That's not true.

CC Roger.

CMP My big problem was all the holes were hills when I first started. Looked just like you had the picture upside down.

CC Roger, Ron. I have a couple pan camera photo pads for you.

LMP Go ahead, Gordo.

CC Okay, the first one goes in the Flight Plan at 90:45, and the start time is 090:50:32. Stop time is 091:10:57. Go ahead.

LMP Okay, I got 090:50:32 and 091:10:57.

CC Okay, and next one goes on the next page. Start time is 091:18:05. Stop time is 091:27:43.

LMP 91:18:05, 91:27:43.

CC That's right.

03 14 47 58 LMP Okay, Gordy, I turned the PAN CAMERA, OFF, there about 30 seconds ago and the post-SPS burn checks are complete. LOGIC - no, that's - well, just a minute. The post-SPS burns are complete down to LOGIC POWER, two, to DEPLOY/RETRACT. No, that's your Flight Plan. Okay? MODE is STANDBY.

03 14 48 33 LMP MARK it. POWER is ON on the PAN CAMERA. Okay, Houston, we're waiting your cue on the power.

CC Okay on that, and there'll be no update to the TEI-4 pad. Over.

LMP Beautiful.

LMP Here's Smythii, gang. Coming over Mare - No, let's see, Crisium. Coming over Crisium. It's - coming underneath us now.

LMP I will have in a jiffy. Okay, I'm going to hang off then a little bit. Get a - Boy, this window.

CDR And, Gordo, how did the spacecraft look to you as we came around?

CC Real good, Geno. Nothing to report.

CDR Very fine. Thank you.

LMP (Laughter) One little minor problem, Gordy, is that we're breathing so hard that the windows are fogging up on the inside for a change.

03 14 50 24 CC Okay, and we'd like the PAN CAMERA POWER, off, now. The pan camera run; good.

CDR Beautiful.

LMP Oh, boy, there is Picard - or Peirce, one of the two.

LMP Okay, Gordy, all those dark and light albedo changes around Picard and Peirce are not obvious at this particular angle yet. There's some hint of them.

CC Roger.

LMP The - rim - Is there one farther south of Peirce?

LMP Which - is it far - Is the one farthest - Picard, yes.

LMP Picard, I think, is the one I'm looking at. Yes, it is. Yes, and I can see Peirce now just - behind the rendezvous antenna - or radar. And - Yes, way out there, you ought to start seeing them.

CMP I guess I ought to get that other stuff on the camera, huh?

LMP Okay. We're just about over the top of Picard, and the rim materials, which go out about a third of a crater in diameter, as near as I can tell, are - are distinctly darker but not by much. They're more gray, really, then the gray-tan, or tannish gray of the rest of the mare.

Tape 59/6

CC Roger. Now we assume you're all set up or about to get that way for the landing site photos.

LMP Yes, sir. There is no obvious ray pattern or secondary pattern outside of that blanket around Picard.

CC Roger.

LMP I see no loops or obvious alignment that would be related to that crater. There are blocks - look like great big blocky areas on the rim.

CC Roger.

LMP Do they want the 80-millimeter lens on these terminators now?

LMP There's Taruntius, Ron.

LMP Yes, I guess that's right.

LMP I've got to get another magazine on it.

03 14 55 12 CC Roger. Can you verify the position of the P - PU valve at this time for us?

03 14 55 19 CDR Roger. It's in NORMAL.

CC Okay.

03 14 55 45 LMP Macrobius, Macrobius, my friend.

CDR No, it's Microbus [sic].

LMP Okay, I'm loaded up for your terminator, Ron. What's - is it not out of 105, or what? Is it - Okay, 80-millimeter or -

CMP 80.

LMP 80 - -

CMP ... Millimeter ... f/11 at 1/500 ...

LMP Okay.

CMP 80-millimeter.

LMP Okay.

CMP f/11 at 1/500.

LMP Five frames over the terminator, huh?

CMP 12 frames.

LMP 12 frames. Very good. How soon do I start?

CMP Well, about -

LMP Okay.

CMP ...

03 14 56 37 LMP Okay, in about 5 minutes. All right. Gordy, you'd be interested - there's a - crater that just on the - on the west rim of Crisium. Relatively fresh rim - fairly crisp rim, but no strong ray pattern. There's no ray pattern apparent at all. It looks like it's pre - the plains material around it - that - since they come right up over the - right up to the edge of the crater in one spot. That is Posidonius. That's right. That's what I'm looking at.

CC Roger.

LMP Not Posidonius, Proclus. That's what I'm describing. You know I - You're looking where?

CDR ... 41.

LMP Infamous Proclus. Okay, give me a mark when I'm - Hey, look at the - -

CDR Okay, I'll give you a mark, Jack.

LMP At the Cauchy Rilles here. Man, is that neat. Let me see. Going to have to -

CDR One right there with the shadowed peak in there. Right? Yes, yes, yes, yes, yes. And that's out of this window, huh? I'm not - sure I'm seeing it yet.

LMP Manischewitz! Look at those terminators.

CDR Shadows.

Tape 59/8

LMP There's the mare domes for the central craters. They're certainly obvious. In - northern part of - Let's see -

CDR The lineations that trend to the northwest through this entire - entire section - they go through the - mostly through the highlands.

LMP I can get the pictures. Is it directly out of window 5? Okay. We've got about another minute and a half. I'm going to proceed here at 41.

CMP It'll be right underneath the groundtrack. It's right under it.

03 14 59 36 LMP Well, that's the way we're going. I'm taking them east-west.

CMP Okay. I ...

LMP O - yes. Okay.

CDR Hey, Jack, we're at - coming up on 40.

03 15 00 07 CC ... about a minute to PRO on P20.

CDR Yes. We're at 40 - Okay, I'm with you, Gordo. Thank you.

CMP Okay, you got it.

LMP Okay.

CDR Don't forget to PRO, Ron; you've got - you got 8 seconds.

03 15 01 02 CDR MARK it - 41. Okay, I guess you can - -

LMP Goes. With the usual FAO flight planning, that was a good time.

CC Roger.

LMP Hey, you can even see horizon in the - earthshine out there.

CDR Boy, you sure can. You can see an earthlit horizon out there into the dark part of the Moon.

LMP Can you see the landing site? I think it's going to be in the darkness.

CDR No, I - it - The shadows are so contrasting here, Ron, that I -

CMP Give me that thing a minute.

03 15 02 00 LMP Donius [sic]. There's le Monnier, the landing site. I can't -

CDR No, it's just - it's just dark.

LMP Isn't it a little north of track?

CDR No, I think it's right below us, Jack. I think it's right smack below us in darkness.

LMP Yes, I yes, it is. I can't - I think I'm looking at Littrow right there, right below us. But I can't quite tell.

CDR If I could see Vitruvius, I'd have a better handle on it.

CC A reminder to go to f/4 and 1/250 on the last six pictures.

CDR Roger. That's Posidonius all right. le Monnier; we're here early.

LMP Boy, I tell you, there's no question that right at the terminator you - you pick up relief that you normally would not believe is there in the mare. I remember Bill Anders talking about the appearance of a sea swell within the mare itself and that's certainly clearly shown right at the terminator. Unless you start to see the shadows from all the very small craters that otherwise don't show up as much more that just little depressions, if that.

CC Okay. We need ACCEPT so we can give you a landing site REFSMMAT.

Tape 59/10

03 15 03 45 CMP Okay, you have it.

LMP Yes. Okay, I think that will do her. Okay, Houston. I cheated. I took three extra pictures, and those were at 2.8 and a 250th at the end.

CC Okay, Jack.

LMP And, your - actually your times might have been a little off, because I was just about ready to lose the terminator because of the maneuver - are we maneuvering or have we?

CMP Yes.

LMP But, I think we got a good set going up to the terminator.

CC Roger.

LMP Plus a couple of shots - a few shots on the CEX mag Quebec Que - No, mag Kilo Kilo as we came around the Moon and that number's now on 20. Kilo Kilo is 20, and Quebec Quebec is 42.

CC Okay, we need the IR, ON, now.

LMP Okay, back to work.

CC It's your computer; the up-link's in there, and you can go back to BLOCK.

LMP IR going ON -

03 15 05 33 LMP MARK it.

LMP Yes, enough - enough tourist activity.

LMP Warm in here, isn't it?

CC America, a couple of items. Would you verify the S-BAND AUX TV switch is in the SCIENCE position? And one other thing, we think you were in LOW BIT RATE during the burn.

03 15 06 34 LMP Okay, it's in SCIENCE and we very definitely were in HIGH BIT RATE during the burn by the checklist.

CC Roger. We may have a problem there because it looks like LOW to us on the data. We'll check further.

LMP Hey, Gordy, there was - Ron questioned - brought up the question or possibility of not having gone to COMMAND RESET; but, just before we left you, you'll probably be able to see that I went COMMAND RESET and turned on the tape, because I remember seeing the tape motion.

CC Okay, Jack. We're discussing it - what happened there.

03 15 08 35 CC America, you can go back to BLOCK.

03 15 11 52 LMP Okay, Houston. How do you read 17?

CC You're loud and clear, Jack.

LMP Okay. Before we really got concentrating on the burn, and I had an opportunity to - we all had an opportunity to look at Korolev, at a very low grazing Sun, one of the striking things was the - to me was the extreme absence of relief, the very smooth surface that existed in Korolev, independent, of course, of the craters that are penetrating that surface. And it looked like there was a ring in the floor - outsi - next to the wall about maybe one-sixth of a crater radius that was somewhat brighter at the low grazing Sun, suggesting it may have had a different slope. And I believe I'm correct in saying that the inner floor may be slightly raised. We'll try to make other observations this next time around on that one, but there was just a very smooth floor. The light plains material in that crater is very smooth.

CC Okay; understand. One quick word from FAO's - -

LMP And, of course, that's independent - -

Tape 59/12

CC - - film watchers here, has to do with optional photographs. We'd rather you take the optional photographs on either 00 or PP and reserve KK for the scheduled photographs. And, as it stands now, we've got to reserve 80 frames on either 00 or PP for scheduled photography. Over.

03 15 13 42 LMP Okay, you have to keep track of that. We need - I was hoping we had an optional capability on our first rev, and we'll work it out.

CC We do. We just want to put them on 00.

CC That's right; just stick them on 00.

CC Jack, the problem on the high and low bit rate there was a synchronization problem between you on the burn checklist and us on the ground on our pre-LOS command. No hardware problems, and I don't think it will be a problem in the future.

LMP Okay. But you did lose the high bit rate. Is that correct?

CC That's affirmative. We just had low bit rate during the burn.

03 15 15 19 LMP Okay. I may have jumped the gun on you there a little bit. But I thought we were supposed to do that just before we went AOS - LOS. I think I did it about a minute before.

CC Okay. It was almost identi - simultaneous with our sending the command. You've got about 4 minutes to start looking at Copernicus coming here.

LMP Okay. Thank you. We're just - Sun's just setting.

03 15 16 08 LMP Okay, I have a visual on Copernicus.

03 15 17 06 CC And by the way, the S-IVB crunched in on time, and it's been ringing the ALSEP seismometers like mad for some time now.

03 15 17 42 LMP

VOX, and that's VOX. How do you read the LMP, Gordy?

CC

Loud and clear, Jack.

LMP

Thank you. Okay, good. All right, I've got a visual on Eratosthenes and Copernicus. The - there are obviously different-age craters in this light. You can see the ray patterns in Copernicus moderately well. You can even tell that they do cross Eratosthenes. Stadius shows up as a very clear dark area to the southwest of Eratosthenes. Now, one of the things that we mapped on the southeast and south rim of Copernicus were dark albedo areas within the ejecta. And those are apparent here, very clearly. And also, within - on the upper portion of the rim and on the benches, in that quadrant. The walls - there are the dark spots - lower albedo material that we mapped. They are - form linear patterns along the benches, apparently. Although the bench - the topography is not too clear. But the dark spots are in arcuate linear arrangement parallel to the rim. And they appear to have - be elongate along radius - along the radius of the crater.

CC

Roger, Jack.

LMP

This is in the southeast - southeast quadrant I'm referring to. Copernicus H is also very obvious as a dark-rimmed crater, relative to the albedo of the ejecta blanket. And the northwest quadrant, which we mapped as a smooth floor material and somewhat darker albedo, is just as apparent here, although all the contrasts, of course, are less. The main thing that you can pick out in earthshine are albedo distinctions. Now - now we - we - I remember that we also, at one time - and I can't remember whether it made the final map or not - mapped an arcuate fault structure, based on the change in albedo. And this was on the southwest quadrant of Copernicus. And that crossed the southern rim, more or less north-south, went down and curved across the floor and up the southwest rim, and that is a very clear arcuate pattern in this lighting. Darker albedo than the rest of the

Tape 59/14

crater. And along the arc, there appear to be a couple or three even darker spots - much as we thought we saw in some of the early photography.

CC Roger.

03 15 21 24 LMP

There is a general streaking - radial streaking - within that arcuate dark area that radiates radially from the crater, and if I had to project, the dark area would, - north - whose northeast terminus is the arc in the crater, I'd project it off to southeast about crater diameter and a half, maybe. Now there's - I'm getting - essentially directly overhead, and again the dark spots within the crater wall are still apparent, and the streaming or the radial elongation of these spots is clear. Now, on the lower wall - that's below the first bench - I can see four of these dark areas, and on the next wall above that, above the first bench, there are two - two obvious ones and a couple that are somewhat more subtle.

CC Okay - -

LMP In the middle of the - -

CC - - Can you see anything of the - that stuff we were wondering about in the central peaks?

LMP No, Gordy, I can't. The - there's very little indication of relief in earthshine and particularly at this high Sun ang - high Earth angle, pardon the expression.

CC Roger.

LMP The central peaks do stand out, though, as a much lighter albedo area within the crater. It looks to me like the best thing you can do in earthshine is work with albedos. Knowing the general topography from the - from the pre - earlier photography. We're coming up on Kepler now. Copernicus is out of my view in window 5. Maybe Ron sees it. Do you, Ron?

CMP No, it's out of my view now, too.

LMP Okay, we, we - -

CDR Can you see Reinhold over there?

LMP Reinhold, I was not conscious of. Yes, I can see Reinhold. Reinhold is one of the craters just like Copernicus that may have contributed ejecta into the Apollo 12 soil. Do you see anything - -

CMP An S - an S-IVB - 16's S-IVB hit out there to the south, I think.

LMP Well, I don't -

CMP No, I don't think you'd see it.

LMP I don't see anything that would indicate that. Reinhold is an Eratosthenian Age crater, as you may recall. It's crossed, very obviously even in this light, by the Copernican rays, which is prime - the main way we determine the age, other than it doesn't have any rays itself. Although, on the good photography we now have, we know it has secondary crater patterns around it.

CDR You're not looking at the same crater I am then.

LMP Reinhold is right down here, Geno.

CDR Where are you looking ...

LMP Well, it's south of Copernicus.

CDR Okay, I'm looking up here.

03 15 24 53 LMP South and a little west.

CDR I don't have the same view you have.

LMP Okay, I can see Lansberg now. And I'm afraid I can't shed any light, pardon the expression, on the old question we've had about the age of Lansberg relative to the mare.

Tape 59/16

03 15 25 17 CC

Okay.

LMP

Kepler ray pattern is very striking in this light - an anastomosing - mosing series of - of bands which only average being radial. In most cases, they're a little off radial, but by joining together, they give you a general radial pattern.

CDR

I just wanted to see a -

03 15 25 51 LMP

Okay. Out the window 4, I have an excellent view of Kepler. Once again, albedo differences, such as the - are very clear - such as the distinction between the wall - light - or brighter wall materials and the rim which, in itself, is brighter than the surrounding mare. We can look right down some of the rays, and the rays are not completely linear. I'm looking now to the northwest. Gene, you can see Aristarchus way up there in the northwest. See it?

CDR

Yes. It's coming into ...

LMP

You ought to have a good view of Aristarchus. Very bright, up in the northwest part of our field of view.

CDR

The inside of that crater almost looks as if it's backlit.

LMP

That's right. Well, it should be (chuckle). Strangely enough.

LMP

And - but I want - these rays when contrast to the - maybe the feeling one would have that they are - once they get started, they form a linear pattern across the surface. They don't seem to have done that. As a matter of fact, they're quite strikingly curved along their pattern. They'll break from the general radius they're out on, curve away and then curve back. Some - all - let's see, there are one - one, two, three, four - four rays that go from out to the northwest of Kepler, all of which show that nonlinear characteristic.

CDR Yes, they're all radial, though.

LMP They are radial, in general. But when you look at them in detail, only portions of them are radial. And a single ray, which you can follow continuously, will bend and then curve back.

CMP The - it's unique. We've got rays from - I guess those must be Copernicus over here - those long ones out to the right, which you might not be able to see. Kepler and Reiner are all - all intermingling up here.

LMP Yes, this is the area now we're going over where the gamma ray work on 15 indicated a relatively high radioactivity. And - not yet, it's -

CMP Houston, America here. Do you see the torquing angles?

LMP I was going to look for the Hortensius domes near Copernicus, but got sidetracked with Kepler and missed them.

03 15 28 37 CC Okay, ... torquing angles, Ron.

LMP They are not obvious, though, in looking in the general direction -

CMP Okay, I'll torque it to 845.

CC Roger.

03 15 28 58 LMP Okay, we're getting out into Procellarum - Oceanus Procellarum proper now and, before long, should pick up the medial ridge that makes that mare so distinctive from the other mare. Actually, the ridge that stretches something like 2000 kilometers north to south, if you want to tie a vari - a number of things together. And, probably is the lun - the Moon's closest analogy to an oceanic ridge, which has - which have been in the news over the last decade.

CC Roger.

Tape 59/18

03 15 29 49 LMP Once again, the topography of the Procellarum Mare is not clear in this light. It's just not quite enough light to give you strong, distinct shadows, at least not yet at this Earth angle.

CC Okay. And as you get the camera set up for the orbital science pictures of Galois would want to change and use magazine 00 instead of KK. That's listed in the Flight Plan at 90:20.

LMP Okay, we'll - we'll do that.

03 15 30 32 LMP Okay I'm - out of the window 4, I'm able to see some of the Rima Gamma materials, and it's - awful hard to say more than just the fact there is a very clear light-colored pattern off to the north - of our position at any rate. I think all I can say is that I've seen it. I can't give you much information on it.

CC Okay.

LMP We can see the area where Marius Hills should be, although it's not an obvious topographic feature in this light. Still see Aristarchus off up there shining like a star, if the Moon could have stars.

03 15 31 40 CMP Okay, Houston. I'm going to torque those cos - coarse align errors out at 1, 2.

CC Roger, Ron.

LMP And - -

CDR You squared away?

CMP It's good to be able to see some stars out of the telescope. It's the first time I've been able to see any.

LMP Gordy, we have a - a very clear zero phase point for the earthlight. It's certainly not a strong contrast for the Sun, but it's out there. And within it, again, the fresh craters tend to brighten - quite a bit more than the surrounding

Tape 59/19

mare. Still looking at Oceanus Procellarum. And now, out window 3, up to the northwest, Grimaldi is starting to show up - a very obvious dark area within the highlands of that part of the Moon - and one of the darkest mare regions that we have seen on the - on the Moon. It's comparable, at least in the photographs, to that of Tsiolkovsky.

CC

Roger.

03 15 33 25 LMP

Normally, of course, we think of the dark mare as being the younger basalt flows that - on the Moon, but in our case, of course, young means something on the order of 3 billion years or older.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 15 33 44 CC Roger.

LMP For our interp - If we can extrapolate from the samples returned by other missions.

LMP Amazing how far over - now the highlands to the west of Procellarum are - still are bright, and the contrast between fresh craters and the normal highland are very - are very obvious still in earthlight, particularly along the zero phase point with respect to the Earth. Rima Gamma now is - is coming a little bit closer to our oval track in the horseshoe in the - larger and more western end of it; the dark horseshoe is quite clear in this light. It's a west - or northwest-pointing horseshoe, as is the complete trend of that strange feature. I think Ron is going to have an excellent chance to study these light-colored swirls within the mare and other parts of the Moon. We had some good views of them and Mare Marginis and to the east of Crisium - Mare Crisium, and he should - if there is anything to be seen, he should be able to see it for - during the next few days.

CC Okeydoke.

03 15 35 50 CDR Say, Gordo, something I just noticed here in working with the GDC what-have-you. I - looked at the Pc gage, and in the Pz - Pc position, there is a continuous bias on it now of about, oh, 7 percent, and if I switch to ALPHA, it goes to zero. We never saw that bias before this last burn.

CC Roger, Gene.

03 15 36 35 LMP Hey, Gordy, I'm looking right up the western edge of the Procellarum mare where it contacts the - the - the high - western highlands of the Moon, and we're just about to fly a little bit south of Grimaldi. That edge is very irregular. There is no obvious indications that it - there are large basins that have been flooded by mare that have formed that edge, but, again, the topographic distinction's possible in this lighter small. Now I'm starting to see that there are shadows in the craters.

Tape 60/2

CC Roger.

LMP That's the small craters. There, in the Mare Procellarum closest to Grimaldi, there are two arcuate rilles. Look like they are probably V-shaped in their cross section. I'm sure we've seen those on the photographs much better than I can see them here. Those - the rille patterns, though, do seem to project over into the highlands.

CC Okay.

LMP To the north of that - to the north of that bay of mare. Just interrupt.

03 15 38 09 LMP Hey, I just saw a flash on the lunar surface!

CC Oh, yes?

LMP It was just out there north of Grimaldi. Just north of Grimaldi. You might see if you got anything on your seismometers, although a small impact probably would give a fair amount of visible light.

CC Okay. We'll check.

LMP It was a bright little flash right out there near that crater. See the crater right at the edge of Grimaldi. Then there is another one north of it. Fairly sharp one north of it is where there was just a thin streak of light.

CC How about putting an X on the map where you saw it.

LMP I keep looking occasionally for - yes, we will. I - I was planning on looking for those kind of things. Starting to see the edge of Orientale, Gordy. Way off to the west. Hey, just yell, Gene, anytime you - -

03 15 39 46 LMP Gordy, to the north of Grimaldi there is a large basin that is about the same size but only incompletely filled with mare in its northeastern quadrant. The rest of it looks like a fairly irregular and hummocky floor material of some kind.

CC Roger.

LMP But it's almost the same size as Grimaldi. It even looks like it is a little bit deeper, but, of course, Grimaldi has considerable fill. Grimaldi on its eastern edge has some of the graben, or it's rim, if you will, is cut by three or four anastomosing grabens that make it look like some of the bench areas in the larger basins.

03 15 41 00 LMP Okay, the first ring of Orientale is showing up. The inner - next ring in is extremely obvious; got some very bright east - east-facing slopes.

CDR I'll turn off the intercom.

LMP It has some very bright east-facing slopes, and you can see the bands of mare that are filling the - both the first bench area and the inner bench.

LMP Any time you need us, Gordy, just interrupt me.

CC Okay; we'll do that.

LMP Now, as I look north along the first bench, that's the first bench from the outside, one inside the Cordillerian ring. I better check that; I may have my names mixed up. Got Orientale, there - handy? See it. Should be on there. Yes, this is what I need. What's the name - they got a name on that ridge, there? That's Rook Mountains. Yes, the Cordillera. Yes, that's right. Looking just west of the Cordillera on the first bench, as I look north, in this light, which is casting some shadows now, Gordy, over in the area, it looks extremely smooth. Now this is not mare; it's lighter albedo, lighter reflectivity than the mare, and, although there are patches of mare in the lower areas in it. But looking along that plain, in fact, a lar - long linear plain, it - it looks quite smooth with only some very broad undulations that appear to be roughly radial to Orientale itself. The more - closer we get to it, the more I see minor relief showing up. I start to see the shadows, I guess. And that relief seems to bring out a hummocky texture in - in addition to the craters you would expect to see there.

CC Roger.

LMP

I won't try to give you a trend on the hummocks because I think the shadows are biasing my view; they do appear to be north-south trending, but I think that is because of the shadow patterns. This is a spectacular sight, you guys; you ought to take a look at Orientale. One of the largest fresh basins on the Moon. It still is probably 4 billion years old, or 3.8 at any rate, if our dating criteria are any - any good. It has the outer Cordillerian ring and the inner ring called the Rook Mountains - very, very nicely shown. There are massifs on that inner ring, the Rook Mountain ring; there are massif complexes much like what we'll be studying at Taurus-Littrow. There are low areas, nonmare areas, that are comparable to some - to the Taurus - the valley that we'll be landing in. And, all in all, I think we'll find that our ring in the Taurus-Littrow area around Serenitatis is comparable in many regards to this Rook Mountain ring around Orientale. You want - did you interrupt, Gordy?

CC

No. I didn't say anything.

03 15 45 33 LMP

Okay; I thought I heard your key. Okay; in the inner portion of Orientale, as we approach a terminator, the lighting is still excellent. Matter of fact, it appears brighter than what we were looking at over at Copernicus. Now, part of that may be we're seeing much sharper relief since the slope - Earth-facing slopes are nicely lit, and the backfacing slopes, of course, are in shadow. The first portion of the bench inside the Rook Mountains is partially filled by mare. Now, the higher land in there is very smooth, in a gross sense, is a very smooth hummocky terrain, cut by roughly circumferential grabens. The trend of the hummocks themselves are not radial; they're more - well, they're about a 45-degree angle to the radius. They, in detail, have a much finer hackly texture, much like we've been able to see on photographs before. And, in general, you get the impression that, in several areas here, that that hackly textured surface is draped over material that resembles the massifs of the Rook Mountains themselves. There's one area just to the north now of our track where there's a large, roughly equidimensional mountain mass, with a few projections of massiflike peaks through this hackly textured surface.

CC Roger.

03 15 47 51 LMP

There are also some radial grabens; I just now picked one up, which we've also seen on the Orientale photographs taken by Lunar Orbiter. It's amazing how fresh appearing this basin looks, considering its great age. But it's - it probably is not - had any more violent a history than Imbrium. Now, we're getting up, just about to go over a delta-rim crater that's out in the basin. I don't remember the name of it offhand. But it's - should be familiar to some of the geologists who have mapped this basin. It does not appear to have a strong impact ejecta blanket around it. It's filled with mare, and it's quite sharply in contrast to a crater of comparable size to the northwest. See that one, Ron; I don't know whether you can get it. I get a good view out of 5 now of that one. And, once again, it looks as if this hackly textured material that forms the higher hills in the inner bench - has a draped appearance over the, over preexisting terrain, and, in fact, along the ridges of the hummocks, you - we now can pick up little rilles that roughly parallel the hummocks, although not - not - not consistently. They do cross down into the valleys. But it has appearance that there may have been a tensional relief along the crest of each of the hummocks, or many of the hummocks.

CC Roger.

03 15 49 58 LMP

Delta-rim crater just as has been, I think, discussed in the literature, has just that - delta rim with no obvious ejecta blanket around it, compared to other larger craters within the basin. We're directly over that crater right now. It's filled with mare, very smooth mare. Matter of fact, within that fill, I can see no - no craters. Getting very close to the Earth terminator, but you see good texture in the ejecta blanket of the large crater in the north part of the inner basin of Orientale. The radial ridge and valley patterns are very clear; the concentric coarse hummocks near the rim are apparent; and you can even see the second - patterns of secondaries, the larger secondaries, extending out away - radially out away from that crater. The south - the mare fill in

Tape 60/6

the south floor of Copernicus, I mean of Orientale, is very smooth but does have the sea-swell texture that we saw over in Tranquillitatis.

CDR Better let him say something before AOS.

CC I ain't got nothing to say.

CDR Houston, I guess we're getting close to AOS. We're getting close to AOS. Do you have some words for us?

03 15 51 54 CC Okay. We show about 9 minutes to LOS. We'd like to clarify one thing, and that was on this tape recorder commands and high and low bit rate. And we just want to make it clear that preburn the 6 minute callout is HIGH BIT RATE, RECORD, FORWARD, COMMAND RESET. Did you - did you tell us a few minutes ago that you did indeed do all those at about 6 minutes?

LMP Yes, Gordy, I certainly thought I did, but I can't specifically - I know the HIGH BIT RATE was there, because we switched to LOW later. I can't - I'm afraid I can't specifically verify the COMMAND RESET.

CDR Gordy, I can specifically say that when those - after the bus stars came on, we called that out. I'm almost sure Jack did get it, because I had him then check the helium valves and the nitrogen - helium and the nitrogen valves.

CC Okay. We're just trying to make sure if we - or to determine if we do have a switch problem. The INCO did send LOW BIT RATE, COMMAND, just prior to - to LOS there before LOI, which is the way it's called out in the Flight Plan. And then you should have come along later with a COMMAND RESET, setting the switch to HIGH BIT RATE, and the COMMAND RESET switched into HIGH BIT RATE mode, and for some reason it did not go into HIGH BIT RATE.

LMP Well, you want to test it out here, before we go around?

CC That's a pretty good thought. I think we will.
On stand by. We'll give you - we'll figure out
how we're going to do it here.

03 15 54 27 CC Okay, Jack. We just now commanded LOW BIT RATE,
and you're in LOW BIT RATE. We'd like you now to
select HIGH and COMMAND RESET.

03 15 54 43 LMP Okay. Gordy, you also have an oscillation in up-
link signal strength and a clicking in the - in
the audio. Do you read? We just switched steady
and at about 60 percent - 70 percent signal
strength.

CC Roger. We hear that.

LMP Okay. I'm going to - you want me to go ahead and
command HIGH and COMMAND RESET?

03 15 55 14 CC That's affirmative. The HIGH GAIN just went WIDE
BEAM, but we're still reading you loud and clear.
Go ahead in HIGH BIT RATE and COMMAND RESET.

03 15 55 24 LMP Okay. HIGH BIT RATE; COMMAND RESET.

CC Okay; it seems to have worked properly, Jack.

LMP Okay, Gordy. I may not have got the COMMAND RESET
at 6 minutes. I - I - I just can't tell you right
now.

CC Okay; I want to assure you it was no big problem
as far as the burn goes. No great loss there.

LMP I hope not.

03 15 56 36 CC America, Houston. About 5 minutes to LOS now. We'd
like to have you go ahead and get the jet inhibits
and the covers open as shown in the Flight Plan so
we can see that before we lose you.

LMP Okay; Gordy. IR COVER is coming OPEN.

03 15 57 06 LMP MARK it.

CC Roger.

Tape 60/8

LMP Okay; UV COVER coming OPEN -

03 15 57 14 LMP MARK it.

CC Roger.

LMP And you want me to stay in HIGH BIT RATE?

CC That's affirmative. You're there. You're going to have to do it in a minute anyway, so since you're there already, stay there.

03 15 57 41 LMP Okay. We're there; we've got tape motion.

CC Okay.

03 15 57 53 CDR Gordy, the deadban - or the A/C - B/D, A/C roll has been changed, and you should have the proper jet configuration now.

CC Okay. We see it; it looks good, Geno.

CDR Okay.

03 15 59 02 LMP Okay; if you're still with us, we're going to OPEN up the MAPPING CAMERA/LASER ALTIMETER COVER.

CC Okay, Jack.

LMP Okay. We're going to EXTEND the MAPPING CAMERA.

CC Roger on that.

LMP Okay. Okay.

03 15 59 40 LMP MARK. Barber pole.

CC Roger.

03 16 17 XX BEGIN LUNAR REV 2

03 16 44 34 CMP Okay, Houston. We're with you on the OMNI Delta.

CC Roger, Ron. Read you loud and clear.

CDR Okay, Robert. We should have gotten everything right on up through AOS here in the Flight Plan.

CC Good show.

CDR And the pan camera should be running right now.

03 16 45 30 CMP Okay, Houston. America here. We stopped the orbital photo path, frame 59. And about the sub-stellar point, we took 59 to 66, and frame 67 was taken of the, oh, the dark slide on the corner of Lobachevsky.

CC Roger, America.

LMP Those frames that Ron mentioned - this is Jack - that he mentioned were taken of a area where there's a much lighter gray albedo. Rather than the tannish gray, it's pure gray material that generally is on the rim crest of a number of craters. It may be related to the swirls that we see elsewhere.

CC Roger, Jack.

03 16 47 56 LMP Bob, we're abeam of Al-Biruni and coming up on Goddard and Marginis right now.

CC Roger, America. We're tracking you on the map here, watching it.

LMP Okay.

LMP Al-Biruni has got variations in the - its floor, variations in albedo. It almost looks like a pattern as if water were flowing on a beach. It's that irregular. Not in great areas, but in small areas around on the southern side, and the part that looks like it's a water-washing pattern is of a much lighter albedo, although I cannot see any real source for it. The texture, however, looks about the same.

CC Roger, Jack.

03 16 49 25 CMP And Houston, America. For your info, it took an hour - an hour (laughter) - a minute and 45 seconds for the map - your mapping camera to extend and a minute and 45 for it to retract.

Tape 60/10

CC Roger, Ron. Copy. 1:45, extend and retract.

CDR Bob, what's our altitude now?

03 16 49 58 CC Looks like you're crossing - you're just about 90 miles, but we'll firm that up here, Gene. You're 90.8 - -

CDR Okay.

CC - - America.

CDR Okay; thank you.

LMP Bob, this is Jack. And the question of these irregular swirls that we've got in Mare Marginis, and we are looking just north of Nep - Neper now. I tell you, in the mare, there just is no visible relief. Although there seem to be some sinuous systematics anyway to the distribution. Like, there'll be a very dark area associated with the light area. And that dark area is darker than the mare. I think the pictures'll show that. Now, in the highlands, however, the - the light albedo areas, which are very comparable, that appear to be swirllike patterns of the same type, seem to be associated with a crest of crater ridges and other high points. We're on over - right over a concentration of these now in the northern part of Marginis, where the rule of a - of the light areas being associated with a - either - either symmetrically around a much darker area than the normal mare, or on one side, and in this case, generally the south side - of a dark area is - that rule is very clear. And that also seems to hold in the back side that there was a slightly darker region between areas of light-colored swirls.

CC Roger, Jack. We understand, and we're standing by. We have a DOI pad and some other updates.

LMP Okay. We'll go back to work.

CC America, Houston. We'd like PAN CAMERA, OFF.

CDR You're reading our minds, Bob.

03 16 53 32 LMP It's OFF.
CC Roger.
CDR It's off.
CC PAN CAMERA's OFF, and we'd like ACCEPT. We've got the DOI target load, the CSM state vector, PIPA - and an SPS tailoff constant.

03 16 53 49 CDR Okay; you've got ACCEPT, Bob.
CC Roger, Gene. And there will be no PIPA bias.
CDR Okay.
LMP Bob, I can start with that pad if you want to.
CC Roger. We're standing by. I'll start with DOI-1. Are you ready to copy?
LMP Go ahead.

03 16 55 02 CC Purpose: DOI-1, SPS/G&N; 40035; plus 1.90, minus 0.64; 093:11:36.60. NOUN 81's minus 019.6, all balls for DELTA-V_Y. DELTA-V_Z is plus 0047.8; 000, 228, 000; 0058.9, plus 0014.5; 0197.4, 0:22, 0192.1; sextant star is 45, 187.5, 19.1. Let me say trunnion again; it's 19.1. The rest of the pad is not applicable. Set stars will be Sirius and Rigel; 133, 200, 030. Four jet, 15 second on the ullage. Other comments: overburn limits, DELTA-V one seven - 17 feet per second; burn time, 2 seconds. Over.

LMP Okay, Bob. Ready for a readback. DOI-1, SPS/G&N; 40035; plus 1.90, minus 0.64; 093:11:36.60; minus 019.6, all zeros, plus 0047.8; all zeros, 228, all zeros; 0058.9, plus 0014.5; 0197.4, 0:22, 0192.1; 45, 187.5, 19.1. Rest of pad is NA. Sirius and Rigel; 133, 200, 030. Four jets, 15 seconds ullage. Overburn limits: DELTA-V 7 - 17 feet per second; burn time, 2 seconds.

CC Roger, Jack. Good readback. Okay; I've got a map update for - at 93:38 in the Flight Plan.

Tape 60/12

CMP Okay; go ahead. I have it.

CC Okay, Ron. AOS without burn, 93:31:37; with burn is 34:24. Over.

CMP Okay. Without, 93:31:37; with burn is 34:24.

CC Roger, Ron. I've got a - You can go back to BLOCK, Ron. And on that same page with the J-3, I've got the T-horizon and TCA.

CMP Okay; ready to copy. Go ahead.

CC Okay. You can go to BLOCK on the computer. T-horizon time 93:48:04; TCA minus 20 is 93:50:44. Over.

CMP Okay. T-horizon, 93:48:04; TCA minus 20 is 50:44.

CC Roger. Good readback.

CC Okay, Ron. Over at 93:52, 93:52, we've got a difference in the NOUN 89 value.

CMP Okay; go ahead.

CC Okay. the NOUN 89s have changed to the following: NOUN 89, the first one, plus 20.284, plus 15.151, minus 001.96. Over.

CMP Okay. It's a plus 20.284, and a plus 15.151, minus 001.96. Over.

CC Roger, Ron. And here's a note for you. The landmark is F Crater, located on landing site - picture 4 of 4 in the Lunar Landmark Maps. Over.

CMP Okay. Understand.

CC Okay; and I've got a TEI minus 5 pad. Over.

LMP Okay; go ahead. TEI-5.

03 17 01 30 CC Roger, Jack. TEI minus 5. SPS/G&N; 38570; plus 0.49, plus 0.92; 098:39:43.24. NOUN 81, plus 2329.8, minus 2403.1, minus 1152.8; 193, 099, 318. The rest of the pad is all not applicable. Set stars, Sirius and Rigel; 133, 200, 030. Ullage: four jet, 12 seconds. Comments: burn undocked; assumes a DOI. Over.

LMP Okay, Bob. TEI-5, SPS/G&N; 38570; plus 0.49, plus 0.92; 098:39:43.24; plus 2329.8, minus 2403.1, minus 1152.8; 193, 099, 318. Rest of pad NA. Sirius and Rigel; 133, 200, 030. Ullage: four jets for 12 seconds. Comment 1: burn undocked; comment 2: assume DOI.

CC Good readback, Jack.

LMP Okay. What else can we do for you?

CC Stand by 1, here. I've got an addition for Ron on that comment about that F Crater landmark. Let me get it. It's right here, and I'll come right up to Ron on it.

CMP Okay; I'll stand by.

CC Ron, this additional comment will have - the crater is 8 nautical miles north of your track. You will lose the landmark at a 36-degree elevation angle. Over.

CMP Okay. It's 8 miles north, and I'll lose it at 30 degrees. Okay; so that'll be pretty quick.

CC Thirty-six degrees; pretty quick still.

CMP Is that the one on Family Mountain?

03 17 05 11 CC Stand by on that, Ron. Let me look at the book here. And I'll get Farouk to help me out on that one.

CMP Okay, Houston. I've got F Crater, now. I'm all squared away. Thank you.

CC Okay, Ron. It's - it's right in the middle of that landing site 4 of 4 which is right before Ache-in[?] in the book on your - on the Landmark Tracking Book. And it's right dead center on that page.

CMP Okay, I've got it now. I wrote down 404; it's 4 of 4.

03 17 07 09 LMP Okay, Houston. We've got a good shot of the landing site.

Tape 60/14

CC Roger. Understand. And Roger, Ron.

LMP The shadows, Bob, go all the way across the Scarp and very long pyramiding shadows go all the way past Family Mountain. The - looks like the Sculptured Hills are lit up on this side, but it almost puts the entire North Massif in shadow, from where I stand.

CC America, Houston.

03 17 08 07 LMP Quite an interesting place to land down there.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 17 08 12 CC America, Houston.

CDR We can now, I think, see contrast down in the shadow. And the only part of the scarp that is visible - I think Jack picked it out - as being right where Lara is.

CC Roger. America, Houston.

LMP Roger; go ahead.

CC Roger. Just some words in your - You'll be going through your systems checklist here and you'll probably see that it says dump the waste water if it's greater than 85 percent and you are at about 89.6 percent. We'd - we'd like you not to dump the waste water until the nominal time in the Flight Plan. Do not dump the waste water during this systems check. Over.

CDR Okay, and I understand that was about 94 hours as I recall.

CC That's affirmative. That's where the nominal time is and that is where we'd like it dumped.

CDR Okay.

CDR Bob, that's a - a fantastic black-and-white shot of the landing area with the shadow stretching across most of it.

CC Roger. Understand.

03 17 10 34 CDR Bob, I can now see down in through the shadow. I can see - Bare Mountain. I can see - I can't really make out the - the slide yet. Most of the North Mass - Massif are still in shadow due to the - due to the Sculptured Hills. And just at the point where we can start really to see through the shadows and see the - some hummocky terrain on the North Massif, it just went out of my next reach. But, I did see some sort of albedo change that went across the canyon about in the vicinity of the - of the scarp.

Tape 61'2

03 17 12 20 LMP Bob, with respect to the landing site - this is Jack - when we had near - or were closer to low phase angle, approaching it - when I first had it in view - there was a clear lightening in the area of the light mantle. It was not sharply defined, but around the crater Lara and Nansen and to the west of the scarp - there was very clearly, slightly brighter - reflectivity.

CC Roger, Jack.

03 17 16 27 CDR Houston, America. The MAPPING CAMERA and LASER ALTIMETER COVERS are CLOSED. I'm going to ENABLE A-1, A-2, and C-2.

CC Roger, Gene.

CMP Yes, it looks like the old gravity gradient worked there or something. I didn't see it get out of attitude at all. Did you all see any movement at all?

CC Max er [error?] was about 0.2 - 0.3 of a degree, Ron.

CMP Okay.

03 17 17 35 LMP I'm sorry, Houston. I should have cued you on changing the SPS pressure indicators. You want to see that again?

CC Stand by on that.

CC Jack, it's not required to go back and do them again; we watched it on telemetry.

LMP Okay. I'll try to remember to be a little more informative.

03 17 18 46 CC No problem, Jack; no problem.

03 17 28 52 CMP Okay, Houston. There are the torquing angles.

CC Roger. We see them. They look good.

CMP Just for another little matter of interest - once the Earth is in the field of view, which it's

about - looks like it must be about 12 degrees from Regulus - it's so bright, that it blacks out any - blanks out the telescope for any star recognition. However, it worked real good in the sextant. You can see the star real well. You just have to assume it's Regulus, though.

CC Roger. Would that star angle difference - -

CMP Okay, I'll torque at 30.

03 17 29 35 CMP I torqued at 30 - 09:30.

CC Roger. We copy.

CMP And the first - the first star angle difference was - you know, you can get a little bit lax about it - if you want to spend a little time at it, you can get five balls every time, looks like.

CC Roger, Ron. With that star angle difference on the second one, I can assume it was Regulus. I think you're safe in your assumption.

CMP Oh, yes. Right.

CDR He had to do it, or else I'd have to go down there and do it.

03 17 30 13 CC Roger.

03 17 34 06 CC America, Houston. P40 looks good.

CMP Okay. Mighty fine; we'll go ahead and maneuver to attitude then.

CC Roger.

CDR Houston, I think I put the wrong number in on the PITCH. We'll correct it. It's 228, isn't it?

CC That's affirmative, Gene.

03 17 35 31 CDR Okay, we'll fix it.

03 17 38 09 CC America, Houston. We'd like the HIGH GAIN to AUTO.

Tape 61/4

03 17 38 20 CDR You've got it.
CC Roger.

03 17 41 48 CC America, Houston. We'd like you to hold off switching to OMNI Charlie until we cue you on that.
CDR Wilco.

03 17 42 43 LMP Bob, this is Jack.
CC Go ahead, Jack.
LMP Was there any indication on the seismometers of an impact, about the time I thought I saw a light flash on the surface?
CC Stand by that - we'll check on that, Jack.
LMP Don't worry about it. Some - I thought somebody was looking at it. It could have been one of the other light flashes.
CC Roger. We copied the time and - -
LMP I have a place marked.
CC - - passed it to the back room.

03 17 43 23 LMP Okay, I got it marked on the map, too.

03 17 51 20 CDR Okay, Bob. The star sextant checks out okay.

03 17 51 24 CC Roger, Gene. Good show.

03 17 54 41 CC America, Houston. You are GO for DOI and you can leave the high gain selected. We're holding good.
CDR Okay, Robert. DOI. ... the high gain.
CC Ro - Gene, say again. You were way down in the mud on that one. Can you say again, please?
CDR Roger; understand. We are GO for DOI, and you have the high gain.
CC That's affirmative, Gene. Just -

LMP Hey, Bob, I know I've argued against this kind of thing, but you got tenths on that burn time?

CC It's 0.1 on that.

LMP Okay, 0.1.

CC Jack, just some words from the back room on you. The a - There may have been an impact at the time you called, but the Moon is still ringing from the S-IVB impact. So it's masked any other - would mask any other impact. So they may be able to strip it out at a later time, but right now they don't see anything at your called time.

03 17 56 05 LMP Just my luck.

03 18 00 39 LMP Bob, log us for a picture of the Earth at 92:40 on mag Oscar Oscar. And we're on frame 68.

CC Roger, Jack; we've got that.

LMP You've got a lot of healthy weather out there in the Pacific today. Looks like most of those things we talked about yesterday, up in the Hawaii region and also in the south, have intensified.

CC Roger.

03 18 05 38 CC America, Houston. We're about 3 minutes until LOS and everything is looking great. No changes since our GO for DOI. We'll expect to see you at 93:34:24.

CDR We'll see you at 93:34:24, Bob.

03 18 05 58 CC Roger, Gene.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 18 25 XX

BEGIN LUNAR REV 3

03 18 54 51 CDR Hello, Houston; America.

CC America, Houston. Go ahead.

CDR Okay. And the burn was good on all counts, 22-second burn. It was on time, V_{GX} , 1982; roll after the burn, 357, 225, and 003. Residuals were plus 0, plus 0.2, and plus 0.1. DELTA- V_C is 0.1, and that was with DELTA-V total set into the EMS. Should have been - should have been zero and the residual on the EMS was plus 0.1. OXIDIZER's 305, and FUEL is 311 and an UNBALANCE of 150 DECREASE. We're in a 59.1 by 14.9.

CC Okay, America; sounds great.

CDR It looks pretty great.

CDR We're getting back down among us where us plain folks belong.

03 18 56 20 CC Roger.

03 19 01 01 LMP Houston, this is the LMP. There seem to be two general kinds of ray patterns: those associated with a lot of secondaries and light colored and those that have no visible secondaries. And that's independent, yet, from the irregular light-colored areas we've been calling swirls.

CC Roger, Jack. We're copying.

LMP Houston, there also - a lot more - there is - there is a lot more of that light-colored swirl-like irregular material, or discoloration - if - whatever you want to call it, in the back side highlands, particularly as we approach Marginis, than I had previously gathered from the available photography.

Tape 62/2

CC Roger, Jack.

LMP And there still seems to be no relief associated with it. Although, in many cases, it seems to follow ridge lines, or crater rims part way. In other cases, it's quite irregular in its distribution.

CC Okay.

03 19 03 33 CMP And bank A, that time, with the chamber pressure, was up to 95.

CC Roger, Ron. And we got tracking data on you; has a 13.1 perigee - peri - perilune, rather.

CDR Roger.

CMP Okay, that's great, Bob, and we're still looking at that zero bias on the DC meter of about 5 to 7 psi.

CC Roger.

CMP Okay.

03 19 05 52 LMP Some of the boys might be interested to know that in a place where the Sun is just grazing the slope - it's a steep slope on the north rim of Crisium, I can see the horizontal lineaments that were such a controversy on 15.

CC Roger. Understand. The north rim of Crisium?

CDR ... big one with the central peak.

LMP Roger. There are some very steep slopes that just have grazing Sun on them now, and with the binocs, you can see that horizontal lineation pattern.

CC Roger.

CMP There it is. T-horizon will be good. Yes. Okay, I've got the edge of Crisium now. ... Getting hills on the side of Crisium, there. Sure a lot smoother-looking material than I thought it would be.

CC Ron, you're about 1 minute from T-horizon.

CMP Okay, Bob. Thank you. Oh. (Laughter) Here.

CC And, Ron, we - we're copying you on VOX, we believe. Is that affirm?

CMP Yes, that's right.

CC Roger.

CMP You're not supposed to copy the other guys, though. Are you copying the other guys?

CC No, just you, Ron.

CMP Okay.

CDR I may have been talking loud.

03 19 08 03 CC Okay, Ron. You should be at T-horizon.

03 19 08 08 LMP MARK. T-horizon.

CMP Okay, that's pointing at the horizon all right. I don't see the crater, yet.

CMP Okay.

CMP Okay, I can see the rims of Microbus [sic] A and B.

CMP Okay.

CMP Okay, I really don't see it yet. I can see Microbus A and B, real well.

CMP Okay, I'm going to pick out one and start marking on it.

CMP 1, 2, 3, 4, 5, 6, 7, 8. That's the wrong one. Okay, now I see what I'm supposed to mark on; okay.

CMP 1, 2, 3, 4, 5, 6, 7, 8, 9, *** 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, and it's gone.

Tape 62/4

CMP Okay?

03 19 11 23 CMP No, the ones I just wrote in there. Right?

CMP Okay? And, lets - now I'm going to take a look and see if it looks like a cinder cone. Hey! There's Maraldi Gamma, the mound sticking up there right beside Maraldi. Hey, you guys are going to have some good hills to run down in there. Can you see it all - at all, coming up?

CMP ... north. That crazy radar is going to be in the way - the LM (laughter). Okay, it's going through the landing site, now. The shadow is just up to - You can really see the scarp on there.

LMP See what they mean by Sculptured Hills, Gene? See the knobby characteristics in that - -

CDR Yes. That'll be ...

LMP - - area down there. That's part of the Sculptured Hills.

CDR That's a massif there, too.

LMP Now, we're just over the rim of Serenitatis, looking over the Graben Plains - -

CMP Yes, I can just see. I'm going to switch to 17-1. 3, 4, 5, 6 - just got six of them on 17-1 and then the other three were were on F - F Crater; 17-1 was just barely in the - Sherlock was just barely beyond the shadow.

LMP This is all supposedly covered with the dark mantle, Gene, what you're seeing down there.

CDR Yes, the Sun angles are so that you can't tell the difference in albedo.

LMP And look at those mare ridges, though.

CDR I tell you, that's looking out into the gray - gray desert down in there.

LMP That's the old Littrow site.

CDR I think so. I think we're just about ready to climb.

LMP I think the terminator is giving you the feeling of that, maybe. Ain't nothing out there.

CC Jack, Houston. Can you see any albedo difference in the landing site area between the dark massif and the light area?

LMP We can't see any difference between - in the low areas, between the dark mantle and other materials right now. We're right at the terminator.

03 19 14 40 CDR Yes, but Jack and I weren't really looking at the landing site. I think Ron was.

CC Roger.

CMP Jerry, you could really see a difference between the - the South Massif and the - the mantle material around through there. The mantle is not nearly as dark as it looks on the pictures, though. But the massif, South Massif, especially, looked almost a whitish color. I guess it's because the, partly the Sun was shining on it. But then - -

CDR Could you see anything that looks like the slide?

CMP Oh, yes. You can see the slide on the thing and definitely see the scarp going across through there. I was primarily concentrating on looking for the various craters so I didn't spend that much time, you know, concentrating on how the thing looked. But in the marks on the thing, the first about four or five marks were on F Crater and then I saw Sherlock about halfway through it and I got about five marks on the Sherlock for 17-1.

LMP Gene.

03 19 16 25 LMP Houston, in crossing Crisium and Marginis, it looked fairly clear that with the small fresh craters, and I don't have a good size estimate

Tape 62/6

right now - I think I'm looking in terms of 100 or 2 meters. You can distinguish where blocks have been thrown up by them, or not - possibly giving depth of the local regolith from the pictures you'll get in there.

CC Roger, Jack.

LMP And, also, on that lineation question, not only, where the Sun grazes a - a slope do you see the horizontal lineations, but they're at the southern end of the shadowed area on a slope. You get a couple other lineations showing up at least in a couple places I saw. One would be parallel to the slope - that is cross-contour, and the other was at a - an angle to that direction - oh - say of about 30 degrees.

CC Roger, Jack. We're copying you loud and clear and no problems with comm at all.

03 19 18 12 LMP Okay. We just had sunset.

CMP And, Houston; America. On mag Bravo Bravo, 75 to 70 percent were utilized on J-3 and F Crater and 17-1 through the sextant.

CC Roger. Just want to confirm, Ron. You started on J-3 and then you went to F Crater and -

CMP Yes. I went to F Crater and then back to Sherlock or 17-1.

CC Roger.

CMP Actually, on J-3, I took four marks on a crater that was to the west of J-3 and then I finally saw J-3 and started marking on it.

CC Roger, Ron.

LMP Okay, Houston. Mag Oscar Oscar is 85.

CC Roger, Jack. Thank you.

LMP And, then - okay; and there's a number of pictures - Now, just a minute, let me try to give you a general feeling for where they were taken. Stand by 1.

LMP Okay; a number of the last pictures that were taken on that series, or that rev, were taken between - say about 115 east, and - oh, about 100 east and they show several examples of the light-colored or swirl - -

CMP Coming up now.

LMP - - alterations to the surface. And that's in highland country where that is a distinct gray against the tan-gray or tan highland background - general highland color.

CC Okay, Jack. I got that.

CMP And, all my pictures (laughter).

CC Ron, Houston. We'd like you to move up and do the waste water dump starting now and the O₂ fuel cell purge.

LMP Okay, we'll get to that and mag Quebec Quebec is on frame 50.

CC Roger. Copy.

03 19 21 35 CMP Okay, you want to dump the waste water on the front side?

CC That's affirm, Ron. We'd like to get a third dump now, so we have it dumped prior to the camera pass.

CMP Oh, okay.

CC We want to get a dump prior to the UV work there, Ron.

CMP Okay, that's right - I'm sorry, I forgot about that.

CMP ... how ... going to go, with BATTERY VENT to - Okay, BATTERY VENTED, BATTERY VENT is CLOSED and going to DUMP A.

03 19 23 31 LMP PAN CAMERA POWER going OFF.

Tape 62/8

03 19 24 24 LMP Okay, Houston. Beginning the fuel cell purge -
O₂.

CC Roger, Jack.

03 19 25 15 CDR Bob, any objections to making that V49 maneuver,
now?

CC Stand by on that, Gene. ...

CDR Okay.

CC America, no objection to going to V49 maneuver
any time. Just do not open the UV door until
the 94:45 Flight Plan time.

03 19 26 08 CDR Okay. We're with you.

03 19 29 25 CDR Hey, Gordo. I think we're still in LM PRESSURE
up there in the tunnel. You want us to go back
to LM/CM DELTA-P?

CC Okay, Gordo's off. I'll have to wait a minute
here, Gene.

CDR For a Sunday night, you're - you're hard to get
along with.

CC Oh, come on.

LMP Wise Marines - wise Marines end up in Antarctica.

CC Roger. Can't do that. They don't have any gates
down there.

CDR That sounds like a job you could probably handle.

LMP Listen, after that answer, I'll build one down
there for you.

CC Thank you, sir. Hey, you can go to LM/CM DELTA-P.

03 19 30 32 CDR Okay, thank you. (Laughter)

03 19 32 29 CC America, Houston. The fuel cell 3 purge can be
terminated.

LMP I beat you.

03 19 37 37 CDR Hey, Bob. Who you talking to us with, Honeysuckle or Goldstone? Honeysuckle, I'd guess.

CC We're talking through Goldst - Goldstone, Gene.

CDR Okay, looks like about a tossup from here. I'll tell you, there is really one heck of a big low-pressure area developing somewhere off the coast of California, Washington, or Canada, out in the Pacific Northwest part of the country.

CC Roger. We copy.

CDR We were watching it earlier today, but I tell you, now, it's really dragged in some other clouds with it. It must cover an enormous distance and it's got some real spectacular circulation.

CC Just for curiosity, are you using a monocular on that?

CDR No, I'm using a binocular.

CC Roger.

CDR Bob, it's - it's got a trailing front. I can't really see the States, or even the North American continent, because - -

CC Stand by, Jack - or Gene. We'd like for you to terminate - -

CDR - - pretty well covered - -

CC - - waste water dump.

CDR Okay.

CC Sorry about that. Go ahead.

03 19 39 56 CDR Okay, I was just going to say, it's got a - looks like a tremendous trailing front. Roughly, north-northwest, south-southeast, and it looks like it may just sweep up the western coast. It's hard to tell how far off the actual center rotation

Tape 62/10

or even a front is. I just remember from earlier this morning, when I could see landmasses, that it appeared to me to be off the Pacific Northwest out in the ocean.

CC Roger.

03 19 42 21 CC Jack, Houston here. We've just been kicking around with Farouk, and if you get - if you want to, during your - any of your free time, if you have any, you might look at Copernicus with your binoculars and see if the dike goes all the way - all the way across. He would recommend using the binoculars. Don't take any of your eat or sleep time at all, but you might get a chance on this one eat pass to, as you go by there.

LMP Okay. I'll give her a try. You might give me a couple minutes' warning the next time around.

CC Okay, Jack.

LMP I'm not sure the attitude is too good for that. I wish I'd thought of it this round.

CC Roger. Well, we were pretty busy coming up on it this time. I think the - that's why we mentioned the attitude may be okay during the eat period. We don't want you to break away from your eat period unless you see you can spare the time.

03 19 44 04 LMP Just looking at the southern edge of Grimaldi, Bob, and we probably have it covered on photos, but there's a nice tangential to slightly circumferential graben along the southern wall and climbs out over the western rim and off the eastern rim, and that graben is premare - premare.

CC Okay, I copy on that, Jack, and as long as we're talking about Grimaldi, you might just rem - we'd like to have you brief Ron exactly on the location of that flash you saw. We'll probably ask him to take a picture of it, maybe during one of his solo periods.

CDR Hey, Bob, before we get awfully involved, just let me tell you what our motive is here in the next couple of hours. That's to eat and get done what's in the Flight Plan, and come our rest period, we're probably going to turn out the lights and make sure everything's done by then so we can start it on time tonight.

CC Yes, that's a definite - we concur with that definitely, Gene. Don't want you to work into your sleep period.

03 19 45 44 CDR Okay.

03 19 47 20 CC Gene, Houston.

CDR Go ahead.

CC Gene, last night you didn't use a tone booster, and the work you gave us was that it had - it wasn't working, and we're just wondering if you want - we're thinking about working up a test board to see if - did you test it out thoroughly to make sure it wasn't working, or was that just your desire not to use it?

CDR We tried it, Bob, and it did not work. The only reason I'm reluctant on a test is I just don't want it to take much time.

CC I don't think it would take much time. The only thing I could say is it would - you know - two obvious things I'm sure you checked them, Gene, would be the utility power and make sure you had the right lamp tests on when you tried it, and that's the only - I'm sure you did it, and that's the only obvious thing - maybe a circuit breaker or something like that.

CDR Well, we checked it both on the left side and on the right side with two separate UTILITY POWERS and verified that the MASTER ALARMS came on with the test on both sides, and nothing ever happened.

CC Roger. I was sure of that, Gene. Just wanted to make it - put everybody at ease that it's just not working. That was essentially the test. Just forget anything we said about tests.

Tape 62/12

CDR Okay.

LMP What test?

CC Roger. Got you guys trained up there, finally.

03 19 49 09 LMP Arf, arf.

CMP Houston, America.

CC Roger. Go ahead, Ron.

CMP If I don't find my scissors here one of these days, I think it takes about four bolts on either side of the - you know the optics, where they stow the optics? It looks like there are four little tool E bolts that'll come out. And I think maybe they might be back behind there, I don't know. See, there's a great big slot up at the top of that - oh, it's at least an inch - inch between the top of the optics thing and the top of the spacecraft. I looked back in there with a flashlight and can't see anything, but it's a big hole back there anyhow.

LMP I think the commander might have something to say.

CDR Hey, Bob, just ignore everything he said. We'll leave him a pair of our scissors, and he's just worried about being hungry.

CC Roger. Those are your EVA scissors, too, aren't they?

CDR But, he is not - Yes, but we can handle - we can handle it with one down there. He is not taking the spacecraft apart to find his scissors, and I will not let him go hungry.

CC Roger.

03 19 50 40 CMP Okay, either way.

03 19 55 46 LMP Hey, Bob, before we lose you, how did the Oilers do today? (Laughter)

CC 9 to 3. Steelers over the Oilers.

LMP 9 to 3?

CC That's affirm.

LMP 9? 09 to 03?

CC That's affirmative. Played one of their better games, I guess.

LMP How about the Chicago Bears? You got their score handy?

CC Hey, Jack, how about if we pick you up during the eat period. While you're eating, we'll brief you of the whole NFL situation for today. Okay?

LMP Well, we are eating. I guess we wait until we come around next time. Okay.

CC Oh - I - the Bears were - -

LMP ...

CC - - the last we heard, the Bears were losing.

LMP Bob, we'll wait and you can get up the late evening news prepared for us here the next time around.

CC Okay. Have your gourmet dinner and I'll give you the news.

LMP Okay.

03 19 58 12

CC America, Houston. We're going to lose you here in about 2-1/2 minutes. We'll see you at 95:28, according to the Flight Plan, and you're looking good. We don't have anything, any anomalies or anything against you right now. You're looking great.

CDR Thank you, Robert. We'll see you coming around the horn.

CC Roger.

CDR Hey, Bob, if you could, it might be appreciated with a word or two from our home fronts.

Tape 62/14

CC Yes. You didn't let me do it. I was going to give them all a call while on this LOS here, Gene.

CDR It's that thing again. I bet you were concentrating on the dot.

03 20 00 15 CC Hey, guys. The Bears 21 to 12 over Philadelphia.

CDR Thank you. We're going to watch your signal get cut off here.

CC Roger. Was touch and go on that because at one time they're losing that game.

03 20 00 30 CDR I watch.

END OF TAPE

LMP Okay. Go ahead.

CC TEI-19, SPS/G&N; 38023; plus 0.49, plus 0.86; the T_{ig} time, 125:46:47.22; plus 2456.3, minus 1925.3, minus 0731.3; 186, 108, 325. Rest of the pad is not applicable. All the notes are the same as on the TEI-12 pad, except the longitude is minus 147.62. Over.

LMP Stand by 1.

03 20 58 20 LMP Okay. Here's your readback. TEI-19, SPS/G&N; 38023; plus 0.49, plus 0.86; 125:46:47.22; plus 2456.3; minus 1925.3; minus 0731.3; 186, 108, 325. Rest of pad is NA. And the remarks are the same as for TEI-12; that includes set stars. And the only change is the 3, which is the lunar longitude at T_{ig} of a minus 147.62. Over.

CC That's a good readback, Jack. I've got a LM DAP read-up here for you. They recommend this be copied on page 1 of the LM Data Card Book, Jack.

LMP Well, strangely enough, the LM Data Card Book's in the LM.

CC Yes, I figured as much.

LMP We'll put it in our Activation Book. Let me find the right page.

CC Okay.

LMP Let me find the right page.

CC Roger.

03 20 59 45 CC And, Jack, the computer's yours.

LMP Okay.

03 21 00 56 LMP Go ahead, Bob.

CC Okay. LM DAP information: LM weight, 36714; CSM weight, 38078.

Tape 63/2

CC Okay. Now, just a note, or you can jump way ahead to 106:51 where it says delete. See where it says UV, OFF; just delete that or else make it a verified, because it will be off during that whole period.

LMP 106. Yes, I'll just put a verified by that; 106:51.

CC Roger. The next thing I've got are the pads. The TEI-12 and TEI-19 pad.

LMP Okay. Go ahead.

CC The first one is TEI-12, SPS/G&N; 38570; plus 0.49, plus 0.92; NOUN 33 times, 111:54:42.86; plus 2543.8, minus 1765.6, minus 0795.0. Roll is 186, 109, 328. Rest of the pad is not applicable. Break, break, Jack. We'd like ACCEPT on the computer, please.

03 20 53 21 LMP You got it.

CC Okay. The set stars are, as always, Sirius and Rigel; 133, 200, 030; four jet; 12 seconds on the ullage. Three notes: Burn undocked, assumes no circ, longitude of the Moon at T_{ig} - it'll be minus 140.19 degrees. Over.

LMP Bob, give me note 2 again, please.

CC Okay, Jack. The three comments are: Assumes burn undocked. Assumes no circ burn. And the Moon at T_{ig} , the longitude'll be minus 140.19 degrees. Over.

LMP Okay. I got everything but number 2. All right, here's your readback. TEI-12, 12, that is; SPS/G&N; 38570; plus 0.49, plus 0.92; 111:54:42.86; plus 2543.8, minus 1765.6, minus 0795.0. 186, 109, 328. Sirius and - Rest of the pad is NA. Sirius and Rigel; 133, 200, 030. Ullage is four jets for 12 seconds. Remarks: 1, burn undocked; 2, assume no circ; 3, longitude - lunar longitude at T_{ig} , minus 140.19 degrees, .19 degrees.

CC Roger. Good readback, Jack. And I've got the TEI-19 pad, if you're ready.

LMP Okay. Go ahead.

CC TEI-19, SPS/G&N; 38023; plus 0.49, plus 0.86; the T_{ig} time, 125:46:47.22; plus 2456.3, minus 1925.3, minus 0731.3; 186, 108, 325. Rest of the pad is not applicable. All the notes are the same as on the TEI-12 pad, except the longitude is minus 147.62. Over.

LMP Stand by 1.

03 20 58 20 LMP Okay. Here's your readback. TEI-19, SPS/G&N; 38023; plus 0.49, plus 0.86; 125:46:47.22; plus 2456.3, minus 1925.3; minus 0731.3; 186, 108, 325. Rest of pad is NA. And the remarks are the same as for TEI-12; that includes set stars. And the only change is the 3, which is the lunar longitude at T_{ig} of a minus 147.62. Over.

CC That's a good readback, Jack. I've got a LM DAP read-up here for you. They recommend this be copied on page 1 of the LM Data Card Book, Jack.

LMP Well, strangely enough, the LM Data Card Book's in the LM.

CC Yes, I figured as much.

LMP We'll put it in our Activation Book. Let me find the right page.

CC Okay.

LMP Let me find the right page.

CC Roger.

03 20 59 45 CC And, Jack, the computer's yours.

LMP Okay.

03 21 00 56 LMP Go ahead, Bob.

CC Okay. LM DAP information: LM weight, 36714; CSM weight, 38078.

Tape 63/4

LMP Okay. The DAP load is LM weight, 36714; CSM weight, 38078.

CC Roger, Jack. And I'd like to correct one call on my - the TEI pads. There is one other difference between the TEI-19 and the TEI-12 on their notes. And the TEI-19 assumes a circ burn. Over.

LMP Okay. That's corrected to assume circ on the TEI-19.

CC Roger, Jack. I'm sorry on that. I've got some - some notes from the Flight Surgeon - -

LMP That's all right, Bob.

CC Got some notes for Gene from the Flight Surgeon. He promised an update to you on some meal recommendations here on food - if you - you might want to copy this into the supplement.

CDR Okay. Just stand by 1, please.

CC Roger.

03 21 03 56 CDR Bob, let us take a look at the landing area and we'll be right back with you.

CC Okay. Just whenever you want it, there's no hurry on this at all. Jack, you just might put a little note there somewhere for yourself - Copernicus at 96:03 - if you want to look at it.

LMP Okay; 96.03.

03 21 06 55 LMP Now we're getting some clear - look like pretty clear high-water marks on the - -

CMP There's high-water marks all over the place there.

LMP - - on the north part of Tranquillitatis in here - mare onto the highlands.

CC Roger.

CMP Yes, there's high-water marks all over that - that - I think that's Maraldi there, isn't it? Are you sure we're at 13 miles up?

CC You're at 14.1, to be exact, Ron.

CMP (Laughter) Looks pretty low.

CDR Gee, I wonder what it feels like to be at 8 to 10.

CC You're going to find out, I think.

03 21 08 17 LMP I tell you there's some mare ridge or scarps, very sinuous - just passing one. They not only cross the low planar areas but go right up the side of a crater in one place and a hill in another. And it's not at all like a fault scarp. It looks very much like a constructional ridge. And it has the sinuosity of a, pardon the expression, rattle snake.

CC Roger. Does it look like that one we saw on the track the other day?

LMP Yes, very much like that one that you almost caught. Look at that. There's a tongue depress - several of them - grabens in here. We must be out on the edge of Serenitatis now, right?

CC Yes, we show you on the edge of Serenitatis, Jack.

LMP Roger. I just - we didn't get a view of the site, though, going over this time. I think it was off to the north of us just a tad. That's the best example of a mare - marelike ridge that was as clearly constructional as I would want to see it. Out on the mare, it's never quite that obvious. But there, it climbed up over a hill and then back down again.

CC Roger.

LMP And that was just east of the - an area just east of the edge of Serenitatis and probably a little bit south of the landing site.

Tape 63/6

CDR Say, Bob, rather than copy specific recommended changes or deletions to a diet, can you have a general comment that's any different than what I already understand?

CC Right. It's no problem.

CDR If not, I would rather delay it.

CC It's no problem, Gene. Two quick comments: the next couple of days, delete the peach ambrosia and the mixed fruit bar, and don't delete anything from the LM menu. And make sure you get all the water in for rehydration, and take - bias it if you think you get 30 percent gas, then put in 30 percent more so you get all the water that is required. And take two antigas tablets after each meal instead of one. That sums it up.

CDR Okay - Okay. Very good. I'll - I'll handle all those words according to their needs.

CC Roger.

CDR Appreciate them, though.

CMP Houston, America.

CC Go ahead.

03 21 11 19 CMP We're shooting magazine QQ, frame 50 - frame 50, 51, and 52. We're taking - looking south at the terminator.

CC Ron, we need to get looking at the pan camera here, per the Flight Plan.

CMP Thank you.

LMP Okay, Bob. POWER on the PAN CAMERA now.

03 21 12 23 LMP MARK it.

CC Roger. We got it.

LMP Okay. And has my biomed been looking all right?

CC That's affirmative.

LMP Okay.

03 21 13 42 CC America, you can turn the PAN CAMERA, OFF.

LMP Okay. PAN CAMERA going OFF.

03 21 13 52 LMP MARK.

03 21 15 22 CDR ... the up-link.

03 21 20 29 LMP Okay, Bob. Let's see. Will Copernicus - will be north of our track. Is that correct?

CC I believe so, from my charts here, but let me doublecheck that. That is affirmative. Tommy just gave me the up on that one.

CC If you guys got time to listen, I can update you on the homefront while you're wor - looking out the windows.

CDR Go ahead, Bob.

CC Let's see. For the CDR, they're eating beans and cornbread over at Nassau Bay tonight. Probably a good thing they're eating beans there, Gene, because you're feeding 25 tonight. And the horse is getting fed, also.

CDR Beans and cornbread? It's a good thing I'm eating up here.

CC You better believe it. And, of course, everybody sends their love. And over in El Lago, they're, well - Go ahead, Gene.

CDR I was just going to ask you to return mine for me, would you?

CC Oh, you better believe it. They're listening to the squawk box. You don't have to say anything to me. And over in El Lago, Jamie's saying - is saying her prayers ending them with, "God bless America and Challenger from now on." And John is saying, "There's Daddy's rocket - makes it go pitch, light out." And of course, everybody sends their love - -

Tape 63/8

CMP They're great.

CC And they're all listening right now if you'd - -

CMP Tell John, though, that I shaved the other night.

CC Roger. He'll be listening, hearing that. They're all over at the - in Nassau Bay at a big meeting of the Flight Plan. The Parkers are briefing the Cernans and the Evans on the Flight Plan tonight. And out in Tucson, for the LMP, it's kind of cloudy and cold out there today. It's colder than normal. Everything's working fine on the speaker out there, Jack, and they're just listening, and Mother - your Mother is really tickled and just pleased as all get out.

03 21 23 22 LMP That sounds like Mother. And I just got a real good view of Copernicus, but I'm afraid I can't help you out on that structure in the central peak. Just a little too dark.

CC Okay.

LMP But it's a fantastic sight at this altitude. It is a big crater. It looks like it's about 80 kilometers in diameter.

CC I'll drink to that.

03 21 24 01 LMP And put down a verify on those dark deposits in the wall. And also on the southeast wall, there's one right on the rim. I think we mapped that one, too, but I'll have to go back and check.

CC Okay.

LMP That one looked like it had a crater in it. However, they all tend to be elongate radially, with respect to the crater. But that's about all I can add now.

CC Okay.

LMP Bob, I'm glad the squawk box is fixed. And, of course, send my love and best wishes out there to Tucson.

CC That's a Roger, Jack. You guys might also be interested, here in the Houston area, all of the ground voice or air-to-ground is being carried on FM stations a hundred percent of it. And KUHT, the television station, will cover the - educational TV station - is going to cover 100 percent of the EVAs, all three of them, for all the time.

CDR That sounds great. We hope we can provide them with as much education as we can entertainment.

CC We're counting on it.

CDR I guess Parker's all we had left down there to brief them on the landing site, huh?

CC I won't even comment on that one.

CDR (Chuckle) Okay. I figure he will later.

CDR I'd like, also, to send my best up north to the Bellwood - the Bellwood area up there, because I think there's a squawk box up there, too.

CC Beautiful.

CDR And, Bob, it's - all in all, it's been a pretty exciting day. I think a pretty accomplishing day, and certainly a rewarding day on our part. It's also been a long day, but we're hoping that it can only be superseded by tomorrow. And judging from what we've got in store, it might very well be.

CC I think that sums up the day. It's a day of anticipation for what's going to happen tomorrow. Everything's gone off real well here, and we're just glad you're in the orbit you're in and ready for tomorrow.

Tape 63/10

LMP My goodness, Bob. This is Jack. It's awful hard to spend much time up here anticipating. The events come so fast and certainly are exciting and rewarding, each one, one at a time. But obviously, tomorrow is going to be the biggy.

CC Roger.

03 21 27 49 CC Ron, we're watching your 52; and just be advised you do not have to do the option 1.

CMP Okay. Real fine, Bob.

LMP Bob, I'm not sure whether it's entirely proper, being a bachelor, but I'd like to send my regards to everybody - all the families listening to squawk boxes tonight.

CC Roger.

03 21 29 54 LMP Bob, we're going right over the Procellarum Ridge now, if I'm not mistaken, out in the middle of Mare Procellarum. And we're low enough now that you can see some of the terrain.

CC Okay.

LMP That is - that is, some of the hills and rilles and valleys associated with that ridge system.

03 21 30 22 CC Roger. Break. Ron, we've got the 52, and it looks good. You can torque.

CMP Okay. I'll torque it 10, 3, 0.

03 21 32 04 CMP Houston, America. You want an E-memory dump?

CC Roger. We're standing by. We're ready for it.

03 21 32 18 CMP Okay. VERB 74 - [sic]

03 21 33 02 CMP The GDC is aligned, and we verified that the LM valve is in LM/CM DELTA-P.

CC Roger. We got you.

CC The E-MOD is finished, Ron.

CMP Okay. Thank you.

CC Ron, we're ready to up-link the jet monitor program and one of the burn constants.

03 21 34 29 CMP Okay. You have CMC and ACCEPT.

CC Okay.

CMP P20 and ACCEPT.

03 21 36 28 CC While you're eating or getting ready to eat, I can update some of the news for you tonight, if you're away from the windows. Or are y'all still looking out?

CDR No. Go ahead, Bob.

CC Okay. There's not a whole lot of news on the wire tonight, matter of fact. President Nixon received a firsthand report on private Vietnam peace negotiations today from a key member of the U.S. negotiating team, General Alexander Haig, Jr., Henry Kissinger's Chief Lieutenant. Haig flew back from Paris to report to the President, while technical experts from both sides held an unusual Sunday meeting in the French capitol. Presidential Assistant Kissinger will resume his talks with North Vietnam's Le Duc Tho on Monday after a 1-day recess. And former President Harry Truman continued to show some signs of improvement late today after he was earlier removed from the critical list at Research Hospital up - up in Kansas City. His cardiac situation has improved, and this improvement included a slower and stronger pulse and a stable blood pressure. The football scores are as follows in the National Football League today: The Bears defeated the Eagles 21 to 12; the Detroit Lions and the Buffalo Bills played to a 21-21 standoff; Dolphins extended their undefeated streak 23 to 13 over the New York Giants; the Patriots defeated the New Orleans Saints 17 to 10; Green Bay sewed up the Central

Tape 63/12

Division of the NFC by defeating the Vikings 23 to 7; the Cardinals upset the Rams today 24 to 14; Denver defeated San Diego 38-13; Kansas City upset Baltimore 24 to 10; the 49ers defeated the Falcons 20 to nothing, 20 to 0; and Pittsburg defeated Houston 9 to 3, and they - they took the Central Division of the AFC. So the playoff picture is becoming a little clearer. You've got - In the NFC, you've got Washington, Dallas, and Green Bay. And the fourth team will either be San Francisco, Los Angeles, or Atlanta. That will be decided next week. In the AFC, Pittsburg, Miami, and Oakland are in it. And the fourth team will be either the Jets - and another team. They've got the Giants listed here, but it can't be the Giants because that's the wrong division. So we'll - we'll check that one out. Cleveland; okay, Cleveland. The fourth team is either going to be Cleveland or the Jets. And did you get a spurious MASTER CAUTION and WARNING?

CDR No. Ron was retesting our bleeper again.

CC Okay.

CDR And it's one of those that worked in lunar orbit, I guess. It doesn't work during coast because it's working now.

CC Good show.

CDR Sounds like there's going to be some good football games coming up.

CC Yes, indeed. You really can't call - -

CDR Who is playing tomorrow night?

CC Stand by.

CC That's the Oakland - Oakland and the Jets.

03 21 42 14 CC Ron, the up-link is complete. The EMP is running, and the computer is yours.

03 21 42 23 CMP Okay, Bob. We got it back.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 21 44 08 CC Ron, we would like the H₂ TANK FANs, ON, and that will be the sleep configuration. H₂ TANK 1 FANs, ON. And leave 3 in AUTO like it is.

CDR You want H₂ TANK 1 - You want 1 and 2 ON?

CC Negative. TANK 1 ON.

CDR Okay, that leaves us with TANK 1, ON; TANK 2, OFF; and TANK 3 in AUTO. Is that what you want?

CC Roger. If you're calling H₂ fans; that's what we want.

CDR Yes, H₂ FANs, Bob; I'll say it again. H₂ FANs: 1 is ON, 2 is OFF, and 3 is AUTO.

CC That's a good configuration, and that will be the sleep configuration.

CDR Okay.

CDR Hey, Bob, it looks like we might make - getting to sleep on time tonight, and - well, we will make it. And I think it goes without saying, we definitely want to get up on time tomorrow.

CC Roger.

03 21 45 53 CMP I'm going to have the tone booster plugged in, and also I want to make sure the suit power and audio power and all that stuff is on.

03 21 46 01 CC Roger.

03 21 49 30 CC Ron, Houston.

LMP Go ahead, Bob.

CC If Ron's listening, just some words about the mapping camera extend/retract times. We came up with slightly different times than what he'd

Tape 64/2

called and we were wondering if his were just ball-park or whether he had timed it? In either case, the times are a little bit long on extend/retract which is a little cause for worry about that - the mapping camera may fail and later on downstream we may want to change our operating mode on that mapping camera and he might want to time it a little closer. If he - if he can - the chance should come up.

LMP What - what times - -

CMP Hey, Bob, that's a good point on the thing. Those weren't exact times and, as matter of fact, we looked - kind of looked away and it was about in - you know, somewhere around that - that period of time. We looked away and when - when we looked back, it was gray again, so - next - -

CC Okay - -

CMP - - next time we extend them, I'll get a good accurate indication.

CC Okay. Well, no problem.

CMP ... - -

CC We'll believe the strip chart. We'll take the strip chart data. We've got 01:24, 1 minute 24 seconds for extend and 01:51, 1 minute 51 seconds for retract. And both those are a little bit on the high side.

CMP Okay. I would believe the strip chart.

03 21 51 04 CC Roger, Ron. You all are about 4 minutes from LOS.

CC Okay, we might lose you a little bit earlier than that. INCO.

CC Okay, we may lose you a little early due to the SIM bay attitude and we'll pick you up at 97:22.

03 21 51 51 LMP Okay, Bob. Once more around at 97:22.

03 22 13 XX

BEGIN LUNAR REV 5

03 22 43 33 LMP Houston, 17.

CC 17, Houston. Go ahead.

LMP Roger. We're just about ready to finish up here. I have a couple of questions. Do you want us to cycle cryo fans or just leave them alone now?

CC We'd like them just left alone, left in you configuration you are now, Jack.

LMP Okay, there will be no cycling then.

CC Roger. We have one question. Who's got the duty tonight or will he be wearing a headset?

LMP Yes, he - Ron has the duty. He will be wearing the headset, but I will be on the biomed underneath.

CC Understand that. And one note for Gene. It's an addition to that Flight Surgeon's note. When you rehydrate your food, make sure that you go the - let it rehydrate for the maximum amount of time. I know you miss it on this one, but the next - like tomorrow morning, make sure it rehydrates the maximum amount of time.

LMP Okay, I'll tell him.

CC Roger.

LMP And we got the star crater stereo trio.

CC Roger.

03 22 45 09 LMP And the - we're - mag - Oscar Oscar is on 93 now. The last three pictures were that trio.

03 22 48 25 LMP Bob, we're ... complete on the presleep checklist. And except for computing communications configuration and Ron will take care of that.

CC Roger.

LMP And, Bob, while we're gradually getting in configuration here, let me reiterate something that I've been watching this rev as we did a lot of other things. And that was this relationship of the light-colored or light gray swirl patterns on the surface to patterns - associated pattern - parallel patterns that are darker than the average of the surrounding area. And this is true both in Mare Marginis and in most cases on the back side.

CC Roger, Jack. We'll get that to the PI.

LMP Roughly, although they're very irregular patterns - roughly it's concentric zoning of dark to light within a intermediate albedo surface. Now there are variations on that theme; sometimes you don't get the symmetry quite as good, but it's common enough that I think it's worth noting.

CC Roger.

LMP Also, there's a sequence of different kinds of crater filling on the far side, and I think that, as the orbital stay progresses, we may be able to pin down the relative age relationships and the characteristics of those crater fill - filling episodes. Whether they are single episodes that happen in a variety of crater or they're a function of the age and characteristics of the craters in which you find them is not clear right now, but the - they seem to form fairly distinct groupings of crater-fill material.

CC Roger. Jack.

03 22 52 07 LMP One of those crater-fill materials that you also see in other kinds of depressions other than craters is a very smooth, light, plains-forming material. And it is, although cratered, when you see it at the terminator, it is smoother than the mare; that is, it does not seem to have the swell, the sea swell characteristics or ridges or any other features other than the crater's superimposed on it.

CC Roger. We copy.

03 22 55 19 CC 17, Houston. You can go ahead and close the UV cover. We'd like to hold off 1 minute before you turn the UV off. We want to look at 1 minute of data with the cover closed.

LMP Oh, okay. Roger. A walkon. I see it now.

03 22 56 08 LMP Okay, it's CLOSED.

CC Okay, we'll give you a cue when you go UV, OFF, and INCO would like to know what you've got on your high gain pitch and yaw knobs. Not the dials but the knobs.

LMP All right. The knobs are - let's see, about plus 20 and 185.

CC Okay, PITCH of 20 and 185 on the YAW.

LMP That's affirm.

03 22 58 22 CC And, Jack, you can turn the UV off now.

03 22 58 38 LMP Okay, it's OFF.

03 23 01 53 LMP Okay, I got the landing site. We're right over the top of it, and the scarp is fantastically detailed at this - Can you see in there, Gene? Right down, right down, straight down there.

CDR No, I can't.

LMP Okay, well, the sli - the light mantle is ob - very obviously mantling the area. The scarp was very detailed, and, so far, could not see any structure in the massifs at all, but I haven't had any - didn't have much time to watch it on that pass.

LMP The slide very definitely subdued the general detail in the plains area - or the light mantle, if you will, rather than slide. MOCR Crater was finally out of the dark.

Tape 64/6

CC Roger.

CC Jack, we'd like to know if you think you can adjust the high gain as close to plus 15 and YAW 190 as possible?

03 23 03 43 LMP Okay, Bob, that's adjusted plus 15 and 190, and I suspect I was a little closer to 15 than 20 when I called you before.

CC Roger.

LMP I'll tell you, from this altitude and with that low Sun, there's no question of the sharpness of the topographic features in the landing area. The - The scarp, and - and even some of the apparent back - pardon - backflow features - and Parker will know what I'm talking about - that is apparent flows to the west in the light mantle area were extremely sharp, even those fronts going west were sharp. It looked even more like a mare ridge than it ever did before.

CC Roger.

03 23 06 01 CDR Okay, Bob, this is Gene. I had a - just a quick view of the site, and if we're anywhere near it, we'll recognize it, I think, without question. And, I think with that, we'll bid farewell and good night.

CC Okay, gang. And looking for a busy day tomorrow - -

CMP Never fear. Your old CM - -

CC Go ahead; I cut you out.

CMP I said, "Never fear, your CMP is watching."

CC Roger. And, just a reminder S-BAND - -

CMP He's got the watch tonight.

CC - - NORMAL VOICE to OFF tonight, please?

CMP Okay, okay, as soon as I get bedded down, I'll do that.

Tape 64/7

LMP Don't worry, he's got a batch of guys up here reminding him of that one.

CMP And I checked out the little whistle, and it works like a charm.

CC Roger. I was betting on - -

CMP Just to make sure, I'm going to check it again.

CC - - you guys to get that switch last night, and I lost my bet.

LMP And, Robert, good night to all.

CC Good night up there.

03 23 07 22 LMP And that is a test. This is a test, test, test.

03 23 07 27 CDR Good night, babe.

END OF TAPE

Tape 65-69/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 00 07 XX	BEGIN LUNAR REV 6
04 02 01 XX	BEGIN LUNAR REV 7
04 03 53 XX	BEGIN LUNAR REV 8
04 05 47 XX	BEGIN LUNAR REV 9

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 07 05 01 (Music: City of New Orleans by John Denver)

04 07 07 28 CC Good morning, America. How are you?

CMP This is America. That's a good way to wake up.

CC Good morning, America. How are you? You'll be gone a million miles before the mission is done.

CMP (Laughter) Okay.

CMP Houston, America. How you reading? Okay now?

CC You're loud and clear, Ron. How are we?

CMP Okay; might fine, Joe.

04 07 09 09 LMP Let's hear it again, Joe.

CC Are you serious?

LMP Well, I just got on a headset. You never had a chance to - -

CC Stand by. Here it comes.

LMP - - wake me up before. (Laughter)

CC It's coming at you, America.

LMP Okay.

04 07 11 04 (Music: City of New Orleans by John Denver)

04 07 13 45 CC How about that?

LMP Thank you, Joe. That's great. We're moving on.

CC Don't you know?

CMP And a big eight-wheeler.

CC And, America, you're 10 minutes from LOS, and the spacecraft looks great.

Tape 70/2

LMP Okay, Joe. That's good to hear. And we're starting to move now, and we'll be ready for you when we come around.

CC All righty.

LMP How long are you with us this morning?

CC Oh, not too many more minutes.

LMP Hope we didn't keep you up last night.

CC The pleasure was ours, Jack. We devoted our 8 hours to selecting your wakeup call this morning and got a little help from the news room pool on that suggestion.

LMP Well, that was a good suggestion. I had forgotten all about that song. That's a good one.

LMP You ought to find the "Golden Rockets" for us some morning.

04 07 15 45 CC You'll wish you hadn't asked.

04 07 16 55 CC 17, this is Houston. You'll be pleased to hear that the IR in the SIM bay is returning some beautiful data to us here.

CMP Hey; great, Joe. That's good to hear, by gosh.

LMP What are you learning, Joe?

CC Hotspots on the Moon, Jack.

LMP Well, we know we had one going around it. We didn't know we had any on it.

CMP Houston, the LM/CM DELTA-P is 0.4.

CC Copy that.

LMP Where - where is your big anomalies, Joe? Can you summarize quickly?

CC Jack, we'll get - get that for you next pass.

LMP Well, don't worry about it. I think we're going to have a lot of things on our mind the next pass. But we're just passing over Orientale again, Joe, and in earthlight it's probably one of the most spectacular sights in nature.

CC Copy that, Jack. I can imagine.

04 07 20 39 LMP Joe, can you imagine waking up anywhere else?

CC 17, we'll think about that until you go LOS.

LMP Roger.

CC 17, about 30 seconds to LOS. We'll see you on the other side. It's going to be a good day.

04 07 21 47 LMP Righto, Joe.

04 07 43 XX BEGIN LUNAR REV 10

04 08 14 35 LMP Okay, Houston. We're with you and we're in the process of getting the tunnel pressurized and moving right towards probe and drogue removal.

CC Okay, Jack. Good morning.

LMP Good morning, Gordy. Welcome aboard.

CC Thank you.

LMP I take it you're going to pick up the - the reports - postsleep reports later. Is that correct? From Ron?

CC Anyway, it's convenient to you.

LMP Well, we're moving towards getting the suits on. Unless you want me to take 5 minutes here, we'll leave it alone and let Ron give it to you.

CC That'll be fine.

LMP Everybody ate and drank and slept just about like last night.

Tape 70/4

CC Okay.

CDR Good morning, Gordy.

CC Good morning, Commander.

CDR Tell Joe I'm sorry I didn't get a chance to say hello to him, but I did hear his presence being evident.

CC Okay. We'll pass it along.

04 08 16 54 CMP Houston, America. The tunnel hatch is out.

CC Okeydoke, Ron.

CDR Gordy, how does America look to you this morning?

CC Beautiful, as it has all the way to date.

04 08 17 27 CDR Okay.

04 08 20 39 CMP Okay, Houston; America. The old probe is underneath the couch.

CC Okay.

CMP Houston, America.

CC Go ahead, America.

CMP Okay. How are Jack's EKGs and stuff. He's going to tape them now.

CC Let me get a check.

CMP (Chuckle) Wait a minute. He's not plugged in. But, you know, he's had them on all night. Were they good?

CC Stand by.

CC Yes, Ron. He was plugged in; we had good signals.

04 08 24 21 CMP Okay; good.

CC America, Houston. If someone's near the telemetry switch, if you go to ACCEPT, we'll give you a state vector.

04 08 28 20 CMP Okay. You have ACCEPT.

CC Okay. And as we're supposed to update your trajectory, which is looking good - predicted perilune at PDI without DOI-2 would be 11.9, a little lower. So that means that DOI-2 will be a little less, in terms of DELTA-V, than nominal. But, otherwise, looking good.

CMP Okay. Did you say 11.2 for perigee, now - without DOI-2?

CC I might have said that. It's 11.9 predicted at PDI time without DOI-2.

CMP Okay. 11.9 predicted without - at PDI time without DOI-2.

CC That's right.

CMP Okay. SO DOI-2 will be a little less than predicted.

CC Affirmative.

CMP I'm repeating it to these guys that are getting suited here, see.

CC Okay.

CC Okay. I have your vector now. You can go back to BLOCK.

04 08 30 33 CMP Okay. We'll go to BLOCK.

CC America, Houston. You owe us a reverification of docking tunnel index angle.

CMP Okay. Let me check it.

CMP Well, I kept ... thinking it might move back to zero, but it hasn't moved - plus 1.2.

Tape 70/6

CC

Okay; plus 1.2. For your information, Ron, on consumables this morning, we're running 6 percent above the Flight Plan line on RCS. On the hydrogen, we're about 8 percent above the line on tank 2; right on the lines on the other two hydrogen tanks. And on the O₂, we're running our standard 4 to 5 percent below the line on oxygen tank 1; tank 2 is right on; and tank 3 has now gained to about 3 percent above the line. All looking good.

04 08 34 26 CMP

Okay, Houston. Hey, that's mighty fine.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

CMP Hello, Houston; America.

CC Go ahead.

CMP Okay. I'll give you the commander's food from yesterday.

CC All right. Ready to copy.

CMP Four bacon squares, cornflakes, orange beverage, two sips of coffee, a vitamin. Okay. Meal B: chicken and rice soup, meatballs and sauce, orange PA drink, and caramel stick - one caramel stick. Okay. Meal C: potato soup, beef and gravy, citrus beverage, a chocolate bar, a package of pecans.

04 08 41 11 CC Okay. We're with you so far.

CMP Okay; commander's medical log: PRD 17036, 6-1/2 hours of good sleep, one Seconal last night, three bags of fluid.

CC Roger.

04 08 42 58 CMP Three bags of water, let's - I better put it that way, I guess.

04 08 42 53 CMP Okay. Here we go on the LMPs food.

CC Okay.

CMP Okay; two bacon squares, scrambled eggs, two apricots, cocoa, and a coffee. Meal B: fruitcake, cit - citrus beverage, hamburger, and a coffee. Meal C: lemonade, beef and gravy, ambrosia, cereal bar, and tea. I guess that's it.

CC Okay.

CMP Hey, Houston. Why don't I give you LMPs menu this morning, too - day 5?

CC Okay.

Tape 71A/2

CMP Then I won't have to get back in their pages. Okay. It's a sausage patty for LMP - sausage patties, cinamon-toasted bread, instant breakfast, coffee with K, and a grape drink, and a vitamin. Okay; for the commander on day 5: spiced oat ceral, sausage patties, instant breakfast, and vitamins.

CC Roger.

CMP Okay; for the LMPs medical log: PRD 24108, 7-1/4 hours very good, one seconal last night, 3-1/2 cans of water.

CC Roger.

04 08 47 59 CC Okay. We're ready to go on command module pilot of the spaceship America and his ... menu.

CC Go ahead, captain.

CMP Okay. Bacon squares, scrambled eggs, cornflakes, orange juice, two coffee, three caramel candies - that's three sticks of caramel candy. Meal B: chicken and rice, meatballs, butterscotch pudding, orange PA drink. I missed the vitamins up there in A, too. Okay; Meal C: potato soup, beef and gravy, chicken stew, orange GF drink, tea, chocolate bar, and a package of pecans.

CMP Okay; CMP medical log: PRD 15034, and about 5-1/2 of good sleep; a little trouble getting to sleep last night, and I woke up early this morning. I took a Seconal; didn't seem to have much good - much effect, and I had four cans of water.

CC Roger.

CMP I think I was on the biomed all the time last night, too, so you can check out that sleep.

CC Okay, Ron. While you've got that book with you, I can give you a one-line change to the E-memory load as a result of our changing the short-burn constant.

04 08 50 10 CMP Okay. Stand by 1 here.

CMP Okay, Houston; America. I've got the right page now.

CC Okay. It's page 1-43. It's load Delta. Identifier number 5; the old value is 01606. Change that to 01637.

CMP Okay. It'll be load Delta, and the octal identifier 05, and its new value is 01637.

CC That's correct.

04 08 52 33 CMP Okay. The LMP has got his suit on. They're connecting up the LCG water connection, and he's still unzipped.

CC Okay, Ron. In the Flight Plan, you're coming up on a VERB 45 and then going to P00 prior to the P52. After going to P00, we'd like you to change to B/D ROLL from A/C. Over.

CMP Okay. We'll change the B/D ROLL. Looks like we're going to run into a problem on our P52 down here, with these guys getting suited. Is it really necessary now?

CC There's no time criticality on that. When they're out of the way, go ahead with it.

04 08 53 27 CMP Okay. Good.

04 09 02 44 LMP Okay, Houston, how do you read the LMP?

CC LMP, you're loud and clear.

04 09 02 51 LMP Okay, Gordy, I'm opening the hatch.

CC Okay.

LMP And the light's still on.

CC Roger.

04 09 03 36 LMP Okay, Gordy. Index 1 plus - or plus 1.2.

CC Roger.

Tape 71A/4

04 09 05 49 · CMP Okay, Houston, I'm going to skip the P52 for a while and maneuver to the docking attitude - undock attitude, that is.

CC Roger. - Stand by on that one, Ron.

CMP Wilco.

04 09 06 14 CC We want to be sure we can get some stars - good stars in the undock attitude.

CC Ron, this is Houston. We didn't see you do a VERB 45. Over.

04 09 07 22 CMP You're right. ... one.

CC And if there's any - if you - if there's no reason why not, we'd just as soon you go ahead and do the P52 now. Finish that off and then start the maneuver. Over.

CMP Okay. The big reason is that Gene's getting into his suit right now.

CC Okay.

CMP As soon as he gets out and gets in his suit, well, I'll do a P52 maneuver.

CC Okay.

CC Ron, Houston. Can you give us AUTO on the HIGH GAIN?

CMP Okay. Just a second, Houston.

04 09 09 22 LMP We're transferring to LM POWER, Houston.

04 09 09 24 CMP Okay; OFF, RESET, back to OFF.

04 09 09 29 LMP Okay. We have LM POWER.

CMP Okay. That was 107:49:28.

CC Roger.

04 09 10 16 LMP LM WATER is OPEN, and O₂ is OPEN.

CC Roger.

04 09 10 55 LMP Okay; 3-4, Houston, in the LM. And step 1 is good.

CC Okay.

04 09 12 31 LMP Okay. Step 2 is complete.

CC Okay, Jack.

LMP And I'm going off of CSM comm, and I'll be coming at you before long on S-BAND, if I can.

CC Okay.

04 09 16 15 CC Ron, Houston. We've taken a look at stars available in the undock attitude, and they don't look too good. We suggest you use the present attitude for your 52 and then maneuver. Over.

CMP Okay. I'm just about to get Gene out of the way here, and then I will.

CC Okay, and we're less than 3 minutes to LOS now. So when you finish that 52, we'd like you to copy down the NOUN 5 and 93s for us.

CMP Okay; will do.

CC America, Houston. About 1 minute to LOS. Nothing further for you. We'll see you on the other side.

CMP Okay, Gordo. We're hustling - like heck. We might make it. (Laughter)

04 09 18 38 CC Roger.

04 09 37 XX BEGIN LUNAR REV 11

04 10 07 34 LMP There we go. Should have done that in the first place.

LMP Okay. Okay.

Tape 71A/6

CC Challenger, this is Houston. How do you read?

LMP ...

CDR Hello, Gordy. This is Challenger. We're reading you loud and clear.

CC Okay. You're readable. Lots of background noise at the moment.

CDR Okay. We'll update you in just a minute.

LMP Okay, Gene, that's locked.

LMP Okay. Another one is verify locked. The band was up. So you're locked here; the red thing is in.

CDR Okay.

LMP And I'll ... you up.

CDR Okay, and I got it over here.

LMP Okay. Okay. Comm checks.

CDR Let me give them an E-memory dump. I can press on. Gordy, Jack will update you in just a second. And I've got some words for you, but I'd like to give you an E-memory dump as soon as you get the steerable.

LMP ...they got the steerable. Okay. Okay, Gordy. How do you read the LMP? This is your S-BAND T/R in secondary power amp check.

CC Okay, LMP. You're clear. Lots of background noise though.

04 10 09 30 LMP Okay. I'm going to bring up the steerable.

CC Okay; go ahead.

SC Okay, steerable ...

CDR ... going to make it?

LMP ... I have to wait for this one.

CDR Pitch is good. ...

LMP Okay. YAW minus ... 2.

CDR Yaw is good.

CDR Do you know where our scissors - -

04 10 12 31 LMP Okay, Houston. How do you read?

CC Okay. You're loud and clear, Jack.

LMP Yes, they're in the - -

CDR Okay. Okay.

LMP ... data file.

LMP Hey, Ron. We need to check out that VHF. You ought to get that done before you close up, Ron. Houston, we'll be right with you. We're going to check out our VHF. Let me finish this part of it, and then - we'll get that.

LMP Okay. You want to read that to me, Gene - the S-BAND?

CDR Okay. Where are you now?

LMP I'm right here in the middle of the page.

CDR Okay. S-BAND PM.

LMP PM.

CDR Secondary - -

LMP Houston. How do you read the LM?

CC Loud and clear, Jack.

LMP Okay. We're in step 2, and - we're giving you your second S-BAND check. And I'm going TRACK MODE AUTO.

CC Okay. You sound good.

Tape 71A/8

04 10 14 05 LMP Okay, Houston. I can hear the antenna rumbling up there, but - I still have not peaked. Still reading 3.7.

CC Okay. You're loud and clear, Jack. It looks like a good lock to us.

LMP Okay. We'll leave it - Okay. I'll leave it there, and I'm going BIOMED RIGHT.

CC Roger.

04 10 14 35 LMP Okay. SQUELCH is OFF. How do you read?

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 10 07 57 CC Hello, America; Houston. Standing by.

CC America, Houston. Standing by.

CC America, America; Houston. Standing by.

04 10 09 08 CMP Hey, Houston; America. Man, you wouldn't believe it. I finally got my suit on.

CC Nothing to make you feel good like a new suit of clothes.

CMP Okay. Let me give you some P52 stuff here.

CC Okay; shoot.

CMP I had to arc all over the sky before I could find some stars. Okay. Let's see. Use star 14 and 25. Star angle difference was .01, NOUN 93 is plus .065, minus .076, minus .102; and I torqued at 108:20:00.

CC Okay; copy.

CC America, are you pretty well caught up with time line now, or can you give me some indication where you are?

04 10 10 48 CMP I'm checking it off here. Right now I'm at 108:10. I'm - haven't - changed the canister yet. Let me check and see if I can have time to do that or not.

04 10 11 07 CMP Okay. I'm VOX. Do you hear me now?

CC Yes sir; loud and clear.

CMP Okay. I've removed the umbilicals - the CSM/LM umbilicals. Guess I need to install the probe and the drogue. I'll get those things done right now.

CC All right. I'll make a note of the canister and remind you of it later.

Tape 71B/2

CMP Yes; okay.

CC Hey, America. Can you confirm that you've got a pair of scissors on board with you?

CMP (Laughter) Yes, I made him keep one.

CC Okay. That's good thinking.

CMP They couldn't ever find the other set, either.

CC Okay. Gets hungry without those.

CMP (Laughter) It sure does. (Laughter).

CC We could hear your drogue and probe banging around there. It sounds like the kitchen is what reminded us of it.

CMP Oh; okay.

CMP Okay. Let's check out the VHF now.

04 10 13 09 CMP Okay. I'm SIMPLEX Alfa and VHF, RIGHT. Now, we're B. Okay. We're ANTENNA RIGHT, SIMPLEX B.

CMP Okay, Jack, I don't read you yet.

CMP Okay. I'm sitting on SIMPLEX Bravo.

CMP I don't read you yet.

CMP I don't read you at all. Do you read me?

CMP Okay. I don't read you at all, Jack.

CMP Okay. I'm down to SIMPLEX Bravo.

CMP Yes; go ahead.

CMP I'm talking on B now. How do you read?

CMP No, I don't read you at all here, Jack.

CMP No, I don't read you.

CMP Okay. I've got everything on in my AUTO panel. Let me try the other one for backup.

CMP Yes, I'm on LEFT. I'm on LEFT. Let me go to
BACKUP.

CMP ... you, yet.

LMP Stand by. Stay where you are.

CMP Okay.

CMP Hey, I finally got you.

CMP Okay. You were kind of clipping there for a little
bit. I got the last part of your transmission.

CMP Okay. I heard it - I just missed - I just missed it.
It was just warming up, but I got you loud and
clear.

CMP Okay. I read you loud and clear; that's VHF B.

CMP Yes, I didn't hear you at all that time. Yes,
you're still clipping. All I got was "now."

CMP Okay. How do you read now? I got that.

CMP (Laughter) Then I missed that part of it.

CMP Okay. Loud and clear, Gene.

CMP Now, you're still clipping, Jack. Can you move your
mikes a little bit closer or something?

CMP No, I didn't read you at all that time.

CMP Not clear.

CMP No, you're going to have to yell or something.
I still - you're still clipping yourself out, Jack.

CMP No, I didn't read you that time.

CMP Okay. Okay; switching to Alfa.

CMP Bravo is off; SIMPLEX Alfa is on.

CMP Don't read you.

CMP Don't read you.

Tape 71B/4

CMP Okay. I don't read you guys at all, except through the tunnel.

CMP Okay. Got you loud and clear that time. And, Gene, can you verify the capture latches are all engaged?

CMP I didn't read you at all, Jack. Didn't read you.

CMP Okay. I got you that time, and check the capture latches.

CMP Okay.

CMP Yes, I'm up in the tunnel, but go ahead.

CMP Okay. I read you. Go ahead.

CMP (Laughter)

04 10 23 06 CMP Okay. I'm getting the probe umbilical installed now.

04 10 24 54 CMP Okay, Gene. Can you look at the capture latches? I've got it preloaded here now.

CMP Okay. Preload the - It's pushing on by, so I'll going to - ... preloaded.

CMP Okay.

CMP What do you mean; probe locked?

CMP Yes, it was locked. Oh, the dorgue. Yes. Yes, it's locked in there.

CMP Okay. I can do that now; put the tun - tunnel in - the hatch in a little bit later.

04 10 26 01 CMP MIN DEADBAND, ATT hold. Okay. I got that right now. Wait a minute; I don't have SCS. Let me give you SCS.

CMP Okay, Gene. You've got MIN DEADBAND, ATT hold, now.

04 10 26 51 CMP Okay. There we go. Plus 356.95, plus 106.34, and a plus 001.49.

CMP Right?

CC America, Houston.

CMP Houston, America. Go ahead.

CC In order to get a better drift check, they'd like to tweak up the attitudes before they do that coarse align. So how about doing a VERB 49 tweak back to the original undocking attitude.

CMP Okay, that's the what; 0105 and 0?

CC Yes, sir.

CMP Okay. Stand by, Gene. We'll get back here.

CMP Okay?

CMP Okay, Houston; America. 0105 and 0, correct?

CC Yes, sir.

CMP That's interesting. I don't know how it got off attitude.

CC Yes, I was going to ask you the same thing. You might have knocked a - a - a stick or something while everybody was flailing around down there. Could you - -

CMP Maybe - maybe I hit the stick or something. Yes.

CC Yes.

CMP Okay, Gene. We're MIN DEADBAND ATT hold at 0105 and 0.

CMP Okay; VERB 6, NOUN 20: 000.32, 104.40, 359.55. Okay?

CMP Okay, Houston. I forgot to release the docking latches. Okay. I'll go up and release the docking latches 1 and 7.

CC Okay.

Tape 71B/6

CMP And if I just put the - No, I'll do that.

CMP I was going to say you could read the probe temp if I put the circuit breakers in.

CMP Okay. There's number 1. One releases; two releases, and it's free. Seven. One release, two releases, and it's free.

04 10 31 30 CMP Okay. DOCKING PROBE circuit breakers; two of them are going CLOSE. MAIN A. MAIN B. PROBE EXTEND/RELEASE is going to RETRACT. I've got two barber poles.

CC That's a good sign.

CMP Okay. The docking probe circuit breakers are going to open. Okay. Extend/releases, and they went gray, of course, when they went open. Okay. EXTEND/RELEASE to OFF. Verify probe extend latch engage indicator not visible. Well, I'll go back - it wasn't awhile ago, but I'll go look again. Only if you hit EXTEND with the circuit breakers in. Mighty fine. It's still back inside there. Extend latch is still engaged.

CMP Okay. Standing by. Go ahead.

CMP Okay. 000.44, 104.63, 359.69.

CC America, Houston, in order to get on and stay on the time line, I'll remind you about the lithium canister after PDI; we can let that one go. And if you'd like to let the camera business slide until after your suit check and we'll get those things. I'll come back and remind you of those, too.

CMP Okay. I've got the - the cameras all set. I got them out, anyhow. I don't have the - the right values on the lenses yet; but, anyhow, the camera are out and they're loaded.

CC Okay.

CMP I've got mag 00 on the Hasselblad.

CMP Okay, Houston. Why don't I go ahead and get the PGA ver out of the way, and then we can get some of the - data, or would you rather get the data up first?

CC No, it's your choice. Why don't we go ahead and get the PGA, and I'll just sit on these pads, and could you tell me if you ever got aound to playing with the squelch on the VHF?

04 10 36 39 CMP Man, I did. And, let's see, we're at SQUELCH A now. I've even got it all the way down to 1, and I still don't hear them.

CC Okay. You did get a satisfactory check on your side, didn't you?

CMP Oh, yes.

CC Okay.

CMP I got a satisfactory - Every once in a while I can hear them now; they're cutting in and out somewhere, I don't know where.

CC All righty.

CMP Okay. SQUELCH A is setting at about 4.

CC And, America, we'll give you a state vector if you give us ACCEPT.

04 10 38 01 CMP Okay. You have it.

CC Thank you.

04 10 44 14 CMP Houston, America. How much time to AOS, yet - LOS?

CC Oh, about 29 minutes.

CMP Oh, okay. Got a little time for the PGA ver then, I guess.

CC And it's your computer, anytime you want to get it, Ron.

CMP Okay.

Tape 71B/8

CMP Ah ha, I got the old helmet and gloves on.

CMP More cables all over the place here than I know what to do with.

CC Well, this place looks like a pigpen - you've run the same course everyone else has, I guess.

CMP (Laughter) I got cables and hoses and -

04 10 46 42 CMP Son-of-a-muck - I hit the stick again. Now I got to unlock it.

CMP Okay. You want me to maneuver back to attitude, Gene?

CMP We're out of attitude just a little bit. Well I'm MIN DEADBAND, but I maneuvered out of attitude. You want to go back to regular attitude?

CMP Okay, Houston. ... flow return is ... SUIT FLOW valve. The other two are closed; mine is open, and I got the inner connect in between the other ones.

CC Sounds good.

CMP How's the old suit pressure? Okay. Looks like its pretty good. Okay. O₂ flow is lower limit lot. Okay. Let's go up to PRESS. Here we go. That's going up to PRESS, and it feels like it's going up.

04 10 48 46 CMP And terminal direct O₂ on air to ... O₂ FLOW HIGH.

CMP Okay. Wait a minute, Jack. I'll just go to RECEIVE on the VHF. I'll just go to RECEIVE on the VHF, Jack.

CMP Okay. Let's see, and there's a DELTA-P of about - 6-1/2 - Now we're going to cycle suit circuit return air.

CMP Okay. It's out; it's back in.

CMP Okay. Now we can squirt a little more O₂ flow in.

CMP Boom, boom - There we go. Man, oh man!

CMP DIRECT O₂ is off.

CMP That's coming down. Shoot! I'm reading 4.5 in my suit. Is that right?

CMP 5?

CC Looks like about 4 on our meter, Ron.

CMP Well, I'll be darn. The old suit gage read 4.5.

CMP ... that close in there. Let's say at maybe nine or something like that. That's closer to four. Can't tell for sure what it feels like. Anyhow, the O₂ flow is down. It's not leaking very much. I'm leaking about 0.3. Something like that.

CC Okay. We're - we're showing 4.2 to 4.3 on our pressure spread, and you're cabin and suit pressure gages probably show something similar. And we show that the flow rate is down. -

CMP Oh, okay. That's not too bad. That's pretty close.

CC Yes. And the O₂ flow is staying pretty good.

CMP ... let's go to DEPRESS on this thing, huh?

CC Sounds good.

CMP Okay; so it looks like it's sta - stable there, isn't it?

CC Yes, sir.

04 10 52 14 CMP Okay. Let's go to DEPRESS.

CMP ... my ear are pretty good. I think I'm going to go to OFF. Save a little time here.

Tape 71B/10

CC America, I don't know if I copied you correctly. You don't want to go to OFF on that SUIT TEST valve until the pressure are back down to normal. If that was what you asked.

CMP (Laughter)

CC Are or you already there?

CMP I changed my mind.

CMP Yes. My ears are popping to beat the band - I changed my mind, I'll let it go down slowly.

CC Okay.

CC Okay. And we've got about 20 minutes before LOS, so there's no hurry on those pads. I've got them standing by when you're ready, and didn't know what you - what you had in mind about working on these things. We might get - you might get started on the hatch integrity check, if you get to that point, and I can give you the pads while you're waiting for it to bleed down or whatever it turns out to be convenient.

CMP Okay. Let's see, I guess it's about time to -

CMP Integrity check; okay.

CC Okay. And I guess the LM is going to be asking you for a NOUN 20 pretty soon like, here.

CMP Okay, Challenger; America here. I'll go back to CMC. Stand by. Okay.

04 10 54 58 CMP GO. Okay; 002.15, 104.36, 359.69. And Houston, do we want to release those docking latches before they do their hot fire? I don't think so. Do we?

CC I'll check. Stand by.

CMP No.

CC You're right, Ron, we'll - we'll just hold up on that release on the latches until the hot fires are over. So, when you get your copying hand ready, why, we'll give you some pads. We'll clean that one up.

CMP Okay. Let's see.

CMP Reading 2 SCS. Integrity check - Okay, it didn't -

CMP Okay, Houston. Let's see - where are we going to start on the pads?

CC Okay. And you might go to BLOCK on the computer, too.

CMP Okay.

CC Okay. The first thing I'll give you is the SEP pad.

CMP Okay. Let's go.

CC And that is on page 113.

CMP Okay.

CC Okay. NOUN 33 is 110:27:55.00. Roll is 0, 105 pitch, and yaw is 0.

CMP Okay. NOUN 33, 110:27:55.00, and roll, pitch, and yaw as depicted: 0, 105, and 0. Right?

CC That's affirm.

CMP Okay; got it.

04 10 58 29 CC Okay. The next thing I have for you is a P24 pad that goes on page 115.

CMP Okay. SUIT TEST valves in OFF now. On page 115. Okay; got it.

CC Okay. It'll be 17-1; 110:58:13; T_2 is 111:00:30; 01:00:01 - -

CMP Wait a minute. Wait a minute.

Tape 71B/12

LMP ... deadband attitude ...

CMP Hold it, Ge - hold it.

CMP Okay. WIDE DEADBAND ATT hold. That's what I'm on. And Amer - Houston; America, I missed T_2 on.

CC Okay. Are you ready to go back to it now?

CMP Okay; ready for T_2 .

CC All right, sir. T_2 : 111:00:30; 01: - -

CMP Shoot!

CC - - 00; 01:26; Roll 015, 297, 000; North 02. Over.

CMP Okay. I'll read back what I have. T_1 110:58:13. I missed T_2 . TCA is 01:00; T_3 is 01:26; Roll 15, pitch 297, and 0; North 02. I presume 17.1.

CC Yes, sir. And T_2 time is 111:00:30.

CMP Okay. 111:00:30.

CC That's correct.

CMP Challenger said something every time you talked on that one.

LMP ... Houston ... RATE COMMAND. Cold fire ...

CMP Hey, Jack, could you go to RECEIVE only on the VHF for a little bit?

CMP Okay.

CMP And, Houston; America. You can go ahead on the next pad.

CC Okay. On page 113, I've got a DAP load for you.

CMP Okay.

CC Okay. The weight: 37983; plus 0.40, plus 0.91.

04 11 01 38 CMP Okay, CSM weight is 37983; pak to off, plus 0.40; yak to off, plus 0.91.

CC Okay. That's correct. And the last one comes up on page 121, and it's a LM P76.

CMP Ah ha; okay.

CC Okay, NOUN 33.

CMP ... about the - 121 - Got it.

CC All right, sir. 112:02:51.92; minus -

CMP Okay. Wait a min - Hold it. America, ... Challenger. The hot fire - you want FREE, Challenger?

CMP Challenger, America. You want FREE for the hot fire?

04 11 02 39 CMP Okay. Going to FREE now.

CMP And, Houston; America. You can try that one again.

CC All righty. NOUN 33 is 112:02:51.92; minus 0007.5 and all zips for Y and Z.

CMP (Laughter). Okay, say that NOUN 33 again.

CMP Houston, America. We're cut out on NOUN 33 again, and I've got minus 0007.5 and X, Y, and Z are 0.

CC Okay. And the time, 112:02:51.92.

CMP Okay, NOUN 33 is 112:02:51 - 112:02:51.92.

04 11 04 04 CC That's correct.

SC ...

CMP Okay, Challenger; America. You're in ATTT hold. You didn't get very far off that time, either. That's good. Okay.

Tape 71B/14

04 11 07 14 CMP Okay, Challenger; America. Okay. I'm going to turn off B3 and also my roll jets, and then I'm going to undo the docking latches. ... verified TRANSPONDER is OFF.

CMP Say again about umbilical. All I get is umbilical. I didn't get the question.

CMP Verify. I have those down here.

04 11 08 05 CMP And jet Bravo 3 is OFF.

CC Okay, Ron, we're about 5 minutes from LOS. And the only thing that you wouldn't be able to do following right down your checklist is to get the VHF data on and check the tape recorder at LOS. The rest of that stuff you can follow right on through, and we'll remind you on the lithium change after descent. So it looks like we're caught up again.

04 11 08 52 CC And, America; Houston.

CMP Okay ...

CC You have a GO for undocking from here.

CMP Roger. Go for undocking.

04 11 09 28 CMP Okay. Number 1 is disconnected; and, Houston, could you watch my O₂ flow - as I disconnect these things?

CC Yes, sure.

CMP Okay. Two clocks on number 2, and that's out of the way. Number 1 J-hook is out of the way. One hook - Okay, that's three of them on number 3, and it's out of the way. Number 4 was already cut. And it's out of the way. Okay, number 5. One, two - and it's fully released, and the hook is off of the docking ring. Okay. Number 6 is - one, two - and it's fully released, and the hook is off of the docking ring. Okay, 7 is released, and the hook is off of the docking ring. O₂ flow still okay?

CC Yes, sir. Looking good.

04 11 11 04 CMP Okay, here's number 8. Here's one, two. And the chute's fully released, and the hook is off the docking ring.

04 11 11 22 CMP Okay, here's number 9. One, two, and she's fully released; the hook clears the docking ring. Okay, number 10. Here's one, two - fully released, and the hook clears the docking ring. There's one ... Okay, handle's free; J-hook clears the ring. I've only got one more to go. There's the first latch there's two latches ... came over. And the hook stays clear; the handle is free. And, by golly, they're all off. Hey, Challenger; America. You're hanging on those three little bitty things. Okay. I put the old - hatch in.

04 11 12 49 CC Okay, Ron, we're within a minute of LOS. Your O₂ flow still looks good, and the rest of the stuff that you can get on the VHF is going to be just fine. You're right on schedule now.

CMP Okay. I'll get that VHF stuff and then put the hatch in.

CMP Okay, we're in RECEIVE ONLY to B DATA. Hey, Challenger; America. I'm going to RECEIVE ONLY the B DATA.

04 11 13 37 CMP Hey, Challenger; America.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 10 14 40 CC Still loud and clear.

04 10 14 46 LMP Roger. Okay ...

04 10 15 10 LMP Hello, Houston. I'm ready to give you an E-memory dump.

CC Okay. We're ready to take it. Go ahead.

LMP Okay, Ron, how do you - Ron, how do you read on SIMPLEX Bravo?

04 10 15 23 LMP I do not read you. Coming at you.

04 10 15 37 LMP Hey, Ron, I do not read you. Check your VHF switch.

04 10 16 03 LMP I do not read you. Do you read me?

04 10 16 54 LMP Okay. I've got you; I got you.

04 10 17 01 LMP Okay. How do you read on VHF Bravo? You're loud and clear.

04 10 17 07 LMP That was my fault, Ron.

LMP Okay. It was just warming up. You're loud and clear now.

CDR Okay, Houston. I've got a couple I want to pass out to you.

CC Go ahead, Gene.

CDR Okay. When I first put in the - -

LMP Okay, Ron, how do you read now?

CDR - - LGC breaker -

CDR Stand by, Houston.

LMP Am I clipping now, Ron?

Tape 72A/2

LMP Am I clipping now?

04 10 18 00 LMP Okay. How do you read now?

LMP Okay. I guess we're okay. It was the squelch.

CDR Ron, how do you hear, Gene?

CDR Okay; very good.

04 10 18 22 LMP How do you read the LMP now, Ron?

04 10 18 34 LMP Okay. How do you read now?

LMP How do you read now?

04 10 18 44 LMP Okay. I've got the SQUELCH to full decrease.

LMP Okay. Do you read Gene, Ron?

04 10 18 58 CDR Okay. We're going to press on and get these VHF checks GO. We can cut them.

04 10 19 20 LMP Okay, Ron. How do you read on Alfa?

04 10 19 27 LMP How do you read on Alfa, Ron?

04 10 19 49 LMP How do you read on Alfa, Ron?

04 10 20 01 CDR Okay. How do you read me?

CDR This is Gene. How do you read me on Alfa?

04 10 20 07 CDR Okay. Let's press on. You're getting us intermittent. We can get it.

CDR Okay, Houston. I'm pretty sure the VHF is all right - -

CDR - - It seems to have something to do with the SQUELCH setting, and it's probably because we're so close.

04 10 20 28 CC Okay. We concur. We'd like you to press on and not worry about the VHF any more now.

04 10 20 35 CDR Okay, Gordo. We are. Here's a couple of quick ones. When I pushed the LGC DSKY breaker IN, I did not get a restart light. The keyboard came up with 400 in R-2. The LGC light was already on, and it went off as prescribed. When I did a VERB 35, I got all the proper lights except when the LGC and ISS lights came on, the entire caution and warning dimmed. One more item. In our DAP setting, we are reading in our checklist for R-1 plus 645 and for R-2 plus 641. The DSKY DAP came up plus 641 and plus 645. It just reversed those numbers. And I'm going to deploy the landing gear.

04 10 21 36 CC Okay.

04 10 21 51 CDR Okay, Houston. MASTER ARM is on, and B light is on.

CC Roger.

CDR Roger. Are you ready for a landing gear?

CDR Ron, if you read, the landing gear is coming on my MARK.

CDR 3, 2, 1 -

04 10 22 11 CDR MARK.

04 10 22 14 CDR Hey, Houston. We got a good one out front.

CC Sounds good.

04 10 22 22 CC We show them all deployed.

04 10 22 24 CDR And the flag is gray. Okay. The flag is gray.

CC Roger.

04 10 22 27 LMP Okay, Houston. The PRIMARY EVAP FLOW time, 108 - EVAP FLOW time 108:16:55. And I'm ready to copy your abort constants and a DOI-2 pad.

CC Okay, Jack. Here come the abort constants.
224 is - 6 - -

Tape 72A/4

LMP Stand by, Gordy.

CC Okay. Stand by.

CDR Ron, when you get the tunnel closed out, I'll need you for an IMU coarse align.

04 10 23 15 CDR Okay. I'll need your NOUN 20s, when you get a chance.

04 10 23 18 LMP Okay, Gordy. You can go ahead, and you have DATA on the UPDATA LINK.

CC Okay. We'll have the up-link in a minute. 224 is 60470, 29364, 60386, 00594, 32772, 54404. Go ahead.

LMP Okay. 60470, 29364, 60386, 00594, 32772, 54404.

CC Okay. That was a good readback. Ready with DOI-2 when you are.

LMP Okay, Gordy. Go ahead.

CC Okay. The - it's DOI-2; T_{ig} time is 112:02:40.92; NOUN 81 is a minus 0007.5, DELTA- V_Y plus all balls, and DELTA- V_Z is plus all balls.

CC NOUN 42, 00615 - -

CC - - plus 00067 - -

CC - - 00075; burn time 0:22; 000, 074.

CC And 373 is a 0122.7.

CC The AGS DELTA-Vs are NA.

LMP Okay, Gordy. 112:02:40.92; minus three zeros 75, plus all zeros, plus all zeros; 00615, plus three zeros 67, three zeros 75; 0:22; all zeros, 074; 0122.7; rest of pad NA.

04 10 26 14 CC That's correct, Jack.

CDR Okay. Stand by - I've - let's see. Okay.

CDR Okay. I need your numbers then. NOUN 20.

LMP Okay, Gordy. I'm going to start the lunar batt check, and it'll be silent.

CC Okay. We're watching.

CDR Ron, I need your - your NOUN 20 numbers.

CDR Okay. I got 356.95, 106.34, and 001.49.

04 10 27 17 CC Challenger, we want to get the attitude tweaked back up closer to the normal before doing the coarse align.

CDR Hey, Ron, they want a more normal attitude for you. You're not quite nominal.

CDR If you're talking to me, it's about 0 - 104.7 and then 0.

04 10 28 05 CC Challenger, the up-link's in there. It's your computer.

CDR Okay, Gordy. Thank you. And, Ron, let me know when you're tweaked up, and then go MIN DEADBAND ATT HOLD.

04 10 29 18 CDR Okay. Read out NOUN 20.

CMP Okay. VERB 6 NOUN 20. 000.32, 104.40, 359.55.

CDR Okay. I got all those.

CMP Okay.

LMP Okay, Houston. I skipped a step on LUNAR BAT, OFF/RESET; I'll go back.

04 10 30 14 CC Jack, we need the - we think you missed a step. We need to -

CC CDR, LUNAR BAT, OFF/RESET.

LMP Yes. That's right, I'll go - that's affirm; I'll go back. Stand by.

CC Okay.

Tape 72A/6

04 10 30 40 LMP Okay. I'm back to LUNAR BAT - LMP LUNAR BAT
OFF/RESET.

CC Roger.

04 10 30 58 CDR Okay, Gordy. For the LM, I've got 300.88, 284,
and three balls 45. How does that sound?

CC Stand by. We're checking.

04 10 31 56 CC Okay, Geno. Those angles are okay.

04 10 31 57 CDR Okay, figured they were. They're going in.

04 10 33 34 CDR Okay, Ron. On my mark, I'd like an 06 20.

CDR Okay; 3, 2, 1 -

04 10 33 47 CDR MARK it.

CDR Okay. Got those.

CC Okay, Challenger. We've got those angles here
on the ground - -

LMP Okay - -

CC - - for both spacecraft.

CDR Fine, Gordy.

04 10 34 31 LMP Okay, Houston, ED bat, 37.2, 37.2 at 109:14:00.

04 10 34 40 CC Roger.

LMP And all battery indications on board were normal,
once I got started.

CC Okay. They look good to us, also.

CDR Ron, I want you to stay in that MIN DEADBAND ATT
HOLD. I'm going to do a P52.

CC Okay.

04 10 35 36 LMP Houston, this is the LMP - -

LMP - - a couple minor things on the back-side check-out. The secondary glycol pump, when I started it, the sound and the pressure was ragged, oscillated around - 20 psi, and then stabilized. After about 15 seconds, it sounded smooth. It had a sound as if it was cavitating a little bit; but, after that, it was smooth. Over.

CC Copy that, Jack.

LMP And on step 3 on page 3-15 - -

LMP - - When I went to SUIT FAN 1, I got a MASTER ALARM - -

LMP - - but all other indications were okay, and the MASTER ALARM reset.

CC Okay.

04 10 36 41 LMP Okay. I'm sorry. I misinterpreted the words there; I should have gotten that. Forget that one.

CC Roger. We concur.

04 10 37 00 LMP Okay, Geno. You need some help?

04 10 38 48 CDR ... what star you got, 30? Or no, what star?

LMP Loaded it? Okay. Okay, and those are the numbers. Hey, that's good. Okay. You ready to mark? What do you want first? ...

04 10 40 31 CC Jack, we'd like to take a look at the glycol pump pressure. Can you close the GLYCOL PUMP SECONDARY pressure breaker?

LMP ... Better finish this.

LMP Gordy, you want the secondary?

CC That's affirmative; panel 16, GLYCOL PUMP SECONDARY breaker - third row, in the middle.

Tape 72A/8

04 10 42 20 LMP Okay. We've got a GLYCOL light, and the temperature is 50.

CC Okay. The pressure looked good there. We'd like that breaker back open. The MASTER ALARM you have is normal.

LMP Roger. Understand it.

04 10 46 48 CDR Ron, keep in MIN DEADBAND ATT hold. I've got to finish the P52.

CDR No, just stay where you are.

CDR Just stay where you are, and put it in MIN DEADBAND.

04 10 42 11 CDR No! N-0, no.

04 10 48 52 CDR Hey, Ron. This is Challenger. We're going to be off your loop for awhile, so we can finish the mark.

04 10 53 17 CDR Hello, Houston.

CDR That looked to be a pretty good alignment from where I saw it. There's 07 for you.

04 10 53 25 CC Okay. We copy.

04 10 54 03 CC Okay, Challenger. Torque them.

04 10 54 35 CDR Hello, America; Challenger. We no longer need your MIN DEADBAND.

04 10 54 49 CDR Okay. But I would like a NOUN 20 from you on my mark.

04 10 55 00 CDR Okay; 3, 2, 1 -

04 10 55 02 CDR MARK.

04 10 55 22 CDR Okay.

04 10 55 37 CC Okay, Challenger, we've got the NOUN 20s, both spacecraft.

04 10 56 22 CC Challenger, Houston, we're ready anytime for the RCS pressurization. You might turn the data switch off.

04 10 56 33 CDR We just got that, and we're going.

04 10 56 36 CC Okay.

04 10 57 05 CDR MASTER ARM is ON; I've got one good light - SYSTEM A.

04 10 57 09 CC Okeydoke.

04 10 57 22 CDR Okay. On my mark; 3, 2, 1 -

04 10 57 25 CDR MARK it. We heard it.

04 10 58 08 CC Okay, Challenger. We saw it, and it looks good. RCS looks good.

04 10 58 14 CDR Looks good on board, Gordo.

04 10 59 04 CDR Okay, Houston. Verify high bit rate - and, Ron, we need you in WIDE DEADBAND ATTITUDE/HOLD.

04 10 59 23 CC Challenger, we verify high bit rate.

04 10 59 42 CDR Okay. Here we go, Houston, with the cold fire check.

04 10 59 45 CC Okay. All set.

04 11 00 44 CDR Okay, Houston. PGNs RATE COMMAND (Cold Fire), AGS pulse (Cold Fire) check.

04 11 00 48 CC Okay; press on.

04 11 02 03 LMP All right, Houston. Step 4. AGS RATE COMMAND (Cold Fire), 4 JET SECONDARY COIL (Hot Fire) check.

04 11 02 09 CC Okay. Go. We're looking good so far.

04 11 02 11 LMP Hey, Ron. We're going to have some hot fires here. We're going to have some hot fires here in a minute.

Tape 72A/10

04 11 02 26 LMP It's affirm. Go CMC MODE FREE.

04 11 02 36 CDR That is affirm. We want you FREE, Ron.

04 11 02 55 CDR Ron, go RECEIVE ONLY.

04 11 03 46 CDR Houston, hardover looked good from here.

04 11 03 50 CC Okay; looked good down here.

04 11 03 55 LMP All right, Houston. PGNS MINIMUM IMPULSE (Hot Fire) check.

04 11 03 59 CC Okay.

04 11 04 24 LMP Okay, Houston. We had a sticky talkback red on SYSTEM A, QUAD 4. And it went to gray with a tap.

04 11 04 36 CC Okay, Jack.

04 11 06 05 CDR Okay - Ron, the hot fire checks are complete. You can go into WIDE DEADBAND ATT/HOLD.

04 11 06 17 CC Challenger, those all look good here.

04 11 06 19 CDR And I think we got them all. Okay, Gordo. Understand.

04 11 06 49 CDR Okay. We're on the top of 3-28, Gordo.

04 11 06 52 CC Roger. We're with you.

04 11 07 18 CDR Go - go ahead, Ron.

04 11 07 27 LMP Okay, you want to verify your - your transponder is OFF as well as B3?

04 11 07 34 CDR Okay. And you did get the umbilicals. Right?

04 11 07 39 CDR You did get the LM-to-CM umbilicals, right?

04 11 07 47 CDR Did you disconnect the LM-to-CM umbilicals? Verify.

04 11 07 54 CDR Okay. Very good.

Tape 72A/11

04 11 08 20 CC Challenger, Houston. We cannot completely explain the startup indications you had on the PGNS, but they are of no great concern. It looks good so far. The DAP gimbal trims are no problem. Don't bother changing them. And there will be no PIPA bias update yet, anyway. Over.

04 11 08 41 CDR Okay. Understand. Was the checklist written backwards on that?

04 11 08 47 CC It was a Cape problem on their tape, and they had it reversed. But it's in the noise level, anyway. No problem.

04 11 08 56 CDR Okay.

04 11 09 39 CC Challenger, Houston. You have a GO for undocking and sep.

04 11 09 44 CDR Roger; understand. A GO for undocking and sep.

04 11 12 35 CDR Okay. Fine, Ron.

04 11 12 38 CC Challenger, Houston. About 1 minute to LOS, and we'll see you when you come around the other side, independently.

04 11 12 48 CDR Okay, Gordo; understand. I'm in step 4, RENDEZVOUS RADAR mode ... to AUTO.

04 11 12 53 CC Roger.

04 11 13 00 CDR And the radar has come out, and I'm in RADAR TEST now.

04 11 13 08 CC Jack, just a friendly reminder to do the LOS procedures on the steerable.

04 11 13 18 LMP Okay.

04 11 31 XX BEGIN LUNAR REV 12

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 11 02 31 CMP Okay. Challenger, America.

CC America, Houston; standing by.

CMP Okay, Houston. This is America. We're floating free out here. The Challenger looks real pretty. The residuals on the P41 were plus 1.9, minus 0.2, and 0. Undock and sep was on time.

CC Sounds good.

04 11 31 xx BEGIN LUNAR REV 12

04 12 06 32 CC America, Houston. When you have an opportunity, how about cycling the HIGH GAIN to WIDE and back to REACQ?

CMP Okay. Can do.

CC Thank you, sir.

CC Okay, America. How about going back to NARROW on the antenna. And could you verify what you loaded on NOUN 34? It went by so fast on the down-link, we didn't get it a chance to look at it.

CMP Okay. Let me call it again here.

CMP There, you got it?

CC Okay. That looks good.

CMP Does that look okay?

CC Yes, sir. Sure does.

CMP Okay. No update then, huh?

CC That's correct.

04 12 08 05 CMP Okay.

Tape 72B/2

04 12 10 20 CC America, can you verify that you gave us NARROW on the HIGH GAIN?

CMP Houston, America. Say again.

CC Could you verify that you gave us NARROW on the HIGH GAIN ANTENNA, please?

CMP Negative, I gave you WIDE. (Laughter) I'll give you NARROW now.

CC Okay. I - I asked for WIDE awhile back, and guess we missed the call there.

CC Got your eyeball in that telescope?

CMP I'm about to.

04 12 12 24 CMP Okay, Houston; America. Had 50 percent on mag Charlie Charlie when I changed mags there for the landmark tracking. And let's see, frame 110, I think - or 112 - let me look on that one.

CMP Frame 103 on mag 00. Shoot. I mean, pardon the French (laughter). Okay; go ahead, Challenger. How you guys doing?

LMP-LM Hey, Ron, this is ... coming up.

CMP Looks like it's pretty low down there.

LMP-LM Well, when you're up here looking ...

CMP (Laughter) I'll bet.

04 12 16 55 CMP Hey, Challenger; America.

CC Okay, America. You're coming up on 3 seconds to T-1.

CMP Okay, 3 seconds to T-1. Thank you.

04 12 18 26 CMP Okay, Challenger; America. Good luck on your PDI burn there. I'm going to track your landmark for you.

CDR-LM Okay, babe. Have a ...

CMP Will do.

CDR-LM Don't forget, no TEI ...

CMP Yes, I got it, too.

LMP-LM Hey, ... We got the landing site; we're coming ...

CMP That slide really shows up beautiful.

04 12 20 02 CC Okay. Coming up on 30 seconds to T-2. Expect the AUTO pitch rate, and remember, the good old Sun is going to be staring at you - -

CMP Okay.

CC - - when you come around.

04 12 21 25 CMP Beautiful results.

CMP Blink! There's the Sun in the sextant.

CMP Oh, those guys are going to have fun down there.

CMP (Laughter)

04 12 23 16 CMP Oh, Houston, I got so excited on that, I forgot to turn the camera On.

CC Oh, that's fair? You got any comments to make on any of those marks? They were - they were collecting the marks in real time. Do you have any that they ought to pay particular attention to?

CMP Well, let me think for a minute, now. They were all within the crater itself. None of them were outside of the crater. The - the last ones I took at - started taking marks at - beyond what the really time was, just because you could still see it. So I wouldn't put too much faith in those - in about the last four.

CC Okay. Sounds good.

Tape 72B/4

04 12 25 39 CMP Challenger, America. You want to try VHF RANGING -
RANGING and REMOVED RADAR compare?

CMP Okay. TRANSPONDER coming ON, shortly.

04 12 26 08 CMP Okay. TRANSPONDER'S ON now.

CC America, sounds like Challenger is still working
on their RESET, if you want to go ahead and get
your 52 out of the way while you're waiting for
the range check. That might save a little time.

CMP Okay. I think they're about ready to do it now.
Challenger, America. You about ready for a VHF
RANGING?

04 12 28 51 CMP Okay. There goes RESET. Now.

CMP Ah-ha! It works! Point - 0.50 miles. Okay, 0.50
or 0.49 miles.

04 12 30 07 CMP Okay, I'm going to turn the RANGING, OFF, then.
Comm's a little better that way.

04 12 33 34 CMP Okay, Houston, you copying the 93?

CC Yes, sir. Talk any time.

CMP Okay. We'll talk at 45:13:45.

CC Okay.

CC And, America; Houston. Have some vectors to send
if you give us ACCEPT. And we're standing by with
a pad.

04 12 35 50 CMP Okay, Houston; America, ready to copy. Pad's here,
and you have ACCEPT.

CC Okay. First one will be the circ pad, on the same
page.

CMP Okay. Press on.

CC SPS/G&N; 37983; plus 0.40, plus 0.91; 111:57:28.09;
plus 0070.5. DELTA-V_X is all zips; DELTA-V_Z,

minus 0000.5; 000, 092, 358; 0069.7, plus 0054.5; 0070.5, 0:04, 0059.9. The stars are Sirius and Rigel; 133, 200, 030. The ullage is four jets for 12 seconds. Comment on your PC: If you happen to notice the chamber pressure, it'll probably be running 90 to 95, and we're predicting that it'll show you about 6 psi less than what the actual chamber pressure is.

- CMP Ah-ha! Okay, that's good to know on that chamber pressure. What you're saying is that even during the LOI burn, the velocity gain and what-have-you was - for chamber pressure, probably up around a little better than 100, huh?
- CC Yes, sir.
- CC We've got a couple of transducer problems we'll - -
- CMP I've got a readback on that circ pad.
- CC - - Talk about them some time when we're bored.
- CMP Okay. For the P30 circ pad. NOUN 37 - I mean NOUN 47 is 37983; plus 0.40, plus 0.91; 111:57:28.09; NOUN 81, plus 0070.5, zero on the Y, and a minus 0.5 on the Z. Okay. The roll is 0; pitch, 092; yaw, 358. NOUN 44 is 69.7 and a plus 54.5. DELTA-V total, 70.5; burn time, 0:04; DELTA-V, 59.9. Sirius and Rigel; 133, 200, 030. That will be four jets at 12-second ullage.
- CC Okay. That's a good readback. I have your RP-3 tracking pad.
- CMP Okay. Ready to copy.
- CC Okay. RP-3: 112:17:01, 21:51, 23:31, 24:19, north 04.
- CMP Okay. Copy that. Hey, while I think about it, on the landmark tracking there in that lower attitude mark, the computer was pointing me - I

Tape 72B/6

wish I knew. I'd have to get a map to look at the name of it, but there I consider Sherlock. And then the one to the south of that, and then another one to the south of that. There are three in a row. And it was pointing to the one just south of Sherlock - one about the same size as 17-1. Okay. A readback on RP-3. T-1, 112:17:01; T-2, 21:51, 23:31, 24:19; be north, 04 miles.

CC Okay, that's good. And I have the - the other pads if you're ready to copy them, or if you want to press on, then we'll come back and pick them up later. Your choice.

04 12 40 55 CMP Why don't I get started to the VERB 49 attitude, then I'll get the rest of the pads, okay?

CC All right, sir. I think that sounds like a good plan.

CC And we're through with our up-link, you can go to BLOCK when you want to.

CMP ...

CMP Okay. Got you loud and clear, too.

CMP Okay, Houston. Okay. PROCEED. Okay, Challenger and Houston. I'm maneuvering to circ burn attitude - Okay, sure will - Ah-ha! Great!

04 12 45 40 CMP And, Houston; America here. While we're maneuvering I'll go to RECEIVE on the VHF, and you can send those pads E to N up.

CC Okay. Here they come. Echo: 113:02:00 - -

CMP Wait a minute. Hold it. Hold it. Hold it. Hold it. I'll tell those guys to go it - to RECEIVE only. Hey, Challenger; America. Okay, Jack, can you go to RECEIVE only on your VHF? I've got all these pads to pick up now. I'll call you when - when I'm all through.

CMP Okay, Houston; America. Let's try it again on pad E.

Tape 72B/7

CC All righty. Pad Echo: 113:02 all zeros; Foxtrot:
plus 1013.4, plus all zips, minus 0050.0; Golf:
113:57:00.00; Hotel: 115:36:45.00. India:
112:49:52.35. Juliett: 115:36:45.00. Kilo:
117:35:45.00. Lima: 113:14:24.91; Mike:
119:34:30.00; November: 114:57:19.09. Over.

CMP Okay, readback as follows: Echo: 113:02 all zips;
plus 0103.4, all zips, minus 0050.0; Golf: 113:57
all zips; 115:36:45.00. 112:49:52.35. 115:36:45.00.
Kilo: 117:35:45.00. Lima: 113:14:24.91;
114:34:30.00; November: 114:57:19.09. Over.

CC Okay, let's go back over Mike again. That's
119:34:30.00. The rest are correct.

CMP Okay. On Mike, 119:34:30.00.

CC Okay, got them all.

CMP Amazing.

04 12 49 34 CMP Okay, Challenger; America. I'm through with all
the pads now.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 12 01 35 CDR-LM Hello, Houston. Do you read Challenger?

04 12 01 45 CDR-LM Hello, Houston. ... Challenger ...?

04 12 01 58 CC Hello, Challenger; Houston. You're very, very weak. Over.

04 12 02 04 CDR-LM Okay, Houston. Challenger ... checkout is complete ... and we're looking at America, the beautiful.

CC Okay, Geno, I understand you're undocked. But we're not reading, but about 10 percent of what you're saying. Stand by ...

04 12 03 20 LMP-LM Houston, this is Challenger. Won't hold on the steerable antenna yet. It looks like I'm getting oscillations in my up-link signal strength, and then it gradually drops off to zero.

04 12 03 35 CC Okay, Jack. We're reading you better now. Understand.

04 12 03 44 CDR-LM Okay, Gordo. If you're reading, you got the words. We are undocked. Landing radar self test is GO. We're ready to press on to the DPS throttle check, and we've been looking at America, the beautiful. It's rare form.

CC Okay, Geno. We've got that. It sounds good.

04 12 04 05 CDR-LM Okay, and the residuals on P47 at undocking were 0, minus 0.1, and 0.

04 12 04 14 CC Okay. We copy that. We'd like you to try the steerable again.

04 12 04 35 LMP-LM Okay, Houston; we've got it.

CC Okay. You sound real good; loud and clear.

LMP-LM Okay, let me give you some NOUN 20 angles, if you want them.

CC Go ahead. Ready to copy.

Tape 73A/2

LMP-IM The IM: plus 301.09, plus 284.53, plus 359.48;
the CSM: plus three zeros 35, plus 104.67,
plus 000.52; the time: 110:24:00. Over.

04 12 05 20 CC Okay, Jack. We got that.

04 12 05 25 CDR-IM Okay, Gordo; we're ready. DPS throttle check.
I'm ready to hit engine stop.

04 12 05 30 CC Stand by. Okay; we're ready.

04 12 05 39 CDR-IM Okay. And the light is on. The REG light is ON.

04 12 05 51 CC Roger. We're showing the ENGINE ARM circuit
breaker may be out. Would you check that?

04 12 06 17 LMP-IM Okay. I'm sorry, Gordy. A little - We missed
that here. Okay, we'll try it again.

04 12 07 21 CDR-IM Gordy, if the throttle test looked okay, I'll go
ENGINE ARM OFF.

04 12 07 26 CC Okay. It looked real good. Go ahead.

04 12 09 23 CDR-IM Okay, Gordy, the MASTER ARM is coming on.

04 12 09 25 CC Roger.

04 12 09 28 CDR-IM I got two good lights.

04 12 09 30 CC Two lights.

04 12 09 36 CDR-IM Okay; on my mark. DESCENT PROP ISOL VALVE. 3,
2, 1 -

04 12 09 40 CDR-IM MARK it. We heard it.

04 12 09 45 CC Roger.

04 12 09 51 CC Okay; looks good.

04 12 09 52 LMP-IM Gordy, there was a slight upward - Gordy, there
was an upward fluctuation in pressure in the
manifold when we fired that. It's back to where
it was prefiring.

CC Okay. That's what it should have done, Jack.

04 12 10 24 LMP-LM Okay, HELIUM PRESS, DESCENT START. 3, 2, 1 -

04 12 10 29 LMP-LM MARK it. We got it.

04 12 10 43 LMP-LM Okay; looks good onboard. About 240 both sides.

04 12 10 50 CC Okay; looks good on the ground.

CDR-LM Say, Gordy, this thing sounds a little bit like my stomach sounded a couple of days ago.

CC Roger there.

04 12 11 24 LMP-LM AGS coming on to STANDBY.

04 12 11 42 LMP-LM Okay. MASTER ALARM and AGS light.

04 12 12 06 LMP-LM Okay, 10 ... 110:52:00 for the time on the AGS.

04 12 12 14 CC Roger, Jack.

04 12 12 47 CC Geno, we show Jack's SUIT ISOL valve in SUIT DISCONNECT. Should be in SUIT FLOW. Would you check that for - for us, please?

04 12 12 58 CDR-LM Yes. He's in SUIT FLOW now.

04 12 13 02 CC Okay. Thank you.

CDR-LM I'll tell you - I'll tell you, this LCG sure makes a world of difference up here.

CC Roger.

CDR-LM Hey, America; Challenger.

CDR-LM Hey, Ron; listen. This ridge you're coming on over - just stick your hand out the hatch and grab a rock.

CDR-LM Well, when you're up here looking at where you are, it even looks lower.

04 12 16 52 CC Challenger; Houston. I have a new AGS K factor for you.

04 12 16 58 LMP-LM Stand by a second.

Tape 73A/4

04 12 17 42 LMP-IM Go with the K factor.

04 12 17 44 CC Okay; it's 109:59:59.94. Over.

04 12 17 59 LMP-IM 109:59:59.94.

CC That's right.

CDR-IM Gordo, this is spectacular. It is absolutely spectacular looking at that command module, America, down there coming across the surface. We're just tracking him at about a 30-degree dive angle.

CC Sounds great.

04 12 18 30 CDR-IM Okay, babe; have a good time, and go get that landmark. Don't forget - No TEIs. See you in about 3 days.

CC Geno, Houston, with a couple of items.

LMP-IM Go ahead, Gordo.

CC Okay. Your perilune seems to be - -

04 12 19 39 CDR-IM Hey, we got the landing site, Gordo.

CC Okay. I'll hold - -

CDR-IM Gordo, we got the landing site. We're coming right over the front of it. Stand by a minute. You can see the Slide. I think you can see the Great Cross.

CC Roger.

CDR-IM We'll get a picture of America coming right across it.

CC All righty.

LMP-IM Super targeting.

CDR-IM Gosh, we've got Family Mountain; we've got - of course - the Massif; we can see the Scarp; we can see the light mantle; I've got the Great Cross, Camelot, Sherlock.

LMP-LM Believe it or not, Houston, they're all there.

CC How about that.

LMP-LM I see possible structure - possible structure in the upper part of the South Massif, little bit east of station 2. It's subhorizontal, dipping to the southeast.

CDR-LM Houston, I can even see Poppy, right where we're going to set this baby down.

CC Very good.

CDR-LM As a matter of fact, I can see Rudolph. I can even see the triangle: Rudolph, Frosty, and Punk. Man, Gordo, this is absolutely spectacular.

CC Sure sounds like it.

04 12 21 11 CDR-LM We can watch Ron track - we can watch Ron track right on through the landmarks. I don't know what kind of results he got, but he sure had a nice smooth track from here.

CC Roger.

04 12 21 38 LMP-LM Gordo, you can go ahead and update us with those words.

04 12 21 41 CC Okay. Your perilune is shifting west. PDI will be a little higher than nominal: 10.7 miles or 65,000 feet; should be no problem. And, from the time you first came around until we had a solid lockup on the steerable on this acquisition was about 3 minutes. We're going to try to speed that up some on the next time around. We'd like you to just keep trying the steerable until we come to you - and say, "stop trying." Over.

04 12 22 14 LMP-LM Okay, Gordy, understand that; and apparently this time, had I let it - had I waited a little longer, it would have dropped to zero and then come up, because that's what happened when I finally got you. I'll give it more time next time.

CC Okay.

Tape 73A/6

04 12 22 38 CC And, Jack, I've got lots of pads for you whenever you're ready.

04 12 23 37 LMP-IM Okay, Gordy; go with the pads.

CC Okay. The first one is a P76 with a CSM circ.

LMP-IM Go.

CC Okay. NOUN 33 is 111:57:30.09; NOUN 84: plus 0070.5, plus five zeros, and minus 0000.5. Go ahead.

LMP-IM Okay. 111:57:30.09; plus 0070.5, plus all zeros, minus four zeros 5.

CC Okay. Good readback. Next one I have is the no PDI plus 12 abort, item Echo.

LMP-IM Go ahead.

CC Okay. Echo is 113:02:00.00; Foxtrot, plus 0103.4, plus five zeros, minus 0050.0; NOUN 42: 0142.0, plus 0005.4, 0114.9; burn time is 0:48; 000, 272; 373 - -

04 12 25 44 CDR-IM Okay. Just a second. Give me a transponder, and we'll start with the radar. Jack's tied up right now.

CC 373 is 0182.0; AGS DELTA-Vs: plus 0103.7, plus five zeros, minus 0049.3; Golf, 113:57:00.00; Hotel, 11 - Okay, I'll start over. 115:36:45.00; and the no DOI-2 DELTA-V_X, 0096.6. Two remarks: throttle profile is 10 percent for 26 seconds, 40 percent for the rest of the burn. Over.

04 12 27 15 LMP-IM Okay, readback. 11 - no PDI plus 12 - 113:02 all zeros; plus 0103.4, plus all zeros, minus 0050.0; 0142.0, plus three zeros 5.4, 0114.9; 0:48; all zeros, 272; 0182.0; plus 0103.7, plus all zeros, minus 0049.3; 113:57 all zeros; 115:36:45.00; 0096.6; remarks: throttle profile 10 percent for 26 seconds; 40 percent for the remainder.

CC Okay, that's a good readback. Item India: 112:49:52.35 - -

CDR-LM Say, Gordo.

CC Go ahead.

04 12 28 21 CDR-LM Gordo, Gordo. Hey, Gordo; stand by. We want to finish the radar VHF test; and when I go to P52, you can finish the PADS.

CC Okay.

04 12 28 45 CDR-LM Okay. We're in VHF RANGING, and I've got you on radar, Ron. We'll be quiet for a second and see if you can get a lockon.

CDR-LM Okay.

04 12 29 34 CDR-LM Okay, Gordo. The VHF ranging and radar checks out very well.

CC Okay, sounds good. Tell me when you're ready for item India again.

04 12 30 02 LMP-LM We cut you off, Ron.

04 12 30 10 LMP-LM Go ahead, Gordy.

CC Okay. India is 112:49:52.35; 11:01, plus 0002.2; attitude is 002, 108, 290; plus 56900, Juliett, 115:36:45.00: Kilo, 117:35:45.00. Go ahead.

LMP-LM Okay. It's a PDI pad; 112:49:52.35; 11:01, plus three zeros 2.2; 002, 108, 290; plus 56900; Juliett, 115:36:45.00; Karen, 117:35:45.00. Go ahead.

CC Okay, that's a good readback. Lima is 113:14:24.91; Maytro [?], 119:34:30.00; and November is 114:57:19.09. And your T-2 at PDI - T-2 will be at PDI plus 24:33.

LMP-LM 24:33?

CC That's affirmative.

LMP-LM Okay, Linda is 113:14:24.91; Mary is 119:34:30.00, and Nancy is 114:57:19.09.

Tape 73A/8

CC That's a good readback.

CC Okay, one thing left, Jack, is the SHe pressures on the PDI page.

LMP-LM Go ahead.

04 12 33 30 CC Okay; at T_{ig} , the pressure will be 1310; plus 1 minute, 1410; 2 minutes, 1400; 3 minutes, 1310; and 4 minutes, 1230. Over.

LMP-LM Okay, I got those. Thank you.

CC Roger.

04 12 41 25 CMP-CM You're loud and clear.

04 12 44 58 LMP-LM Roger, America. Have a good burn. You look just as pretty in earthlight as you do in sunlight.

CC We see that. Looks like a good job.

04 12 45 36 LMP-LM Yes, but it's not an easy one, Gordo.

LMP-LM Go ahead.

04 12 46 14 LMP-LM Okay, RECEIVE only. We got your GO, Gordo?

CC That's affirmative, torque them.

04 12 47 29 CC Challenger, we need AFT omni and select the steerable to SLEW. And LOW bit rate.

04 12 48 13 CC Challenger, select FORWARD omni, please.

LMP-LM Okay, Gordo, the COAS alignment's good and the DAP is retracking.

CC Okay, and like the rest of the spacecraft, the platform's beautiful, there's no drift compensation or PIPA bias update. Over.

LMP-LM Beautiful. It's ... like a ...

CC Roger. Give you one update, you can write it in the Timeline, page 8; the T-1 time is PDI plus 17:00. Over.

Tape 73A/9

04 12 49 52 CDR-IM Okay; T-1 is PDI plus 17:00, we got it.
CC Roger.

04 12 50 30 LMP-IM Okay, Houston, you got P00 and DATA.
CC Okay.
LMP-IM Gordo, can I start maneuvering to the AGS cal while you're getting those updates - up-links ready?
CC Okay, we'd like the steerable back again. Try PITCH of minus 25, and YAW of minus 72.

04 12 52 26 LMP-IM Okay; you got the steerable.
CC Okay, we need HIGH bit rate.
CC If we start on the up-links now, we'll get that in before we go to the AGS cal attitude. Over.
LMP-IM Okay, Gordo, I've got - I've got the Earth and the direction I have to maneuver is nothing but good for the high gain, so I'll start over slowly.

04 12 53 07 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 12 56 28 CMP Hey, Challenger; America. Are you still with me?
Okay; I got something like, "yes."

CMP Okay, I just wanted to make sure on the voice
check if we still have the VHP problem.

04 12 57 25 CMP Okay; loud and clear OMNI, Jack.

CMP Challenger, America. Read you loud and clear OMNI.

04 12 57 59 CC Okay, America, we show you inside of 20 minutes,
saying you have a GO for circ.

CMP Houston, America. Roger. We'll do our best.

04 13 00 01 CMP Okay, we're in burn attitude, and we don't have
any sextant star check this time. And we're in
P40; got a 58 10; align the old GDC.

04 13 00 54 CMP Okay, GDC is aligned.

04 13 01 13 CMP STAB CONTROL and SPS breakers are CLOSED. MANUAL
ATTITUDE are RATE COMMAND.

04 13 01 20 CMP LIMIT CYCLE OFF. DEAD BAND, MIN. RATE to LOW.
SERVO POWERS in RATE COMMAND.

04 13 01 41 CMP Okay, DELTA-V_{CG} is in CSM. GIMBAL DRIVE PITCH and
YAW is in AUTO. Standing by for the bus ties.

CC Hey, looking good.

CMP Okay.

04 13 06 36 CC Okay, America. About a minute until LOS. All
systems look good. We'll see you on the other side
with a good circ.

04 13 06 47 CMP Okay. Mighty fine.

Tape 73B/2

04 13 25 XX

BEGIN LUNAR REV 13

04 13 55 00 CC

America, Houston standing by.

04 13 55 09 CMP

Hey, Houston, This is America. Good burn.

CC

Okay. Glad to hear it.

CMP

And I'll give you some dope here. Okay, it was on time. Burn time, as near as I can tell, was 4 seconds. V_{GX} was 69.9. Okay. The trim angles were 357, 89, and 4 degrees of yaw. Okay, at the completion of the burn there, the NOUN 85's.

LMP-LM

Okay, Houston. This is Challenger. How do you read ... LM data?

04 13 55 55 CMP

The NOUN 85's were plus 1.70 and a minus 0.6. They are trimmed out to 00 and a plus 0.1. DELTA- V_C was minus 10.0.

LMP-LM

..., Houston. How do you read Challenger?

CMP

And I didn't look at that one until 112 plus 00. Oxidizer was 30.3. Fuel was 31.1. And unbalance was minus 200. Over.

CC

Okay, that sounds good.

CMP

And - oh, P76 was good on the LM, too.

CC

Okay, sir. I've got your P24 pad.

CMP

I'm on ... three.

CMP

Okay, I'd better take it first.

CC

Okay. I'll give you a 17-1. 112:50:52, 55:42, 57:22, 58:10; north 02.

CMP

(Laughter) Okay, Ken; Jack keeps talking every time you do. So maybe you can keep one ear on them or something. I got T-1 and 112:50:52; and I think T-2 was 55:42, and that's all I got.

Tape 73B/3

CC Okay, America. Are you ready to try again on the P24 pad?

CMP Okay. Let's try it now.

CC Okay. 17-1: 112:50:52, 55:42, 57:22, 58:10; north 02.

CMP Okay; I copied that that time. 112:50:52, 55:42, 57:22, 58:10; north 02 miles.

CC Okay, that's correct. And you were starting to say something about your RPs - target?

CMP Yes. RP-3 is just about the limit of high Sun angle that you could take to track that thing. I could track it up to TCA. And then, from TCA on across, you could hardly even tell there was a crater there, at all. It's just completely washed out.

CC Okay. I'll keep that in mind when they look at it.

CMP I think we got some good marks on it anyhow, though.

CC Real fine.

04 14 00 06 CMP Also, Houston, I lost the landmark at 24:01 instead of 24:19.

CC Okay.

04 14 01 14 CC Okay, America. We've taken one last look around your bird and it's looking good. So at least your half is GO for PDI.

CMP Okay, mighty fine. And I think that chamber pressure was up around 95. I really couldn't swear to it. So you might take a look at the read-out on the playback.

CC Okay. You got a mighty fast scamp ... to see all that.

CMP (Chuckle) That's what I say. I really couldn't swear to it.

Tape 73B/4

04 14 06 12 CC And, America; Houston. We haven't watched you
load P24 yet.

CMP Yes, that's a good point, I'll go ahead and get it.

04 14 10 41 CC Coming up on T-1.

CMP Okay, Ken. Thank you.

04 14 15 39 CC Five seconds to T-2

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 12 56 01 CC Challenger, Houston. It's your computer. UP
DATA LINK, OFF.

LMP-LM Roger.

LMP-LM Still with you.

LMP-LM Say again, Ron. Okay, I'll have to give you
another one here in a minute.

04 12 57 23 LMP-LM Okay, how do you read? You're loud and clear.

04 13 02 18 CC Challenger, Houston. You're GO for DOI-2.

LMP-LM Thank you, Gordo. We're GO here for DOI 2.

LMP-LM Okay, Houston, did you get the AGS cal numbers?

CC Challenger, that's affirmative.

LMP-LM Okay, it all looks pretty good to me. 546 may
have been a little more than specs, but it looks
pretty good.

CC Okay, looks good here.

CC Jack, have you gone through an omni? If you have,
go LOW BIT RATE.

LMP-LM Okay, we got you on an omni and LOW BIT, RA -

04 13 06 50 CC Okay.

04 13 56 13 LMP-LM Hello, Houston. How do you read Challenger?

CC Challenger, you're loud and clear.

LMP-LM Hello, Houston. How do you read Challenger on
an omni right now?

CC Okay, Challenger, you're loud and clear on the
omni. How did it go?

LMP-LM Okay. The burn was GO. We're in a 7-mile perigee
on the PGNS, and we had 0, plus 0.1 and plus 0.1
residuals.

Tape 74A/2

CC Okay, sounds good.

LMP-LM Ok - Okay, Gordy, I'm going to try the high gain. I had you locked up once, and then I lost you. Let me try it again.

CC We concur. Go ahead, Jack.

LMP-LM Okay, Gordy, that's my fault. I didn't know you were up-linking. You've got the omni, and I'll leave it.

04 13 58 07 CC Okay, we'll stay on the omni for the up-link.

LMP-LM Okay, Gordy, ED BATs are 37.2, both batteries. The ascent battery on time was 112:19:00, about 4 minutes late.

CC Okay, Jack. Copy.

CC Jack, we want BATTERY 3 OFF for preconditioning.

LMP-LM Roger.

CC Challenger, we'd like you to verify that the ...

LMP-LM And we did ..., Gordy.

CC ... is egress.

LMP-LM That's verified.

CC Roger.

LMP-LM And do you have a 231 update?

CC Stand by. Negative. No change, Jack.

LMP-LM Roger.

CDR-LM Okay, Gordo, how do you read CDR on VOX?

CC CDR, you're loud and clear on VOX.

LMP-LM Okay. How do you read the LMP on VOX?

CC Loud and clear, Jack.

CDR-LM Okay. Gordo, up until this time, the bird has looked beautiful - perfectly plain. All the check's have come out just as advertised.

CC Okay, sounds good.

04 14 00 48 LMP-LM And we're looking at 9 minutes and 5 seconds from PDI.

CC Challenger, do you see a VERB 33 out of DSKY? If you do, ENTER it.

LMP-LM Okay, it's there, and I will ENTER.

CC Roger.

LMP-LM Okay, it took; and I'm showing P00.

CC Okay. Your computer; the up-link's in.

04 14 01 20 LMP-LM Okay, we've got a tone on the upvoice backup.

CC Roger.

04 14 01 26 CDR-LM VERB 47 coming in at you, Jack. Okay, hit it. Okay, I got it. 240 - wait - 231, 56900, that's supposed to be. Okay, 56900 ... 240s are the same - 56900. Okay? Okay, 254 is plus 01944. Okay. Okay, 262 is minus 00143. Okay, 400 plus 3, and I'll watch it.

LMP-LM How's it look?

LMP-LM It's - it's had that all the way along - a little bit of roll bias.

CDR-LM Okay. That's good. 400 plus 1.

LMP-LM 400 plus 1 is in.

CDR-LM Okay, and we do have your needle. We do have your needle.

LMP-LM Okay.

Tape 74A/4

CDR-LM Okay, and there's VERB 83 looking at you. Our CROSSPOINTERS are LOW MULT for you. Okay, and there's VERB 83. Give me a 317 and a 440.

CC Challenger, Houston. We'd like you to try the high gain once more. PITCH is minus - PITCH is zero and YAW plus 59.

CDR-LM Are you happy with this, Jack? Let me ... 63.

LMP-LM Yes. Go ahead.

CDR-LM Okay.

LMP-LM That's good.

CDR-LM Gordy, understand no NOUN 68 prior to P63 or NOUN 69, right?

CC That's affirmative.

LMP-LM ... you need to ask him anything, I'll try to high gain.

CDR-LM No. Go ahead; try it.

LMP-LM Try the high gain, Gordy.

CC Okay.

LMP-LM Okay, it's locked up in AUTO.

CC Roger.

LMP-LM And, Gordy, be advised that you're clipping on your first word.

CC Okay, Jack. We'd like you to set 410 in the AGS to all balls. Plus all balls.

LMP-LM That's 410, 410 not 400. Check that again.

04 14 04 26 CC That's affirmative; 410.

LMP-LM Thank you, Gordy.

CDR-LM You better go back and check 400 now.

LMP-LM It's okay. I fixed it.

CDR-LM Okay.

LMP-LM Oh, man, are we down among them, babe! Whooh! ...

CC Challenger, Houston. I have a PDI T_{ig} update.
It's 112:49:51.87. And NOUN 61 cross range should
be a plus 2.8. Over.

LMP-LM Okay. Say the seconds again on the PDI.

CC PDI seconds are 51.87. Over.

LMP-LM Okay. And the cross range?

CC Cross range is - is a plus 2.8. Over.

LMP-LM Okay, Gordy. That clock checks with - with our
time out of P63.

04 14 05 38 LMP-LM The LANDING RADAR breaker's IN, I've got altitude,
velocity, power. We're coming up on 4 minutes.

CDR-LM I'll give you the final trim at 4.

LMP-LM Okay.

04 14 05 51 CC Challenger, Houston. You're GO for PDI.

CDR-LM Oh, thank you, Gordy. We are GO up here for PDI;
doing the final trim at 4.

CDR-LM Hello, America. Do you read Challenger?

CDR-LM Hey, Jack, you can check your watch.

LMP-LM Okay.

CDR-LM At 2 minutes, I'll get the MASTER ARM.

LMP-LM All right.

Tape 74A/6

CDR-LM At 30 seconds, I'll get the ENGINE ARM; and we'll watch the PGNS tapemeter pick up average g. If you give me a GO on the ullage, I'll back up the ullage.

LMP-LM Okay.

04 14 06 52 CDR-LM And I'll back up the START.

CC Challenger, should we lose the steerable, - -

CDR-LM You get the steerable.

CC - - go FORWARD OMNI.

CDR-LM Roger. FORWARD OMNI.

LMP-LM ... down a little bit.

04 14 07 15 CDR-LM Okay, 02:41.

CDR-LM Okay, we picked it all up. Power still good.

LMP-LM Okay. Coming up on 2 minutes; I'm changing over here.

CDR-LM Okay.

04 14 07 54 LMP-LM MASTER ARM, ON - 2 minutes.

CDR-LM Okay, Houston. 2 minutes. MASTER ARM is ON. I've got two good lights.

CC Roger.

04 14 08 01 LMP-LM MODE SELECT is PGNS.

CDR-LM Okay. Once again, in average g, I'll get the ENGINE ARM. You confirm the ullage, I'll get the PRO. I'll back up the ullage and get the START.

LMP-LM Roger.

CC Challenger, we're going to leave BAT 3, OFF, - -

LMP-LM ... AUTO, AUTO.

CC - - until after ignition. We'll call you.

LMP-LM Roger. Yes, I should have put that on like we talked about.

CDR-LM Man, I'll tell you, we are getting close.

LMP-LM Looking out your window is really strange. (Laughter). From over here.

04 14 08 56 CDR-LM One minute, Houston, and we're standing by. We're GO for PDI.

CC Roger. You're looking good here.

04 14 09 19 LMP-LM Okay, approaching 30 seconds. Blank, DSKY.

CDR-LM DSKY blank?

LMP-LM Average g. Got two lights.

04 14 09 30 LMP-LM Okay, ENGINE ARM is DESCENT. I think the tapemeter drove. I'm not sure. Confirm the ullage. Standing by for ullage. Ten seconds.

04 14 09 48 LMP-LM Fuel ullage. We've got ullage. PROCEED on the 99. It took. 2, 1, 0 -

04 14 09 56 LMP-LM IGNITION. IGNITION, Houston. Attitude looks good.

04 14 10 01 LMP-LM ENGINE OVERRIDE is ON, MASTER ARM is OFF. We got a DESCENT QUANTITY light ON at ignition, just prior to ignition.

CDR-LM DPC [?] tank's good. RCS is good at 15 seconds.

CC Roger.

LMP-LM RCS is golden. Should be stable throttle up. Stand by ...

CDR-LM ... Houston. And the computer likes it.

CC Roger.

LMP-LM Still got the QUANTITY light ON.

Tape 74A/8

CDR-LM Okay, attitude looks good, Jack.

LMP-LM Okay. At 30 seconds. Should have about 108.

CDR-LM Oh, boy.

LMP-LM AGS and PGNS are CLOSED.

CDR-LM Okay, coming up on 1 minute.

LMP-LM One minute, you ought to have 98.

CDR-LM Okay, H-dot is high right now.

04 14 10 57 LMP-LM MARK it, 1 minute.

CDR-LM Altitude's high.

CC Challenger, Houston. I have a NOUN 69 - -

LMP-LM ... looks good, Houston.

CC - - plus 03400, plus 3400 feet. Over.

LMP-LM You're looking at it.

04 14 11 17 CDR-LM Okay; 3400. I confirm.

CC Challenger, you're GO for ENTER.

LMP-LM Roger. GO for ENTER 01:30. We're GO coming through 57K. Okay, the altitude's high and the H-dot is high. ... - that's right.

LMP-LM Okay. At 1 - 2 minutes, you ought to have 89 on the ball. We're still 30 feet per second high in H-dot. But we're about 8000 feet high - -

CC Challenger, Houston - -

LMP-LM - - 7000 - -

CC We'd like you to cycle the PQGS switch OFF and then back ON.

CDR-LM Okay, Houston. Coming up on 2 minutes.

04 14 12 01 LMP-LM Okay. It's OFF. And it's back ON. QUANTITY light is out.

CC Roger. That should be good now.

LMP-LM And, Houston, we - Okay, we have ENGINE THRUST and COMMANDED THRUST, full-scale high.

CC Roger.

LMP-LM Man, that looks good.

CDR-LM Okay, babe, let's check them at 02:30.

LMP-LM RCS looks good.

04 14 12 27 CDR-LM 02:30, I'm about 89 degrees - -

LMP-LM Cabin looks great - -

CDR-LM - - coming through 51 5.

LMP-LM 89 is great. We're catching up - on our altitude. We should start dropping H-dot here a little bit. AGS and PNGS are together. AGS has us a little bit out of plane. And we're north - has us north of track.

CC Challenger, Houston - -

LMP-LM Houston, we're ... up on 3 minutes, we're GO and - -

04 14 12 54 CC - - you're GO at 3.

LMP-LM - - we're out of 49K.

CDR-LM Roger. Understand we're GO.

LMP-LM Okay. At 3 minutes. 82's your ball number. We're still looking for the right altitude. So H-dot is high.

CDR-LM Okay. The day of reckoning comes at 4 minutes, Jack. Got the weight building up, looking good. Attitudes are good.

Tape 74A/10

LMP-LM Okay, at 03:30, you ought to have 79 - -

CDR-LM And it's right on.

LMP-LM We're still a little high - about 2500 feet. H-dot is still high. Okay. The tapemeter moves in spurts and jerks, both on altitude and altitude rate.

CDR-LM Yes.

04 14 13 58 CC Challenger, Houston. You're GO at 4 minutes.

LMP-LM Yes. ED BATs are 37.2.

CC Roger. ED BATs.

LMP-LM ED BATs are 3 - -

CDR-LM Okay.

LMP-LM Okay, Gordo, yaw's coming at 340.

CC Roger.

LMP-LM And the radar lights are out. Beautiful.

CC Okay, sounds great. Both systems are GO - -

LMP-LM You're looking at DELTA-H.

CC - - right on the line.

LMP-LM Okay. You're looking at DELTA-H.

CC And you're GO for a VERB 57.

04 14 14 34 LMP-LM Okay, VERB 57 is in. Hey, Houston, is the AGS out of plane correct?

CC Stand by.

CDR-LM Okay, coming up on 5 minutes, Jack. Let's take a check at it. About 74 degrees.

LMP-LM That's good.

CDR-LM 70 feet per second; we're coming down 36 - you're still ... - -

04 14 14 56 CC Challenger, you're GO at 5 minutes - -

CDR-LM - - down at 30 - -

CC - - the AGS out of plane looks okay to us.

CDR-LM Okay. GO at 5. We're out of 365 now. We've got the Earth right out the front window.

CC Challenger, Houston. BATTERY 3, ON, at your convenience.

04 14 15 23 LMP-LM BATTERY 3 is ON.

CDR-LM 05:30, Gordo. We're GO. We're out of 34K.

LMP-LM 73, 34. We're right on altitude. The H-dot ought to start dropping off.

CDR-LM Except that we want to keep it high. We're allowed two quick looks out the window, one now and one when we pitch over.

LMP-LM I can't see a thing except the Earth.

CDR-LM That's what I'm telling you to look at.

LMP-LM (Laughter) Ok, there's the old Earth. Okay, Houston, coming up on 6 minutes. Six minutes, you ought to have 72 on your ball.

04 14 15 56 CC Challenger, you're GO at 6.

CDR-LM 72 and GO.

LMP-LM 31. Altitude's great. H-dot's great. AGS and PNGS are very close, couple feet per second difference.

CDR-LM Okay.

Tape 74A/12

04 04 16 10 LMP-LM Okay, Houston. We went over the hump. DELTA-H
just jumped.

CC Roger.

LMP-LM And looks like it's back down.

CC Roger. Sounds good.

LMP-LM 06:30, Geno. It looks good, babe. 72. Altitude
is right on. H-dot is very close.

CDR-LM Okay, 30K, YAW to zero.

CC Throttle down time, 7 plus 26.

LMP-LM 7 plus 26.

CC Okay.

CDR-LM Okay, we got everything - We're YAW at zero.

04 14 16 56 LMP-LM Okay. At 7 minutes, 67's your angle, 26 - 27;
that's great ... - -

04 14 16 59 CC Challenger, you're GO at 7.

LMP-LM - - H-dot's slightly high, but okay.

CDR-LM Okay, Gordo. We're GO at 7, we're now at
25,000 feet. We're quite a bit out of the com-
mand module plane, but I guess we're on target.
Okay, watch the throttle, now. Here it comes.

LMP/CDR- Throttle down -
LM

04 14 17 22 LMP-LM - at 27; computer likes it. Beautiful.

CC Roger.

04 14 17 29 CDR-LM Okay, 07:30, 63. Okay, 145 to pitchover, Jack.

04 14 17 34 LMP-LM Okay, 63's your angle, about 56 now.

CDR-LM Okay, that's getting closer.

LMP-LM H-dot and H are great. Standing by for the camera.

CDR-LM 19K, Houston. We're GO coming up on 8.

04 14 17 55 LMP-LM Okay. The old camera's on, Gordy. Believe it or not.

04 14 17 58 CC How about that. You're GO at 8. Monitor fuel, 2.

LMP-LM Fuel 2, 27. That's good.

CDR-LM Come on, baby.

04 14 18 13 LMP-LM Okay, at 08:30, Geno.

04 14 18 17 CDR-LM Okay, I got the South Massif.

04 14 18 21 LMP-LM Okay, update the AGS, Houston? ...

CDR-LM Yes.

CC That's affirmative; update the AGS.

04 14 18 35 CDR-LM Okay, Gordo, I've got Nansen; I've got Lara; and I've got the Scarp. Oh, man, we're level with the top of the Massifs, now.

CC Roger.

CDR-LM Okay, 151 - 1510 ENTER. Okay, Jack, - -

04 14 18 53 CC Challenger. You're GO at 9.

CDR-LM - - pitchover is at 24; 24 is pitchover.

04 14 18 58 LMP-LM Okay, Gordo, we're out of 11,000 at 9. Okay, stand by for pitchover. Oh, are we coming in. Oh, baby.

04 14 19 11 LMP-LM ... through 9000.

04 14 19 12 CDR-LM Stand by for pitchover, Jack.

Tape 74A/14

04 14 19 14 LMP-LM 8000.

04 14 19 15 CDR-LM I'll need the PRO.
LMP-LM I'll give it to you.

04 14 19 18 CDR-LM Pitchover.

04 14 19 19 LMP-LM There it is! PROCEEDed.

04 14 19 21 CDR-LM And there it is, Houston. There's Camelot! Wow!
Right on target.
LMP-LM I see it.
CDR-LM We got them all.

04 14 19 26 LMP-LM Forty-two degrees, 37 degrees through 5500,
38 degrees - -

04 14 19 32 CC Challenger, you're GO for landing.

04 14 19 34 LMP-LM - - 5000 feet, 40 - 42 degrees through 4000, 47 now;
47 degrees through 3500; 49 degrees; 3000 feet,
53 degrees.

04 14 19 54 CDR-LM Okay, I've got Barjea; I've got Poppy; I've got
the triangle.

04 14 19 59 LMP-LM At 2500 feet, 52 degrees. The H-dot is good. At
2000, H-dot is good. Fuel is good. 1500 feet,
54 degrees, Gene. Approaching 1000, approaching
1000 feet, 57 degrees. Okay, you're through 1000,
and I'm checking - radar altitude and PNGS
altitudes agree. You're through 800 feet. H-dot's
a little high.
CDR-LM Hey, I don't need the numbers any more.

04 14 20 32 LMP-LM Okay, you're 31 feet per second, going down
through 500; 25 feet per second through 400.
That's a little high, Geno.
CDR-LM Okay.

04 14 20 42 LMP-LM 300 feet, 15 feet per second. A little high.
H-dot's a little high.

04 14 20 51 CDR-LM Okay. I've got P66.

04 14 20 55 LMP-LM Okay; 9 feet per second, down at 200. Going down
at 5. Going down at 5. Going down at 10. Cut
the H-dot. The fuel's good. 110 feet. Stand by
for some dust. Little forward, Gene.

CDR-LM ...

04 14 21 15 LMP-LM Move her forward a little. 90 feet. Little
forward velocity. 80 feet, going down at 3.
Getting a little dust. We're at 4 - 60 feet,
going down about 2. Very little dust. Very
little dust, 40 feet, going down at 3.

04 14 21 42 CDR-LM Stand by for touchdown.

04 14 21 43 LMP-LM Stand by. 25 feet, down at 2. Fuel's good.
20 feet. Going down at 2. 10 feet. 10 feet -

04 14 21 58 LMP-LM CONTACT.

04 14 22 03 LMP-LM *** op, push. Engine stop; ENGINE ARM; PROCEED;
COMMAND override, OFF; MODE CONTROL, ATT HOLD;
PGNS, AUTO.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 14 22 56 CMP Hey, Challenger; this is America. I heard you all the way down. That's great. Beautiful.

04 14 26 21 CC And, America; we have a STAY for T-1.

CMP Challenger - understand a STAY for T-1. Good.

04 14 31 17 CC And, America, I have a pan camera photo pad whenever you're ready for it. It'll go on page 129.

04 14 33 33 CC America, Houston. The LM has a STAY for T-2.

CMP Hey, okay. Great. STAY for T-2. Beautiful.

CC Okay, and I - -

CMP Looks like they hit the right spot?

CC Yes. They must be right in there. And I got your pan camera photo pad, whenever you're ready for it on 129. That's page 129. Excuse me.

CMP Okay. Just a second.

CMP Okay. Ready to copy.

04 14 34 19 CC Okay. T-start: 114:03:11; T-stop: 114:33:18.

CMP Okay. T-start: 114:03:11; stop: 114:33:18.

CC Okay. That's correct.

04 14 35 08 CC And, America, we're ready for the HIGH GAIN to AUTO.

04 14 35 15 CMP Okay. You have it.

04 14 37 05 CMP Yes. It's a good thing it's in the sextant because you can't see it in the telescope. The Earth is in the field of view.

CC Are you able to get something in the sextant, or would you like for us to look for some new stars and attitudes?

Tape 74B/2

CMP No. You can see them in the sextant real well, Ken. You just can't see them in the telescope.

CC Okay. That's a mighty pretty thing to look at in the telescope, though, isn't it?

CMP Yes, it sure is.

CMP You know, I noticed there's even a lot of difference in earthshine and - and in the double umbra. You get in earthshine on the thing, and it's - it's hard to see the stars even if you don't have the Earth in there.

CC Yes. That - that makes a surprising difference.

CMP The double umbra on the back side of the Moon - Yes. The double umbra on the back side of the Moon is even better than the simulator (laughter).

04 14 39 36 CMP Okay. If those look good to you, I'll torque at 20.

CC Okay. That looks good.

04 14 45 18 CMP Okay, Houston; this is America. I think I'll go ahead and use a shaft, 200.12, and a 57.470.

CC Okay. We copied that.

CMP That's for the COAS cal.

CC All righty. That thing flies a little better than the simulator on that, doesn't it?

CMP Yes. It sure does. It's outstanding, as a matter of fact. You can even see the star out here.

CC Yes, it's a rather wondrous thing. When you get around to it, I've got a HYDROGEN tank I call. I'd like to have you turn that to OFF.

CMP Okay. Let me get started here in the P20 attitude.

CC Sure thing.

04 14 48 01 CMP Okay. GO on the H₂ ... TANKS.

CC Okay. That's HYDROGEN tank number 1 should be turned OFF.

04 14 48 26 CMP Okay. H₂ FANS, number 1, OFF.

CC Okay. And I missed seeing you set the VERB 44. Did you get that one in?

CMP Yes. I did it while I was doing the P52 for pericynthion. I'll do it again.

04 14 48 56 CC Okay. It's all - it looks good, Ron.

CMP Okay.

04 14 49 12 CMP And RENDEZVOUS TRANSPONDER is OFF.

CC Okay. Thank you.

04 14 50 28 CMP Okay. PAN CAMERA POWER is coming OFF.

CC All right.

04 14 50 41 CMP And the VHF is OFF to RECEIVE ONLY - is OFF.

CC Okay. And Olso's [?] standing here with baited breath.

CMP He's ready to go to work, isn't he?

CC Yes. He's chomping at the bit.

04 14 51 07 CMP Okay. We're in DEPLOY/RETRACT. Circuit breakers are IN.

04 14 51 11 CMP SM/AC POWER's ON, and those circuit breakers are IN. So 181's squared away.

04 14 51 27 CMP Okay. DATA SYSTEM is going ON.

CC Okay.

04 14 51 33 CMP IR is going ON.

04 14 51 37 CMP UV is going ON. Okay. Let's open a few covers.

04 14 52 08 CMP Okay. MAPPING CAMERA. LASER ALTIMETER. Barber pole, and then a gray.

Tape 74B/4

04 14 52 18 CMP IR; barber pole, and a gray.

04 14 52 26 CMP UV COVER; barber pole, and a gray. And we'll try timing the old mapping camera. See how she does this time.

CC Okay.

CMP I'll watch it. Okay. 3, 2, 1 -

04 14 52 50 CMP MARK it.

04 14 52 52 CC Okay. Got my clock running.

CMP Okay.

04 14 55 01 CMP Still barber pole.

CC Yes. We're commenting on the same thing. We don't have any data yet, but ... - -

CMP (Laughter)

CMP Hey, it went gray.

04 14 56 10 CMP MARK it.

CC Okay. Thank you.

CMP About 3 minutes and 20 seconds, wasn't it?

CC Yes, sir. 03:21. Okay, Ron. And before we get started this morning, we skipped the Lithium canister, and that was back at 108 hours and 10 minutes on page 3-109. So, at your convenience, you might want to catch up on that one.

CMP (Laughter) Okay. Do you have it handy there? What it is? Which one?

CC Yes. Just a second. I'll read it to you.

CMP Can you just tell me?

04 14 57 00 CC Okay. We wanted to take 11 into A, and stow number 9, which you're going to take out, into A-9.

CMP Into A-9. Okay. That must be where 11 is then.

CC Eleven should be in - Yes, okay. Get all of you
in A-9 now, hopefully.

CMP (Whistling)

04 15 01 01 CMP Okay. The old lithium hydroxide canister's changed.

CC Okay. Thank you.

CMP And, Ken, can you give me a hack on Houston time
there? Or Greenwich mean time or something so I
can set my watch?

04 15 02 16 CC Okay. I'll give you Houston time. It's
14:35:21 - 2 - 3 - 4 - 5.

CMP Okay. Mighty fine. Thank you.

04 15 03 25 CC Okay, America. We're about 3 minutes from LOS.
All systems look good. And G&C has noticed that
you've got the OPTICS not in ZERO, and next time
you're down that way, it would make everybody feel
better if you'd put it there. It's not - not some-
thing that you have to do right away.

CMP (Laughter) Okay. Will do. Good way to keep me
honest.

04 15 03 58 CC And a ... to that.

04 15 24 XX BEGIN LUNAR REV 14

04 15 52 15 CC America, Houston.

CMP Do-de-do-do. Looks like we're about to acquire.

CC America, Houston.

CMP 33:18 is stop time. No, no. That's better than
having a trail. Let's try it. Cantaro [?].
Whoops. Good work. There it goes. Just about
to make it.

04 15 53 22 CMP MAP CAMERA is STANDBY.

Tape 74B/6

04 15 53 37 CC America, Houston. We're reading you. How us?

04 15 53 44 CMP Okay. Just about have you, Houston - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 14 22 11 CDR-LM Okay, Houston. The Challenger has landed!

CC Roger, Challenger. That's super.

LMP-LM Okay, Parker valves - Boy, you bet it is, Gordo.

CDR-LM Boy, when you said shut down, I shut down and we dropped, didn't we?

LMP-LM Yes, sir. But we is here; man, is we here. How does that look?

CDR-LM That looks good.

04 14 22 35 LMP-LM Pressure - pressures look great. Tank 2 is down just a little from before.

04 14 22 40 CDR-LM The ENGINE OVERRIDE is OFF ... - -

04 14 22 41 LMP-LM Manifold is great. Manifold is right on. Get - go to JETS.

04 14 22 44 CDR-LM Okay. I am JETS.

LMP-LM Okay. That side's complete. Houston, you can tell America that Challenger is at Taurus-Littrow.

CC We'll do it.

CDR-LM Ron, I had the meatball all the way. Jack, are we going to have some nice boulders in this area.

04 14 23 08 LMP-LM Okay. The old camera's off.

CDR-LM Okay.

04 14 23 12 LMP-LM LANDING RADAR breaker, OPEN. Checking the water. And, Gordy, ascent tank 1, we started out a little low. It's still - same place. That's water.

CC Roger, Jack.

Tape 75A/2

04 14 23 28 LMP-LM Batteries look good.
CDR-LM Oh, man. Look at that rock out there.
LMP-LM Absolutely incredible. Absolutely incredible.
CDR-LM I think I can see the rim of Camelot.
CC Roger.
CDR-LM Epic moment of my life.
LMP-LM Where'd you land? You never let me look outside at all. Hey, you can see the boulder tracks.

04 14 23 58 CDR-LM Okay, Gordy. We're standing by for your GO. We look good. We're looking good on board.
CC Okay. You're looking great here so far.
LMP-LM There are boulders all over those massifs. Gosh, look at that propellant. We could have gone all around and looked around.
CDR-LM We should have hovered around a little bit; gone and looked at the Scarp.
LMP-LM No, thank you.
CDR-LM (Laughter)
LMP-LM I like it right where we are.
CDR-LM Okay, Gordy. While you're - while you're waiting on that GO, I had to - I - I shot for a spot, around 2 o'clock from Poppy. There's a number of boulders out at 12 o'clock from Poppy, and I really think I'm probably not more than about 100 meters out in front of it - and slightly to the north. Actually, I may be a little bit closer to Trident than I expected Poppy to be. I - I think I've got Trident right out the left window. And our first cut at the mobility around here in the Rover. It ought to be super.

CC Okay. Sounds good.

LMP-LM But I tell you, the massifs and Bare Mountain are two different products.

CDR-LM Do look it, don't they?

LMP-LM Of course, they're different slopes, too.

CDR-LM I think you're looking - probably - that may be Rudolph, right there, Jack, out your window. I was looking more at those boulders and trying to stay in the spots in between them than I was - -

LMP-LM Yes, you did great, Gene.

CDR-LM - - relationship to that crater. Man, there was practically no dust, just a little bit of a film; you had the ground, all the way to the ground.

LMP-LM Yes. I could call touchdown on the shadow. Look at that. Really here.

04 14 25 44 CDR-LM (Laughter) Okay, Gordy. We're hanging in for your GO.

LMP-LM It better be a GO. I'll check everything again. Let's just doublecheck.

CDR-LM Okay.

LMP-LM That hasn't changed.

CDR-LM Okay, that's good.

04 14 25 55 LMP-LM Those - the manifold hasn't changed. The RCS hasn't changed. Ascent water hasn't changed. The batteries haven't changed.

CDR-LM Oh, my golly.

LMP-LM Only we have changed.

Tape 75A/4

CDR-LM You know the - you can't see into Camelot, Jack;
that rim is - is Camelot out in front of us.

LMP-LM Yes.

CDR-LM You ... - -

04 14 26 16 CC Challenger, you'll be glad to hear you're STAY
for T-1.

CDR-LM Gordy, you're a smooth talker, you know it?

LMP-LM Very good.

04 14 26 25 CDR-LM We are STAY for T-1.

LMP-LM Okay. You can forget all I told you about
VERB 22 NOUN 46.

CDR-LM What was that? (Laughter)

04 14 26 37 LMP-LM Okay. Let's find out where we are. Engine stop
is reset.

04 14 26 42 CDR-LM Okay. The AGS is ready for us if we need it.

LMP-LM Okay. I need a P12 time as soon as I get 60 - -

CDR-LM Okay.

04 14 27 02 CDR-LM Okay, Gordy. You're looking at NOUN 43. Copy
that down, Jack, right here.

04 14 27 09 CC Okay. We've got it.

04 14 27 11 LMP-LM 20 21 and 20 21 and 30 75, and I'm going to P12.
Okay. I need a P12 time from you.

CDR-LM Okay. For T-2. For T-2, the time is 113 - -

LMP-LM Okay.

CDR-LM 14 - -

LMP-LM 14.

CDR-LM 24.91.

LMP-LM 4.91.

CDR-LM Yes, sir.

LMP-LM I can't feel any difference between 1/6g and anything else right now.

CDR-LM Well, you still got your restraints on. (Laughter) Okay. 113:14:24.91. You happy with that?

LMP-LM That looks good, sir.

CDR-LM Okay.

LMP-LM I got to change these numbers. You didn't get an update on NOUN 76, did you? I don't think so.

CDR-LM No. No.

LMP-LM Okay.

CDR-LM No. Okay; 5515. Hello, Gordy. How would you like me to handle R-3 of NOUN 76?

04 14 28 26 CC Stand by. I'll come back to you.

CDR-LM Okay. Oh, that radar performed super.

LMP-LM How was the view on the way down, Gene? (Laughter)

CDR-LM You know, after we pitched over, I was just looking for a place to land. I'm not sure. I just didn't want to hit one of those boulders out there which would have been as easy - and look at that. Look at right in front of us. I didn't want to land there either.

LMP-LM I see that one right in front of us.

CDR-LM You see that? ... a boulder, a hole.

LMP-LM Where's the hole? I can't see the hole - -

Tape 75A/6

04 14 28 58 CC Challenger, Houston. R-3, cross range, is okay as is.

LMP-LM Okay. Okay. We're coming up - -

04 14 29 11 CDR-LM We're in posture for a T-2, Gordy.

CC Roger.

CDR-LM Okay. I can see the Scarp. I can see Hanover. Good thing we didn't plan to go to Hanover. (Laughter) It's steep.

LMP-LM Look at the boulder - halfway up the hill.

CDR-LM Yes.

LMP-LM Not halfway, just enough - -

CDR-LM Yes, the boulder tracks - they're beautiful.

LMP LM It's sitting right there in the end of the tracks. There are tracks all over that hillside. There's a boulder came right down to the surface there. See it?

CDR-LM Yes.

LMP-LM That one right through that little crater -

CDR-LM Yes.

LMP-LM - - sitting right there for us to sample. Look at it.

CDR-LM Yes, sir. I'll bet Bare Mountain and the Sculptured Hills are the same.

LMP-LM Yes. They - Well, the slope's different. We'll have to look at it from outside. You may be right. Now I see why they call them sculptured. My gosh, they're so hummocky that there's shadow all over them.

CDR-LM Yes.

LMP-LM Gosh, there are some holes and rocks around here. Who told me this was a flat landing site?

CDR-LM It is flat. For crying out loud. What do you want, an airtight guarantee?

04 14 30 14 LMP-LM Let's see, we got about 2 degrees left and about 5 degrees pitchup.

CDR-LM We're about what - about 100 meters from Trident?

LMP-LM Yes - yes, less than that, I think Trident's right here. Our shadow's about 100 feet, Geno, I think.

CDR-LM Yes, we're only about - yes, less than 100 meters then. It doesn't look that long, but it ... - -

LMP-LM Yes, there are some holes I'm glad I didn't land in around here, I'll tell you.

CDR-LM Now, if you look at the massif, Jack. I don't know if you can see it over here. You see, they're almost like a series of linear boulder tracks, but they come crossways down the slope. So it looks like there may very definitely be some - some jointed - There's outcrop on top the massif, too.

LMP-LM Oh, it sure looks like it, gray outcrop. And there's a bluish gray compared to the - the brown or tan gray of the massif side.

CDR-LM And a lot of that boulder is - a lot of that outcrop down on the bottom is boulder.

LMP-LM Yes. Do you know what that reminds me of, way up on top - that outcrop? It reminds me of sunset where you could just get a little piece of outcrop around the corner.

CDR-LM That's right.

04 14 31 25 LMP-LM Okay. Let's see what we're doing. We got 3 minutes for T-2. Let's take another check.

Tape 75A/8

CDR-LM Okay. I just looked at them.

LMP-LM Okay. Ascent looks good.

04 14 31 36 CDR-LM Gordy, I noticed something ever since we've landed. The oxidizer quantity went from - from 7 or 8, and now it's down to 2, and the fuel has stayed constant.

CC Roger.

CDR-LM And the QUANTITY light came on somewhere, I believe, after we landed.

LMP-LM Yes, it did. I noticed the QUANTITY light also. I was thinking reg light, though, when I saw it. Oh, man.

CC Challenger, we'll have a story on that for you later. We don't think we were really low level.

CDR-LM Okay. It doesn't make any difference now, Gordy, expect to talk about when we get home.

CC Roger.

04 14 32 27 CDR-LM And we're 2 minutes and counting to T-2.

CC Roger.

LMP-LM We better hurry if - you're going to give - they're going to give us the GO.

LMP-LM How about some water?

CDR-LM Yes, you can zap me.

LMP-LM Oh, I tell you. That's something everyone's got to do once in their life. I want to - We're not going to have much time for T-2 - -

04 14 33 18 CC Challenger, Houston. You're STAY for T-2, and GO for the DPS vent.

LMP-LM Okay.

CDR-LM Okay. Understand. STAY for T-2, and GO for the
DPS vent. Let me get out of - Okay, we can't
hack that. I'm going to get out at 12.

LMP-LM Excuse me, Gene.

04 14 33 46 CDR-LM Okay. You can unzip that water, if you'd like.
And let's go off VOX. Let's go on PTT.

04 14 34 41 CDR-LM Okay. REG 1 is CLOSED, Houston; OXIDIZER FUEL
VENTS coming OPEN.

CC Roger.

04 14 34 45 CDR-LM MASTER ARM, ON. MASTER ARM's coming ON. Okay,
Gordo. I got two good lights.

CC Roger.

CDR-LM DESCENT VENT, FIRE. Okay -

04 14 35 01 CDR-LM MARK it. Now we did not hear anything on that
one, Gordy.

CC Roger.

04 14 35 11 CDR-LM ... pressure's coming down, though. Pressure's
coming down.

04 14 35 17 LMP-LM Okay. MASTER ARM, OFF. Okay. We'll monitor
oxidizer pressure until 20 to 40, and then OX VENT,
CLOSED; fuel pressure to less than 8. FUEL VENT.

04 14 35 28 CDR-LM DESCENT QUANTITY light - REG light. Excuse me.

04 14 35 36 CDR-LM Okay. MODE CONTROL, two to ATT HOLD. Well, we
just keep going, I guess.

LMP-LM Yes. Hey, we can press on. Okay. Okay. Now
wait a minute. Here we go. Let's get that. Go
up here first, because I haven't selected it.

04 14 36 03 LMP-LM Okay. ECA CONTROL is CLOSED. Three is back on.

Tape 75A/10

04 14 36 11 LMP-LM BATTERY 5 is OFF/RESET, and it's off the line.

04 14 36 18 LMP-LM BATTERY 6, OFF/RESET, and it's off the line. INVERTER number 2 breaker is IN. INVERTER 2. Let me check the voltage. Voltage is great. Okay. Keep going.

04 14 36 41 LMP-LM DESCENT ENGINE OVERRIDE's OPEN. ASCENT ECA CONTROL's OPEN. CWEA cycling, cycled; both lights are out. Okay. Cabin pressure is good. Okay.

04 14 37 04 LMP-LM And then, A and B going to CABIN. A is to CABIN. B is to CABIN. PULL-EGRESS. RETURN is EGRESS. REPRESS going to AUTO. Stand by for a noise.

04 14 37 29 LMP-LM There you go. It's in AUTO. Okay. Now it's your turn. Verify - Wonder where it's going? (Laughter) Out, I guess.

04 14 37 51 LMP-LM INVERTER 2 is selected. Okay. And DECA POWER, OPEN. And guess what? Take your helmet and gloves off.

04 14 38 59 LMP-LM Okay, Gordy. We're in 1-1. Helmets and gloves are off. DIVERTER VALVES are IV.

CC Okay. We're right with you.

04 14 39 16 LMP-LM And you're looking at NOUN 20.

LMP-LM Window shades are going close. I just - I'm using it instead of a light switch because I've got it covered up.

CDR-LM Gordy, you got NOUN 20?

04 14 40 26 CC That's affirmative. We copy NOUN 20.

CDR-LM Okay. Jack's going to pick up the AGS - on the right side of that page, and I'll part the antenna.

CC Roger.

04 14 43 01 CDR-LM P20's in work. Correction, P57's in work.

04 14 43 13 CC Challenger, Houston. Your DPS OXIDIZER PRESSURE is 40 or less. You can close it.

CDR-LM Thank you, Gordy.

CDR-LM Gordy, while the P57 is doing its gravity work, let me say that the LNA and the landing site, from a relief point of view, I - I think, are identical. I - I couldn't say enough for the LNA. I actually didn't look around nearly as much as I thought I would, or as I wanted to, because I had fixation on - on a reasonable spot to land. They're not all reasonable in that there's some very subtle hummocky-like craters right in and around where we are. And there's not a - a lot of boulders laying on the surface, but there's a lot of what appear to be boulders that are covered up by some of the dark mantle. Numerous enough that you would not like to take a chance at putting a - a pad down on one of them or in one of those hummocky subtle craters. As a result, I really didn't have a chance to look all around at where I wanted to except to put the bird down where I wanted it.

CC Okay. We've got no complaint with that.

CDR-LM I guess the thing that probably - probably surprised me most about the site, as far as landing is concerned, is the fact that there were these - these - I hesitate to say they're outcrops but certainly they're buried massive pieces of rock - whether they're boulders or not, we'll have to find out - out here in the plains area, partially covered and filleted by the dark mantle. And I expected to find a number of craters, but I guess I really didn't expect to find - to find the - the rock types around. And we're talking about anywhere from 1 to 2 meters down to - oh, 2 or 3 feet, which when they're sticking out and on the sides of some of these subtle craters look pretty menacingly. But that probably is the one thing that surprised me most.

CC Roger, Gene.

Tape 75A/12

04 14 45 49 CDR-LM The visibility prior to pitchover was such that I could see Nansen. I could see the Scarp. I could see Lara. I could not see Camelot until after pitchover. However, once I had pitchover, if I could have froze it right there like we do in the simulator occasionally, I could have picked out everything there was to see. Even at 6000 feet, the small triangle with Frosty and Rudolph and Punk were visible to me. I had - I had Poppy from orbit, as a matter of fact, so it was - easily - easy to see. Barjea was a very sharp round crater just as depicted on the LNA. The thing I really didn't get a good look at, because I didn't pay too much attention to it, was from Trident on to the south.

CC Roger.

LMP-LM Gordy, this is the LMP. Let me say - Gordy, this is the LMP. Let me say that the inside of the spacecraft looked just like the simulators.

CC Very good, Jack.

CDR-LM Another interesting thing, Gordy. All the way through PDI prior to pitchover, Jack and I had - had the real America - or the other America - right out - smack out the front window all the way down, which was pretty spectacular.

04 14 47 21 CC I bet it was. And you can consider yourself STAY for T-3.

CDR-LM Thank you, sir. You're getting smoother all the time. If you're happy with NOUN 22, I'll PRO.

CC Stand by 1.

04 14 47 46 CC You're clear to PRO.

04 14 48 41 LMP-LM Okay, Gordy. I had the angles matched on the steerable and went to SLEW, and they - it held for a few seconds and then dropped off.

CC Okay. It looks pretty good. You might try to peak it up just a little more.

04 14 49 01 LMP-LM No, we're on an omni now.

CC Roger.

04 14 49 12 LMP-LM I'll try the steerable one more time here.

CC Okay, you should be - -

04 14 49 22 LMP-LM Okay. We're on the steerable, and I'm not going to touch it.

04 14 49 35 LMP-LM It's steerable and SLEW, and I got 3.8.

CC Okay. That looks good to us, Jack.

CC Jack, we'd like you to verify the TAPE RECORDER, OFF.

04 14 50 12 LMP-LM Yes, that's verified, Gordy.

LMP-LM Gordy, how does the fuel vent look to you?

04 14 51 04 CC Okay. Looks like 8 to us. You can go ahead and close it.

LMP-LM Anyway, it - Okay. I already did.

04 14 58 28 CDR-LM Gordy, I - I guess I'm puzzled on that one. I had the right star. You see anything we did wrong?

CC Stand by. We're checking.

04 14 59 52 CC Gene, our only guess is that you might have loaded NOUN 88 wrong. We'd like you to start over, and we'll watch you real close again.

04 15 00 05 LMP-LM Gordy. Listen, I think we know what we did. We loaded SPRL for CRSR, and CRSR for SPRL. How would it be if we went through the P57 again and - Yes - we'll - I guess we got to do it all over. Those old numbers are no good anymore.

CC Okay.

Tape 75A/14

LMP-LM I - you can - I'm sure that's what we did. We loaded CRSR for SPRL, and SPRL for CRSR.

CC Okay. And it's our fault, too. We should have watched that.

04 15 01 51 CC Jack, this is Houston. We do have the pre-PDI AGS cal numbers. You won't need to read them to us.

LMP-LM Okay.

CDR-LM Gordy, you going to want a recycle on this gravity measurement? I doubt if it'll need it.

CC Stand by. No, no recycle necessary this time through.

CDR-LM Okay.

04 15 02 32 LMP-LM Gordy, ED BATs are 37.2.

CDR-LM Gordy, let me comment about the handling of the bird. After you once fly it around in orbit a little bit, you get accustomed to the thrusters, and it - it came back to me quite a bit from 10, anyway. And you get a feel for acceleration and deceleration as well as the attitude hold capability. And it really - the response, even with a heavy descent - descent stage near the surface - is phenomenal. Responded exactly in the direction I wanted, held attitude very good. And, let me tell you, the LLTV plays no small part in this landing as far as I'm concerned.

CC Roger, Gene.

04 15 03 45 LMP-LM Okay. NOUN 22 again. I'll go ahead and torque them.

CC Okay. Go ahead.

04 15 10 18 CDR-LM Okay, Gordy. It's a little better.

CC Roger. Looks good.

04 15 10 28 LMP-LM Computer is NOUN 93.

04 15 10 48 CC Okay. Torque it.

CC Challenger, Houston. We're standing by for the dumps.

04 15 11 38 LMP-LM Okay, Gordo. I'm ready to give the E-mem - Coming at you -

04 15 11 46 LMP-LM MARK it. It's on the way.

04 15 12 58 CDR-LM Gordy, one other thing about the landing. I saw the light, I think. And I heard Jack call it - the CONTACT light. I think I waited about a second and - and hit the stop button. She shut down immediately. And, of course, you could feel the fall. I don't really feel we fell that much, but it was quite a change in acceleration at that point.

CC Roger, Gene.

CDR-LM And I guess I had, from what I would guess, a foot or 2 for - per second forward on that one.

CC Okay. Sounds good.

CDR-LM And let me know when I can have the computer, please.

04 15 14 13 CC Okay. It's your computer. And I'm standing by with parking angles when you're ready to load them.

CDR-LM Okay. We'll be ready in a second.

LMP-LM Go ahead with the angles.

04 15 15 02 CC Okay. These are the IMU parking angles. Plus 295.86. I see you're loading the radar. Do you just want to load these or write them down?

LMP-LM Go ahead. I'm writing.

04 15 15 29 CC Okay. Y will be plus all zeros. And plus 084.14. Over.

Tape 75A/16

LMP-LM Okay. NOUN 20 will be plus 295.86, plus all zeros, plus 084.14.

CC That's correct.

04 15 16 16 LMP-LM Okay, Houston. I'm going to power down the AGS, if you're willing.

CC Not yet, Jack. We'd like you to read out 047 and 053 to us.

LMP-LM Okay. You want the new ones.

04 15 16 46 CDR-LM Okay, Gordy. If you're happy with NOUN 22, I'll ENTER them.

CC We're happy.

CDR-LM Okay. And it just dawned on me. I'm sorry about the zero on the NOUN 69. (Laughter)

CC That's okay. You're forgiven.

CDR-LM I appreciate that.

04 15 17 24 CC Okay, Jack. We got 047 and 053.

LMP-LM Okay. Am I GO to PULL the breakers?

04 15 18 01 CDR-LM Okay. Are you happy with NOUN 20?

04 15 18 14 CC Okay. We're happy with NOUN 20, and you're clear to power down the AGS.

LMP-LM Okay.

04 15 19 37 LMP-LM Gordy, the breakers are coming OPEN on 1-4 and 1-5.

CC Roger.

04 15 22 11 CDR-LM Gordo, we're on 1-6.

CC Okay. Thank you.

04 15 31 31 LMP-LM Okay, Houston. We're at the bottom of 1-8, and I'm standing by for your lift-off times.

04 15 31 38 CC Okay, Jack. Lift-off time for rev 15 is 116:55:51; 16 is 118:54:28; 120:53:04; 122:51:40; 124:50:17; 126:48:53. Over.

04 15 32 27 LMP-LM Okay. Starting with rev 15, 116:55:51; 118:54:28; 120:53:04; 122:51:40; 124:50:17; 126:48:53.

CC That's a good readback.

04 15 35 11 CDR-LM Gordo, the PLSS is against the hatch, and we're installing the BRA.

CC Roger on that.

04 15 48 22 CC Challenger, Houston. We've got three questions for you to help pin down your exact position, any time it's convenient. Maybe when you're taking the out-the-window pictures. Over.

CDR-LM Okay, Gordo. I think we can give it to you. Why don't you wait? We're just getting the - the mag bag out and jett bags out from behind the engine cover here, to give you an idea where we are.

CC Okay. No hurry at all.

CDR-LM I had it pinned down for you, until I got to about 500 feet, when I changed my mind.

CC Roger.

04 15 50 17 CDR-LM Gordy, we're not going any further, and we'll answer your questions here when we get some time. My best guess is 150 meters from Poppy at 1 to 2 o'clock.

CC Okay. We copy that.

CDR-LM And I'll bet on that one. But we'll get with you in a minute.

CC Okay. 150 north-northwest of Poppy.

Tape 75A/18

CDR-LM Yes. Mostly west, but slightly north.

CC Roger.

CDR-LM I'll tell you the - we're abeam, I think, just about abeam of Trident 1. I can see it out there, but I can't really define Trident 1 from Trident 2. And the thing that is a little different is that I appear to be closer to it than I normally would have expected to be.

CC Okay.

LMP-LM That's probably as close as the Navy Captain could ever guess where he is anyway.

04 15 51 56 CC Roger. (Laughter)

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 15 53 03 CMP Just about to make it.

04 15 53 23 CMP PAN CAMERA to STANDBY.

CC America, Houston. We're reading you; how us?

CMP Okay; just about have you, Houston. But not quite.

CMP Not quite.

04 15 56 01 CMP ... vent's closed. Okay, Houston. This is America. Looks like we have you for good now.

CC Roger. Ron, you're looking great. We need a - words on the spacecraft condition. We got a couple of rockets out at White Sands ready to launch for a UV calibration, and we need the GO from you on that.

CMP (Laughter) Yes, I'm great up here. They're not going to try to hit me, are they?

CC No, babe. We wouldn't do that. These are a couple of calibration rockets on Aerobee.

CMP (Laughter) Okay. Sounds great. Tape motion has stopped, by the way. And I'm ready to charge battery B.

CC Roger. That's a GO on that.

CMP By the way, battery - Okay - the battery compartment pressure went up to 0.8 after 3 or 4 days here.

CC Roger, Ron. We copy that.

04 15 57 18 CMP Okay. BUS TIES are OFF; PYRO BUS TIES are OPEN. Let's see about BUS A and B. I think those are OPEN. Yes, they're OPEN.

04 15 57 40 CMP Okay; RELAY BUS BAT B is OPEN - coming OPEN. Getting around to battery charger. BAT CHARGE to Alfa and then to Bravo. Both about 30.

Tape 75B/2

CC Ron, we're ready for bat - PAN CAMERA POWER, OFF.

04 15 58 24 CMP Okay. PAN CAMERA POWER is OFF. And - let's see. Is the time for the lunar sounder stuff?

CC Got about 3 minutes on that, Ron.

CMP Okay.

CMP You know, all I did was eat for 3 days. And now I don't even get a chance to eat.

CC Roger. You getting hungry?

CDR I've had two gingerbread bars and a brownie, so far.

CC Yes. We're going to keep you busy.

CMP (Laughter) Okay. That's good.

CC I understand they left you some scissors so you can eat. Huh?

CMP Yes, fortunately. I still got them. I even got them tied down this time.

CC Roger.

CMP Did Challenger figure out where they are? Are they pretty close to - the center of the ellipse?

CC They look like they're a couple of hundred meters short, Ron. No problem. They landed in a smooth area. And that's what counted.

CMP Oh, that's great.

04 16 02 11 CMP Okay. LUNAR SOUNDER OPERATE is in STANDBY. RECORDER is going ON. RADAR is going ON. RECORDER is gone OFF. OFF to center; not to HEATERS. And the MODE is going to VHF.

CC Thank you, Ron. I've got that pan camera photo pad any time you want it.

CMP Okay. Let's see, 116:30. Huh?

CMP (Humming) Okay; ready to copy.

CC Okay, Ron. T-start time: 116:31:10. T-stop time: 116:59:46.

CMP Start: 116:31:10. T-stop: 116:59:46.

CC Good readback, Ron.

CC Ron, we'd like the HIGH GAIN to AUTO.

04 16 04 09 CMP HIGH GAIN to AUTO.

CMP And, Houston; America here. I'm ready to do the LUNAR SOUNDER EXTEND test here for a while, if you want. Whenever your ready.

CC Roger. Stand by, Ron.

04 16 05 40 CC Okay, America. We're ready for the HF ANTENNA EXTEND test, and, just for your information, White Sands got one of the rockets off. The other one was a NO GO.

CMP Oh, okay. Good.

04 16 06 02 CMP Okay. HF ANTENNA 1. Barber pole. 1001, 1002. It's OFF. Gray. Okay; number 1, RETRACT, barber pole. Barber pole? No barber pole. Very interesting.

CMP Would you believe number 1 stuck out there?

CC Roger, Ron. We're seeing stall current right now.

CC Ron, we'd like to go OFF on HF ANTENNA 1. And standby on number 2.

CMP Okay; it's OFF, and, of course, it went gray again.

CC Roger.

CMP You say standby for number 2?

CC Stand by on that, Ron. Don't do number 2 yet.

Tape 75B/4

CMP Okay. I won't do it yet.

04 16 09 51 CC America, Houston. We'd like to try ANTENNA 1 again. We'd like you to go EXTEND for barber pole plus 3 seconds, then OFF, then RETRACT.

CMP Okay. We'll try that. HF number 1, EXTEND. 1001, 1002, 1003. It's OFF. And, of course, I got a barber pole as it was going up. Okay; you want to try RETRACT again?

CC That's affirmative.

04 16 10 32 CMP Okay. HF for number 1 to RETRACT, now. And a barber pole.

CC Ron, we'd like you to turn it OFF now.

04 16 11 14 CMP Okay; it's OFF, and the talkback is gray.

04 16 13 56 CC Ron, Houston here. On that one, we followed your RETRACT current in for 7 seconds, and then it went into stall; so it apparently is the track - it's retracting normally up to a point, and then goes into stall. We'd like you to press on and do EXTEND on HF ANTENNA 2. And we're going to press on here, probably thinking like maybe we won't get the antennas in. And on ANTENNA 2 - -

CMP Okay.

CC - - it's - it's according to the Flight Plan, barber pole plus 2 seconds.

CMP Okay; we'll go barber pole plus 2.

04 16 14 31 CMP Okay. Number 2, EXTEND. Barber pole 1001, 1002. Off. Okay; number 2 going to RETRACT, now. Barber pole 1001, 1002. Hey! Okay; it went gray - and back to OFF.

CC Roger. We copy that.

CC Okay, Ron. You're GO for the extending, and just a reminder on the Flight Plan, there's a RECORDER, ON, prior to the EXTEND there.

CMP Oh, okay; that's good.

04 16 15 28 CMP Okay. RECORDER's going ON. And we'll extend number 1. Let me get the clock going here. Okay; 3, 2, 1 -

04 16 15 44 CMP MARK it.

CC Currents are looking good. The extension is looking normal, so far. And the Aerobee rocket had some problem - -

CMP Okay; great.

CC - - and didn't get a chance to look at the Sun.

CMP Uh-oh.

CC And they're going to try and launch a couple more the day after tomorrow.

CMP Very good.

04 16 16 45 CMP Hey, I think I can see a light spot down there on the landing site where they might have blown off some of that halo stuff.

CC Roger. Interesting, interesting comment.

CMP It's between Sherlock and Camelot - between -

04 16 17 00 CMP Hey, it's gray now on the number 1 EXTEND.

CC Roger. We got it. And we got - we copy it's all the way out down here. You can to go OFF on that one.

04 16 17 08 CMP Okay; number 2 is going to - it's OFF. And number 2 is going to EXTEND.

CC Okay, Ron. The currents look normal on number 2 while it extends.

CMP Okay.

04 16 18 17 CMP Hey, I can see number 2.

Tape 75B/6

CC Roger. That's good show. It's going to be moving, Ron.

CMP All the way out there. It is?

CMP My window's all fogged up here, and can't see a thing.

CC Roger.

CC Okay, Ron. We show it all the way out - -

CMP Fogged up on the ... side ...

CC - - so you can go ahead and turn it off.

04 16 19 09 CMP Okay; we'll turn it off.

CMP Houston, this is America.

CC Go ahead, Ron.

CMP I didn't have my map there, but I was looking at the landing site, and as close as I can remember, it had to be somewhere around about DN 83.3 on the 200-meter scale, the TL25-8.

CC Okay, Ron. I'm coming up on some Flight Plan operations on the mapping camera that you might want to check.

CMP Thank you.

CMP Okay.

04 16 23 58 CMP Probably dark down there. MAPPING CAMERA to OFF.

04 16 24 49 CMP Okay; MAPPING CAMERA to STANDBY. LASER ALTIMETER, OFF. IMAGE MOTION, OFF. Barber pole; gray.

04 16 25 08 CMP MAPPING CAMERA to OFF.

04 16 26 09 CMP Let's see. PAN CAMERA SELF TEST, OFF. And it's after sunset. UV, OFF. IR is OFF. DATA SYSTEM is OFF. SM/AC POWER, we're going to get that OFF. SM/AC POWER is OFF. Okay; it looks like 12. LUNAR SOUNDER to OPERATE.

Tape 75B/7

04 16 29 01 CC America, while we're waiting for this lunar sounder to operate for 2 minutes, could you - could you say again those coordinates you gave us. I dug out the map TL 25-8, and I got the 83.3, but what was the azimuth coordinate on that, Ron?

CMP It was Dog November, and maybe just a little bit to the right of Dog November.

CC Okay; Dog November. Thank you. And you think that's where they are, huh?

CMP Yes.

CC Okay.

CMP Well, there's the - there's a real white spot down there, you know. And I didn't have - I only got a short - I only got a look at that thing for about 30 seconds before I had to do something else. But I'm just re - re - recalling in my mind where the - where the white spot is with respect to those - there's Camelot and there's Sherlock, and then from Camelot to Sherlock, there were two other craters, and they were just a little bit closer to Camelot, but between those two other craters there.

CC Good show. Roger.

CMP There's a white spot - yes, there's a white spot on the - like it might have been dust blowing or something, you know.

CC Roger. That may be the - the rocket exhaust. It might be just a little off that light spot.

CMP Yes.

CC Okay, Ron. We're ready for LUNAR SOUNDER, OPERATE to OPERATE. And if you'll give me a mark, I'll time it out for you.

CMP Okay. Stand by. 3, 2, 1 -

04 16 31 13 CMP MARK it. Barber pole; gray.

Tape 75B/8

04 16 33 15 CMP Okay; she's STANDBY. MODE has gone to HF. I'll select, I'm going to need Bravo. Too bad. Do old HIGH GAIN, MANUAL and WIDE. That's 12 and 211.

04 16 34 23 CMP Okay; minus 12, 211. HIGH GAIN ANTENNA POWER is OFF. BIT RATE is LOW. Okay; ready for the HF part of it?

CC Stand by, Ron.

CMP Okay; standing by.

CC Okay, Ron. You can go LUNAR SOUNDER OPERATE to OPERATE.

04 16 35 03 CMP Okay. OPERATE at 15. Barber pole and then a gray.

04 16 37 03 CMP SOUNDER to STANDBY at 17.

CC Roger.

04 16 37 09 CMP Okay; BIT RATE - BIT RATE to HIGH.

CC Stand by, Ron.

CMP May as well pull some film for - Okay; we'll stand by.

CC Okay, Ron. LUNAR SOUNDER OPERATE to OPERATE. We're all set.

CMP Okay. We'll make it at 17:40.

CC Roger.

04 16 37 43 CMP 17:40, went to OPERATE.

04 16 38 44 CMP 18:40. LUNAR SOUNDER, STANDBY.

CC Roger, Ron. Just for your information, whatever we could read down here was looking great.

CMP Hey, great!

CC Both HF and VHF look good, and we saw no visible interference on the CSM telemetry.

CMP Hey, outstanding! That's great.

CMP Now, if the old antenna would come back in, we'd be in good shape, huh?

CC Yes, sir.

04 16 39 56 CMP Okay; we're maneuvering to VHF test attitude.

04 16 46 26 CMP Okay, Houston. I'm about ready to press ahead, if you all are?

CC Stand by on that, Ron. Okay, Ron. We are all ready to press on.

04 16 46 53 CMP Okay. HIGH GAIN ANTENNA POWER is ON. We go to MANUAL and WIDE. Minus about 12, and YAW about 21 or something, 211. ... on the HIGH GAIN. Ah-ha, AUTO. Looks like it worked pretty good. Okay. MODE to VHF. Find it - there it is. MODE to VHF.

CC Okay, Ron. We're ready for LUNAR SOUNDER OPERATE to OPERATE.

CMP Okay. OPERATE at 28.

04 16 48 04 CMP OPERATE.

CMP Boy, you talk about night flying, this is the kind of night flying you want to do, by the full Earth.

CC Is that right?

CMP Beautiful out there.

04 16 50 04 CMP Okay. It went to STANDBY at 30.

CC Roger.

04 16 50 10 CMP MODE is gone to HF. RECORDER is OFF. Lose a little comm here, huh? Maybe. Okay; there's Bravo. Select OMNI. The HIGH GAIN at minus - MANUAL, WIDE. Minus 10 and 25 for AOS.

CC Okay, Ron. We're still riding you - reading you loud -

Tape 75B/10

04 16 51 08 CMP Okay; good. And HIGH GAIN ANTENNA POWER is going OFF.

CC Roger.

CC We just want to give you some fair warning, Ron. When you come around AOS next time at 116:30, it's a - Flight Plan update. We got quite a lengthy update on the Flight Plan - all orbital picture work, but quite lengthy.

CMP Okay. Are you going to try to pull that antenna back in first before we completely change the Flight Plan?

CC Ron, we're going to take a good hard look at that, and see if we can generate up either a test on that or what. That's kind of in limbo right now, Ron. These Flight Plan changes - -

CMP Oh, okay.

CC - - these Flight Plan changes I've got for you coming up later will be all some items Farouk has on camera pictures on the - that spot Jack thought he saw the light spot and a few other changes.

CMP Oh, okay.

CC And, Ron, just for your information, regardless of what we do on that antenna, we won't have any Flight Plan changes until after 144 hours due to that antenna.

CMP Oh! Okay.

CC Ron, we would like H₂ tank 2 FANS to ON.

04 16 54 00 CMP H₂ tank 2 FANS are ON, now.

CC Okay, Ron. You're lucky you're up there tonight, Ron. We're having really ratty weather down here. Low clouds and rain and drizzle and cold.

CMP Oh, really?

Tape 75B/11

CC Yes. You walk - you walk outside, you just about
can't see the top of building 2.

CMP Gee whiz! Guess I picked a good time to be gone.

CC That's for sure.

04 16 55 27 CMP Hey! You know, you'll never believe it. I'm right
over the edge of Orientale. I just looked down
and saw a light flash myself.

CC Roger. Understand.

CMP Right at the end of the rille.

CC Any chance of - -

CMP That's on the east of Orientale.

CC Roger.

CMP You know, you don't suppose it could be - Vostog [?]

CMP I'll be derved. I've got to mark that spot on the
map.

CC Ron, just before you leave, you're too bad to hear.
You're looking good as you go around the horn, and
we'll pick you up at 116:30. Voices will be pretty
marginal the rest of the way out.

04 17 00 27 CMP Just about to lose you.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 15 58 37 LMP-LM Okay, Houston, we're just starting our eat period. Sorry to be a little behind. PRD readings are 17037 and LMP is 24117.

CC Okay, Jack. We got that.

CC Would you verify your BIOMED, RIGHT?

LMP-LM Yes, that's verified. How does it look?

CC Looks good.

04 16 01 11 CDR-LM Okay, Gordy. We're starting to cut into a little lunch here and, if you've got any questions, why don't you come up with them now?

CC Okay. We're wondering if you can give us estimate of the angular position, clock position of Rudolph. And can you line up Rudolph with a horizontal feature out beyond it?

CC I - I should say horizon feature - out in the distance, not horizontal.

CDR-LM Okay. I thought Rudolph was right out there at 3 o'clock. Jack's looking at it and he said, yes, that is Rudolph right at 3 o'clock out his right-hand window.

CC Okay.

CDR-LM I don't know if it'll mean anything to you, but the shadow of the LM, the rendezvous radar antenna is pointing about one-third of the way down from the peak of Family. And that, I know, is pretty gross. And, Gordy, I - I must be right here abeam of Trident 1. The only reason I hesitate is that I'm so close - but it's probably, well I guess it's close to 100 meters - 80 meters anyway - to where the - where the rim of Trident 1 falls off. And I am abeam of the center of Trident 1, and that's the only possible thing it could be. And that would put Poppy just about where I expected it to be.

Tape 76A/2

- CC Okay.
- CC We just want to confirm. You're referring to Trident 1 as the easternmost part of Trident, is that right?
- CDR-LM No, sir, Gordo. It's always been the westernmost part of Trident. The - the landing site was on a line between Trident 1 and Rudolph and judging from what Jack's got on his right-hand window and what I got on my left-hand window we're right there, except possibly a skosh further south on that line.
- CC Okay, understand.
- LMP-LM And the target point that was in the PGNS was right up where we all had expected it to be about halfway between here and what we're calling the rim of Camelot. We can't see into Camelot; we can just see the rim of it. It's several - oh, at least 200 meters - 2 to 300 meters up there, I expect.
- CC Okay, what o'clock position is the west - the nearest part of the rim of Camelot? Or maybe if it's better defined - -
- LMP-LM 12 o'clock.
- CC - - Define the south rim. Can you see the south rim of it?
- CDR-LM Yes, Gordy, but it - it blends in so well; all we're seeing is a - an undulating high as the rim. And to the best of my knowledge, we've got the south rim at - or correction, the east rim right at 12 o'clock. Hey, Gordy, right at 12 o'clock also is a boulder that's at least 3 meters and maybe 5, and I wouldn't be a bit surprised if you can find it. It's on a line between us and the intersection of the South Massif and the Family Moun - Mountain horizon. Just slightly left of that line or south of that line. And that boulder ought to show up on your best photography.

CC Okay, Jack. We'll take a look. One other question - -

LMP-LM And it's at - it's at least - that boulder's at least 200 meters away.

CC Okay. Can you see the west rim of Trident, and can you give us a clock position on the west rim of West Trident?

CDR-LM Okay, Gordy. The west rim of Trident, which, by the way, is full of outcropping-looking boulders, is at 10 o'clock.

CC Okay, Gene - -

CDR-LM Okay, I can look back around the corner now and I can - I can see where the east - where Trident 1 rose up to its rim on the east side, and I would say we're abeam of a point - abeam of a point one-third the way from east to west up the center of Trident; that is, we're - we've covered one-third of Trident 1 and we're abeam of a point of a line that goes through the one-third point from east to west of Trident 1.

CC Okay, Gene; that's very clear. I think we've got you pretty well nailed down. And you're pretty close to the - the planned landing site.

CDR-LM Yes, I think it's very close to our planned landing site and I - I'm (chuckle) - I'm anxious to see where Poppy is, because I think what I said earlier is true.

CC Okay. That's all the questions now. Enjoy your dinner.

04 16 10 24 LMP-LM Houston, I have calmed down, but be advised that our dinner is corn chowder.

CC Roger.

CDR-LM He went to captain's mast for eating that the other day.

Tape 76A/4

04 16 16 09 LMP-LM Gordy, Houston; 17. How do you read - or Challenger or whoever we are?

CC Whoever you are; you're loud and clear.

LMP-LM I took the binocs and looked at some large boulders at our 12 o'clock position. They're probably on the order of a half meter to 2 meters, buried but without strong filleting. And most of them that I could see had the same mottled light-gray and medium-gray texture, and it looked like there's a lineation in it. And whatever the mottling is, it's on a frame size or fragment size of a - or a few centimeters, and it looks as if it's very uniform in that mottling; that is, there's one - one fragment size.

CC Okay.

LMP-LM There are a few near one crater out at 12 o'clock - dark-gray rock that may be glass coated. Matter of fact, one of them looks like it's right at the rim and might have been part of a projectile that made the crater.

CC Roger.

04 16 17 47 LMP-LM The large boulder that I mentioned that's several meters in diameter - I'm not even sure it's a boulder - It does have a well-developed fillet. It's highly fractured. It looks like the fractures generally are north-south. At least you can't - we can't see end on into the fractures. And it's too far away to be sure, but it looks like it's mottled also, although there did appear in the bin - in the monocular to be a more heterogeneous mottling. It might be a breccia.

CC Okay.

LMP-LM That boulder ought to be very close to the ALSEP site.

CC Roger.

CDR-LM Gordo, in reference to these boulders, everywhere I can see out of my left window and out ahead of me in referring to that boulder Jack's talking about which is just a little bit on my side at 12 o'clock, it appears that the dark mantle has filleted and, for the most part, covered - or it has covered part of or is up on top of some of the crevices and the crannies in the boulders themselves, with the exception of - Well, I'll take that back - even the very small ones. I'd say from a population point of view, boulders of the size Jack's talking about that are visible through the surface anywhere from 1 to 2 to 3 meters - a very small percentage, but when you look at them at our level, it looks like they are quite populous. I'd say there are maybe about 25 of them in view between myself and the - where the horizon falls off down away from us towards the South Massif. The area back towards Station 1, at least the other side of Trident, looks like it's more heavily strewn with some of these filleted and partially mantled large fragments.

CC Roger, Gene.

LMP-LM To say that there is a boulder, as such, actually sitting on the surface, I can't - I really can't find one, unless they're along - around something very small and possibly younger craters. But I think for the most part everything is somewhat mantled.

CC Okay.

04 16 20 48 LMP-LM Gordy, I think maybe the predictions of a fairly thin regolith were good. I have a crater at about - oh, 130 feet. It looks like it's not more than a meter deep. It's very fresh, has a bright halo around it, and it's very rocky in its interior and has some rocks that are at least 10 or 20 centimeters in diameter on the rim. It looks like it's penetrated into some rockier - much rockier substrate than what we're seeing on the surface. The surface itself looks like a - oh, probably 15 percent fragments greater than half a centimeter.

Tape 76A/6

CC Okay, Jack.

LMP-LM I don't see any general size - I don't see any general size, Gordy. I do have a crater out here that's - maybe a meter in diameter that - fairly fresh, although not bright halo - that has not penetrated to blocky material. And it looks like that the saturation crater size is very small in the area we can see; that is, there don't seem to be any old or very subdued craters - Well, let me - let me think about how to put that again. They're - It's obviously saturated with craters a few centimeters in diameter, but when you get bigger than that, there seems to be more of a - a clear distribution rather than a saturation.

CC Okay.

04 16 23 02 LMP-LM Gordy, let me give you a quick far horizon. At 12 o'clock, I've got Family Mountain. It's a - it and South Massif are a replica from their plane form where I - up from where I am, except that Family Mountain is much more symmetrical and rounds off to a very more definite peak. The South Massif, in turn, has got a high plateau, a high flat peak on top. My far horizon then, at 12 o'clock, from about - to 11:30 is dominated by Family Mountain. It's - Well, I hate to use the word anorthosite without getting out of the spacecraft, but it sure is white. It sure is white, but its varied shades of white - with - sort of a - a tendency on its southern or southeastern slope to sort of be marble caked with a darker material much the same color as the mantle that we're - we've landed on. The Family Mountain disappears just about at the level of the rim of Camelot on my far horizon and just in front of it - it starts out - that's at about 11 o'clock - it just - just there is where the South Massif starts up very abruptly - I'd say - well, I'll try not to overestimate, but certainly 30 degrees, I'd say - very abruptly to a very impressive altitude. I know I was at 13,000 when I said I was at their level, but - it sure looked it from there. It - it plateaus off from about 10:30 to about 9:30, and then

it starts sloping back down towards the east at about the same angle. Very symmetrical. There are several places where you can see what appear to be outcrops. I say several - about a dozen anyway, where you can see relatively large areas of outcrop on the South Massif. That outcrop is a - of a darker gray color than the white-gray of the Massif itself. The one most domineering - dominant outcrop is right at the change in slope to the west, where it goes upslope and then plateaus off, and there is a definite outcrop. And you can see several boulders on all levels of the Massif that have come apparently from outcrops and I feel certain we will be able to get to some of those - that have come all the way down. South Massif, too, is a - appears to be in areas marbly caked dirty, such as if it was sprinkled with a dirty or a darker covering, and that covering is more evident as - as it slopes back here towards the - towards the east. As the far horizon now, I can see - I can see - South Massif all the way to 9 o'clock, but then behind it, there's just a little breadloaf-type dome of a much darker, much more hummocky mound back there, relatively big. It's probably, from where I stand, at least 10 percent the - the size of the Massif, the South Massif. Gray in texture. There appear to be some lineations running - well, as I'm looking at them, they're dipping down into the west at about 20 degrees, but that may be a Sun-angle problem. But they're definitely there. And then, contrasting that is - is Bare Mountain which is also much darker gray, much different than the Massif from where I stand, much more hummocky surface. It appears to be to me what I would expect Sculptured Hills to be like. One other thing about the South Massif is that - as I look at - as I look at it - at about 9:30 to 10:30, there is a little knob of the South Massif that sort of flows toward - towards the east or slightly towards the northeast. That's the one that tends to be a little bit more heavily covered with the - darker dusty material - -

04 16 28 06 CC

Challenger, Houston, over.

Tape 76A/8

LMP-LM There are. Go ahead.

CC Okay. We're about 12 - 13 minutes behind the time line for starting cabin preps. And backroom is enjoying your descriptions, but we think we'd rather you press on with the preps and get ready to get out for a really good view. Over.

LMP-LM Okay, Gordy. We're - we're doing this and eating too - We're trying to do them both at the same time, and we are pressing. Just want to say one other thing about the Massif. I can see a couple of places where craters have - have penetrated very small craters and penetrated the Massif - craters maybe a meter or 2 in size, some 5 meters, and there's a lot of rock debris around them, which tends to believe that there is very little, if any, soft covering on that Massif.

CC Roger.

LMP-LM Gordy, just a couple more words about the North Massif. It looks like a good distribution of boulder tracks. Many of the boulders are accessible. They are - the tracks can be traced up, at least to midslope. That's at my 3 o'clock position. And occasionally, at that midslope position, particularly northwest of Henson, you can see abundant boulders suggestive of outcrop. That's something that we had missed seeing on the pre-mission photos. But - And it isn't as abundant as on the South Massif, but there are apparent ledge formers about midslope.

04 16 30 08 CDR-LM Yes, let's make ... I don't know ... a lot of ... No way it could be 1.

CDR-LM Give me that ... throw away.

04 16 31 03 LMP-LM Okay, Gordy. There's also a few very bright sparks - sparkles from the surface - not abundant, but a few.

CDR-LM Well, let me - I - I need these.

04 16 33 52 CC Challenger, Houston. I'm going to hand you over to the good Dr. Parker here. Have a good trip outside there.

CDR-LM Gordy, thank you. You do outstanding work and we sure do appreciate it, babe.

CC My pleasure.

04 16 37 12 CDR-LM Bob, we'll give you a call in a minute. We just made a couple of suit adjustments.

CC Okay. Copy that.

04 16 40 38 CC Apollo 17, Houston.

CDR-LM Go ahead, Bob.

CC Okay, Challenger; we've just lost about 16 dB on your high gain signal strength there. We're wondering if you happened to hit the switch there, has it moved, or could you give us a check on it?

CDR-LM We're nowhere near it. Stand by 1.

CC Okay. And, Challenger, that should be a PITCH of 21 and a YAW of minus 45.

CDR-LM Plus 21 and minus 45; Roger. Bob, about 2 minutes here.

04 16 46 30 LMP-LM Bob, this is Jack. On that high gain, I'm up close to 39 now, which is better than when we landed. Do you want me to do anything to it?

CC Stand by on that.

CC Leave it alone. It seems to have gone away, Jack. It may have been a ground problem.

CC Did you guys adjust it, Jack?

LMP-LM Yes, Bob. We had to fix the drink bags and a couple other things.

Tape 76A/10

CC No. Did you guys adjust the high gain antenna?

LMP-LM No. I didn't touch it.

CC Okay. Copy that.

CDR-LM Buddy SLSS's in there?

LMP-LM No. That's over there. Oh, did they? *** in there? I don't - I thought it was over on your side. Okay? Okay, that's over there. Bigger than it used to.

04 16 47 51 CC And, Challenger, we have your hot mike.

LMP-LM Well, because I - -

04 16 49 04 CC Challenger, Houston. Over.

CDR-LM Go ahead, Bob.

CC Okay. When you guys get to the top of page 2-5, and I assume you're down still in the - ETBs from what your comments were on the hot mike there. When you get to the top of page 2-5, we'd like you to put both DEMAND REGs to EGRESS. Over.

CDR-LM Okay, Bob. Will do. We'll give you a call as we go along.

CC Roger. Thank you.

04 16 50 55 CDR-LM Hey, Bob, while I'm thinking of it, we're - we're working with one pair of scissors down here. We're going to take them out with us in the ETB. You might make a point of reminding us to bring them back.

CC Okay. I copy that. Never did find Ron's, huh?

CDR-LM No, sir, and I couldn't just leave him up there starving to death.

CC Roger on that.

CDR-LM By the way, how's he doing?

CC Stand by.

CC Challenger, Houston. Your buddy is doing great, and the sounder is also doing great, which is a surprise, I guess.

CDR-LM I'm glad to hear that.

LMP-LM That was no surprise, Bob. We wouldn't have taken it if it wasn't going to work.

CC I thought about that after I said it.

04 16 53 09 CDR-LM Bob, I just turned the URINE LINE HEATER, ON.

CC Copy that.

CDR-LM And the physical status of the crew is excellent, by the way.

CC Beautiful. The Surgeon's happy.

04 16 54 35 CDR-LM Say, Bob, we're at the top of 2-5, and I forgot what it was you wanted me to do up there.

CC Okay. We'd like you to have DEMAND REGs, both of them, go to EGRESS, please.

04 16 54 49 CDR-LM Yes, sir. Okay, they're EGRESS now.

CC Okay, thank you.

04 16 57 36 CDR-LM Okay, Bob, we're in the middle of the first paragraph on - at 115:15 in the time line.

CC Okay; copy that.

04 17 04 12 CDR-LM CDR's OPS ... 5800.

CC Okay; we copy 5800.

04 17 04 45 LMP-LM LMP's OPS is 6000 plus.

CC Copy that, Jack.

LMP-LM Okay, eng.

Tape 76A/12

04 17 05 31 CDR-LM Okay. Both regulators are reg - regulating slightly under 4.0.
CC Copy that, Challenger.

04 17 09 48 CDR-LM Okay, Bob. The URINE LINE HEATER is OFF and the URINE LINE BREAKER is OPEN, and we are down to applying antifog.
CC Okay. Copy that, Challenger.

04 17 17 12 LMP-LM Okay, Bob, the BRA is stowed.
CC Okay. Copy that, Challenger.

04 17 20 15 LMP-LM Okay. We're at "Starting PLSS donning on LMP."
CC Roger. Copy that.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 17 22 XX

BEGIN LUNAR REV 15

04 17 54 45 CMP Okay, Houston. This is America. Looks like you're with me now.

CC That's affirmative, America. We read you loud and clear.

CMP Okay.

CC Did you get the pan camera start time there, Ron?

CMP That's affirm. But, I got a 31:11 instead of 31:10.

CC Oh, Roger. No problem.

CMP Okay. (Laughter) I'll try to do better next time.

CC America, is the bird in good shape?

CMP So far as I know.

CC Okay, great. Anytime you want to start taking a Flight Plan update, just let me know.

CMP Okay. (Cough) Give me a little bit of time to lead into the landing site there, and we can go ahead and do it now.

CC Okay.

CC The first thing is at 119:00, 119:00. Add the following words, Ron: "Configure camera." In parenthesis, "Earthshine photos. CM5, command module 5 window/November Kilo. Nikon/55/VHBW." That's Victor Hotel Bravo Whiskey.

CMP Okay.

CC In parenthesis; f/1.2, 1, infinity, end of parenthesis. Eighteen frames FR - 18 FR.

Tape 76B/2

CMP Good.

CC Magazine Zulu Zulu.

CMP Okay, got it.

CC Okay. Go down to 119:24 and add the following. Let me just read it to you in - quickly here, so you can put in the words you want to. The words are "Point at target marked by LMP. Use same technique as for Copernicus central peak."

CMP Okay. We'll point at the target by the LMP. Use the same technique, which is starting out at 1 second - -

CC Roger. Let me read it to you.

CMP - - was it 30 seconds?

CC Roger. 1 second, two frames; 1/2 second, two frames; 1/4 second, two frames; 1/8 second, two frames; 1/16 second, two frames. On Copernicus, we're using a 30-second interval. It's not important, - the interval. It's mainly just the stop settings on that. You're going to use a total of 10 frames.

CMP Okay.

CC Okay, then add the following after that: After completion of above, switch to window CB3. For 8 frame of end of target, Papa 17 Delta. At 30-second intervals. Record frame number.

04 17 59 52 CMP Okay, I've got to switch to window number 3 for end of target. Say again, the target number.

CC P, as in Papa; 17 Delta, D as in Delta. 17 Delta.

CMP Okay, Papa 17 Delta.

CC As 30-second intervals.

CC Okay, Ron. There is a caution note on this. It's a note concerning the frame usage.

CMP Seems to me like Zebra Zebra only has 18 frames, doesn't it?

CC That's affirm. Do not exceed 18 frames. The balance of mag Zebra Zebra was used for preflight calibration. Do not exceed 18 frames. You can put that down any way you want it.

CMP Okay.

CC Okay. Under rev 17, I've got a note - a similar note, Ron, for rev 17.

CMP Okay.

CC The note is, do not exceed 40 frames on earthshine mag Whiskey Whiskey. Balance of magazine was used for preflight cal. I'll say again, do not exceed 40 frames on earthshine mag Whiskey Whiskey.

CMP Okay, on mag Whiskey Whiskey don't exceed 40 frames. The balance is already on calibration.

CC That's affirmative. And I've got three notes then, Ron, just general notes - may come up in the crew film area. Mag Papa Papa for crew option. Just use mag Papa Papa for crew option. Do not use Kilo Kilo for crew option. Do not use Kilo Kilo for crew option. The last one is save all the remaining VHBW on Quebec Quebec and Romeo Romeo for scheduled photos. We have a very small margin on each.

CC ... end of update.

CMP That was - Okay, save all remaining on Quebec Quebec. And what was the other one, Jack?

CC Romeo Romeo.

CMP Okay, no extras on those two, then - on the VHBW, huh?

CC Yes, we got a very small margin on those now. And, you're about 10 minutes prior to landing site orbital. Why don't you go over and start studying that, if you want?

Tape 76B/4

04 18 03 20 CMP

Okay.

04 18 11 52 CMP

You know you look at - next to Macrobius A, there is a kind of a dark halo-type crater there. Very small one. And it doesn't have the appearance of a hummocky crater rim to it, at all. It looks like the material just kind of spreads out all over the area, but it doesn't have a hummocky appearance to it. I'm going to take a look at that again when I come back - on back around on the other side. There's a small mound down in the bottom of the crater, also. It's a domical-shaped structure in the bottom of that small crater. It's right next to J3. North of J3.

CC

Roger, Ron.

CMP

Coming in, I can see the landing site, now - quite well. The appearance of the slide area definitely shows up. The South Massif seems to have the Sun shining right on the walls. I'm looking for any type of layering, or anything like that. And can't see anything that - that would show that up. The big difference between the massif structures and the Sculptured Hills is that the massifs look like they are a steeper slope. And they - they don't seem to have that type of covering over them, like the Sculptured Hills do.

CMP

I'm right over now. The scarp definitely cuts up through the North Massif. I can't see continuation on into the South Massif at all. But, you can definitely see a vertical exaggeration as it cuts on around up over the North Massif. And it's almost - I'd have to take another look at it for sure, but it almost looks like a flow coming from Family or in the vicinity - in the direction of Family Mountain - but from the direction of Family Mountain - lapping up on the side of the North Massif. That's the way it looks as you go on by it. I couldn't see anything that would lead you to believe that the slide area, so to speak, would come on across anything that would be the source

of that slide area. I still think I can see the - one spot that has a lighter albedo than the surrounding area there in the Pentagon complex. And it's pretty close to the - Let me get my chart out here and take a look at it again.

04 18 16 50 CMP

No, it still looks like that area that's blown away there is Dog November - between Dog November and Dog Papa. And about 83.4 or something like that.

04 18 17 07 CC

Copy.

CMP

Yes, just like the map shows, and all the pictures, you've got a definite demarcation in the annulus around Serenitatis here, as you look by Sulpicius Gallus area. As you look at it - I'm going to have to take another check on it - but the dark annulus looks to me like it's raised above the mare, proper, itself. I'll check that a little more as we come on across.

CMP

You know all those rilles to the north of - I mean to the west of Sulpicius Gallus. There is a bunch of crisscrossing. One is right on the edge of the Serenitatis basin - and I don't remember the name of that crater, I'll have to look it up later - but they've got slightly raised rims around the rilles. You can see some layering down inside the rille itself, in the east-west and the one that runs in the east-west direction.

CC

Roger. You're talking about near Menelaus?

CMP

Yes, I'll have to look on the map and see for sure what the crater is, but there's an impact crater right on the edge of Serenitatis basin - right on the terminator. Right now.

CC

Roger.

CMP

And then those rilles are just to the north of that crater.

CC

Roger. That's probably Menelaus - M-e-n-e-l-a-u-s - Menelaus.

Tape 76B/6

CMP I think it is.

CC Okay, Ron. Is The PAN CAMERA, OFF? T-stop time.
PAN CAMERA to STANDBY. T-stop time.

CMP Okay. Is it now?

CC Roger. You're just a little bit past it.

CMP Oh, okay, thank you. (Chuckle) Okay, PAN CAMERA -
STANDBY. Thank you. That's the first chance I
had to look at the Moon, you know. These guys - -

CC Roger.

CMP - - let me look at the windows.

CC That's all right. We don't mind calling you, if
you don't mind getting the call.

CMP (Chuckle) No, not in the least.

CC Ron, I'll give you a cue here shortly for PAN
CAMERA - OFF. I just want you to know, we will
not be retracting the mapping camera; and, there-
fore, we will not be closing the mapping camera,
laser altimeter cover. But we will be dumping
normally. Over.

CMP Okay. We're going to dump with the mapper open,
is what you're saying, huh?

CC That's affirmative.

CMP Okay.

CMP You know it looks to me like it all disappears
anyhow. It just kind of leaves the spacecraft.
I don't think anything comes around or even sticks
around.

CC Roger, Ron.

04 18 22 03 CC At your convenience, HIGH GAIN to AUTO.

CMP You have HIGH GAIN to AUTO.

CC Thank you, sir.

CMP Okay, it's orbital science photos coming up here. Do you want to use magazine KK still? Or should we finish up Oscar Oscar?

CC Stand by, Ron. Checking with Tommy on that one.

CC Ron, they'd like you to use mag KK on that.

CMP Okay.

CC While you're looking at the Flight Plan there, at 117:20 where that mapping camera stuff - just delete mapping camera, retract; and mapping camera, laser altimeter cover, closed at 117:15.

CMP Okay. Delete mapping camera, retract; and mapping camera, laser altimeter, closed. Okay.

CC Roger.

CMP Okay, magazine KK is starting with 21 pictures.

CC Roger. We copy.

CMP Okay. Bob, if - would you give me a call when you get ready for that mapping camera stuff? I was kind of shoved off this morning, and I got to sample their buses.

CC Yes. Roger, Ron. We'll give you a call - first one will probably be a pan camera call here shortly, and then I'll call you when it's time for those H₂ purge line heaters - things like that.

04 18 26 20 CMP Okay.

CC Okay, Ron, PAN CAMERA POWER to OFF.

04 18 28 22 CMP Okay, PAN CAMERA POWER - Let's see. PAN CAMERA POWER is OFF.

CC Thank you, sir.

CMP Good.

Tape 76B/8

CMP Hey, this is not so bad, if you think of iced tea,
I guess.

CC Roger.

CC Just for your information, Ron. Gene's out on
the surface right now.

CMP Oh, they are? Hey, great!

CMP Did they confirm my position yet?

CC I don't - Let me check here - I don't think we
have it pinned down exactly. You're pretty darn
close to it. That's for sure.

04 18 32 25 CMP You know, it's funny. It wasn't as bright - That
pass over - This last pass - as it was the time
before.

04 18 41 05 CC I hope you haven't - I hope you haven't spilled any;
and, by the way, LMP is on the surface now, too.

CC America, Houston. You can go with the H₂O PURGE
HEATERS now.

CC America, Houston.

CMP Houston, America. Go ahead.

CC Roger. You can go with the H₂ PURGE LINE HEATERS
and the rest of that Flight Plan.

CMP Okay. What do you know? The PURGE LINE HEATERS
have been ON.

CC Roger. We kind of suspected that.

CMP Okay. (Laughter) Okay. Let's see. MAPPING
CAMERA can come OFF. Thirty seconds.

04 18 45 31 CMP Okay, MAPPING CAMERA is going to STANDBY. IM
PITCH MOTION is OFF. Altimeter - LASER ALTIMETER -
is OFF. UV is OFF. IR is OFF. Okay, UV cover -
box. UV COVER is CLOSED; barber pole, gray. IR
COVER is CLOSED; barber pole, gray. Okay, MAP
CAMERA LASER ALTIMETER - we'll leave that one OPEN.

CC Good show, Ron.

CMP Okay. Then it's my understanding you don't want to do any dumping until I go on the back side of the Moon. Is that correct?

CC That's affirm, Ron.

CMP Okay.

CC According to the Flight Plan, you do it at 117:50. Right about that time.

CMP Okay. Will do.

04 18 48 23 CMP Bob, one little notice. Supplies I had this morning. Might made notes, so I wouldn't forget about it. It was when you go to tunnel vent, it takes a heck of a long time to vent that tunnel. In the simulator down there, you go to tunnel vent, and it flips right down and vents. And I was beginning to wonder if it - if it was leaking or something.

CC Roger.

CMP As it turned out, as it turns out, it worked out all right. But I bet it took a good 10 minutes, - to get up to 3.5. Before I could turn the jets back on, you know.

CC Roger.

CMP Go, that's ready to go.

CC Ron, just one reminder as we go around the horn here. The waste water - the way - the position it is in will probably take between 10 and 12 minutes to dump it completely. Or dump it to your 10 percent number.

CMP Okay, that's good. Oh, glad I don't have anybody watching for me this time. Do I?

CC Yes, that's right. We won't be able to call you on that. When it's down to 8 percent.

Tape 76B/10

CMP (Laughter) Okay, I'll put my old timer on.

CC Hey, Ron, one other reminder. We know it's in the Flight Plan, but you may get real busy just prior to that orbital science photos. And EECOM would like to make sure you get the H₂ purge line heaters off, as scheduled, at 118:02.

CMP Okay. Okay, is she in there? Yes - it's in the Flight Plan. Okay.

04 18 53 21 CC Roger; it's in the Flight Plan. But it's just before you're going to get busy on that orbital science photo. You might of - you might go to the window earlier or something.

CMP Okay. It's a good point.

CC And your friends out on the surface have the Rover out now and - starting to load it up and getting ready to check it out.

CMP Hey, great!

CC The surface work is going really good. They're just a little bit behind the time line from their suiting-up exercise. But it doesn't make a whole lot of difference.

CMP Uhuh. Uhuh. 250 lens on that thing.

04 18 58 19 CC Ron, you're 5 minutes to LOS here. And you're looking real good all around the room. No problems with any of the systems that we can see. We'll see it at 118:29. And we'll be with you for another 5 minutes here.

CMP 118:29, okay. Okay, we're going to have a little grape drink.

CC Just remember what Jan says. Don't spill it on your flight suit.

CMP (Laughter) Right.

CMP Did I miss lunch? Or wasn't I supposed to get any lunch today?

CC I don't know, that wasn't on my shift. But if you're hungry, why don't you eat something?

CMP (Laughter) That's what I'm doing.

CC It's been a long time since lunch - -

CMP I'm nibbling.

CMP Yes. Long time since breakfast, I think, wasn't it?

CC Yes, I think it was. And you got about 4 more hours until scheduled eat time. So - you got some lunar sounder work there - and about 119 or so, so you might as well consider eating a lot.

CMP Yes, I could eat dinner. I'm kind of nibbling a little bit.

CC Just want to make sure you don't lose your scissors, too.

CMP Yes. This time I got them snapped to the hand controller and stuck in the little thing around it. I don't know how I've lost those things.

CC Roger.

CMP I didn't like that big string on there all the time. I didn't like that big string getting all over the place. So I rolled the string on the strap, and stuck the scissors in that little bungee that's on the hand controller. I woke up the next morning and they're gone. I still think it's behind the optics.

CC Just don't go look at them; okay? We'll find them pre - postflight. Okay?

CMP Okay.

Tape 76B/12

CC Hey, Ron. I don't know what Tommy has against you, but they just never scheduled an eat period in here. We checked this out so thoroughly that, we forgot to check it to see if there was an eat period in there.

CMP We probably weren't hungry when we checked it out.

04 19 00 54 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 17 30 17 LMP-LM Okay. The LMP has got the RCU connected to the PLSS.
CC Copy that, Jack.

04 17 31 43 CDR-LM Okay, Bob, I'm going to get on the PLSS, now.
CC Okay, Geno. Copy that.

04 17 32 34 CDR-LM Sublimator exhausts.

04 17 42 17 CDR-LM Okay, Bob. I've got my PLSS on. We're picking it up with verifying the powerdown configuration on the upper right-hand corner.
CC Roger. Copy that.

04 17 43 00 CDR-LM Circuit breakers are configured.
CC Houston copies.

04 17 45 21 CDR-LM Okay, I'm in VOX. VOX SENSITIVITY is MAX, A is T/R and B is RECEIVE. Okay. You can open your breaker and connect to the PLSS comm. Houston, I guess you heard that.
CC That's affirm. Loud and clear.
CDR-LM ... just AUDIO breaker. Your AUDIO breaker, that's all. Want some help with that?

04 17 46 08 CDR-LM Yes. Do it while you're facing that way. Just hang them up. Got time to do it. All you've got is water.
CDR-LM Okay, Bob. We're getting Jack up on PLSS comm, and we'll be picking it up - the comm check here on left-hand column of the bottom sheet.
CC Roger. We're following you.

04 17 46 58 CDR-LM Okay. You're on and locked. Okay, and you got the cover? Okay. Your AUDIO breaker, CLOSED. Okay, on your PLSS PTT go MAIN; that's right.

Tape 77A/2

CDR-LM Okay. PLSS MODE A.

04 17 47 16 LMP-LM A.

CDR-LM Okay; tone ON; VENT flag, P.

04 17 47 20 LMP-LM Got a weak tone and a VENT flag, P.

CDR-LM Okay.

04 17 47 23 LMP-LM Got a good tone right now.

CDR-LM PRESS flag, O; and O₂ - -

LMP-LM ... O and - -

CDR-LM - - momentarily.

LMP-LM - - O₂ still there.

CDR-LM Okay, PLSS O₂ - -

04 17 47 32 LMP-LM It's on.

CDR-LM What's your PLSS O₂ pressure gage?

LMP-LM The O₂ - -

CDR-LM Give Houston a call and give it to them.

04 17 47 40 LMP-LM I'm reading 100 percent, Houston.

CC Roger, Jack. And we're reading you slightly garbled but loud.

LMP-LM Okay. Well, you're loud and clear, Bob.

CDR-LM Okay, Jack. You got that, and I'm reading you. How you reading me?

LMP-LM Loud and clear.

CDR-LM Okay. We will not unstow the antenna. You are a skosh garbled, but very readable.

CDR-LM Okay. Stay where you are. I'm going to get mine.
Okay. AUDIO breaker is -

LMP-LM ...

CDR-LM ...

LMP-LM ...

CDR-LM B.

04 17 49 37 CDR-LM Okay. I got a tone.
LMP-LM VENT flag, P.

04 17 49 39 CDR-LM I got a VENT flag, P.
LMP-LM PRESSURE flag and O₂, momentarily.

04 17 49 43 CDR-LM PRESSURE flag, and I still got an O₂ flag.
LMP-LM Off with your tone.

04 17 49 47 CDR-LM Okay. The tone is gone. The O₂ flag cleared.
LMP-LM Okay. PLSS O₂ PRESS quantity.

04 17 49 53 CDR-LM Okay; and I'm reading 10 percent.
LMP-LM Okay.

04 17 49 59 CDR-LM Okay. Note crewman in MODE B, that's me, cannot
hear Houston. Houston, broadcasting in the blind
100 percent on the CDR.

04 17 50 06 CC Roger, CDR. Houston reads you loud and clear.

04 17 50 13 LMP-LM I read you loud and clear, Gene. ... me?
CDR-LM I'm reading you loud and clear.
LMP-LM Okay.
CDR-LM Give me a call again.
LMP-LM Okay. How do you read, Gene? 1, 2, 3, 4, 5.

Tape 77A/4

CDR-LM Give me again.

LMP-LM 1, 2, 3, 4, 5.

CDR-LM I think so. I can't - Okay. I'm reading you.
Okay. PLSS. LMP go B.

04 17 50 32 LMP-LM Going B.

CDR-LM Try that. B ... A. Okay. How do you read me,
Jack.

LMP-LM You're loud and clear, and I got a tone.

CDR-LM Okay. Give me a short count once.

LMP-LM Starting. 1, 2, 3, 4, 5.

CDR-LM ...

LMP-LM You're great.

CDR-LM Okay. I had a tone, too. I still got a PRESSURE
and a VENT flag.

LMP-LM And, Houston, how do you read the LMP?

CC Roger, LMP. We read you loud and clear.

CDR-LM Okay, Bob. I'm reading you loud and clear, and
he's not reading you in this mode. How me?

CC I read you loud and clear also, Gene.

04 17 51 19 CDR-LM Very, very, good. We're both going AR, now.

LMP-LM Let's go.

CDR-LM Okay. Ought to get a tone. I didn't, but my VENT
flag did clear.

LMP-LM Here it is.

CDR-LM Tone and a VENT flag.

LMP-LM ... my tone and - VENT flag.

Tape 77A/5

CDR-LM Okay, Jack. The wheel is Houston and the blade is me. Hello, there; Houston. How are you reading CDR?

CC Read CDR loud and clear. And, for your information, your TM on the PLSSs looks good.

04 17 51 52 CDR-LM Okay. Let's go.

LMP-LM How do you read, Houston? This is the LMP.

CC Houston reads LMP loud and clear now. You're much clearer than you were before, Jack.

LMP-LM Very good.

CDR-LM Okay. Jack, we gave them our quantities already; so, SQUELCH, VHF B LMP, FULL DECREASE.

LMP-LM SQUELCH B is to FULL DECREASE, huh?

CDR-LM That's affirm.

04 17 52 16 LMP-LM Okay. It's FULL DECREASE.

CDR-LM Okay. On 60, leave that PUMP breaker CLOSED.

LMP-LM Okay.

CDR-LM Oh, that's cold; but that's good. Okay. On 16, ECS, CABIN REPRESS, CLOSED.

LMP-LM Okay. It's - Is that a verify?

CDR-LM That's a verify.

04 17 52 30 LMP-LM Okay. It's CLOSED.

CDR-LM SUIT FAN DELTA-P, OPEN.

04 17 52 33 LMP-LM Okay. DELTA-P is OPEN.

CDR-LM And SUIT FAN number 2, OPEN.

04 17 52 36 LMP-LM 2's open.

Tape 77A/6

04 17 52 38 CDR-LM Okay. And I've got SUIT FAN number 2. There's a MASTER ALARM. Okay. And I heard it run down. Okay. I don't see a - No, there's not an ECS caution until that thing runs down - about a minute or so. We'll watch for that. Okay; SUIT GAS DIVERTER, PULL-EGRESS.

04 17 52 57 LMP-LM Okay. DIVERTER is PULL-EGRESS.
CMP-LM CABIN GAS RETURN, EGRESS.

04 17 53 03 LMP-LM TURN [sic] is EGRESS.
CDR-LM SUIT CIRCUIT RELIEF, AUTO.

04 17 53 07 LMP-LM RELIEF is AUTO.
CDR-LM Okay. OPS CONNECT. You ready?
LMP-LM Yes.
CDR-LM Okay. SUIT ISOL, ACTIVATE OVERRIDE.

04 17 53 21 LMP-LM Okay. OVERRIDE.
CDR-LM Okay. Disconnect your LM O₂ hoses.

04 17 53 26 LMP-LM Okay. LM O₂ hoses are disconnected.
CDR-LM Okay. And they're stowed, right?
LMP-LM Right.
CDR-LM Okay. Connect OPS O₂ hose to PGA, blue to blue.
LMP-LM Okay. Where is it?
CDR-LM Okay. It's sticking - right - Turn around. No, that's not right.
LMP-LM No, that's the water.
CDR-LM Could you turn towards me a little bit? Turn to the left. There you are, because I got ... Okay. Here it comes - right here. OPS hose under it now. Right here.

LMP-LM Here it is.

CDR-LM Let me get it. I'll get it - I'll get it under your electrical cable.

LMP-LM Guess you're going to want a purge valve in a minute.

CDR-LM Okay. That is locked in the lock lock.

LMP-LM Move your arm.

CDR-LM This is ... Could you do that?

LMP-LM I will in a second.

CDR-LM Move your arm. I can't see.

LMP-LM Okay.

04 17 54 19 CDR-LM Okay. We're right here. Okay. And I'm going to connect OPS hose to put it blue to blue, retrieve PURGE valve. Let me give you purge valve, and I'll pick that up, Jack. The cockpit's just as small as the mockup. Okay. Here you are. You verify it's in LOW, LOW.

04 17 54 37 LMP-LM Okay. It's in LOW.

CDR-LM Slip to the right just a skosh.

LMP-LM Yes; slipped it to the right just a skosh.

CDR-LM Oh, it's - man, that's easy.

LMP-LM (Laughter) Whee.

04 17 54 50 CDR-LM Okay. Pin's installed. And I might be an iceberg when I get out there, but it's going to feel good.

04 17 55 03 LMP-LM Okay. It's in.

04 17 55 06 CDR-LM Okay. My PURGE valve's LOW, locked, and the pin's in. Want some help with that? I want to take a look at it.

Tape 77A/8

04 17 55 18 LMP-LM There's the old MASTER ALARM.
CDR-LM Okay. That should be the WATER SEP.
LMP-LM Yes.
CDR-LM It's on.
LMP-LM Yes. It's barely on.
CDR-LM You're going to have to push my lock lock down.
LMP-LM I'll get it.
CDR-LM I don't know why, but -
LMP-LM Why don't you check mine, too. That's it. I'm going to have to check you anyway. Let me turn this way.
CDR-LM Okay.

04 17 55 56 LMP-LM That's why; because it wasn't locked.
CDR-LM Is that where you want it; facing down or in? You don't want it there, do you?
LMP-LM No, I don't want it there. Must have had it in the wrong - ... Thank you.
CDR-LM Is that where you want it?
LMP-LM Yes.
CDR-LM Okay. It's there.
LMP-LM Good.

04 17 56 14 CDR-LM The lock lock is down and it's verified LOW and the pin still is in. Okay. Look at mine while you're there.

04 17 56 25 LMP-LM Okay. It's safe and in. Lock's in and rides [?] low. Pin's in; it's good.

Tape 77A/9

CDR-LM Okay. Let me get my - this thing right here. Reach that hose for me under my arm.

LMP-LM Put it under the electrical cable.

CDR-LM Okay.

LMP-LM I think that'll be better, isn't it?

CDR-LM Okay.

LMP-LM ... and lock. Verify lock lock.

04 17 56 56 CDR-LM Lock.

LMP-LM Okay.

CDR-LM And the cover is going on.

LMP-LM Okay.

LMP-LM Look pretty good under that ...

CDR-LM ...

LMP-LM Yes. That's right.

CDR-LM Good.

CDR-LM Okay. You're covered. Okay. I think we're getting to our favorite part here. (Laughter) Okay. PURGE valves are installed on both. PGA DIVERTER VALVE; put it vertical.

04 17 57 40 LMP-LM Okay. It's vertical.

CDR-LM Okay; commander repeat - that's done. Drink - Let's take a drink then close the descent water.

LMP-LM Okay.

CDR-LM My ... is already prepared. And drink and position mikes.

LMP-LM Oh, those little ... covers are next. Okay.

Tape 77A/10

CDR-LM Had enough water today; they could - you could say you discovered me. I'm water on the Moon. Okay. Let's turn the descent water off, and let's stow this.

04 17 58 19 LMP-LM Okay. WATER is going OFF. DESCENT WATER is OFF.

CDR-LM Okay. And it's - Man, is it - Okay.

CDR-LM Position your mike.

04 17 58 34 LMP-LM Okay; mikes are good.

CDR-LM Top of the page. Okay. Before we turn the fans on, let's make sure we've got - all I got hooked here is the water. Those cables are all stowed. They're not in your way, are they?

LMP-LM No, not in my way.

CDR-LM Pretty good.

LMP-LM ... though.

CDR-LM Do you want to put - put this around them?

LMP-LM Yes.

CDR-LM That's probably a little bit better. ...

CC 17, Houston. Over.

CDR-LM Go ahead, Houston.

04 17 59 05 CC Roger. We're still seeing the commander's SUIT DISCONNECT VALVES in CONNECT.

LMP-LM How's that?

CC Yes, there it goes. We got it. Thank you.

CDR-LM Okay, Bob. Okay. We got to get the PLSS fan on. Don't forget that's battery power. We can don our helmets, check our drink bags, don our LEVAs, protective visors, secure our tool harness. Our O₂ umbilicals are already stowed.

04 17 59 38 CDR-LM CDR's under the handhold. Verify the following.
Now, where we pick up our -

04 17 59 54 LMP-LM Have to put the helmets on, I think.

CDR-LM Okay, yes. Then we pick up our gloves.

LMP-LM I reckon.

CDR-LM Yes, there it is. Okay. Well, let's do one at a
time here.

LMP-LM That's mine.

CDR-LM That's yours.

CDR-LM Okay. Do you want to turn your fan on for
circulation?

04 18 00 11 LMP-LM Well, I guess I better. Fan's, on.

CDR-LM Now pull this out just to get it out of your way?

LMP-LM Okay.

CDR-LM Okay. Okay. All your candy bars, and lemonade,
and all that jazz are all clear. Water, I should
say.

LMP-LM That sounded good.

CDR-LM Okay. Try it. Okay. It looks good here, Jack.
Okay. And what's your LEVA?

LMP-LM ... Okay.

CDR-LM Enjoy it in there; you're going to be in there for
a few hours.

LMP-LM Can't think of any place I'd rather be right now.

CDR-LM Sounds like you're in there, too. Darn, too far
back. Okay, that's better. I'm freezing my you
know what off.

LMP-LM Me, too. (Laughter)

Tape 77A/12

CDR-LM Okay. Does that look lined up to you?

LMP-LM Looks pretty good.

CDR-LM Okay. Let me - Wait a minute. Let me get this down around - Okay. That's around behind you; thermally protected back there. That's below the OPS hose.

LMP-LM Right now, I'm hoping to get out of this warm. (Laughter)

CDR-LM Okay. You're thermally - Let me double check that. The helmet is locked. Your visor is locked. It's one thing you don't want to lose among some others. Okay. Okay. You want to give me a hand?

LMP-LM Not particularly. (Laughter)

04 18 02 15 CDR-LM Oh, man. Where did that come from?

LMP-LM Watch your nose, drink bag, candy bars, popcorn. Click, click, click.

CDR-LM Breathe hard back there.

LMP-LM Want your fan?

CDR-LM Yes.

LMP-LM Looks good.

CDR-LM Okay. I can hear the fan running. Oh, man, whew!

04 18 03 23 CDR-LM Looks good here.

LMP-LM Yes. That's all right.

CDR-LM Steady ...

LMP-LM New; never been used before.

CDR-LM Make sure that flap in back goes below that OPS hose.

LMP-LM Want to put your protective visor down?

CDR-LM Yes, if you got that thing all - You got it all done?

LMP-LM Yes.

CDR-LM You happy with it back there?

LMP-LM Yes, sir. You're nice and protected. Okay. Good Velcro.

CDR-LM Okay. You're all covered here.

LMP-LM Okay.

CDR-LM Not my other one is it? No.

LMP-LM No.

CDR-LM Okay. Ohhh! I think we've got to get two harnesses here. Don LEVAs. Look at that scratch right in the middle of that thing. Okay. Don LEVAs and lower protective visor.

CDR-LM Okay. Secure harness and self doff straps.

LMP-LM Okay. Stay where you are.

LMP-LM Can't miss it.

CDR-LM Okay. Stow LM O₂ - the LM O₂. And comm. Okay. They're all stowed; everything except water, right?

LMP-LM Okay. Verify the following. Check your helmet and visor.

CDR-LM Okay. You check me. I'll read them. Helmet and visor, aligned and locked.

04 18 05 27 LMP-LM Okay. That's locked.

CDR-LM Okay. O₂ cover is all locked. There's a ...

LMP-LM That's locked.

CDR-LM Purge valve; everything down there.

LMP-LM That's locked; that's locked.

CDR-LM Comm carrier.

LMP-LM Stand by. That's locked.

Tape 77A/14

CDR-LM Okay. DIVERTER VALVE is vertical.

LMP-LM Comm is that way. DIVERTER VALVE is vertical.

CDR-LM Okay. One more time. Your helmet is locked, purge valve, locked. Yes. That's locked; that's locked; that's locked. And, let me see - let me see. Sure and that's locked.

LMP-LM Don't let anything to chance.

CDR-LM Today?

LMP-LM And the DIVERTER VALVE is vertical.

CDR-LM Okay. Comm, you check, too.

LMP-LM Yes, sir.

CDR-LM Okay. Verify your old white dots.

LMP-LM Okay. Old white dots. My old white dots - Can you manage to move a little?

CDR-LM Yes, I'll move.

LMP-LM Okay. Got it.

CDR-LM I'm going to miss Danny being out there to hand us those light PLSSs.

LMP-LM That's right.

CDR-LM You want - Okay. I want the EVA decals, also, Jack.

LMP-LM Yes, white dots plus decals.

CDR-LM Roger. Okay, Bob, we're turning the page.

CC Roger. We're right with you.

04 18 07 31 CDR-LM Okay; don EV gloves.

LMP-LM Okay. Is that it?

CDR-LM That's it. Don EV gloves. Do a little grease in here.

CDR-LM And make sure your wrist locks are locked. Glove straps adjusted and cover the wrist rings. Golly.

04 18 08 14 CDR-LM I sure missed hearing it click, but they are locked. One of them is, anyway. Hey, Jack. I verify - -

LMP-LM (Laughter)

CDR-LM What?

LMP-LM Guess what?

CDR-LM They don't go on any easier in one-sixth g, do they?

LMP-LM They break just as easily, too.

CDR-LM Okay, I've got my one glove locked. One of them - one of the old fist covers.

LMP-LM I never had that happen in training; you did.

CDR-LM It's locked - that's about as locked as it can go. Boy, I'd hate like the devil to have that pop open. Okay; that's very good. You want me to help you with one, or can you get it?

LMP-LM Well, I don't know. I've only worked on one so far.

CDR-LM I've got a free hand before I grease it up.

04 18 09 17 LMP-LM I broke that one.

CDR-LM I'm telling you, from the looks of that soil out there, that drill may have a job ahead of it.

LMP-LM Yes, I didn't have a chance to mention that. I don't think the regolith is very thick, and I think you've got rocks below it.

CDR-LM You got that?

LMP-LM Well, how does it look?

CDR-LM Let me take a look. No.

LMP-LM Didn't make it, huh?

Tape 77A/16

CDR-LM Yes, well, let me - Hold your hand up here. Hold it up here.

CDR-LM Looks good on my side. How is your side?

LMP-LM Good over here.

CDR-LM Okay. Let me pull this one out for you.

04 18 10 08 LMP-LM Okay. Thank you.

CDR-LM Get the old other hand.

CDR-LM Okay. That's locked.

LMP-LM And mine - other glove is locked.

CDR-LM Now for the fun in back (laughter).

CDR-LM Oh, me; oh, my.

LMP-LM I think I got it. I think I got it.

04 18 11 37 LMP-LM Pull it and let go. Isn't that the word?

CDR-LM That's what they tell me. Want me to get it?

LMP-LM I got mine - No, I got it.

CDR-LM Verified your's locked?

LMP-LM Yes, sir.

CDR-LM Okay. Both my gloves are verified locked. How does that grab you?

LMP-LM Okay; feels good.

CDR-LM Is your air on tight enough? Checklist on tight enough?

CDR-LM That's the best I can do; I guess.

LMP-LM Okay. Now what?

04 18 12 22 CDR-LM Wrist rings are covered. Note if PGA biting. ...
No, mine's all right. Your's okay?

LMP-LM No; it's fine.

CDR-LM Okay. LGC cold's required. We been on cold all this time, right?

LMP-LM Yes.

CDR-LM Okay. Guess you can open that breaker, and I'll stop shivering. (Laughter)

LMP-LM Okay.

CDR-LM And, we can disconnect the LM water hoses. Let's help each other with those, so we don't screw up the other hoses.

04 18 12 42 LMP-LM Okay; breaker's open.

CDR-LM Okay.

LMP-LM Let me turn around this way.

CDR-LM Okay. Go ahead and I'll -

LMP-LM Okay. You want to get mine or you - -

CDR-LM No, I'll get yours.

LMP-LM Okay.

CDR-LM Okay. First of all I'm going to take that off. Okay. Now let me get your other one. There it is. Okay. We did this before. Stand right there. It's locked, Jack.

04 18 13 27 LMP-LM Okay. It is locked.

CDR-LM Get the cover on. Okay. The cover is on.

LMP-LM Okay. Yours off?

CDR-LM Get that in a second. Okay. Yours is just laying there, too.

LMP-LM Okay. Hang on.

CDR-LM Okay. I'll push towards you. Make sure that thing falls in the hole, because yours didn't right away.

Tape 77A/18

CDR-LM Did it fall in?

LMP-LM Yes - yes, it's in the hole.

CDR-LM Okay. Wrist cover on.

LMP-LM Wrist cover's on.

CDR-LM And my PGA is going to start biting here if we don't get going.

LMP-LM Yes. Okay - okay - PLSS to the - -

CDR-LM I've got to turn my oxygen on a second, Jack.

LMP-LM Yes, so do I.

LMP-LM That's that. There it is.

CDR-LM Okay. It's on.

CDR-LM A little hard to get it off, isn't it.

LMP-LM Yes.

CDR-LM Okay. Mine is back off.

LMP-LM Yes, mine is.

CDR-LM Okay. PLSS DIVERTER VALVE, MIN; verify.

04 18 14 56 LMP-LM Okay. Mine's MIN.

CDR-LM Okay. PLSS PUMP, ON; that's to the right. PRES-SURE REGs A and B, EGRESS.

LMP-LM I think we're already at EGRESS.

CDR-LM Pump's on.

LMP-LM We're in EGRESS.

CDR-LM Okay, my PUMP is on. I can feel it running.

LMP-LM Keep talking.

CDR-LM Pressure integrity check. Okay. PLSS O₂ ON. You ready for this?

LMP-LM I hope so.

CDR-LM Okay. PLSS O₂ ON.

LMP-LM Mine's on.

CDR-LM PRESSURE flag and O₂ flag clear, 3.1 to 3.4.

04 18 15 38 LMP-LM Okay. I'm coming up. I know that.

CDR-LM Gee, it's 10 minutes to 6 at home.

LMP-LM Okay. Okay. I'm still coming up, coming up.

CDR-LM Keep coming up. Just got mine on.

LMP-LM Oh, okay. Well, I'm ahead of you then.

CDR-LM Yes. Okay. The PRESS flag will clear 37 -
correction - 3.1 to 3.4.

LMP-LM What do you want me to do when I'm pressurized?

CDR-LM We'll want to make an integrity check.

LMP-LM Yes, but then what?

CDR-LM Can you reach those water hoses right there? By
chance before you get too hard?

LMP-LM Throw them out of the way?

04 18 16 25 CDR-LM Okay. When you get - when you get up - Okay. A
PRESS flag cleared on the commander. Okay. The
O₂ flag did not clear. I'm at 3 - 8 - Okay. O₂
flag cleared on the commander.

LMP-LM Still got an O₂ on the LMP.

CDR-LM Okay, you're not up yet; I suppose.

LMP-LM No.

04 18 16 58 CDR-LM Okay. I'm going to take my PLSS O₂ OFF for 1 -
counting 1 minute, 57. Let me know when you're up,
Jack, and I'll give you a minute hand.

Tape 77A/20

LMP-LM Okay. I'm clear.

CDR-LM Okay. You up?

LMP-LM Yes.

CDR-LM You can turn your PLSS O₂ OFF any time. Let me know when. Can you reach it? If you can't, I'll get it for you.

LMP-LM Why don't you get it.

CDR-LM Okay. Okay.

04 18 17 34 CDR-LM MARK it.

LMP-LM Okay.

CDR-LM You're on the 30-second mark, and I'm on the minute mark.

LMP-LM Okay, and I'm at 3.8.

CDR-LM Okay. I'll give you a hack on it..

CDR-LM Okay. I'm coming up on 45 seconds.

04 18 18 01 CDR-LM Okay. I'm 1 minute; going back on. Okay, Houston. Commander went from 3.8 to about 3.67. I'll get yours on when you need it on, Jack.

CC I copy that, Commander.

CDR-LM Okay. And we'll pick Jack up here in about 10 more seconds.

CC Okay.

04 18 18 31 CDR-LM Okay, Jack. I'm turning on. Did you mark it?

CDR-LM Okay, Houston; 3.8 to 3.6.

LMP-LM Hello, Houston; you copy the LMP?

CC Roger. Copy the LMP. Okay; and Challenger - -

CDR-LM Okay. Standing by for your GO for depress.

CC You'll be glad to know you are GO for depress.

CDR-LM Thank you, Robert. I understand we are GO for depress.

CC That's affirm.

CDR-LM Okay, Jack. Can you reach the front valve, or do you want me to?

LMP-LM Well, let me turn around here.

CDR-LM Okay, on 16 - first around, on 16, CABIN REPRESS, OPEN.

04 18 19 16 LMP-LM Okay; 16: CABIN REPRESS, OPEN. Circuit breaker is op - coming open.

CDR-LM Okay, and CABIN REPRESS valve, CLOSED on the panel.

04 18 19 25 LMP-LM Okay. The valve is closed.

CDR-LM Okay. If you can't reach it, I guess I can.

LMP-LM Okay. I just had a momentary tone.

CDR-LM So did I. I got it, too.

LMP-LM Okay.

CDR-LM I think it was when you closed the REPRESS valve.

CDR-LM Can you reach it? If not I'll reach your overhead one.

LMP-LM I think you better reach your overhead one.

CDR-LM Okay. Slip over to your right.

LMP-LM Some more?

CDR-LM Let me turn here. Wait a minute, I got turned.

LMP-LM Okay. How far down are we going to take it? 3.5, right?

Tape 77A/22

CDR-LM Yes, wait a minute. I'm not there yet.

LMP-LM Well, I just want to make sure that I'm watching.

CDR-LM Okay; now.

04 18 20 18 CDR-LM Okay, coming open. You ready? You reading the checklist?

LMP-LM Stand by AUTO. REPRESS is CLOSED.

CDR-LM Say when.

LMP-LM ...

CDR-LM You ready?

LMP-LM Wait a minute, wait a minute, wait a minute.

CDR-LM Okay.

LMP-LM Got the wrong place. OPEN, then AUTO at 3.5. Okay; go ahead.

04 18 20 37 CDR-LM Okay. Here it comes. I can see daylight through it.

LMP-LM Okay, it's coming down. Okay. That's 4 - Stand by.

04 18 20 53 LMP-LM MARK. 3.5.

CDR-LM Okay. It's off.

LMP-LM Okay. And your cuff gage should not be below 4.6, and mine's at 5 - mine's at 5.0.

CDR-LM One? Okay.

LMP-LM Okay. The suit circuit is locked up at 4.5. We're at 3.5 and holding.

CDR-LM And I'm decaying.

LMP-LM Okay. I'm below 5.

CDR-LM So am I.

LMP-LM Verify that; okay.

04 18 21 32 LMP-LM Okay. I'll start my watch.

CC Okay. We verify and we're counting.

LMP-LM Watches started.

04 18 21 41 LMP-LM Okay. OVERHEAD or FORWARD DUMP VALVE, OPEN.

CDR-LM Okay. Here it comes.

LMP-LM And it's going down.

CDR-LM You going to want me to put this in AUTO afterwards or not? So, I can turn around, Jack.

LMP-LM Stand by.

CDR-LM ... open - -

LMP-LM ... - -

CDR-LM - - leave it open.

LMP-LM Leave it open.

CDR-LM No, we don't, because then we don't want that hatch to get closed.

04 18 22 09 LMP-LM You got to turn around here. Oh, boy!

LMP-LM Boy, you sure get heavy at 5, don't you? Okay. Where are we? Right here, huh? What that was -

CDR-LM What's cabin, Jack.

04 18 23 05 CDR-LM Do you read, Jack?

CC Jack, this is Houston.

CDR-LM Wait a minute.

CC CDR, we're not reading the IMP either.

LMP-LM Now, how do you read?

Tape 77A/24

CC We read you - -

CDR-LM Now, how do you read, Jack?

LMP-LM Okay. You're loud and clear. Okay.

LMP-LM We got a switch in the wrong place as usual, Bob. I just hit the MODE SELECT; that's all.

CC Okay. We copy.

LMP-LM Okay. Partially open the forward hatch, when we can. Okay. Can you zap over to the left as much as you can?

CDR-LM To the right, you mean?

LMP-LM Yes.

CDR-LM Yes. To the north.

LMP-LM To the north.

CDR-LM The north.

LMP-LM The north. (Laughter) Okay, it's about 0.2, Gene.

CDR-LM Okay. Let me -

LMP-LM You going to be able to get to it?

CDR-LM Yes. You bet you. I've come this far. I'm not going to miss getting that hatch open.

04 18 23 56 LMP-LM Hey, something just flew out.

04 18 23 58 CDR-LM It's open now.

LMP-LM Gosh, look at those trajectories (laughter).

CDR-LM Yes. Put just enough air in here, we're - Okay; it's open, babe. Okay; it is open.

04 18 24 12 LMP-LM Good. Okay; final prep, PLSS primary H₂O. I've got to figure out how to open that now.

CDR-LM Okay.

CDR-LM When you're at 5 psi, it's - We never did really train for this in the right way.

04 18 24 39 LMP-LM Yes, we did. Okay. My water is OPEN.

04 18 24 47 CDR-LM And my water is OPEN.

CDR-LM Okay. Well, let's see, rest until cooling sufficient; 3.7 to 4.6. I'm to 4.9; coming down.

LMP-LM Yes, I am, too. Coming down.

CDR-LM CWEA status.

04 18 25 13 CDR-LM PREAMPs and ECS. Can you see that?

04 18 25 16 LMP-LM See a PREAMPs, and I see ECS.

04 18 25 18 CDR-LM Okay. Water SEP component light, on.

04 18 25 22 LMP-LM Water, excuse me, water SEP. Well, the next thing it says that Gene gets out.

CDR-LM I don't see that.

LMP-LM That's what it says on my checklist.

CDR-LM Okay. Good heavens! That means you got to get out of the way so I can open the hatch.

LMP-LM Well, I'm going to have to turn around a little, I think, so I can help you.

CDR-LM Okay. Boy, beware of that corner.

LMP-LM It's high pressure (laughter).

CDR-LM Yes. I tell you at 4-1/2, you're really pretty heavy.

LMP-LM What was that that came shooting up here? A piece of bread? (Laughter) Would you believe that?

Tape 77A/26

CDR-LM Yes, I'd believe it.

LMP-LM Why is our hatch open? Somebody opened our hatch. Are you getting cooling?

CDR-LM I'm beginning to, I think.

LMP-LM I still got a water flag. Not hot. Stand by. Okay. Well.

04 18 26 39 LMP-LM How does the water pressures look, Houston?

04 18 26 46 CC Challenger, they're looking just a little bit low. We're still expecting it to build up. It's going to take a little while.

04 18 26 54 CDR-LM Okay. I'm getting down on my knees out here. How am I looking, Jack?

LMP-LM You're just fine. I'm holding you away from the DEDA, the ... DSKY.

CDR-LM Okay. I'm going to put this visor down now, I think. How does that look to you?

LMP-LM What?

CDR-LM How are my legs? Am I getting out?

LMP-LM Well, I don't know. I can't see your legs.

CDR-LM Oh, okay (laughter).

LMP-LM I think you're getting out though, because there's not as much of you in here as there used to be. Oh, hey; Gene, when I get down there, I got to fix your tool harness. Hold it.

CDR-LM Okay. Can you reach it?

LMP-LM It's come off the bottom again.

CDR-LM Can you reach it?

LMP-LM Well, I can't do it now, because it's come off from the bottom. I'll have to - -

CDR-LM Oh, the bottom of the PLSS, huh?

LMP-LM Yes.

04 18 07 46 CDR-LM Okay. Well, my legs are out. Keep that hatch open.

LMP-LM Can you squat down any further, because you're hooked on - you're making it worse. Okay.

CDR-LM How's that?

LMP-LM Okay. Now, I think I - Be careful because you might hook it on something down there.

CDR-LM Oh, the tool harness?

LMP-LM Yes. The back. It's loose on your back; on the back of the PLSS.

CDR-LM Oh, man, I don't like that. Okay. I'll watch it.

LMP-LM Well, I'll fix it when I get out there.

04 18 28 21 CDR-EVA Okay. I'm still reading 4.0. Houston, Commander is on the porch of Challenger.

04 18 28 30 CC Roger. We copy you, Commander, and your feed water pressure is looking much better - -

CDR-EVA ...

CC - - now, and you're probably getting cooling.

CDR-EVA Okay. Everything else look good to you?

CC That's affirmative.

04 18 28 46 CDR-EVA Okay, Jack. I'm going to get the MESA.

LMP-LM Okay. And I'll have an ETB ready for you.

CDR-EVA Oh, man; oh, man; oh, man.

LMP-LM Deploy MESA.

04 18 29 00 CDR-EVA Okay. Here it comes.

Tape 77A/28

04 18 29 08 CDR-EVA There she goes, Babe.

LMP-LM Yea, hey!

CDR-EVA There she is. All the way down; it looks like.
Okay. I jettisoned - Oh, you want an ETB?

LMP-LM That's up to you.

CDR-EVA Yes.

LMP-LM You're the commander.

CDR-EVA I got it. I got it. And, the pressure looks like
it's started to stabilize at 3.8. I don't know
whether I'm getting cooler or not, but I feel
pretty good.

CC Okay. We copy that.

LMP-LM How about a jett bag, too?

CDR-EVA Okay. Oh, Jack, I could swing it over the - Won't
be any problem. Over the strut. Okay; and the
jet bag is springing free - swinging free.

LMP-LM You mean the ETB.

CDR-EVA ETB. Oh, man. This looks like a Santa Claus bag.

LMP-LM It is.

CDR-EVA Oh, boy. There it goes. The Rover looks in good
shape. ETB is down there. Okay. I've got all
my visors down. Jack, I wouldn't lower your gold
visor until after you get on the porch, because
it's plenty dark out here.

LMP-LM Okay.

CDR-EVA Okay.

LMP-LM Tape recorder - -

04 18 30 43 CDR-EVA I'm on my way.

LMP-LM - - is off.

CDR-EVA Sensitivity, max and max.

CDR-EVA Okay, Houston. The Commander is about three-quarters of the way down.

04 18 31 09 CDR-EVA I'm on the footpad. And, Houston, as I step off at the surface at Taurus-Littrow, I'd like to dedicate the first step of Apollo 17 to all those who made it possible. Jack, I'm out here. Oh, my golly. Unbelievable. Unbelievable, but is it bright in the Sun. Okay. We landed in a very shallow depression. That's why we've got a slight pitch-up angle. Very shallow, dinner-plate-like dish crater just about the width of the struts. How you doing, Jack?

04 18 32 12 LMP-LM Fine. Getting the circuit breakers verified.

CDR-EVA The LM looks beautiful. Oh, do we have boulder tracks coming down. Let me see exactly where we are. I think I may be just in front of Punk.

04 18 32 45 CC Okay. We copy that, Gene, and are the boulder tracks - -

CDR-EVA I'm beginning to - -

CC - - to both the north and south?

04 18 32 53 CDR-EVA Okay. On the North Massif, we've got very obvious boulder tracks. A couple of large boulders come within 20 or 30 feet of the - Looks like where we can get to them, but there's a couple - there's a couple I know we can get to. Well, the Sun angle is such that, what I saw on the South Massif earlier I can't see very well. But, I know there were boulder tracks over there. The - Bare Mountain - Boy, it's hard to look to the east - Bare Mountain and the Sculptured Hills have a very, very similar texture on the surface. The Sculptured Hills is like the wrinkled skin of an old, old, 100-year-old man - is probably the best way I could put it. Very, very hummocky, and - but smoothly pockmarked. I do not see any boulders up by the Sculptured Hills from here. But it's awful hard to look to the east and to the southeast.

Tape 77A/30

CC Okay. We copy that, Gene. Have you got an LMP with you yet?

04 18 34 09 CDR-EVA Well, here come his feet. Jack, let me make sure. We didn't have an awful lot of dust on landing; but I can dig my foot in 8 or 10 inches, and I know we're at least that thick. There's a small little 1-meter crater right in front of us with a whole mess of glass right in the middle. That's right in front of the MESA, as a matter of fact. Right where I want to park the Rover. Jack, you're looking good.

CC Beautiful, guys; beautiful.

CDR-EVA I'm going to take a quick look back. I think this is Poppy, and I can give you a real better idea where we are.

LMP-LM Hatch is closed, barely.

CDR-EVA Hey, Jack, don't lock it.

LMP-LM I'm not going to lock it.

CDR-EVA We've got to go back there. You lose the key, and we're in trouble.

04 18 35 01 LMP-EVA Oh, I'm on the porch. Who said this place was smooth?

CDR-EVA Boy, there's a lot of local depressions here I didn't figure existed.

04 18 35 17 LMP-EVA Hey, who's been tracking up my lunar surface?

CDR-EVA Hey, Bob, I'm east of the LM now. I'm east of the LM, and the back strut of the LM is - Well, the LM straddles this crater I talked about, and that's where we get the pitch angle; the back strut is probably right down in the eastern one-third of that crater. Just a little - very subtle crater.

LMP-EVA Hey, man; you had some forward velocity.

CDR-EVA That's what I wanted to have.

CDR-EVA Boy, I look at some of these rocks that are filleted here, Jack, and there sure are a lot of sparklies in them. Awful lot of sparklies.

LMP-EVA You landed in a crater!

CDR-EVA That's a pretty good shot.

CDR-EVA Okay. I'm going to get to work in a minute, just as soon as I take a look at Trident.

LMP-EVA Why don't you come over here and let me deploy your antenna.

CDR-EVA Okay. Just walk around for 1 second.

LMP-EVA (Laughter) Hey, man, put your visor down.

CDR-EVA And, I'll be over there, and you can fix my tool harness. I don't like that thing loose.

LMP-EVA I don't like it loose, either. What are you doing over there? We're supposed to be working.

04 18 36 39 CDR-EVA I was just going to give them a fix. All these little craters, Jack, have got glass in the bottom of them. Here's another one.

LMP-EVA There's very clear sweeping of the surface by the descent plume out, oh, about 10 meters - no, 15 meters. Come over here, and I'll fix your antenna.

CDR-EVA Okay. Hey, Bob, how big is Poppy supposed to be?

CC Stand by. It looks on the map - -

CDR-EVA I didn't hear you. You cut out.

CC Okay. It looks on the map like it's about 75 meters in diameter. Fairly subtle.

04 18 37 28 CDR-EVA Okay. Okay, I tell you where I think I landed - oh, about 100 meters from Poppy at 10 o'clock.

LMP-EVA You think that's Poppy, huh?

Tape 77A/32

CDR-EVA I think so - I think - -

LMP-EVA That's an awful big hole.

CDR-EVA Well, I know. I got to look around a little more. It sure is not Trident.

LMP-EVA Bend over and I'll - -

CDR-EVA It might be part of Trident.

LMP-EVA - - get your antenna. Get your antenna. Oh, a little more.

CDR-EVA Gosh, it's beautiful out here.

LMP-EVA Well, hang on.

CDR-EVA Yes.

CDR-EVA Okay. The immediate surf - -

LMP-EVA Not yet. Yes, go - you talk to them. I don't want you to stand up yet.

CDR-EVA The surface is moderately cohesive, which holds a pretty good footprint - very fine grain. ... looks very much like previous soils. You got her?

LMP-EVA Yes. You got a hole behind you now.

CDR-EVA Well, I'll stand in it, and you can get at it better.

LMP-EVA Well, you got me right in the Sun. Can you come around this way? Ho-ho. (Laughter) I'm going to have to get upstream of you.

CDR-EVA Look, you get up on the hill, and I'll get in the hole.

LMP-EVA Yes. There you go. Whoa, whoa, whoa, whoa.

CDR-EVA Don't move too fast. Boy, your feet look like you just walked on the Moon, you know.

LMP-EVA Well, I tell you Gene, I think the next generation ought to accept this as a challenge.

LMP-EVA Let's see them leave footsteps like these someday. Got another - there, that'll be all right.

04 18 39 12 CDR-EVA Okay. What did you do with my tool harness?

LMP-EVA I'm going to work on it; that's what I'm going to do. Whoa; hold still.

CDR-EVA Okay. Boy, I tell you, looking to the east, you might just well forget it.

LMP-EVA Well, let's see. How's this thing - I'm going to have to loosen it.

CDR-EVA Well, if you could just stretch it around.

LMP-EVA I can't.

CDR-EVA You can't huh?

LMP-EVA But I will be in a minute.

CDR-EVA Don't loosen it to the point where you can't get it back on.

LMP-EVA Okay. You're almost reconfigured.

CDR-EVA Okay.

LMP-EVA Okay. Somebody tied you on wrong, too. They've got the strap reversed for the Velcro. Okay, Gene. I think that will hold.

CDR-EVA Okay, and I'm going to - -

LMP-EVA If it doesn't I'll fix you again.

04 18 40 20 CDR-EVA Man, there's sparklies in the soil, Jack. You can just look at it. See them all over? Very fine grained. It's sparkly, that's all. Bob, I'm going to min cooling - or, intermediate cooling.

04 18 40 33 CC Okay. Copy that.

Tape 77A/34

LMP-EVA Boy, that sure -

CDR-EVA See the soil sparkle?

LMP-EVA Yes, I think that's a little glass.

CDR-EVA There's - Let's go back here and get to work, and I'll show you that crater that's got nothing but glass in the bottom.

LMP-EVA That's a vesicular rock of some kind there, Geno. It almost looks like a mono crater - pumice, but don't quote me.

04 18 41 01 CDR-EVA Bob, I have to reiterate. Even the small - even the very small - the 1- and 2-inch - 3-inch fragments that are laying around here have been dusted and filleted - -

LMP-EVA Do-tu-doo.

CDR-EVA - - with the dark mantle.

LMP-EVA And that sweeping by the descent stage goes all the way out there, Houston, to where we were, which was about 50 meters, I guess. Hey, man - whuh, whuh, whuh - these rocks - they almost have a pink - very light pinkish hue to them, and they are not - they're not obviously breccia. Now, that - that's a - like a breccia there. But this stuff is something else again.

CDR-EVA Yes. I don't think there is any place you could land around here where you wouldn't have one foot in the crater.

LMP-EVA Looks like a vesicular, very light-colored porphyry of some kind; it's about 10 or 15 percent vesicles. I'm right in front of the LM. They - Quite a few of the rocks look of that type. Sort of a pinkish hue to them. The texture is coarse, but I'm not sure how crystalline they are, yet. Okay; back to work.

CDR-EVA Jack, when you put up the ETB, the - check down there below it.

LMP-EVA Oh-ho-ho (laughter).

04 18 42 33 CDR-EVA Okay, let's take a look at the Rover.

LMP-EVA Let's don't forget those.

CDR-EVA Yes.

LMP-EVA That's my fault; I guess.

CDR-EVA Yes.

LMP-EVA Okay.

CDR-EVA Oh man, I tell you, we came down at just a little forward velocity. Look at that - right there. About a foot slip on the pad. I tell you, there's craters all over here. Okay, baby. I'd sure like to think that that wheel is where it's supposed to be. It looks good to me.

04 18 43 06 CDR-EVA Our next little vehicle to work.

04 18 43 35 CDR-EVA Okay. Bob, so far, the Rover looks pretty good.

04 18 43 39 CC Roger; sounds good, Geno.

CDR-EVA Hey, let me ask you. When I was behind the LM, I could look right into an area and see the bell of the ascent stage. I never realized that before, but I guess that's normal, huh?

LMP-EVA Yes. We saw it on the pad. Remember.

CDR-EVA Barely.

LMP-EVA Remember when we went out there?

CDR-EVA The only reason I asked, Bob, I'm sure it's normal, and it doesn't look anything's missing, it's just right - right into the Sun.

CC Yes. The consensus of opinion down here is that you can, also.

Tape 77A/36

CDR-EVA Yes, that's probably the best place in the world to get a consensus of opinion from. Okay, Jack, it's about work time. I've got this Rover about ready for - your pull up there.

LMP-EVA I got a little delayed here.

CDR-EVA Okay. I'm sure glad those guys made us train so hard.

LMP-EVA Okay. The MESA's up. Let me know when you're ready to deploy.

CDR-EVA Okay. Babe, I am - I am ready for you. Everything I can see looks pretty good. The walking hinges, you will be glad to know, are intact. They did not drop.

04 18 45 12 CC Roger. That's a first.

LMP-EVA You want me to go up there and do that, huh?

CDR-EVA Yes, sir. The beginning.

LMP-EVA You ready for me to deploy?

CDR-EVA Okay. Let me just doublecheck. Drape, contingency, unstow aft deployment cable, verify walking hinge, forward and aft chassis parallel. They are.

LMP-EVA MESA insulation is not coming off as easy as in training.

CDR-EVA Okay. Outrigger cables are taut. Looking good to me. Yes, Jack. You can go on up. Go on up.

LMP-EVA Okay.

CDR-EVA I'm ready for you. Gosh, that LM is a pretty sight. Challenger, you're a beauty.

LMP-EVA Well, let's see how good I am.

CDR-EVA Don't drop that. Let me get that thing again.

CDR-EVA Yes, sir. (Laughter) Yes, sir. You're pretty agile there, twinkle toes.

LMP-EVA You bet your - life I am.

CDR-EVA All I asked you to do was pull that handle up there. Man, anything you grab, Jack - I just grabbed this lanyard that was in the dust - is really black.

LMP-EVA You ready?

04 18 46 29 CDR-EVA Go. She fell, Houston. She's open.

LMP-EVA Okay. You've got parallel chassis; the wheels look good on this side.

CDR-EVA Okay. They're good on this side. Let's get done. Let's get it out.

CDR-EVA I'll wait for you to get the deploy cable. I'll tell you, Jack, this place is not locally level.

LMP-EVA You - you're right.

CDR-EVA Okay. There's not - there's not many places you could put the LM down and have it be zero, zero, zero. Okay. I'm ready if you are.

LMP-EVA I don't know how much help I'm going to be.

CDR-EVA Well, I'm starting; you pull. It's coming. It's coming. It's coming, baby. How's your wheels on that side? Can you see them: Mine look good.

LMP-EVA Wheels; they looked good a minute ago. I got the Sun, so I can't tell much - -

CDR-EVA Okay.

CDR-EVA Eeee. The only way to do it.

LMP-EVA I'm putting all my weight (laughter).

CDR-EVA Okay. Wait a minute. I'm coming down now. She's going to pop here.

Tape 77A/38

LMP-EVA Okay.

CDR-EVA Wait a minute. Stand by.

LMP-EVA I may pull a Jim Irwin here.

CDR-EVA Wait a minute. Watch out. Here she goes.

LMP-EVA Got her.

04 18 47 52 CDR-EVA Okay. Beautiful, Houston. The aft chassis's out.

04 18 47 57 CC Roger. Beautiful.

CDR-EVA Beautiful. Whoa, whoa, wait, wait, wait, wait.

LMP-EVA Tried to get off the hinge there.

CDR-EVA Yes, yes. She's on, though. She's all in. She's in the walking hinges. I wish you could see it. Jack, those wheels did not lock all the way up though. We ought to pull them up before we - well - -

LMP-EVA ...

CDR-EVA Well, there it goes by itself. Okay. Wait a minute - wait a minute. Okay. Let me pull it until the outriggers cables get slack.

LMP-EVA Okay. Walk away from it. Easier.

CDR-EVA That tape up there - on the reel.

LMP-EVA Yeah, it's all -

CDR-EVA It's coming.

LMP-EVA It's free reeling.

CDR-EVA Yes. Let me - let me - don't pull it until I - Okay. Now I've got it.

CDR-EVA Man, I'd walk and fall into that crater if I went to the end of this line.

04 18 48 59 LMP-EVA Houston, I do think we've got a different -

CDR-EVA Well, we're deploying it at an angle. Okay. The outrigger cables are free, Jack.

LMP-EVA Okay. Got a different breed of rock up here. The stuff's sticking through this thin regolith - or regolith, period. I don't know whether it's thin or thick yet (singing). Okay. Mine's free.

CDR-EVA Let me get this - let me get all this cable out of the way. Otherwise, I'll - is that enough of this stuff? I don't like all that over there. ...

LMP-EVA A geologist's paradise, if I ever saw one. Boy, you certainly are changing the color of that cable, sir.

CDR-EVA Yes. Just tried a John Young trick.

LMP-EVA Did it work?

CDR-EVA Yes. (Laughter).

LMP-EVA You're getting dirty.

CDR-EVA But, I'm still getting my balance. I didn't touch the ground. Just got to get some of this cable out of here.

LMP-EVA I'm not sure my pockets are going to be accessible.

CDR-EVA Man, I'll tell you, I don't know how long this line to pull the Rover out is, but -

CDR-EVA Well, I'll tell you, it sure is easy to get dusty, but that's nothing new to anybody. Okay, Babe, let me get - Whee!

04 18 50 32 LMP-EVA I think it's safe to say this surface was not formed yesterday. There is a regolith; it looks classic. Area distribution of particles up to 3 or 4 centimeters, anyway. Then, you start to get maybe a selective distribution of large fragments. Got that cable?

Tape 77A/40

CDR-EVA Yes.

LMP-EVA Okay. I'm going to walk away with this one.

CDR-EVA Okay; outrigger cable.

LMP-EVA You ready?

CDR-EVA Okay. When forward wheels on surface; okay. Let me - let me pull.

04 18 51 09 CDR-EVA Okay, Houston. She's continuing to come.

LMP-EVA Here's a couple of different looking rocks. One's very white; one's quite dark. But we do have a general rock type, I think, in the area - of the big boulders. Gosh, how much cable is there?

CDR-EVA There's a lot of it Jack. Keep going.

LMP-EVA (Laughter)

CDR-EVA You're going to be a long way away. We're not there yet. Keep going. Okay. We've got the front wheels on the surface, but keep going, I don't think you've got it up there.

LMP-EVA I never thought I'd do geology this way.

CDR-EVA Okay. I think you got it. Let me see.

LMP-EVA Is it slack?

CDR-EVA I'll get up there and take a look. Okay. It's slack.

LMP-EVA Longest cable in the world.

04 18 52 12 CDR-EVA It's slack.

04 18 52 15 CC Wait till you get to the ALSEP package.

CDR-EVA Okay. By golly, those wheels did lock.

LMP-EVA (Laughter) I never knew that cable was that long, Bob. Oh, a glass bottom - a glass bottom crater with a little bench. Looks like one of the Flagstaff explosion craters except for the glass in it. Right out at 12 o'clock. That's the one I was talking about, about having a bright halo. I don't know whether it's easier to walk out there or to do what I did in training - that I wouldn't do on the Moon. Somebody's going to get tangled up with this thing.

CDR-EVA That's why I'd get it all under the LM somewhere. I'd - what I'd - took me 5 minutes to do and get it all out of the way. Okay, Bob, the front wheels locked in. I had to pull the rear wheels - rear wheels back to get them to lock in.

04 18 53 11 CC Okay. Copy that.

04 18 53 16 CDR-EVA At least no one let any air out of the tires. Man, I look like I've been on the surface for a week already. Holy smoley. Okay. Pull pins on deploy cable and fittings - move LRV from LM.

LMP-EVA Wait a minute. I haven't ... the - -

CDR-EVA Okay.

LMP-EVA - - other pins. It's going to take awhile. Think we can avoid that cable?

CDR-EVA Why don't you set it there, pull this pin, and then you can go back and get it; that is, it's better to use the Rover contingency tool, because - -

LMP-EVA Yes, but that's off over there on the ground now, somewhere or another.

CDR-EVA Okay. Pull that pin. Until we get that saddle loose.

04 18 53 52 LMP-EVA Loose.

CDR-EVA Beautiful. Okay, we're going to have to move that thing - that line, Jack. You ready?

Tape 77A/42

LMP-EVA I'll move it.

CDR-EVA Okay. Let's find a - back over here. See that?

LMP-EVA Yes.

CDR-EVA Oh, man. Face a little more east, so I don't have to run into the ... Okay, how about here?

LMP-EVA That's - You're the driver.

CDR-EVA Okay; right there.

LMP-EVA You like it?

CDR-EVA Like it.

LMP-EVA Okay. You got it.

CDR-EVA Not yet. You got some fenders and stuff for me - -

LMP-EVA I was going to get my cable. I thought you said I could work on the cable.

CDR-EVA Ohh.

LMP-EVA You're putting me farther and farther behind.

CDR-EVA Oop.

LMP-EVA Don't forget your post.

CDR-EVA Okay.

04 18 54 38 LMP-EVA Okay. Pull pins. I can see a little yellow ...

CDR-EVA Okay. The post is up.

LMP-EVA Hinge pins.

CDR-EVA Okay. Yours is in, but mine is not.

LMP-EVA Well - neither's my outboard one.

CDR-EVA My outboard is in, but my inboard is not.

LMP-EVA And my outboard isn't.

CDR-EVA Well.

04 18 55 09 LMP-EVA That's supposed to do it. But it didn't.

04 18 55 14 CC ...

CDR-EVA Let me get the contingency tool and try to push those things closed.

LMP-EVA Okay. Be care -

CDR-EVA There's a piece of glass I picked up. I'm going to set it right on the floor of the Rover. Jack, let me get that tool. We got to get those pins in, I think.

04 18 55 52 CDR-EVA Bob, you got any words on the yellow pins on the rear chassis?

04 18 55 55 CC Roger. The best way to put those in, if you've tried bouncing the chassis, would be to push them with the contingency tool. ... what you're going to do.

LMP-EVA That's affirm. Can you get that, Geno?

LMP-EVA Need some help?

CDR-EVA Nope. Well, I found how to get up.

LMP-EVA Did you fall down?

CDR-EVA Well, this thing was in the mud down here. We'll find out in a minute.

CDR-EVA Okay, Jack. Got an out one here, huh?

LMP-EVA Yes. Let me try to push it in.

04 18 57 06 CDR-EVA Okay. Yours is in.

LMP-EVA Good.

CDR-EVA Can I get mine in?

Tape 77A/44

LMP-EVA Want me to get it?

CDR-EVA Well, yes. Can you reach it from there? It's a nice ... on it. Almost. A little more. Wait a minute. Let me get it - let me get it right - Okay; push. It's in. It's in.

LMP-EVA Very good. Why don't you put that between the seats?

04 18 57 39 CDR-EVA Yes. Okay. Bob, they're in.

04 18 57 40 CC Copy that.

CDR-EVA Okay. Now where was I? I got my fender, got the post, got to get the seat.

LMP-EVA Ready?

CDR-EVA I'm going to take it a little slower here in a minute.

LMP-EVA Yes.

CDR-EVA Just a little bit slower in a minute.

LMP-EVA The blush is off the rose. Okay, your front pin is in. And both of mine are in.

CDR-EVA Okay. ...

LMP-EVA Not quite as easy as in the training building.

CDR-EVA Well, it's a case of knowing how to play in 1/6 g, is what it amounts to. Okay. Okay. I'm ready on the - the lock?

04 18 58 41 LMP-EVA Yes. It's locked.

04 18 58 43 CDR-EVA Let me get the seat down. Okay. I got the console.

04 18 58 48 LMP-EVA Okay; and I got the handle.

04 18 58 50 CDR-EVA Okay; mine's pulled.

04 18 58 51 LMP-EVA Mine's pulled.

04 18 58 53 CDR-EVA Come on down, baby. Here it comes. Stiff, but come on.

04 18 58 56 LMP-EVA There it is.

04 18 58 57 CDR-EVA Okay; make sure your T locks.

04 18 58 58 LMP-EVA I'm not - you're not all the way down yet, Gene.

04 18 59 00 CDR-EVA Yes. I'm locked. There you go.

04 18 59 04 LMP-EVA Okay. Okay. I'm locked and secured. Okay.

CDR-EVA Oh, Jack, I put a little piece of glass I picked up right by the Rover, here.

LMP-EVA Yes. Okay.

CDR-EVA Just a little piece. I'm going to leave it right behind your footstool. It just - just sparkled at me. I had to pick it up. Okay?

LMP-EVA That's yours. Your sample for the day.

CDR-EVA I doubt that. Man, I tell you, zero g is a piece of cake if you - or 1/6 g, if you'd play it right.

04 18 59 45 LMP-EVA Okay, Gene, you've got - fenders, your pin was good. I checked that. I could see mine, too. Mine are okay, and you'll have to check your outside ones.

04 18 59 57 CDR-EVA Okay. My two pins are good here.

04 19 00 01 LMP-EVA Yes. And mine are good.

04 19 00 02 CDR-EVA This one isn't quite flush. Almost. It's good.

04 19 00 05 LMP-EVA I'm going to pull your flags. Oops, I bent that one - that one. And your attitude indicator is free.

04 19 00 17 CDR-EVA Man, look at that stuff go, will you?

Tape 77A/46

04 19 00 18 CC And, Jack, this is Houston. We're seeing - Looks like your water temperature's getting pretty high. You might want to go to intermediate cooling or slow down or something. Looks like you're getting a little warm.

04 19 00 38 CDR-EVA You hear them, Jack?

04 19 00 39 LMP-EVA Yes. I got it. Thank you, Bob.

04 19 00 41 CDR-EVA Okay, Jack, get that cable, because I tripped over it coming back.

04 19 00 46 LMP-EVA Yes. I'll get it.

04 19 00 47 CDR-EVA Okay. Let's see. Verify hinge pins and seal. Erect seat, seat - seatbelt. Armrest is lowered, pull T-handle, console's lowered. Tripod apex is gone both sides. Tool behind footrest; that's done. Front hinge pins are in. Erect footrest. Extend front fenders; they're down. Verify batt covers are closed. They are closed. And let's keep them clean.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 19 01 19 CC You've got a lunar sounder HF pass at 1 - starting - at 119, for a site - well, actually a 2 hour, no, 1 hour that you could probably grab some food at that time.

CMP Okay.

04 19 19 XX BEGIN LUNAR REV 16

04 19 51 12 CC America, Houston.

CMP Houston, America. Go ahead.

CC Okay. Just wanted to make sure you're there. Your friends are out on the surface, and we've got a live TV picture coming from the Moon.

CMP Hey, great!

CC And Bob just passed word that they just dropped the scissors up there, but they found them under the dirt awhile. Anyway, they almost lost a pair of scissors.

CMP (Laughter) Oh, come on now. They've only got one pair, too, I think. Unless both of them ended up over there.

CC Get some good pictures of Aitken there, Ron?

CMP Yes, I sure did.

CC Out of curiosity - -

CMP Almost missed ... picture.

CC Roger. When you came by Arabia, could you see the subdued rings of Arabia?

CMP You know, I haven't had a real chance to look at those yet.

Tape 77B/2

CC Roger.

04 19 53 16 CMP Okay. Magazine SS is full.

CC Roger. We copy.

CC Ron, any time you're ready, I've got a TEI-26 pad and an earth - earthshine photo pad.

CMP Let's see. (Humming)

CC Ron, if you've got 1/2 scale on your HIGH GAIN, will you go to REACQ and NARROW?

04 19 54 50 CMP Okay. Good idea. REACQ and NARROW.

CC Good show, Ron.

CMP (Whistling)

CMP Okay. Let's see. I guess I ought to do a TEI. What did you say it was, 26?

CC That's affirm, Ron. TEI-26.

CMP Okay. Ready to copy.

04 19 55 51 CC TEI-26, SPS/G&N; 37630; plus 0.53, plus 0.97; 139:41:14.32; NOUN 81's plus 2450.7, minus 2097.8, minus 0807.1; roll is 187, pitch, 104; yaw, 323; rest of the pad is not applicable. Good old Sirius and Rigel for set stars; 133, 200, 030. Ullage, four jet, 12 seconds. Longitude of the Moon at T_{ig} will be minus 160.39. Over.

CMP Okay. Say again the longitude.

CC Roger, Ron. It's minus - minus 160.39.

04 19 57 37 CMP Okay. Readback. TEI-26, SPS/G&N; 37630; plus 0.53, plus 0.97; 139:41:14.32; and 81's plus 245.07, minus 2097.8, minus 0807.1; roll, 187, 104, 323. Sirius and Rigel; 133, 200, 030. Four jet, 12 seconds. Lunar longitude at T_{ig} is minus 160.39.

04 19 58 17 CC Good readback, Ron. And the earthshine photo pad is at 121:05 in the Flight Plan.

CMP Okay. Stand by just a second. 121:05, huh?

CC That's affirmative.

CMP Okay. Have it.

CC Roger. T-start, 121:03:59.

CMP Okay. T-start, 121:03:59.

04 19 59 01 CC And, Ron, we'd like the RECORDER, ON, on the LUNAR SOUNDER.

04 19 59 09 CMP Okay. RECORDER, ON.

CMP (Humming)

04 20 06 24 CC Just talked to the homefront, Ron. And I guess some of you guys will do anything to get out of - get away from putting up -

CMP Roger.

CC - - Outdoor Christmas decorations. All the neighbors are outside putting up your Christmas decorations tonight. It's pretty bad when you have to travel thousands of miles to - -

CMP Well, I'll be darned. That's - (Laughter) Yes. That's pretty darn nice of the neighbors, though, I think.

CC And the Putnams got home, so you got the whole - whole neighborhood back now.

CMP Gee whiz.

04 20 07 48 CMP Okay. Finally got mag ZZ on the ole Nikon.

CC Roger. Looking at the Flight Plan, Ron, you're coming up on selecting OMNI Bravo and setting up the HIGH GAIN and pow - powering it OFF; and getting ready for the LUNAR SOUNDER receive only section here.

Tape 77B/4

CMP Okay. (Humming)

04 20 09 52 CMP Okay; 49. OMNI Bravo. And set the HIGH GAIN MANUAL and WIDE, minus 74.

CC And, Ron, your friends down here said that they could hear you on the VHF loud and clear.

CMP (Laughter) Very good. I was just curious. I don't hear them. I thought maybe I could hear them. Yes, have a ball down there, guys.

04 20 13 40 CC Okay, Ron. We're - It looks like we're about 30 seconds in front of OPERATE. Right there on OPERATE.

CMP Okay.

CC And we're not going to have a number - - any calls here for a good 40 minutes, so this is a good time to catch up on your meal regimen there if you want, Ron.

CMP (Laughter) Okay.

04 20 20 59 CC Ron, when you get a chance, we'd like H₂ TANK 3 FAN to OFF.

04 20 21 09 CMP Okay. H₂ TANK 3 FANS are OFF.

CC Roger.

CMP Hey, Bob. Did Jack call down where that flash is - where he saw that light flash?

CC Roger.

CMP Okay. I've got a mark next to Riccioli G - Riccioli Golf. Is that correct?

CC That's affirmative. We - we circled it - at Grimaldi B and the east and north of Grimaldi B, right in that area.

CMP Okay. We've put it just - got a little X about the diameter of Riccioli G, to the west of Riccioli G.

CC Okay. That's probably - -

CMP ... west of it.

CC That's probably - he didn't ever call the - I'll ask FAO here, but I don't think he ever called the actual - coordinates on it. I'll ask FAO. That's probably close enough. They'll probably all be in the picture anyway, wouldn't it?

CMP Oh, yes. They'll all be in the picture anyhow.

CMP You'll never believe it, but I saw lightning flash down there too. I don't know. That last rev. Did you hear that?

CC Roger. We heard that, Ron. The thought that occurs to us, should you be seeing the - those cosmic ray flashes just while you're looking at the lunar surface and getting that effect?

CMP Yes, that's what I'm wondering myself, you know.

CC As Charlie said, he mentioned he'd seen something similar to that and possibly thought it was that. And we were thinking that maybe what it was with Jack, but it won't hurt to take a picture of the area anyway.

CMP Well, I think we'll try taking a picture of it, but I think I tend to agree with you. That's probably what it was.

CC We're just guessing just like anybody else on that. We're just - just guessing on it, Ron.

CMP (Laughter) Okay. Nothing showing up on the seismometer anyhow ...

CC Well, you have to remember on the seismometer, on at least the one for Jack's call, the S-IVB had just clobbered the seismometer, and - and that there was something small impact that when the - it was in the mud, you wouldn't have seen it.

CMP Oh, okay; sure.

Tape 77B/6

04 20 27 58 CC Ron, I know you're wondering. All the data so far on the lunar sounder has come out real good, and the HF pass is looking real good.

CMP Oh, that's dandy! Hey, that's great!

CMP Let's hope something is going on the film.

CC That's - that's Roger on that. We sure hope so.

CMP (Laughter) Oh, I'm sure it is.

CC You take another look at Copernicus, or did you eat during the test?

CMP Just stuck my head out the window. I've got to find it. There it is, right here.

CMP Oh, boy. Just wasn't quite light adapted there. I'm not sure if you could really tell ... going through there or not.

CC Roger. Understand.

CMP You know, light and dark albedos show up real well. You can see some indication of terrain; that is, hilliness or burrows or - or grabens or rilles. Of course, the fresh craters show up a - lot wider with respect to the surrounding territory than I think they do in the - on the bright side, you know? With the Sun shining on them.

CC Roger.

04 20 33 20 CC Gene became the first auto-mechanic on the Moon as one of the rear fenders fell off the Rover right after they deployed it, so he had to tape it on with some tape.

CMP (Laughter) Oh, he did? Well, they were pretty much sure those things were going to fall off anyhow.

CC Yes, they were willing to bet on it.

04 20 33 35 CMP You can't pack them in there, you have to - yes - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 19 01 21 CC Okay; and 17, you're right on schedule.

CDR-EVA Okay. Thank you, Bob. Did you tell Captain America we're on the surface?

CC Roger. We broke the news to him awhile ago.

CDR-EVA Okay; next spacecraft to powerup is going to commence right now.

LMP-EVA Okay. That takes care of that little job.

LMP-EVA How's my cooling look now, Bob? Oops.

CC Roger. It's come down quite a bit. You were 86, and now it's down to 75. Looks much better. We didn't want you to sweat.

LMP-EVA Well, I'm just a hot geologist; that's all.

CC Or something.

CDR-EVA Somebody kicked dirt all over the MESA. Let's see if there is any life - in this here baby.

04 19 03 04 CDR-EVA Okay. Getting up and on.

LMP-EVA Give me a yell when you start to go, and I'll try to be sure to be there with the camera.

CDR-EVA Okay.

CDR-EVA Big bag is deployed.

CC Copy that.

LMP-EVA Well, the seat belt fits perfect.

CDR-EVA Shoot. I thought I was going to get to drive. Man, I got so much dust over my visor already, I got to wipe it off. Get that lens brush; I want you to dust me off a little later, Jack.

Tape 78A/2

LMP-EVA The lens brush?

CDR-EVA Well, I've got to dust my visor off with something.

CC Roger. Don't use your glove or dust brush there.

CDR-EVA Okay; when I was bringing that -

LMP-EVA No, we'll use the lens brush, Bob.

CC Roger.

CDR-EVA Okay. Let's try to see if I can read in this Sun now. Rotate the hand controller. Let's wipe it out a couple of times to make sure we got all the the steering. She's wiped out. She goes forward and she goes reverse. She's back in forward; she's wiped out, and she's in park. Reverse is down. Okay, here we go. Stand by for life. It ought to be on this one. There's life in this here baby. Beautiful.

LMP-EVA I don't know who's responsible for packing this ETB, but I think it was me. You didn't by any chance pick up those scissors, did you?

CDR-EVA No, sir.

LMP-EVA They're going to be hard to find, but I think we can do it.

CDR-EVA Well, they were right down there, unless you picked them up. That's exactly where the Rover tool was, too, and I picked it up, so it's - they're probably there. I didn't see them though. Okay.

LMP-EVA Okay. I got my camera.

CDR-EVA All the breakers closed except NAV.

LMP-EVA The old 4 o'clock pan.

04 19 05 50 CDR-EVA Okay, Houston. Amp-hours, I'm reading 115, Amps are 0. Volts are 82 and 82. Batteries are - 95 and 110. FORWARD MOTORS are off scale low, off scale low, and REARS are off scale low, off scale low. Houston, you with us?

CC Roger. We copy that.

CDR-EVA Okay.

CDR-EVA DRIVE ENABLE, FORWARD ... time-1. Take it nice and easy. Here we go at time-2. And that is BOTH; I know that. That's SECONDARY. Okay; STEERING, go FORWARD to A - -

LMP-EVA Boy, it's hard to see in that Sun.

CDR-EVA - - and REAR to D, and REAR to D. DRIVE POWER FORWARD is going to A. I didn't feel any Earth-shaking rumbles like I do in the - in the trainer, but let's see what happens.

CDR-EVA Okay, Jack. I'm going to find out in a minute.

LMP-EVA Okay.

04 19 07 34 CDR-EVA Okay. Here we go. Okay. The runt - the fright - the front wheels turn. I can't see the rear ones.

LMP-EVA I'll verify them in a minute.

04 19 07 50 CDR-EVA Okay. I can't see the rear ones, but I know the front ones turn. And it does move. Hallelujah! Hallelujah, Houston! Challenger's baby is on the roll.

CC Roger. Copy that. Sounds great.

CDR-EVA And judging - judging from the way it's handling, I think the rear wheels are steering too.

CC That's a first.

CDR-EVA What do you see, Jack?

LMP-EVA Well, I - you're wrong angle. Yes, they're turning.

Tape 78A/4

CDR-EVA How does that grab you?

LMP-EVA They're turning.

CC How about that?

LMP-EVA Come towards me, baby. Looks like it's moving.

CDR-EVA Oh, boy. Keep moving.

LMP-EVA Don't run over me.

CDR-EVA Don't worry. Man, if they don't like this.

CDR-EVA How's that?

LMP-EVA Let me - Let me move back. Okay?

CDR-EVA How's the time line, Bob?

CC As far as I can tell, you guys are right on within a minute or 2.

LMP-EVA They're just a little high for me, Geno.

CDR-EVA Okay.

LMP-EVA I'm not sure I can get it without getting way away.

CDR-EVA Okay. Don't worry.

LMP-EVA Somebody said it was going to be just behind the south end. (Laughter)

CDR-EVA Okay. I'm going to take a little spin around here, and I'll meet you at the front end.

LMP-EVA Okay.

CDR-EVA Boy, there's a lot of static, though, everytime I start driving.

04 19 10 09 LMP-EVA I know what that was over there, I think. Let me see. Whee! Okay, Houston. The basic material around the LM is just what I said — a fine-grained, medium-gray regolith-appearing material that is the

standard area's population. The craters, though, bigger than about a meter in diameter, seem to - get to - rock fragments - which I haven't yet learned how to pick up.

CDR-EVA Okay, Jack. I'm going to give them our position here. I think I know exactly where we are now.

LMP-EVA Well, once you get them dirty, just like the boys say, it's hard to tell what they are.

CDR-EVA Okay, Houston. I'm - I'm parked right next to Barjea. And we are, from Barjea, 12 o'clock - Jack, how far - oh, you can't see. You're looking at the Sun. I guess about 150 meters due west of Barjea. And that's why we looked so close to Trident. I'm coming right up on Poppy. No question about where I am now. I've got Trident, and when I get up there - We are abeam of Trident 1, just where I said we were. I'm right at Poppy. We're about - oh, 100 meters just about due - due west of Poppy, which is almost in line with Barjea, of course, but basically, on that line, I think, between Rudolph and Trident 1. And, as I look at it in the cross section, about 100 meters - about 100 meters north of Trident 1. That's the landing point.

CDR-EVA Sure get dirty fast. Jack, that is Trident right here that I - that we walked over to. (Laughing) I just got my first initiation to getting very dirty.

LMP-EVA You sure did (laughter). Where are you? Are you ready to go?

CDR-EVA I'm coming right around the front now. Houston, did you get that position?

CC Roger. We copied that, Geno.

CDR-EVA And Bob, I'm - I'm - I'm very firm of that now. I'm almost positive, unless I'm awfully mistaken about Trident. I don't see how I could be from here. At the sacrifice of my cleanliness, Houston, the basic bright-colored rock type in the area looks very much like a cristobalite gabbros of

Tape 78A/6

the - I didn't see cristobalite, but it looks like the gabbros in the mare basalt sweep. The coarse-grained clinopyroxene plagioclase rocks.

CC Okay. We have that.

04 19 13 50 CDR-EVA Okay, I'm going to park - How about along side - Am I gonna screw up that little crater with glass in it if I park there?

LMP-EVA Well, we will eventually.

CDR-EVA Well, there's that one anyway. Let me park right here.

LMP-EVA I'm sure we'll find some more.

CDR-EVA Yes - Jack, where you been?

LMP-EVA I fell down.

CDR-EVA Okay, that's about close enough. Isn't it.

LMP-EVA Yes.

CDR-EVA Okay, she is locked.

LMP-EVA Here, let me get the 15-volt ...

CDR-EVA I think this camera is probably a little dirty on the lens. Okay, Houston. We're parked. No. The lens is okay. When you uncover one of those lens brushes, I want to use it on my visor. Oh, boy.

CDR-EVA It just takes a little getting used to the 1/6g, Jack.

LMP-EVA I want to put this camera over here right now, because it's pretty dirty to put back in that bag. Okay, get to work.

04 19 14 54 CC Roger. We copy that guys. You're about 7 minutes behind right now.

CDR-EVA LRV front configure. Whoops. Hold it. Hold it.

CDR-EVA What? Okay, we'll catch up.

LMP-EVA I haven't quite learned how to pick up rocks in my hands yet, Bob, or I would of had you a sample. That's why I fell down. My day will come (singing). Oh, oh! It's an old blue traverse gravimeter.

CDR-EVA Okay. On the plains of Taurus-Littrow. What a valley. I'd like to cut down here, through here, with a P-38 sometime.

LMP-EVA That'll be the day.

CDR-EVA Yes, it will.

LMP-EVA Whoa there.

CDR-EVA You never know.

LMP-EVA Friend of mine - -

CDR-EVA Install LCRU, lock posts; I'll get that. Okay. That's the next big hooker, the LCRU.

LMP-EVA Okay, geopallet's off the IM.

CC Copy that.

CDR-EVA You know, you just got to take it easy until you learn to work in 1/6g.

LMP-EVA Well, I haven't learned to pick up rocks, which is a very embarrassing thing for a geologist.

CDR-EVA Yes, I look like an elephant stumbling around here.

CDR-EVA Careful with the LCRU. One dust cover came off. Careful with this baby. That's the real one.

LMP-EVA Boy, you sure move that Rover around when you do that.

LMP-EVA Hey, the geopallet is locked on.

CC Copy that.

LMP-EVA I'm getting pretty good at throwing things - already.

Tape 78A/8

CDR-EVA Man, that thing won't want to go on. That's because it's not in there. Put it in right, and it goes on.

04 19 18 05 CDR-EVA Okay, the power cable's on to TCU, Bob.

CC Got that.

LMP-EVA TGE is on. 22 - oh, you just want the last ones. Okay, 07.

CC Okay. Copy that.

LMP-EVA 07.

CDR-EVA Gosh, the dirtiest checklist in the world (laughter).

LMP-EVA Doesn't take long, does it? Doesn't take long.

CDR-EVA Manischewitz, look at that go! Did you see that?

LMP-EVA I wish you'd be more careful.

CDR-EVA What?

CDR-EVA No, no, no! Not the television camera! (Laughter)

LMP-EVA Okay.

CDR-EVA It's warm out here, you know?

LMP-EVA I'm certainly glad I got cool.

CDR-EVA Okay, the TCU is locked in.

04 09 19 34 LMP-EVA Houston, I've seen an awful lot of rocks, as I worked here. They look just like those pyroxene gabbros that I mentioned. The pyroxene's irridescent in the bright sun. The grain size is about - oh, between - Maybe the mean is 2 millimeters with max maybe up at 3 or 4. And it looks like predominantly a pyroxene plagioclase rock - clinopyroxene, but I haven't looked at it real closely.

CDR-EVA Okay, Jack. I set the rake on the - -

LMP-EVA Beautiful.

CDR-EVA - - on the seat. I just haven't learned - I'm getting more finesse now. I think you can over-work yourself, instead of making use of the 1/6g.

LMP-EVA Yes.

CDR-EVA It's going to take a whole EVA to get familiar.

LMP-EVA Well, I hope it doesn't.

CDR-EVA I find I'm using my arms almost as much as I ever did. I remember the last time I was on the Moon - about 2 hours ago.

LMP-EVA Okay, guess what? That old hammer goes to the gate top. The blue-handled hammer. What more could you want?

04 19 21 09 CDR-EVA Okay, Bob. I'm getting a low gain out now.

CC Okay. Copy on that.

LMP-EVA ... live the Rover, huh, Geno?

CDR-EVA Beautiful.

LMP-EVA I just couldn't feel it murmur when I pressed the breakers in. I could feel life in it, but - -

CDR-EVA Hey, you let me down, sport. You let me down. There's a pin you didn't pull.

CDR-EVA Okay, I'll let you get that; keep you honest.

LMP-EVA Not only keep me honest. There. Okay. Where am I? Okay. Gnomon's an island. Actually, up here, it's a geometric reference for photogramat - grat - photogrammetry.

CDR-EVA Would you believe that the doggone antenna - here - Jack. When I bend this, pull the -

LMP-EVA Okay.

CDR-EVA Pull the antenna.

LMP-EVA Rather awkward.

Tape 78A/10

CDR-EVA Pull the - pull the antenna. I got to open it up to get it out.

LMP-EVA Okay. Big connector, you know.

CDR-EVA Yes, connector was wedged in there.

LMP-EVA Well, that's probably the way it was designed.

CDR-EVA Boy, don't drop any of those connectors on the - -

LMP-EVA Look at that go.

CDR-EVA - - in the dust. We'll never clean them out.

LMP-EVA (Hum.)

CDR-EVA Good thing we're well coordinated human beings.

LMP-EVA Man, I can't believe - yes I can.

CDR-EVA Okay, let's see. Do it right now.

LMP-EVA Yes, I can.

CDR-EVA See that?

LMP-EVA Yes.

CDR-EVA Which way are you going to put it on?

LMP-EVA Well, I thought maybe I would put it on that way, so I will put it on this way, because that's probably right.

CDR-EVA If you put it on right, you're going to disappoint me.

LMP-EVA Oh, I hate to touch - touch the old gnomon. I'll do my best to please.

CDR-EVA Very bad general - -

LMP-EVA Okay, Bob the low gain is - -

CDR-EVA - - will never forgive me.

LMP-EVA - - low gain is hooked up.

CC Okay. We copy the low gain hooked up.

LMP-EVA (Hum.) The rake - the rake is on the extension handle.

CC Roger, 17.

LMP-EVA My king - my kingdom for a scoop.

CDR-EVA The scoop is on the extension handle. Different extension handle's of course.

LMP-EVA Go ahead Bob. Were you calling?

04 19 24 56 CC Roger. And your exuberance is showing up on the BTUs. You're running a little high on those.

CDR-EVA Okay.

LMP-EVA Exuberance! I've never been calmer in my life ...

CDR-EVA Okay, let's get - we'll take it easy, Bob. I think it's a great deal a part to just get accustomed to handling yourself in zero gravity, the only vice on the Moon.

CC Roger. I thought you were at 1/6g.

CDR-EVA Yes. You know where we are, whatever.

LMP-EVA Okay, old sample bag -

CDR-EVA Sample containment bag, sample collection bag, or whatever. ... What is this thing called (singing) crazy. Come on. Okay, that's there. Some of the simplest things in the world you forget. Okay, let's get this one right this time.

LMP-EVA You did a great job of parking, so I was standing in a hole.

CDR-EVA Don't want to mess up all those good looking craters around here.

LMP-EVA Oop! Hang on there accessory staff. Accessory staff, huh? Most staffs are accessory I've learned.

Tape 78A/12

04 19 26 54. LMP-EVA Okay, Bob the high gain is up and connected.

CC Okay. Copy that. Beautiful.

LMP-EVA And raised.

CDR-EVA Okay.

LMP-EVA Cable is to staff. See if I can't get your TV camera.

CC We're waiting with breathless anticipation.

LMP-EVA Ah, let's keep them in - -

CDR-EVA Well, how is my cooling doing? I'd like to stay on intermediate, Bob. I feel pretty comfortable. I'm not cold but I'm pleasant.

LMP-EVA Pleasant? He thinks he's pleasant?

CC You're fine, no problem; your option, Geno.

CDR-EVA Okay, I just don't want to run out of consumables about 6 or 7 hours.

LMP-EVA You're about as - Oh well. Okay. I don't think it makes any difference. You got to use the heat. Matter of fact, that's one of the little known facts of this business, Gene.

CDR-EVA Okay, here we go. Coming up. I've got the TV camera in my hand, Bob. Oh man. Hey, Jack, just stop. You owe yourself 30 seconds to look up over the South Massif and look at the Earth.

LMP-EVA What? The Earth?

CDR-EVA Just look up there.

LMP-EVA You seen one Earth, you've seen them all.

CDR-EVA No you haven't, babe. When you begin to believe that. Come on camera, go in there ...

LMP-EVA I'll look in a minute, Gene. But I tell you, once I start this little operation, if I don't finish it, it never gets done.

CDR-EVA Okay, get in there. Okay, that's in there. That's in there.

04 19 28 39 CDR-EVA Camera is locked down. Okay, TCU, sunshade the camera and then the cable. Okay, let me get the sunshade.

04 19 28 56 LMP-EVA That's always more of a job than it ought to be. However, SCB-3 is on the handhold.

CDR-EVA I think I'm getting smarter about 1/6g.

LMP-EVA That gate works great. Snaps in, snaps closed with the slightest flick of a coordinated wrist. Where is that camera anyway?

CDR-EVA Oh, it's over here. Oh, boy. I just still barely see the scissors.

LMP-EVA I ought to get those.

CDR-EVA Yes, but when we go hungry.

LMP-EVA I'm not sure I can.

CDR-EVA Okay, don't. Okay, we'll - we'll get them when we get the tongs out, Jack.

LMP-EVA Yes.

CDR-EVA There are some tongs in the Rover, and I'll come over and get them in a minute.

CC Roger, Challenger. And we refrained from mentioning that to Ron.

CDR-EVA Tell him - Tell him I hope he's enjoying our scissors. Okay, Bob, the TV is connected to the TCU electrically. The sunshade is on. I've got to deploy the high gain.

LMP-EVA Okay, now, well let's see how smart you are. That was a pretty good attitude you parked at.

CDR-EVA Okay, Jack is the high gain away from my antenna. Can you see?

Tape 78A/14

LMP-EVA Let me turn around. Yes. You're clear.

CDR-EVA Okay, it's locked. Locked. Now let me see if I can find beautiful big dot up there. I know what I'm going to have to do. I'm going to have to get the, oh, I got it right there. Might be able to peak that but I got that.

LMP-EVA You hit it, huh?

CDR-EVA Put my hand over it, so I could see it.

LMP-EVA Hey, that's an interesting problem. Your seat won't stay up.

CDR-EVA How about that piece of Velcro there.

LMP-EVA That's just what I'm working on there. Great minds think alike. Okay, that goes in there. The trouble is to reach it, I've got to -

CDR-EVA Okay, I'll bet you it says put MAG Bravo.

LMP-EVA Oh, your's is in a circle.

CDR-EVA Okay, check LCRU. Deploy LCRU with antenna? Okay. Deploy the LCRU with antenna. Blanket's open 100 percent.

LMP-EVA Come on, baby, open. Ponna, it goes.

CDR-EVA Oh, are those mirrors nice. I hope they stay that way for a while.

LMP-EVA They won't. John and Charlie know exactly what we're talking about. Mark my words.

CDR-EVA Okay, I'm going to close the circuit breaker, Bob.

04 19 32 43 CDR-EVA Okay, circuit breaker is CLOSED.

CC Copy that.

CDR-EVA POWER switch is INTERNAL. POWER switch is INTERNAL. Okay, let me give you some - some

Tape 78A/15

numbers. AGC is 3 - about 3.4; temp is about 1.8; and power is about 2.1. Okay; POWER to EXTERNAL.

CC We copy those, Geno.

CC Geno.

CDR-EVA Okay, POWER is EXTERNAL. MODE SWITCH is going to two FM/TV. Okay. Man, did you peak out at signal strength of 40.

LMP-EVA I can't see right now, but I think I've still got you right in the center.

CDR-EVA Okay, POWER switch on to TCU. Okay, it's on to TCU. Okay, AGC and POWER. Yes sir, Bob, I'm verifying at 40. That's a good Navy term, 40 on the AGC.

CC Copy that.

CDR-EVA And the TV is all your's.

CC Roger. Have you got a power reading there for us, Geno?

CDR-EVA I hope. Okay, I'll give you a power reading, EXTERNAL, if you want it. I'll give you - TEMP is still about 17 and POWER is about 18 on EXTERNAL.

CC Hey, we have a picture, 17. We have a picture.

CDR-EVA You have? Beautiful, babe. It's all your's. I hope it moves now.

CC It does.

CDR-EVA I hope it moves. You'll find out - hey, it moves. It's alive.

CC And.

CDR-EVA Okay, Bob, I'm going to get SRC 1.

CC Okay, could we have a EMU check on you fellows when convenient?

Tape 78A/16

CDR-EVA Okay. Commander is 3.8 plus. I'm - I must be 80 percent and no flags and no tones.

CC Copy that.

LMP-EVA Okay, LMP is - LMP is about 80, let me see - 75, about 80 percent, and no flags, no tones. I've got 83 percent.

CC Okay, copy that. And you've sure got a lot of stuff on the Rover already.

LMP-EVA Yes, MAG Helen has just gone into the bag - into the seat.

CC Copy that.

LMP-EVA MAG Cynthia is in there.

CDR-EVA Okay, Bob, SRC is open.

LMP-EVA Gail is in.

CDR-EVA Jack, watch these SRCs. I don't like the lock on this cable very well.

LMP-EVA I never have.

CC Okay, and Jack. You did get that mag?

LMP-EVA Okay.

CC Charlie as well?

LMP-EVA That's affirm.

CC Okay. And we did not copy your cuff gage reading down here.

LMP-EVA Oh, you didn't? Well, maybe that's because I didn't give it to you. 3.9. No wonder that's so much work.

CC Go ahead. Copy that.

04 19 36 53 CDR-EVA Okay, Bob, SRC 1 is - She sure won't stay in the MESA ...

LMP-EVA Let me try that. Okay, that will stay in there

CDR-EVA Okay, Bob. It's closed. It sure doesn't seem like it wants to stay there, though. And the organic sample has been sealed.

CC Copy that.

CDR-EVA I guess you believe we're here now, huh?

CC Now we believe you're here. We see you in person.

CDR-EVA Okay. Bob, the - Bob, the SRC cover will not stay closed. It just slowly springs up. There's nothing I can seem to do for it. I might be able to set something, a blanket, on top or something.

CC Okay, stand by on that. We'll get back with you.

CDR-EVA Okay. I'm putting - yes, it just flops open. I'm taking SCB 1 to the Tool Gate.

CC Copy that.

CDR-EVA I'll get me a hammer, and I'll give you a gravimeter reading.

LMP-EVA No, you won't. Not until you're done. I'll go get the flag there. Guess what? We're here again.

LMP-EVA The Buddy SLSS is on the Rover. Okay, ETB. Okay, CDR's camera film magazine I had to work on a little bit to get it to work but it's working.

CC Copy that.

LMP-EVA If I get that camera, you can punch the gravimeter, I think.

CDR-EVA Okay. Get the camera, and I'll give them a gravimeter reading. Is that all you need? Because I'll go get the flag.

LMP-EVA Okay, you'd better let that - yes, but why don't when you go - let me get some tongs, too. We need to salvage those - -

CDR-EVA Okay.

Tape 78A/18

LMP-EVA - - scissors.

CDR-EVA Okay.

LMP-EVA Okay. Let me steady the Rover ...

CDR-EVA Okay, Bob.

04 19 39 08 CDR-EVA MARK: Gravimeter and the light is flashing.

CC Okay. We copy that.

LMP-EVA (Singing) Oh, bury me not on the lone prairie.
Where the coyotes howl, and the wind blows free.
Okay.

CDR-EVA Okay, where am I?

LMP-EVA You're doing a gravimeter, getting the flag. I've
got your camera. I'm going to salvage the
scissors.

CDR-EVA Okay, get the scissors, and I'll be putting the
flag in. And don't no near the Rover.

LMP-EVA Don't go near the water. That reminds me of a
good book - Boy. I can't go near the Rover.

CDR-EVA Let me tell you.

LMP-EVA No, I can't go near the Rover.

CDR-EVA Why don't you set them - -

LMP-EVA How about you letting me stick these in your
pocket with your - -

CDR-EVA No. Set them up there. Just set them in there.
We'll get them when we come back in.

LMP-EVA Okay. I'll tell you what I'm going to do.

CDR-EVA Just set them inside the - put them in the -

LMP-EVA I'm going to hang them here on the hook.

CDR-EVA Okay, that's good.

LMP-EVA Right there.

CDR-EVA Okay, Jack. How about the flag right over here in this little mound?

LMP-EVA Which mound?

CDR-EVA Well, let me take a look around.

LMP-EVA How about right up there on that little high point. Right up in here where I'm going.

CDR-EVA Yes. Of course, your idea of a high point might be different than mine.

LMP-EVA I meant the North Massif. (Laughter)

04 19 40 58 CDR-EVA That's probably the best place in the world for the flag, is right up on the top.

LMP-EVA Okay, let me come over and help you. How about right - how about right? Well, we'll find out ...

CDR-EVA Yes. Hey, you're in the edge of the crater though. That's no test.

LMP-EVA Yes, that's all right. Move right over here near your tire tracks.

CDR-EVA Yes. This is a high point right here.

LMP-EVA Yes, that's good. Right there.

CDR-EVA Well, that wasn't too good.

LMP-EVA Okay, let me give it a few whacks. Baloney.

CDR-EVA Okay. Watch your fingers. Now that wasn't too bad. Want to make sure it stands up. That's getting pretty - I can - I - well - we'll - we can probably - what we could do - I don't know how far we could drill, but we hit something solid with that one.

CDR-EVA No, it was still going.

LMP-EVA Yes, but did you ever see a vibrator like that?

Tape 78A/20

CDR-EVA No, I've never put a flag up on the Moon before.

LMP-EVA What? Pull that in.

CDR-EVA (Laughter) You'll have to get it down to my level. Tall guys are all alike.

LMP-EVA Wait, I'm not through.

CDR-EVA Okay. How about getting it stretched out?

LMP-EVA I will. I just can't start forward as fast as I would like to. Hate to touch it, my hands are so dirty.

CDR-EVA Okay?

LMP-EVA Yes, it's going to want to curl. Maybe it'll - it sort of looks like it's waving in the breeze.

CDR-EVA Yes sir. How about right there?

LMP-EVA Take a couple this way, and we'll take a couple that way. How's that?

CDR-EVA Oh, I ought to get - let me get over to the other side - you can get the Rover in the background.

LMP-EVA Yeah, and the LM.

CDR-EVA It does wave when you do that.

CC We've got a beautiful picture of you guys up - down there.

CDR-EVA Let me tell you, Bob. This flag is a beautiful picture. You see that?

LMP-EVA Okay, you're - it's partially covering the Rover, but I think it's a pretty good shot. How's that? Let me get the focus right.

LMP-EVA I don't know where to put it.

CDR-EVA There you go. Wait a minute.

LMP-EVA All right I got you reaching for the flag.

CDR-EVA How's that?

LMP-EVA That's very good, Gene. Let me get it to stereo.

CDR-EVA Houston - -

LMP-EVA That's beautiful.

04 19 43 53 CDR-EVA It's got to be one of the most proud moments of my life. I guarantee you. Let you get a close in one and we'll trade cameras. Houston, I don't know how many of you are aware of this, but this - this flag has flown in the MOCR since Apollo 11. And we very proudly deploy it on the Moon, to stay for as long as it can, in honor of all those people who have worked so hard to put us here and to put every other crew here and to make the country, United States and mankind, something different than it was.

CC Roger, 17. And presuming to speak in behalf of some of those that work on the MOCR, we thank you very much.

CDR-EVA Back right where you were. Step to the right. Right there.

LMP-EVA Yes, that's alright. I'll keep it down.

LMP-EVA ... Get closer. I'm going to get on the other side.

CDR-EVA Well, I want to get something here.

LMP-EVA What's that?

CDR--EVA I want to get the Earth.

LMP-EVA Okay. Let me get over here.

CDR-EVA Get around on that side.

LMP-EVA I don't - I don't think it's going - you're a little close, maybe. Get them both in focus.

CDR-EVA That might do it. Try that one time, then we'll give up and get to work.

Tape 78A/22

LMP-EVA Higher up a little -

CDR-EVA Yes.

LMP-EVA Let me try it again, okay? I don't know, Geno, okay? Let me get over here closer to you. Okay. That might have got it.

CDR-EVA Okay, very good.

LMP-EVA Okay.

CDR-EVA Alright, looks good. You think your gravimeter's ready so I can go back there?

CC Roger, 17. The gravimeter's ready and a couple of words here. One, I presume you found the scissors, right?

LMP-EVA Yes, sir.

CC Okay. Two -

CDR-EVA Not Ron's, we found ours.

CC Roger. And the second thing is we do want the SRC closed. And if you can partially latch it, I'm not sure that's easily done, that would be one solution. The other would be to put something on top of it to hold it closed.

CDR-EVA Okay, Bob. I'll find something

CC Okay, copy that. One of the brackets off the MESA would be something, or a rock that's nearby; that's another possibility.

LMP-EVA Okay. Gene, what are you going to be up to now?

CDR-EVA I'm going to go get the - -

LMP-EVA ... pallet?

CDR-EVA - - pallet.

04 19 47 52 LMP-EVA Okay, why don't - why don't I give the old - the old inspection here bit. And I really ought to have my camera, shouldn't I?

CDR-EVA I need a - -

LMP-EVA Yes.

CC Roger. That's affirmative.

CDR-EVA ... on this.

LMP-EVA What would you just -

CDR-EVA Well, I'll find something.

LMP-EVA I'll take the old CDR's camera. Not a bad camera to take.

CDR-EVA Jack, I'm going to take the old gunny sack here and put it over. That'll hold it down.

CC I presume you're talking about the big bag, Gene.

CDR-EVA Yes, the big bag that was on the ladder. That's all it needs. It's just a little bit. There's just enough spring force in it. Okay, Houston. I think you've had all the good words about the LM. We have never flown a better LM. I guess that's safe enough to say. The quads look great. The old steerables are aimed right at you. Rendezvous radar's in good shape. It's parked - looks like parallel to Z. Just about perfectly. There's no visible - I'm on the 3 o'clock position, plus Y. No visible contamination. There's a little bit of discoloration of the plume shield below the thrusters. The engine bell never touched the ground. It's about - 15 centimeters off the ground.

CC How's that for coming down gentle?

CDR-EVA That's what you call okay number three wire, Jack.

LMP-EVA Hey, we never heard what our landing parameters were.

CC We'll worry about that later.

CDR-EVA ... now that we're here.

Tape 78A/24

LMP-EVA Oh, but they always - they always give them to us in the simulator. Hey, Bob, judging from what I see on my clock, we're not but about 5 minutes behind.

CC That agrees more or less with the way we read it.

04 19 50 03 LMP-EVA Gene had a little forward motion as I think you heard his call. And that shows up in the forward footpad at any rate or did. It looks like he may have hit tail first a little bit. That's embedded to the full pad depth. I see no - By George, Gene, you may have had a first. I think you stroked that thing.

CDR-EVA I stroked what?

LMP-EVA The rear - the rear landing gear.

CDR-EVA Well, we can measure it and find out.

LMP-EVA I'll take a picture of it.

CDR-EVA May have stroked it. The Mylar, the lower orange Mylar, is folded a little bit.

CC Roger. There's word floating around down here about a typical Navy landing, but I'm not sure whether we believe it or not.

LMP-EVA He caught his tail hook. Say, Bob - -

CC That's the best way.

LMP-EVA - - Just behind the LM in that very fresh crater, I picked up an example of the kind of gabbro I was talking about. And I'll stick it in the big bag, except the big bag has disappeared.

CDR-EVA Okay, I've got to give you a reading, Bob, if you're ready.

CC Ready.

LMP-EVA You put the big bag up - -

04 19 50 51 CDR-EVA 670 003 101. That's 670 003 101.

CC Okay. We copy that.

CDR-EVA Jack, I put that there to hold the SRC down.

LMP-EVA That's alright, I just put our sample in it. It's in the bottom of the bag. It's about 8 by 5 centimeters by 3 centimeters. Slightly tabular.

CC Okay. We copy that. It's in the big bag.

LMP-EVA Yes sir.

CDR-EVA Okay, okay, Bob. A MARK on gravity.

CC Copy that.

CDR-EVA And the light is flashing.

CC Copy that.

CDR-EVA I've got to tell you, Bob. I haven't done everything there is to do in the Navy, but deploying that flag has got to be the most proud thing I'll ever do in my life. If you could see, and you could see it from where we are, I know you'd feel the same way.

CC Roger on that, Geno.

LMP-EVA (Laughter)

CDR-EVA God, he's pretty up there. God, you're pretty up there over the South Massif. Beautiful.

LMP-EVA Hope nobody saw that.

CDR-EVA Beautiful.

LMP-EVA Oh, they were watching me. (Laughter) Those finks. Okay, you weren't doing anything with this gravimeter on here, I hope.

CDR-EVA No, its on the deck.

LMP-EVA Okay.

Tape 78A/26

CC Okay, you might grab me a ... when you set it on there, Jack.

LMP-EVA Too late, Bob.

CC Okay.

LMP-EVA I'll get it later.

CC We'll get it later. No hurry.

CDR-EVA Okay, now if I can figure how to get this off. You've got to educate us again.

LMP-EVA We may not remember those.

CDR-EVA Bob, the sceptre's in hand.

CC Roger on that.

LMP-EVA Okay. I'll give you a temperature. Let's see whether it fits. I'll bet it does.

CDR-EVA Come on. Lock, baby. Okay, it's ON -

CC Copy that.

04 19 54 24 CDR-EVA LOCK.

CC Roger.

LMP-EVA Okay, Bob. Here's a temperature for you. Forty degrees.

CC Say again.

LMP-EVA 40.

CC Copy that.

CDR-EVA Both covers. Okay, number 1 - something over here. Never did figure out what. Okay, Bob, the shade is deployed facing deep space.

CC Copy. Roger. Understand the cosmic ray.

CDR-EVA Okay, Bob. The antenna is deployed. It's not on the post yet, but it's deployed.

LMP-EVA Oh, oh, come on. Don't get - don't get all caught on something. That's better, that's better. Okay, Bob. I think - just about got a - the sunside deployed, just as perpendicular to the Sun as I think anybody could do.

CC Okay. Copy that. Good enough.

LMP-EVA Okay, I don't have any pictures yet, so you might put that down as something to get later.

CC Yes, we'll catch that in the PAN with the next EVA or something like that.

LMP-EVA Man if that - Boy, if that antenna doesn't get some noise from outer space, I don't know what will. If they are out there, and they are I'm sure. They'll see that one. That is even weirder looking out here than it is in the high bay. Hey, Bob, before I leave the ALSEP, remind me to check the cosmic ray. I might hit it here in the process of deployment.

CC Okay, try not to.

LMP-EVA I got a little close.

CC Okay.

CDR-EVA Oh, I will. Okay, the doors are open, beautifully.

LMP-EVA I don't know what talent you have for landing in holes, Cernan, but once again I'll be doing all the ALSEP work in the hole.

CDR-EVA Okay.

CC Are you saying we should have kept the pulleys there, Jack?

LMP-EVA Okay. Yes, I need the pulleys.

CDR-EVA You know, Bob, I've got a little bit of a problem here. I've got the SEP connector on. (Laughter) But it - it - it'll - it'll - it'll slide - slide down in, but the locking cover just won't go over.

Tape 78A/28

CC Roger, Geno. Understand. It slides in far enough, you think it's aligned, huh?

CDR-EVA Yes, I'm positive it's aligned. It just - it didn't appear to lock over, well not appear, it just won't lock over. I'm shoving it home. Okay, I got it.

CC Okay. Copy.

CDR-EVA I got it. Makes everyone happier.

CC I'm glad we have the right solution to that one, Gene.

CDR-EVA The right solution is the fact that you've got a man here doing it.

CC Laughter.

04 19 58 30 CDR-EVA Okay. Hey, Bob. The ECS TEMP MONITOR switch is ON.

CC Copy that.

LMP-EVA There's an easy way and a hard to do everything. Don't know why we don't do it the easy way. Pay-day. RTG is on the surface.

CC Copy that.

LMP-EVA Central station is ... Gene's little pet job makes these things slide out by themselves almost.

CC Better thank him next time you see him.

CDR-EVA Okay. Hey, Jack, you notice there's none of those guys up there holding those hoses as we go around the LM.

LMP-EVA What do you mean? I saw one just a minute ago.

CDR-EVA Okay, Bob. You want 4, 5, 6, and 7.

CC That's affirmative.

CDR-EVA Okay, 4, 5, 6, and 7. It's coming off.

CC Roger on that.

CDR-EVA Okay.

04 20 00 36 CDR-EVA Just took time out for a snack and a little water.

CC Okay.

CDR-EVA Okay. How's the TV working?

CC Beautiful - To coin a phrase, it's a panoramic scene of beauty.

LMP-EVA Come on now, Bob.

CDR-EVA Say, Bob, what do you think of the terrain?

CC Looks flat. Looks very flat and smooth.

CDR-EVA That's why you're an astronomer.

LMP-EVA That's why you're - (laughter). Oh, well.

CDR-EVA Okay, I'll give you a reading on the TGE if you're ready.

CC Roger, ready.

CDR-EVA Don't kick dust on it. Hope I can read it down here. Okay. Okay, Bob. Bob, you're going to have to bear with me. When I leaned over to punch it, I hit GRAVITY instead of READ, so I guess I got to wait it out.

CC Okay. We'll set the timer again.

CDR-EVA Okay, I'll - I should have been more - more careful. Okay. Orient pallet to the Sun. If you can see it, it's directly at the Sun so that ought to be good.

CC Okay, copy that.

CDR-EVA The SRC doesn't have to be all the way closed does it?

CC No. Not all the way. Just as long as it's most of the way closed. You can have a crack there in the top.

Tape 78A/30

CDR Okay, that's what it is. Man, I'll tell you. This - this thing got low all of a sudden. How are you coming, Jack?

LMP-EVA Great.

CDR-EVA You get it fueled yet?

LMP-EVA No. Okay, coming soon though.

CDR-EVA Let me know if you have any problems with that.

LMP-EVA All right, I will.

CDR-EVA Okay. Come on bag. You're all I got. Man, I - there we go. (Hum) Bob, that gravimeter went right to steady. It blinked once and went right to steady, so I don't expect it'll be too long.

CC Okay, I'll give you a call in a couple of minutes there. Ought to be done.

CDR-EVA Okay.

CC And Jack. I understand you have the RTG fueled?

LMP-EVA Negative.

CC Okay.

LMP-EVA I'm supposed to call you when I have it fueled.

CC Okay.

CDR-EVA Jack, do you have a - am I missing a map I should have up here?

LMP-EVA There should be two maps. They're under the seat. I put them in there so they wouldn't bounce off. I'm sorry. I forgot to tell you.

04 20 04 06 CDR-EVA Okay, I got them. Hello, Houston.

CC Hello, Challenger.

LMP-EVA I wish I could go back and make that landing about 6 or 7 times so I could take in all that I missed.

CDR-EVA So do I. I might as well have stayed at the Cape. Okay. Let's see. Core bore neutron flux, and I'll get the drill and I'll go back and ...

CC Geno, you know you might wander by the gravimeter. I think it might be done by now. You might just check the light and see if it's steady, or on or not.

CDR-EVA Okay. I'll go by there right now, Bob -

LMP-EVA For future reference, Bob, the dome removal tool doesn't - it'll turn. Shoot.

CDR-EVA Okay, Bob, let's see. It's not lit. Can I take a reading?

CC Roger. If the light's out, give us a reading.

04 20 06 01 CDR-EVA Well, let's see if I can push the right button this time. Okay, it's 670 017 201, 670 017 201. And it was about 75 percent in the shade of the Rover.

CC Okay. I copy that. And now we're ready for bias.

CDR-EVA Now, you want - okay, a bias coming at you on the ground, correct?

CC Roger.

CDR-EVA It's blinking - it's blinking, Bob.

CC Okay. Copy that.

CDR-EVA I've got the core bag and the neutron flux, and -

LMP-EVA Gene, I need your hammer.

CDR-EVA Okay, you need my help? Okay, coming over. What's the problem?

LMP-EVA Well, the dome removal tool never latched into the dome, but it turned it. I think it's pretty badly chewed up. I'm not sure what happened.

CDR-EVA Oh, boy.

Tape 78A/32

LMP-EVA So, let me have your hammer because I'm going to have to pry off the dome.

CDR-EVA Can't you - -

LMP-EVA No. I - I, you see I - I've stripped it, I think. I didn't think I could do it.

CDR-EVA No. Wait a minute, wait a minute, wait a minute. Let me -

LMP-EVA See, it's stripped. See, but it's open. Wait a minute. See, no wait, see. Just put your blade in there. Don't touch it. Put the blade in there and pry. It'll come, I hope.

CDR-EVA Be careful. Here, let me get it once from this side. Can I -

LMP-EVA Gene, don't get so close. Move your hand - There, you got it. Nice work.

CDR-EVA Okay, it's off. It's off.

LMP-EVA Nice work.

CDR-EVA Whoo.

CC Roger. Once again we have the right solution.

LMP-EVA I'm not sure, Bob, what happened. You might ask them that if you only partially get the dome removal tool on, if you can strip the whole thing out?

CC Okay, we'll look at it ...

LMP-EVA It won't make much difference any more.

CC We'll make sure of its change on the next dome removal tool.

CDR-EVA Bob, I'm just taking a breather.

CC Okay, we're watching you.

LMP-EVA That was a strange one, Gene. Did you see how I mangled that thing?

CDR-EVA Yes.

LMP-EVA Okay, TRG is out.

CDR-EVA Don't trip.

LMP-EVA Wouldn't think of it.

CDR-EVA Okay, where was I? I've got to go back and get the drill, if I'm not mistaken. Yes sir, and then I'll be caught up with the TGE. Okay, Houston. The RTG is inserted. The element, that is -

CC Okay, we'll copy that.

CDR-EVA Bob, I'll - I'll give you my word. Before we leave here, I'll make sure that the SRC is closed.

CC Okay. Copy that. As long as it's got only an inch or two showing there, should be no problem. That looks fine ...

CDR-EVA Man, I've got to put something on it to get it down to that far.

CC Okay.

CC Okay.

CDR-EVA Oh, that came out like a dream. Man, is this MESA low when you go - Come on, baby.

04 20 09 33 LMP-EVA SEQ bay doors are closed.

CC Roger. Copy that.

LMP-EVA And I'm checking out the cosmic ray. Cosmic ray looks good.

CC Beautiful.

Tape 78A/34

LMP-EVA Oh, I snuck a queek - quick peek at the drill, and it does work. What in the world is that?

CDR-EVA That's Ron.

LMP-EVA Ron?

CDR-EVA That's Ron. Got his VHF on, that fink. Hey, you might tell Ron we can hear him.

CDR-EVA Okay. Drill - LMP seat. With seat belt - Bob, you still with us?

LMP-EVA Okay, ALSEP is put together in the barbell mode. And Charlie Duke, I have checked it - and it is locked.

CDR-EVA Hello, there, Ron. If you read, we're reading you.

CDR-EVA Well, (singing) "We're off to see the Wizard."

LMP-EVA Hey, do you need me, Gene?

CDR-EVA No. I'm going to go deploy an ALSEP.

LMP-EVA Have at it.

CDR-EVA First, I've got to find an ALSEP site.

LMP-EVA Don't fall into Camelot.

CDR-EVA Okay, Bob. I'd like to read a TGE.

CC Roger. You're ready to read the TGE? We are.

CDR-EVA Oh, you won't believe it.

LMP-EVA You did it again.

CDR-EVA Ah - there goes a fender. Oh, shoot!

LMP-EVA Say, Bob, I'm moving down-Sun.

CDR-EVA Well, I'll get that in a minute.

LMP-EVA I'm moving down-Sun, and where we've walked, we stir up darker material - just slightly, but it's darker. The same old thing, the most mature - that most regoliths have.

CC Okay, copy that. Have you got a bias reading there, Gene?

04 20 11 54 CDR-EVA Yes, I'm giving it to you right now - 337, 454, 001 - that's 337, 454, 001

CC Okay, we copy that.

CDR-EVA And I hate to say it, but I'm going to have to take some time to try - I'm going to have to - I'm going to have to try to get that fender back on.

CC Okay. Was it the rear fender, Geno?

CDR-EVA Yes. Caught it with my hammer, and it just popped right off.

CDR-EVA Bob, for future reference - it's a piece of cake putting the TGE on or off.

CC Okay, copy that.

CDR-EVA Jack, is the tape under my seat, do you remember?

LMP-EVA Yes.

CDR-EVA I may need it. Okay. Let's set my hydroxide canister to middle - I'm in MAX - MAX cooling. Man, you're romping around like a - how are you doing?

LMP-EVA Oh, fine. It's just - it's work going out here.

CDR-EVA Yea, I'll bet it is. Just take it easy.

LMP-EVA I am.

CDR-EVA I'm going to be a little bit behind you if I have to work on that fender, anyway.

CC Yes, you can walk a bit more slowly than you're walking, Jack.

Tape 78A/36

LMP-EVA Okay, more and more - What's that?

CC I said that you can walk more slowly than you started out, anyway.

LMP-EVA Bob, texturally, some of these rock that I believe - gabbros - have a texture not unlike a - a welded tuff. But I don't think - I know they're not. But they've got some mottled characteristic to them that I haven't yet figured out.

CMP-EVA Yes, if it wasn't for that fender, I'd be ready to go. Makes me sort of mad.

CC I say there, Jack, that looks like a big rock there beyond you.

LMP-EVA That's the one we were talking about. Earlier.

CC We believe you now.

CDR-EVA Well, I've done this in training. I can't say I'm very adept at putting fenders back on. But I sure don't want to start without it.

CDR-EVA Well, shoot!

LMP-EVA Okay, Bob. I think I'm going to move a little bit to the northwest of my present position in order to get a little farther away from that big rock.

LMP-EVA Okay, Jack.

LMP-EVA And to get out of the shallow depression - -

CC Roger.

LMP-EVA - - get out of the shallow depression that's here.

CC Roger. It's not so shallow. You disappeared out of sight from the last ...

04 20 16 10 LMP-EVA Well it's shallow relative to other depressions I've been in. You know, this ALSEP is almost as heavy as what we had at the Cape. I lost one of my blocks. Oh well, I'll - I'll get it on a rock, or I'll retrace your steps.

CDR-EVA Don't worry about that. I'll be able to - there are enough rocks around. I can use it.

CC Copy that, Jack. And Gene, if you're having trouble with that fender and you think it might be easier with two guys, you could wait until you get out to the ALSEP site.

CDR-EVA No sir, I got it on, but a little piece of the rail is cracked off. And I'm just going to put a couple of pieces of good old-fashioned American gray tape on it - see whether we can't make sure it stays. Because I don't want to lose it. Except good old-fashioned gray tape doesn't want to stick very well.

LMP-EVA I've not seen any sign of layering in any of the craters. In their walls.

CC Okay. Copy that.

LMP-EVA The rocks still seem to be the pinkish-gray - the pinkish-gray gabbro out here.

CDR-EVA Good old-fashioned American gray tape doesn't stick to lunar-dust-cover fenders. One more try. I think it'll stay, for an indefinite period of time, right now. Not bad for EV gloves.

LMP-EVA Do you see me, Bob?

CC We're watching Gene, right now. You disappeared out of sight a long while ago. Hey, you just came into sight again, Jack.

CDR-EVA Hey, leave me enough room to deploy the heat flow.

LMP-EVA I'm going to, I'm looking for a place. Away from craters and rocks.

Tape 78A/38

LMP-EVA That's why I didn't land up there.

LMP-EVA Okay, I think I've got a place. And I think it will also give you a spot for the NEUTIZON flux that's sheltered from the RTG.

CC Okay. You say you have a place like that, Jack?

LMP-EVA Well, - pretty much, I think, Bob.

CC Okay.

LMP-EVA Let me work on it here a little more.

04 20 19 36 CC Okay, and right now you're about 10 minutes behind the time line, Jack.

LMP-EVA Okay.

CDR-EVA Bob, I'm only going to spend another minute or two on the fender.

LMP-EVA We'll catch up.

CDR-EVA I never thought I'd be out here doing this.

LMP-EVA Boy, I'll tell you, Geno - Okay, I'm going to go back this way. Central Station can be near a crater. It will be pretty good, that'll put the LEAM right out over there, which is probably all right. The gravimeter out over there, which is probably all right. Going to put your drill holes a little too close to that rock, though. Bob, ask Mark if he's worried about rocks as much as craters.

CC Okay, stand by.

LMP-EVA I've got a rock about 2 meters in diameter, partially buried - that one of the probes may be near.

CC Stand by and define near.

LMP-EVA Well, it could be 10 feet.

CC Okay.

LMP-EVA Well, I can move a little more south, I guess.

CC Okay. And Jack, it seems like about - if you're about 3 meters from the rock, that's no problem.

LMP-EVA Okay. Okay, this is it.

CC Okay. Copy that.

LMP-EVA I tell you the block - the - let's see, the Sun's south, this way. South of east. Okay. Well, shoot!

CDR-EVA What's wrong?

LMP-EVA Well, it's just about impossible. Bob, it looks like the probes are going to be in a shallow depression. I'll try to improve that a little. It's not a real crater - it's just a shallow depression.

CC Stand by. Stand by on that, Jack, a minute. That may be okay. Okay, shallow depression's all right, Jack, don't worry about it.

LMP-EVA It's not more than a meter deep.

CC That's okay, Jack.

LMP-EVA Okay.

CC Stay there.

LMP-EVA All righty. It looks pretty good to me.

CC Okay. Good enough.

LMP-EVA It's just - Bob, it's really, in detail - The meter and half-meter scale relief is a little more than we can stand here for a good site. But I think - I think this will be all right.

CC Okay, copy that. We're ready to press on with ALSEP INTERCONNECT. And Geno, how are you doing on that fender?

Tape 78A/40

CDR-EVA Bob, I am done. If that fender stays on, I'm going to take a picture of it because I'd like some sort of mending award. It's not too neat, but tape and lunar dust just don't hand in there together.

CC Okay. Copy that.

CDR-EVA Well, let's hope. Keep your fingers crossed, and I'll be more careful around the fenders.

CC Okay. Copy that.

CDR-EVA Whoops. Bob, I'm going to do one other thing real quick here. I've got to dust my visor off.

LMP-EVA Gene, do you want me to do that?

CDR-EVA No, I can do it. I'll just do it right here. Only have to do it in a couple of places right in front of me. That didn't do much good, did it. Someone should have told me that. That just really screwed it up. Okay. Bob, you might ought to be thinking of a good way to clean that visor when I get in the cabin.

CC Okay, we'll put someone on that.

04 20 24 20 CDR-EVA Okay, LRV equipment check. Blankets are open 100 percent; TV/sunshade is on; SEP receiver/antenna - nav cable; we've got 4, 5, 6, and 7 on the charges; TGE - I've got three measurements complete, I've got the drill, the bag, and the neutron flux. The TV camera - I'm taking it away from you.

CC Okay. Roger.

04 20 24 47 CDR-EVA Sorry about that, Ed. Okay. MODE switch is going to 1.

CC Roger.

CDR-EVA Okay. MODE switch is 1. I'm ready to drive to the ALSEP site. Still want to park 60 northeast - east and north.

CC Okay, Geno. And before you leave the LM there, how about giving me another BAT TEMP reading. Those were a little high and we'd like to try and verify some of that stuff.

CDR-EVA Boy, oh boy. Yes, I get you Bob. Boy, oh boy. You just got to be careful where you kick dust.

LMP-EVA That's right.

CDR-EVA Boy! Don't do that again.

CDR-EVA Yes, Bob, I thought they were a little high, too.

CC Roger.

CDR-EVA Okay. BAT TEMP are 100 and 120 - right now.

CC Okay. How about tapping the meter a little bit for us?

CDR-EVA Yes, I think the meter's been tapped since we've been working on the Rover. Yes - 100 and 120.

CC Okay.

CDR-EVA Okay. Get this baby started.

CDR-EVA Okay. I'm going to be heading west. The low gain - is 270.

CDR-EVA Okay, Jack, I'm on the way.

CC Okay, and Geno, we'd like to vary the parking a little bit because of this. We'd like to try and get those batteries cooled down. We'd like to have you park about 60 feet north of the Central Station.

CDR-EVA Park about 50 feet from Central Station ...

CC And facing east. Down - Sun. And then we'll open the battery covers - -

CDR-EVA Okay, Bob, I can't read you, but facing east and down-Sun are not the same.

Tape 78A/42

CC Well, approximately there.

CDR-EVA Jack, you need your block? I got it right here.

CC Facing - -

LMP-EVA You're on the Rover, aren't you?

CC Facing - -

CDR-EVA I got it, wait a minute.

CC Hey, Geno, we mean up-Sun. Sorry about that.

CDR-EVA I got your block coming, Jack.

LMP-EVA Okay.

CDR-EVA Boy, it doesn't take much to get those battery covers dirty.

CC Okay, Gene, did you copy me that we meant facing up-Sun?

CDR-EVA Yes, Bob.

LMP-EVA What did you do, get ...

CC Okay, I got that.

04 20 29 07 LMP-EVA Bob, the shorting plug meter is 90 percent scale to the right.

CC Okay, copy that.

CDR-EVA Okay, Bob, give me that parking heading again, would you?

CC Okay, we'd like you to park facing the Sun. How's that for being definite.

CDR-EVA Okay.

CC About 60 feet north of the Central Station.

CDR-EVA Sixty feet north of Central Station - I can't park a little northeast? Now, okay, and you want the battery covers open?

CC That's affirmative, Gene. And that means you will have to dust them before you open them.

CDR-EVA Yes, I guess so. Man, am I glad I didn't land up here, Jack.

LMP-EVA So am I.

04 20 30 04 CDR-EVA Okay, ALSEP is connected, RTG is connected. Is that where you're going to have the Central Station, huh?

LMP-EVA Well, Geno, that's the best I can do without spending a lot more time.

CDR-EVA Yes.

LMP-EVA And let me - let me talk to you about it. Say, I asked them about this depression.

CDR-EVA Yes.

LMP-EVA You probe's all right out in here. And if you get in the bottom of it for the - either this one, or go out there - especially in the straight line between you and me now, another depression would be good for the neutron flux. You need to be over that way - you're just a - -

CDR-EVA Yes, they went - they want me to park about here where - -

LMP-EVA You need to be over here.

CDR-EVA Where's Central Station, right there, huh?

LMP-EVA You need to - -

CDR-EVA Yes, I've got to park in the Sun for the batteries.

LMP-EVA Oh, okay.

CC Okay, 17, for your planning -

Tape 78A/44

LMP-EVA Okay, about 60 feet northeast. How does it look behind you.

CC Okay, 17, for your planning, we're -- we're now about 20 minutes behind the time line -

LMP-EVA That's good.

CDR-EVA You're cutting out, Bob. You'll have to wait.

CDR-EVA What are you, Bob?

CC Roger, we're about 20 minutes behind the time line, two-zero minutes.

CDR-EVA Okay. Yes, I guess it could be worse considering a couple of things. Okay, about time I got those batteries. Okay, Jack, let me give you this first, so I can get to work.

LMP-EVA Oh, the block.

CDR-EVA Yes.

LMP-EVA I'm sorry, I forgot you had it. Thank you.

CDR-EVA Okay, where are we?

CDR-EVA MARK. Sixty north heading, okay, 15 VOLT is OFF. Let me double check that while I was thinking of something. Wouldn't want this Rover to go rolling over the terrain without me. Okay, it is OFF. MODE switch, position 3. Dust TV/TCU, and the whole works, huh? There is TV REMOTE.

04 20 32 54 CDR-EVA Okay, Bob. You're aligned on the high gain.

CC Okay, we copy that.

CDR-EVA And you're in position 3.

CC Copy that.

CDR-EVA Okay, let me get these covers dusted.

CDR-EVA Well, that's a consolation. It's not as hard to get at the covers as one might think.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTIONS

04 20 39 29 CMP Well, I can see Reiner Gamma real well out window 3.

CC Roger.

CMP I should be able to get back there next rev, I guess.

CC Roger. Look like a gamma up there? Is that why they call it a gamma?

CMP Hey, that sure does. Oddly enough, it almost looks like an elongated crater in this - this light.

CC Roger.

CMP You know, with the gamma part of it ...

CC Now, we've got both of - we got two - or a number of picture-taking sections here next rev, but we got that sequence on Copernicus and that sequence on Reiner Gamma there.

CMP Aha. Okay.

CMP And now, I'll see if I can find Riccioli.

CMP I should be able to see Grimaldi, I think.

CC Getting pretty easy to locate yourself as you go along your track?

CMP Yes, it's starting to get that way. It's not as good as I - as I want it yet. Every once in awhile, you look out of the window, you don't have the slightest idea where you are (chuckle).

CC Right.

CMP Yes, I can see Grimaldi and Riccioli coming up now. Just passing over the edge of the mare ...

Tape 78B/2

CC Roger. That's Grimaldi mare there?

CMP Yes, I can see it coming up.

CC Okay.

CMP There's a pretty stark difference between the mare and the - I guess you might as well go ahead and call them highlands, that's what they look like.

CMP East of Procellarum, in fact just before you get to Grimaldi.

04 20 44 32 CMP Okay, I want to switch to window 3. A little better to try and get the pictures.

CC Roger.

CMP Getting too much glare on the windows.

CMP Okay, Bob. That is correct. Now, you want to continue on across here at a 15th, huh?

CC Roger.

04 20 48 53 CC Okay, Ron. No ... for picture taking, but you need to select OMNI A when you get a chance.

CMP Okay.

CMP There you go.

CC Good show.

CMP Say, I can only take 18 pictures on that, I think.

CC Say again, Ron.

CMP It will only take 18 pictures, I think.

CC Roger.

CMP (Laughter) Fool around in here by yourself, and you get disoriented.

04 20 54 05 CMP Well, I didn't see any slices down there that time.

CC Roger.

CC Hey, you're looking good, Ron. You're right on the Flight Plan. We haven't missed a thing yet today, I don't think. In really good shape.

CMP Oh, okay. Good. I tell you, there's a little more hussling up here than I thought there would be though.

CC Keeping you busy, huh?

CMP (Laughter) Yes, a little bit. That's all right. It's fun.

CC Just don't want you to get lonely up there.

CMP (Laughter) Sure won't.

CMP Okay. That was mag Zebra Zebra, I guess. Started out just like we had it planned. Took two each in 1 second and a half, and then a fourth, and then an eighth. The total count on this camera is going to be 50 instead of 60.

CC Back at 150.

CMP And then the rest of them - -

CC Yes.

CMP - - And then the rest of them are 160 - 150 throughout, except the last 2 foot and a half.

CC Okay.

CC I'll get a confirmation on some, Ron, but I think when we get on to Reiner Gamma on that pass of target 15 Delta, we're not going to have enough film left to run out over Riccioli and that area, which is already taken. That's why we hate to take these now, because when - when we come up there in the next pass, you're not going to have enough film.

Tape 78B/4

CMP Oh, I see. Okay.

CMP Let's see. While I got the camera out, I can look ahead, I guess, and see what - what mag to put in there.

CMP WW, I guess, huh?

CC Yes, that's affirm. WW on the lunar ...

CMP Okay. Give you that.

CC Ron, comm is getting pretty bad down here with us, we're going to lose you in about 4 minutes, maybe 5, completely. And we'll pick you back up at - 120:28 thereabouts, 120:28.

CMP 120:28. Okay. We'll see you there.

CC Roger.

04 21 01 52 CC Ron, you're about ready to go over the hill. You're looking really good.

CMP Okay, Robert. Thank you much. See you in about 45 minutes then, I guess.

CC That's affirmative.

04 21 20 XX BEGIN LUNAR REV 17

04 21 50 05 CC Hello, Ron. How's it going up there?

CMP Hey, pretty good, Robert. The last photo pass was a - a good one.

CMP Just about half an Earth now.

CC Roger.

04 21 53 01 CMP Houston, America. The mag Lima Lima is on frame number 54 now.

CC Roger, Ron. We copy. Lima Lima on 54.

Tape 78B/5

CMP And mag - and mag Quebec, Quebec is starting on
frame 53.

CC Roger. We copy.

04 22 02 16 CMP Houston, America. I got to unplug you for a
little bit. I'm so tangled up in my hoses here,
I'm getting strangled to death.

CC Okay. No problem, Ron. We'll just sit. Give
us a call when you're back on the air. Okay?

04 22 08 01 CMP Houston, do you need OMNI Bravo yet? Will you
give me a call when you want it?

CC Roger, Ron. We'll give you a call. You can go
on to Bravo now, Ron.

CMP (Laughter) Okay. Do you have it? Okeydoke.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 20 34 05 LMP-EVA Okay; I'm working on the LEAM connection now, Bob.

CC Okay. I copy that, Jack. Understand you - -

LMP-EVA Say, it's hard to hit that garbage pile.

CC Roger. Understand you almost have the heat flow connector connected by now?

LMP-EVA Yes, sir.

CDR-EVA I'm a little late, Jack, until I get these battery covers opened.

LMP-EVA Okay. I got the heat flow for you.

CDR-EVA Okay.

LMP-EVA Well, the old LEAM connector doesn't connect, just like usual, or lock.

CDR-EVA Okay. I'm not going to touch the batteries. The covers are clean, and the batteries themselves are clean. The LR - LCRU has been dusted and - -

LMP-EVA Okay.

CDR-EVA - - so has the TV.

LMP-EVA It's locked. - -

CC Okay. Copy that.

LMP-EVA - - LEAM's locked on.

CDR-EVA Okay. I'm going to use this.

04 20 35 44 CDR-EVA Okay, Bob. The battery covers are in the shade.

CC Okay. Copy that, Geno.

04 20 36 02 CDR-EVA Well, well, well, well, okay; I hope that helps. Whoo! I'm going to go to MAX for a minute here. Do you buy that?

Tape 79A/2

CC Okay, Geno. We copy.

CDR-EVA It seems hot in the valley of Taurus.

CC Okay.

04 20 36 27 CDR-EVA Okay. Oh, man, - Whoo! Yes, I'm going back to INTERMEDIATE.

CC Okay. Copy that.

CDR-EVA Okay, Bob. I'm ready to go to work.

CC Good.

CDR-EVA Okay. I'm going to push the gravimeter.

CC Roger -

04 20 36 42 CC MARK.

04 20 36 51 CDR-EVA Okay. You have a mark.

CC Copy that.

CDR-EVA - - It's blinking, and remember what I said, it's a piece of cake to take on and off.

CC Okay. Copy that.

CDR-EVA Okay. This is north over here, huh? Okay. Off-load old heat flow, 10 ... northwest. You got the connector connected. Carry heat flow 30. Place on ground, experiment up; okay. Way to do that, Jack. Keep your eye on cables.

LMP-EVA Oh, man, all I could do is go down hill over here.

CDR-EVA Jack, do you read?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA I'm just trying to level - -

CDR-EVA Are you going to move that very much?

LMP-EVA No, I'm just - I'll be working with it to try to level it. It's - that's going to be a major task.

CDR-EVA Okay, there's 30 feet, I'll just - I'll get this thing squared away when I - Okay, Boyd bolt time.

LMP-EVA Ha, whee! That really went. Man, these things are just like they are at the Cape. You can feel every one of them.

CDR-EVA Hey, Bob, has Ron been able to see the LM?

CC Stand by. I'll find out.

LMP-EVA Oh - oh -

CC Watch it, Jack.

04 20 39 06 CDR-EVA First cable - first cable hooked. Jack, you all right?

LMP-EVA Yes. I'll straighten it up in a minute. Okay. The LSG is going out.

CC Okay. Copy that, Jack.

LMP-EVA I hope it does the things that we want it to for us.

LMP-EVA Bob, I'm not doing too badly on keeping things clean. The - the base of the central station and - got some stuff on it, but - otherwise it's pretty good.

CC Okay, Jack. We appreciate your efforts, and we understand you got the LEAM connected eventually.

LMP-EVA Yes, and it locked; just took some diddling. Okay. Sun's over there. Oops, I forgot my Boyd bolts. Let's see.

CDR-EVA Yes, I never drilled a hole where there's not a can.

LMP-EVA Boyd bolts are OFF. Bob, does it bother him that the base of the LSG is touch - touching soil? Because this is pretty soft.

Tape 79A/4

LMP-EVA Bob, did you give me an answer?

CC Roger. Ron thinks he has seen it. We haven't had a confirmation on the last orbit when you were talking to him, but he thinks he saw it the previous orbit.

LMP-EVA Hey, hey, Bob. Hey, Bob.

CC Go.

LMP-EVA Can the LSG - the base of the LSG, be touching the soil?

CC Stand by on that. Roger, Jack.

LMP-EVA Well, it's very soft and it's going to be very hard to level for it.

CC Roger, Jack. The base can be touching the ground.

04 20 41 37 LMP-EVA Okay. It's level, aligned, the sunshield is shaded inside. The level bubble is just touching the outer circle; a one circle. And I improved that. It's perfectly centered now and I'm going to uncage. Whoops. I moved - the experiment moved. It's still pretty good level. Okay, it's uncaged; the gimbal is swinging.

CC Okay. Copy that.

04 20 42 26 LMP-EVA The gimbal is swinging.

CC Copy that. And Jack, you're still in MAX - -

LMP-EVA The bubble is back just touch - Yes, I know - -

CC Okay.

LMP-EVA I've been working, man.

CC Okay.

LMP-EVA Okay. I went to "pseudo intermediate," between minimum and intermediate. The bubble is just touching the - its circle, and the alignment - Sun alignment is good.

CC Roger. Copy that. Thank you.

LMP-EVA Okay, Gene. You've got some good slack here, if you can leave it that way. You shouldn't have the cable draped across anything, that's good.

CDR-EVA Okay. I want to try and get this thing in there. It won't - there it is.

LMP-EVA Can I help you, Gene?

CDR-EVA No. I got a little dust in this mirror, though. I'm not sure I - Bob, I got a little dust on the white surface, not on the mirror - of the heat flow. You got any recommendations?

CC Stand by on that, Jack - Gene. Is that the - on the heat reflector?

CDR-LMP Yes. Yes, it's on the north side.

CC Okay. As long as it's not on the mirror, it's okay, Gene.

CDR-EVA Well, let me take another look. I'll double check.

LMP-EVA Watch it. You're pulling pretty hard.

CDR-EVA Yes, I'm watching - -

LMP-EVA You're pulling - -

CDR-EVA I'm watching; I'm not pulling. Okay. The mirror's clean.

CC Okay; then, it's good enough.

LMP-EVA Give me some more slack up here, you're draped.

CDR-EVA Okay.

CDR-EVA Okay. Okay. That's where it's going, Jack, right there.

LMP-EVA Can you - okay.

CDR-EVA How's that?

Tape 79A/6

LMP-EVA That's good.

CDR-EVA Got enough?

LMP-EVA This way just a little, Geno. That's good.
Doesn't take much.

CDR-EVA Man, we sure didn't need blocks or anything out
here. There's enough soil here to level almost
anything.

LMP-EVA But that's so soft, though, it's hard to get a -
fast level. Whoops! That's strange. I think I
did something wrong.

CDR-EVA What's that?

LMP-EVA Pulled the pin at the wrong time ...

CDR-EVA Okay. The heat flow is level; the gnomon is
good. And, Bob, I verified that that dirt is not
on the mirror. It's on - on the white stuff that -
that, you know, is horizontal to the surface of
the box.

CC Okay. Copy that, Gene; that's okay.

CDR-EVA The mirror - mirror's - the mirror's clean.

CC Roger. Thank you.

CDR-EVA Okay. Okay, I'll give you a TGE reading.

CC Roger. We're ready.

04 20 46 17 CDR-EVA Okay; 670 002 601 - 670 002 601.

CC Okay. We copy that.

CDR-EVA Bob, was that with the camera - with the camera
running?

CC Roger. The camera's been running all this time.

CDR-EVA That's beautiful. Okay. Your temperatures are
down to a hundred - and maybe a sukosh 120 under,
so maybe those batteries are cooling off.

CC Okay; good.

CDR-EVA It's sure good. I don't want to walk on that third EVA.

CC Roger.

CDR-EVA I'm getting to like driving this machine. Okay, pull pin 2. Pin 2 always comes after - goes before pin 1.

LMP-EVA I think that's in the NASA documents now.

CDR-EVA What's that?

LMP-EVA Pin 2 comes before pin 1.

CDR-EVA (Laughter) Okay.

LMP-EVA Reel 3 comes before reel 1 and 2, also. I think I overdid that one.

CC Yes, it went clean out of sight; but by all means, watch reel 2.

LMP-EVA (Laughter) Oh, you think you're so clever. Believe it or not, Bob, I'm anchoring the geophone module.

CC Hey, Jack, it looks to us on the TV as though you're m - anchoring the geophone module with a flag.

LMP-EVA Yes, that's what I'm doing. I'm anchoring the geophone module with a flag.

04 20 48 14 CDR-EVA Okay; one leg, two legs, three legs. And none of them - none of them -

LMP-EVA Hey, Bob, remind me to police the garbage pile.

CC All right.

LMP-EVA The garbage pile is turning out to be - just like every other ALSEP deployment. It's hard to control.

Tape 79A/8

CC And I understand all your legs came out okay, Geno, or didn't come out.

CDR-EVA Okay. Yes, sir; they all came out okay.

04 20 48 51 LMP-EVA Okay. LMS ring is pulled.

CC Copy that.

LMP-EVA Amazing. Amazing.

CDR-EVA Okay, Bob. I've got my tools of the trade right here. I'm ready to go to work. Now I put a mark in the deck - Here it is; right there.

LMP-EVA Hey, Bob, what have I forgotten? The package won't rotate.

CC Try rotating the UHT.

LMP-EVA No, I'm serious. Oh, rotate the UHT, huh?

CDR-EVA Yes, remember that one?

LMP-EVA No - that's right. I'm sorry. I knew it, I knew it would happen.

CDR-LMP Where's your garbage pile, Jack? Well, I - I can't find yours.

LMP-EVA Well, don't worry about my garbage pile. It turns out it looks very much like the ALSEP.

CDR-EVA Okay. I made a mark over here that says - that says that should be about cable length.

LMP-EVA What am I doing over here? You're awfully - you're awfully close.

CDR-EVA No, my - my - I'm going right in here, Jack. Right here.

LMP-EVA Okay.

CDR-EVA I can move it further - -

LMP-EVA No. That's all right.

CDR-EVA - - further north.

LMP-EVA No, this will be all right. I just want to keep away from you there.

CDR-EVA We shall soon see how tuned we are. I'm anxious to see what's under this mantle.

CC So are we.

CDR-EVA Well, Bob, I hope I can drill you a couple of good holes.

CC How about three?

CDR-EVA And I know you do, too.

LMP-EVA Okay, Bob, the arrow is east/west, pointing west. The bubble is in the center. If I'm lucky, it'll stay there. I'm not - I'm more like east/northeast. I'm trying to keep a little further away from Gene.

CC Okay. Copy that.

LMP-EVA Break seal is OPEN.

04 20 52 02 CDR-EVA Okay, that was my MARK. Let me see. Double check that cable length. I'd sure hate to drill a hole that was outside of the - length of the cable.

04 20 52 22 LMP-EVA Okay, Bob, the LMS is deployed. I'm policing the site. The screen is over the port.

CC Copy that.

LMP-EVA I'm going to more - one big rock. What am I doing down in here?

CDR-EVA What were you doing down in there?

LMP-EVA (Laughter) Okay. And, Bob - -

CDR-EVA ...

Tape 79A/10

LMP-EVA - - Bob, there's a little bit of dust adhering to the - sides of the LMS. And a few particles less than - half a percent of the surface on the top. But, of course, you're going to clean that one off; so that's all right.

CC That's affirm on the top.

LMP-EVA The - the north side has about a - 10- or 15-percent dust cover.

CC Copy that.

LMP-EVA ...

CC - And, Geno, you're leaning pretty heavy forward on that drill.

CDR-EVA Okay, Bob. She went in - she's going in like she's in some pretty dead stuff, and then I hit some rock here. I'll watch it - I won't lean forward. I'm not putting too much pressure on it.

CC Okay.

CDR-EVA It sounds to me like she's chippering away through rock. May be just a little longer drilling hole than it was at the Cape.

04 20 55 14 CDR-EVA Bob, she's going in - but not without a little bit of resistance.

CC Roger. We're observing that, Geno.

CDR-EVA Every once in a while - every once in a while, she breaks through a soft spot.

CC Good.

LMP-EVA Bob, I'll tell you, this central station's a bear - bear to get level. Well, I just got dust on it now.

LMP-EVA It's just too soft.

Tape 79A/11

CDR-EVA Boy, that sure was drilling in hard stuff because it took a lot to get it off.

CC Okay, Jack. And we could certainly stand a little bit of dust, at least on top of that central station sunshield.

LMP-EVA Yes, I guess the level's important.

CC Roger.

CDR-EVA I can just see what John's thinking right now. That's what makes the difference. That's where you expend your energy.

LMP-EVA Bob, I don't know that I'm going to be able to do that without a lot of time. It's hanging against the south edge.

CC Say again there, Jack.

LMP-EVA I don't know whether I'm going to be able to level it - the central station.

CDR-EVA Anything I can do, Jack?

LMP-EVA Okay. I got it off the edge.

CC Okay; maybe we better just leave it there.

LMP-EVA Well, I'm making it worse by getting dust on the top.

CC No, the dust on the top is not as important as getting it leveled, Jack. But if you get it broken off the edge, that ought to be good enough.

04 20 59 02 CDR-EVA Bob, I'm riding at about 382. I've got - oh, I guess, about 80 - Well, no, there's half - I guess, 60 percent; no flags and no tones.

CC Okay. Copy that, Geno.

04 20 59 24 LMP-EVA Okay, Bob. It's touching the second ring; the gnomon is aligned, and I'm going to leave it alone.

CC Roger on that.

Tape 79A/12

LMP-EVA Yes, I think I lost all the time I might have made up.

CDR-EVA Hey, Bob, it's obvious that I'm going through some pretty stuff - tough stuff. Consolidated material, like rock fragments, and then it breaks through; and then it jumps for about 3 or 4 inches and then I hit some more fragments.

CC Roger. We're seeing that Geno. Looks interesting.

LMP-EVA Oh, me. I got too low on that one. I thought I had that gaged.

CDR-EVA If you deploy that geophone, you'll go out of sight.

CDR-EVA Bob, there would be absolutely no way of breaking this drill from that - those bores without that tool, I guarantee you that.

CC Okay. We copy that, Geno.

CDR-EVA I think I found a way to get this off, though, with a little help. Okay, number 3 coming up.

CC Roger. The third and last one on this hole.

CDR-EVA Yes, sir. Oh, boy. Time out.

CC Okay.

LMP-EVA Don't work too hard.

CC Roger.

CDR-EVA My fender's still on, which makes me happy. I'll tell you, if you could come and sprinkle the whole area with water and get rid of some of this dust -

CC Okay, Geno. And can you remember if those heat flow cables are not crossed as they come out of that box?

CDR-EVA Yes, sir. I very definitely made a point of them - not crossing them.

CC Okay; very good.

04 21 02 45 CDR-EVA They are not - they are not crossed.

CC Good.

LMP-EVA (Laughter) Where do we find such men?

CDR-EVA How's it coming, Jack?

LMP-EVA Oh, slow. This leveling is really throwing me behind the power curve; but I know they - they're serious about it, so - If I can keep it where it is now, I'm in like Flynn. It's perfectly centered. Even the gnomon is aligned within a shadow width.

CDR-EVA Man, is that thing biting.

LMP-EVA Really working down there, are you?

CDR-EVA Oh, you betcha, man. I'm in something tough down there now. Whew.

LMP-EVA Well, what - what bore are you in?

CDR-EVA Number 3. If I let go of that drill and it kept running - If that drill kept running and I wasn't anchored to the ground - -

LMP-EVA (Laughter)

CDR-EVA - It would throw me over a massif - in tangential turns.

CC Okay, Geno - -

CDR-EVA I think I'm in the mother lode down there.

CC Gene, if its getting really tough and you're not making much progress, we'll be happy with it where it is.

CC Well, looks like you really - -

CDR-EVA No, sir, you're going to be happy with it where it's supposed to be; and that's where it's - -

Tape 79A/14

CC You were hiding it from us - -

CDR-EVA Yes, sir.

CC We couldn't tell how deep in you were.

CDR-EVA I wanted to surprise you. They're going in all the way, and they're both going to work. It's a little tough looking into the Sun.

LMP-EVA Yes.

04 21 05 10 CDR-EVA Oh, Manischewitz! I don't know where I picked that work up, but (chuckle) it's better than some, I guess. Now if I can use my little lean-to here. Oh, man, that works great. That works great. Put this out of the way. Bob, I'm into the white mark; it depends on what you want to call the surface. You know, it's - I can - I can give you 6 - or give or take 6 or 8 inches.

CC Yes, something like that will do, Gene, I guess. You can measure it ...

LMP-EVA Gene, is the dust coming up changing color on you at all?

CDR-EVA No, Jack. It isn't changing color. I can't even tell - I can't even tell where it's coming up.

LMP-EVA (Laughter)

CDR-EVA I don't think it is coming up. I think I'm just pushing it aside.

LMP-EVA Boy, I'll tell you - -

CC I saw something come up then just then, Jack.

LMP-EVA - - the old ALSEP central station - -

LMP-EVA Yes, it deploys itself; it turns out.

CC Roger on that. That was - -

LMP-EVA Bob - -

CC - - pretty amazing.

LMP-EVA Okay. When I - I finally leveled it in a bull's eye. I don't know whether you heard me or not, but it was - it was perfect. So it's okay. It's just got a fair - it's got about 20-percent dust cover on the top.

CC Okay.

CDR-EVA ... Glad you've got that probe covered.

CC And, Jack, ALSEP says that that's okay ... but that's no problem.

LMP-EVA Okay. I put a rock under the northwest corner. Oops - guess what happened? (Laughter) Just like in training, Geno.

CDR-EVA What happened?

LMP-EVA The old geophone cable caught on the corner.

CDR-EVA Okay. Oops, I'm not ready. That says F4B on that; that's an airplane.

04 21 08 27 CDR-EVA Houston, there's no dust on the probe except that which was on my hands.

CC Okay. Copy that.

CDR-EVA That must be solar wind.

LMP-EVA - Sorry not to be more talkative, but - this is taking all the concentration I got. I'll have to push this down, I can see that. Yes, this ... doesn't hold any better here than it - did in training.

CDR-EVA Oh, don't - don't lose that - Geno, don't lose that - don't lose that. Notice how you talk to yourself out here?

LMP-EVA Who, me? (Laughter)

CDR-EVA Help.

Tape 79A/16

LMP-EVA I says - you is getting farther and farther behind.
CDR-EVA Well, I've had my one for today.
LMP-EVA Your one what?
CDR-EVA Well, I just did my "whifferdill."
LMP-EVA Oh, did you fall?
CDR-EVA No. It's funny how for every action there's an equal and opposite reaction, isn't it?
LMP-EVA Hey, I've heard that before. Okay. Secure thermal curtains.

04 21 10 05 LMP-EVA Thermal curtains are secured.
CC Okay. Copy that.
CDR-EVA How far behind am I, Bob?
CC Stand by. Roger. We're showing - Gene, just about 20 minutes; and Jack, just about 25 - between 20 and 25 minutes for both of you.
CDR-EVA Okay.
LMP-EVA - How are our consumables?
CC Stand by.
CDR-EVA Oh, if this thing isn't going to work better than that -

04 21 11 52 CDR-EVA Bob, just like the book says, it's down to Papa 1; and it hooked.
CC How about that.
CDR-EVA Oh, boy, the old fingers really suffer on these.
LMP-EVA Take it easy.
CDR-EVA Okay. Now this one down to Fl. Would you believe Fl?

CC Yes, I believe you, Gene.

CDR-EVA Bob, in this soil, best number I can give you is about an inch below the white spots - or Bravo 1.

CC Okay. Copy Bravo 1.

CDR-EVA I got a - I got a better way of putting that last thermal shield on now.

CDR-EVA Okay, Bob, you're looking at it - coming out to the south, but I don't expect it'll stay that way unless I put some dirt over the cable. How does that grab you?

CC Stand by, Gene.

CDR-EVA You like that thermal shield the way it is? Okay. That's coming out south. That's in good shape. I'm pleased with that.

CC Dirts okay, if you want to put it on there, Gene.

CDR-EVA ... happy with it. I'm moving on.

CC Okay.

CDR-EVA Now the thermal shield is on there, Bob. I got them all on there.

CC I was talking about - If you want to put some dirt on there to hold it down, that's okay.

CDR-EVA Oh, okay. Well, I got it down without the dirt.

CC Okay. Good enough.

CDR-EVA I'm just finding all sorts of good ways to make life easier out here.

LMP-EVA Stay away from the cable.

CDR-EVA Bob, and I didn't forget the last measurement either.

CC Roger that.

Tape 79A/18

CDR-EVA Hey, can you see this big mound that I just walked - it's just to the north - not the mound - the depression that's just to the north of me?

CC Roger, 17. ...

CDR-EVA It's probably behind the Rover. Okay. Well, how's - how's that look for the core?

CC Stand by.

04 21 15 26 CC Geno, can you give us a distance estimate to that? Does it look like it's 80 feet or so?

CDR-EVA Yes.

CC Okay. Then that sounds good.

LMP-EVA Oh, shucks. Hey, Bob, is there any way a level bubble can fail (laughter)?

CC Hey, Jack, remember that's on top of those wobbly legs and - or wobbly springs there. And with the thing not being straight, you shouldn't really expect the level bubble to be level after the thing's been deployed. That happened at the Cape a couple of times, remember?

LMP-EVA Yes, but Bob, I've - I've moved this practically all the way down the full throw and it - That bubble won't move, and I can't get it to move by tilting it; and I was level. And the bubble on the top of the central station is still level.

CC Okay. You're talking about the level on your other one, huh? Stand by on that.

LMP-EVA The gnomon, yes - Both of them? I can't get it to move to the other side of the - fluid.

CDR-EVA Keep working. That - that thing shouldn't fail.

LMP-EVA Well, I've gone full throw - -

CDR-EVA That's not level.

LMP-EVA That bubble's stuck in there, somehow. In both of them. That's not even pointing close to the Earth. Okay, I'm going to have to tweak it up and let them see the signal strength - and tweak it.

CC Okay. Why don't you try and manually point it - try and level it and see if we - see what you can do toward getting it towards the Earth.

LMP-EVA I will, Bob. That bubble's just not working. I - I can't figure that one out.

CC Okay. Just go ahead and use the - -

LMP-EVA Okay. Maybe I jarred it loose here.

CC Okay.

LMP-EVA Okay. I think I jarred it loose.

CC That's another first - -

LMP-EVA Don't ask me how.

CC - - Okay, we won't.

LMP-EVA Okay. I got the other one loose. That's very strange. A sticky level bubble. (Laughter)
Never heard of it.

CDR-EVA Hey, Bob.

CC Go ahead, Jack - Gene.

CDR-EVA If you're looking at me, what I'm talking about is this depression - is this depression in here for the core - oh, maybe 15, 20 meters out in here. Jack, what did you have in mind for the neutron flux?

LMP-EVA Either the one you're in - you're down in there, or next one over behind that rock in front of you over there.

CDR-EVA Hey, I can go way over there. That's not too far probably for - -

Tape 79A/20

LMP-EVA Well, either way I think is fine, Gene. But I would suggest behind the rock.

CDR-EVA - - For a neutron flux, huh?

LMP-EVA Yes, sir; and the core.

CDR-EVA Well, I wanted - I thought they wanted a core in that depression.

LMP-EVA Well, that - there's also one over there.

CC Okay, and - 17 - -

LMP-EVA ... a choice.

CDR-EVA I'll go behind that rock; that looks good from here.

CC And, 17, we think you guys are in far - by far the best position to judge that - far better than we are. You know what the requirements are on shielding and - -

CDR-EVA Okay.

CC - - greater than 50 meters - 25 meters.

CDR-EVA Okay, Bob. Okay. The long - long bores in.

CC Okay. Copy that, Gene. Looked like that one went in fairly well.

CDR-EVA Well, probably about like the other one did. Not - not too bad.

CC Okay.

LMP-EVA Oh, I must be getting old.

CDR-EVA I expect the next two are going to be a little harder.

LMP-EVA Bob, I'm not very happy with this level. But I'll turn it on and - Have me come back a little bit later, when they've warmed up some more, and let's see what it looks like.

CC Okay. We'll do that. Give me a mark when you turn it on, and we'll see what kind of signals we get.

LMP-EVA Okay. The shadow gnomon is - aligned; I'm going to turn the shorting plug on.

CC Copy that.

04 21 20 05 LMP-EVA It's on.

CC Roger.

LMP-EVA And - the needle is fullscale left.

CC Copy that.

CDR-EVA I can't believe that.

LMP-EVA What's your problem?

CDR-EVA Well, that whole bore turns in the - in the ground, it's so loose. I got - and I got that - You know how those threads sometimes stick on you a little bit. I got one stuck halfway down and the whole bore is turning, so now I've got to use a wrench on it.

CC Okay, Jack. And we have - -

LMP-EVA Bob, I've got a - I've got a - rock about 10 feet southeast of my LEAM location. I can move - I can move a little more north and get, oh - get 15 feet from that. That okay?

CC How big is the rock there, Jack?

LMP-EVA Oh, it stands - it's a meter wide and stands about a third of a meter high.

CC About a third, and about a foot high?

CDR-EVA Bob, how's that for - -

LMP-EVA A third of a meter.

CC Okay.

Tape 79A/22

CDR-EVA Bob, how's that for soil mechanics? I pulled the first bore right on out trying to get this thing on right.

CC Well, put it in - put it in before your hole fills up there, Geno.

CDR-EVA Yes. Right now I'm interested in getting this second bore on. Now, let's see if I can get it back in. Well, not quite as far, but high enough for me to reach the - It still feels, Bob, like there's a lot of fragmental material down there.

CC I copy that, Geno. Good luck.

CDR-EVA That was an interesting little - exercise. Well, I got the bore on right, anyway.

LMP-EVA Well, shoot.

CC Okay, Jack. As long as it's only 1 foot high and 10 feet away, that's satisfactory.

LMP-EVA Okay.

04 21 24 54 LMP-EVA Okay, Bob, the LEAM's deployed, aligned; and the level bubble is - just touching the inner ring.

CC Copy that.

LMP-EVA Hey, Bob. Did you get anything from the ALSEP yet?

CC Watch that cable, Jack. Roger. We started to tell you that when you had the question there, and we're getting a good lockup on the data.

LMP-EVA Well, keep an eye on it, because I'm not happy with the level.

CC Okay. We'll get back with you on that.

LMP-EVA I'll check. ... checking.

LMP-EVA I found a way to get over cables.

CDR-EVA Shoot.

LMP-EVA (Laughter)

CDR-EVA Oh, Manischewitz. Whew.

LMP-EVA There you go again.

CDR-EVA I know. Let me get this one off and take a ... here.

LMP-EVA I'm kind of having trouble with UHTs today. They just don't want to lock in when you get dust in there.

CDR-EVA Hey, Jack. Be careful with that UHT on the heat flow because it was aligned - real good.

LMP-EVA It was what?

CDR-EVA The heat flow experiment electronics, when you go over there for that UHT, was aligned.

LMP-EVA Oh, yes.

CDR-EVA Bob, I'm going to take a zap of cold water.

CC Okay. Sounds good to me.

CDR-EVA Whee. Almost looks like it's getting dark out. Is it? Guess not.

LMP-EVA (Laughter) Hope not, or we is in trouble.

CDR-EVA I think I may have gone the wrong way. I did. I went to MIN instead of MAX. Here it comes. Oh, boy. Oh, boy. Man. Watch it. Okay, Jack. You're all right. Still deploying.

LMP-EVA Huh?

CDR-EVA Still deploying. Nothing; you're all right. It's coming out a little - hard.

LMP-EVA Wouldn't you know it?

CDR-EVA Okay. I'm back in MIN, Bob.

CC Okay. Copy that.

Tape 79A/24

CDR-EVA By any chance have any heat flow data yet?

CC No, Geno. We don't have the heat flow turned on yet.

CDR-EVA All right. Oh, that's right. Okay. I think that's right. Okay. I'm about to give you your number. Oh, darn it. (Laughter) Crank it a couple of times. Clean as a whistle. Clean as a whistle.

LMP-EVA Well, just like I thought; antenna doesn't want to go in.

04 21 28 57 CC Is that the number 3 section there, Geno?

LMP-EVA Yes, it's in.

CDR-EVA Yes, sir, Bob.

CC Roger. Beautiful.

CDR-EVA Well, it's the last one I got. I guess we'll find out when I put the probe in. I think they're all in there.

LMP-EVA Okay. I'm about ready to deploy some geophones.

CC Okay, Jack. Did you get the antenna into that pallet okay, eventually?

LMP-EVA Yes.

CC Good enough.

CDR-EVA Bob, I occasionally hit stuff and it - it spits this whole drill back at me. Knocks it back about a half an inch or so, and then it will bite - bite through it.

CC Okay.

CDR-EVA My general impression is that there is an awful lot of fragments I'm busting up down there.

CC Okay.

CDR-EVA Okay, Bob. That last 6 inches, I really came into something hard; but it's down all the way.

CC Beautiful, Geno.

LMP-EVA Oops, there's a heat flow probe.

CDR-EVA What happened?

LMP-EVA (Laughter) I - I messed up -

CDR-EVA Man, don't hit that. Give me heart failure after all that drilling.

LMP-EVA No, I just walked too close to it. I apologize for that.

CDR-EVA I don't care how close you walk to it -

LMP-EVA Well, ... does ... does.

CDR-EVA Just don't step on it.

LMP-EVA I do that ...

CDR-EVA Ooh. Hey, Bob, just out of curiosity, what kind of heart rates has this drill been producing on me?

CC Stand by. Okay, you've been running at 120 flush, Gene, with peaks of 140 to 150 from time to time.

CDR-EVA Okay.

04 21 32 02 CC And there goes the last heat flow hole on the Moon.

CDR-EVA Oh. Yes, sir. I tell you, if you learn how to use your instruments in this 1/6g, you take your time and you get around; it's frank phenomenal. But if you try and bend over without some help; not so phenomenal.

CDR-EVA Boy, what a ride that Challenger gave us coming down. What a ride.

CDR-EVA Oh, you dummy - you dummy. Jack you still with me.

Tape 79A/26

LMP-EVA Yes.

CDR-EVA Okay. Boy, I'm getting dropsies now. Getting dropsies.

LMP-EVA Don't push it.

CDR-EVA Getting dropsies.

LMP-EVA Take a rest.

CDR-EVA Unbelievable - unbelievable.

04 21 35 11 CC Okay, Geno. And the heat flow is on and looking good.

CDR-EVA That's good news, Bob. Let me give you another one here. While it's ... I'll tell you I'm in to the bottom of the white marks, and that's - oh, about Bravo 1 again.

CC Okay, I copy. Papa 1, Foxtrot 1, and Bravo 1?

CDR-EVA No, sir, Bob. Now the - the bore stem is in to the top of the white marks; I'm still putting the probe down.

CC Okay, copy that. - -

CDR-EVA And the top of the white marks is about bravo 1.

CC Copy that.

CDR-EVA About bravo 1. Okay. Here go - here goes the probe. Pick a number you'd like to hear. How about Papa 1?

CC How about Papa 1 there, Geno.

04 21 36 29 CDR-EVA Bingo, babe, you win; and it locked in.

CC Roger. I think Mark won on that one, too.

CDR-EVA Papa 1.

CC Roger. And, Jack, I gather you are probably traipsing across the landscape with a geophone about now, right?

LMP-EVA That's firm.

CC Okay. And let me ask you - -

CDR-EVA Good gravy! You know how big that rock -

CC Stand by. Go ahead.

LMP-EVA Go ahead, Bob.

CC Okay. I gather - you said that the heat - the LEAM was leveled and aligned, and I gather that meant it was on the black decal on top. Do you happen to remember what number was on that?

LMP-EVA Well, I'll check it. But I think you know where that decal is.

CC Well, okay. Good enough.

CDR-EVA Okay, Bob. The little thermal shield went to Fl.

CC Hey, that's another bingo.

CDR-EVA And it's coming out to the south. I'm coming out to the south.

CC Roger.

04 21 38 07 CDR-EVA And the thermal shield is in place.

CC Roger. Copy that.

CDR-EVA Well, it was until I moved it. Do I need my javelin anymore?

LMP-EVA You might.

CDR-EVA Yes, I might.

CC One never - one never knows, Geno.

CDR-EVA I think I'll save it until after - I think I'll save it until after I drill the core. Oh, me oh my.

LMP-EVA Take it easy, Geno. You sound like you're -

Tape 79A/28

CDR-EVA No, I'm doing fine.

LMP-EVA Okay.

CDR-EVA That Sun is just bright. I ought to put those visors down, I suppose - those other visors. Okay. Let me take a look at my list and see whether I've got everything. Measured, measured; height, height; you've got all the shields; you're coming out south; verify heat flow is level and aligned - It is aligned and gnomon was good; UHT to the LRV LMP seat; and then what do I do? Let me see. Deep core prep. Jack, I'm going to leave the UHT in the heat flow in case you need it.

LMP-EVA Okay.

CDR-EVA Okay. I'm going to go behind a rock over there -

LMP-EVA Now, now.

CDR-EVA In that depression. Bob, you do want the core in a depression, right?

CC Roger. That's affirmative, Geno.

CDR-EVA Okay, nobody touch my heat flow. That's the prettiest job I've ever done. Okay, I'm going behind a boulder over here. Bob, I've got about 385; and, I guess, about 50 percent. I can't see it too well.

CC I copy that, Geno.

CDR-EVA And no flags and no tone; and I'm on - I'm on intermediate coolant and I feel great.

LMP-EVA Likewise; and I'm - -

CC Roger.

LMP-EVA - - and LMP is - LMP is 56 percent.

CC Okay. Copy that.

LMP-EVA What are you, Geno?

CDR-EVA Well, I can't see it. The Sun was - I don't know, Jack. I can't - It was about 5 - yes, about 55 or 54.

LMP-EVA Okay.

CDR-EVA Now, this ought to shield that thing from the doggone -

LMP-EVA Pressure's 385 on the LMP.

LMP-EVA Bob, one comment on - getting the geophones within a few degrees of vertical - In this undulating terrain (chuckle), I think they're pretty good; but it's not real easy to tell what vertical is.

CC Roger, Jack.

CDR-EVA Well, this is right in line with the shallow depression; and it's right in line with the - RTG, with a rock in the middle.

CC Okay, Geno. As long as you're drilling behind the rocks from the RTG, that's great.

CDR-EVA That's where you're going to get it. Let me see what I need. Drill, rack, core bag - drill at 1 IPS. Okay. Let's go do it right.

04 21 42 29 CDR-EVA Okay. Let me see, I'm going to put it right in this depression. Right in it.

LMP-EVA There, get the middle of that.

CDR-EVA It's a shallow one. If I go over there, I'm not shielded, Jack.

LMP-EVA No, that's good. Get in the middle. Get it in that place.

CDR-EVA Right in this little - It's only about a 4-meter depression.

LMP-EVA Oh, wait a minute - oh, you're on the other side of the rock. Okay.

Tape 79A/30

CDR-EVA Yes, yes. Yes, I want to get back here.

LMP-EVA That's good. Oh, man, go slow.

LMP-EVA Bob, the - all of these big boulders around here that I've looked at, are the same - same rock type.

LMP-EVA Oh - who pulled over the geophone module?

CDR-EVA Can't imagine.

LMP-EVA Okay. That sounds like the title of a book.

CDR-EVA Oh, oh. There it went.

LMP-EVA What happened?

CDR-EVA Oh, I lost my vise. I see it. I see it.

LMP-EVA Hope I took number 1 in the right direction. Yes. Okay, number 4 will be a little hard to pick up.

CDR-EVA Boy, all these little craters are filled with glass. Come on back here. I've got to chase this thing over the lunar surface.

LMP-EVA I've seen glass covers. Oh, about out towards there, I guess.

LMP-EVA As I was saying, Bob, all these big blocks that I've looked at look like the gabbroic rock that I was talking about - possibly upwards of 50-percent plagioclase rather than 30 like the mare - but an intermediate gabbro of some kind. And one big block there had very sharply defined - parallel parting planes. I think there is a foliation of minerals that parallel that parting, but I'll have to check it out.

04 21 46 08 CC Okay. Copy that, Jack.

LMP-EVA Those parting planes go over the - go through the whole boulder on the order of at least 3 meters long and outcrop.

Tape 79A/31

LMP-EVA How is it going, Gene?

CDR-EVA Fine. I'm on my second stem, here - or I'm starting on it. How are you coming?

LMP-EVA Okay. I'm just about ready to - pick up - old the biggy, geophone 4.

CDR-EVA (Laughter) Have a good time.

CC Okay. And Geno, how are you doing? We've been watching Jack traipse back and forth across the ..

LMP-EVA I'm getting there, Bob. I'm trying to pit -

CDR-EVA Talk about seven league boots.

LMP-EVA Put stem number 2 on.

CC And, Jack, how's the visibility back at the center geophone ...

LMP-EVA How's the vis?

CC Yes. Are you - -

LMP-EVA Not bad.

CC Okay. You're not having to worry about the photos yet?

LMP-EVA No, I've been checking it. Bob, my biggest problem is that the flags don't anchor.

CC Okay. Copy that.

LMP-EVA In general, the lines are following the contours. Whoops - whoops - whoops.

CDR-EVA Well, try another one. Doggonit.

CC What's the problem, Geno? It won't screw on?

Tape 79A/32

CDR-EVA Oh, yes. It's no problem. You know, it's the same problem you always have. You get these threads - get a little side force on them and - you know, with the helmet and gloves and what have you - It's just - you can't - Sometimes they go on easy; sometimes they don't.

CC Copy that.

04 21 50 04 CDR-EVA Okay. I got this one on now.

CC Roger.

LMP-EVA Boy, do I have a ball of spaghetti here. But the geophones are going in the right direction. I hope you don't have an EMI problem. Can the geophone lines cross, Bob?

CC Stand by on that. Okay; no problem, Jack.

LMP-EVA Okay. Hey, if you see me start to pull over that - module there

CDR-EVA Hey, don't do that.

LMP-EVA No, I mean - oh, I won't hurt it. It's just that it - it stretches the other geophones tight.

CC Okay. Well, right now we're watching Gene.

LMP-EVA Okay. Don't worry about it. I'll watch it. The anchors are completely unsuccessful - on the module, anyway.

CC That looks pretty good, Geno.

CDR-EVA Not too bad, Bob. The first core was awful loose. I think I could have pulled it back out with my hands.

CC That's not the idea.

04 21 53 02 CDR-EVA Oh boy, oh boy. Speaking of boy, oh boy - are you a long way off.

Tape 79A/33

CDR-EVA Okay, going to stop for a second, Bob.

CC Okay. We've observed your problem there getting the wrench off, Geneo.

CDR-EVA Well, I had to get down to get that - to get that - third - third stem aligned and get it on there. This is the easy part, but I just got myself behind the power curve for a second.

CC All right.

LMP-EVA How's the time, Bob?

CC Stand by. Okay. Presuming you're taking photos now on geophone 4. Having to finish geophone 4, Jack, you're about - right now, looks like about 15 minutes behind.

LMP-EVA Okay.

04 21 56 09 CC And no problem on the time line so far.

CDR-EVA Darn it. You know, Bob, one of the problems is I'm working in a small crater; and it's just a little difficult to work on these slopes. Okay. It's on. I'm ready to put the drill in.

CC Okay, Geneo.

CDR-EVA Okay. Let me get the dust out of the bit by blurping it. Oh, man; okay. How am I doing, Bob, on the time?

04 21 58 04 CDR-EVA Jack, do you read me?

LMP-EVA Yes.

CDR-EVA Okay, because I don't see you.

LMP-EVA I'm out by the big rock.

Tape 79A/34

CDR-EVA Oh, okay; I got you. Man, I hope that hole doesn't collapse. I'm going to be awful disappointed. I think I could drive that heat flow flux - or heat flow - or neutron flux in, at least for one probe, without any problem. Okay, Bob, if all goes well in the next few short moments, you'll have the final - unleaded(?) - cores stem - automatic - in this area - on Apollo 17.

CC On a Monday evening, Roger.

CDR-EVA Yes, on Monday evening. That is what it is, isn't it? Hey, who's winning the football game?

CC Stand by; we'll find out.

CC Okay; and, Jack and Gene, the score is 10 to 10 at the half.

CDR-EVA Yes, that's Oakland and - and who?

CC Jets.

CDR-EVA ... Kansas City. What am I thinking of?

04 22 03 14 CDR-EVA Hey, Bob, would you settle for about 8 inches out of the ground? It's about as low as I can get.

CC Okay - -

LMP-EVA I haven't heard from them recently.

CC Okay, Geno. We'll give you A minus for that.

CDR-EVA I know.

LMP-EVA There he is.

CC But it's still an A.

CDR-EVA Well, I'll go lower if I could get an A plus. But I am going to accept an A minus, because I'll never get the wrench on it if I go any lower.

CC Roger there, Gene.

CDR-EVA I'm - I'm within an inch of the white stripes.
How's that?

CC That sounds great to me - -

CDR-EVA An inch of the white stripes, Bob.

CC Roger. And they're worried up here that you didn't
clear the flutes, Geno. You want to tell them that
so they'll be happy?

CDR-EVA Yes, sir. I'll tell them I did clear the flutes.

CC Okay. And, Jack, where are you lost on the plains --

CDR-EVA Yes, I did. But if you want me to do it some more,
I will.

CC No, if you cleared, that's sufficient. And, Jack,
where are you lost on the plains of Taurus-Littrow,
there?

LMP-EVA I'm over here.

CDR-EVA He's 180 from where your camera - from where I am.

CC Okay.

LMP-EVA Right across the Rover.

CC Okay. Are you getting ready to take geophone
photos or ALSEP photos?

LMP-EVA I'm getting ready to enable the old geophone.

CC Okay. I take it that means you've taken the geo-
phone photos.

LMP-EVA Oh, yes, sir; and I forgot the gnomon (laughter).

CC (Laughter) Hey, Jack. How about giving me a
couple of quick readings here to satisfy some
people. One, was there a decal on the LEAM that
you aligned it with? There's some controversy
down here that there's no decal there; and the

Tape 79A/36

question is, if there isn't they want a reading out of the degrees. But we keep saying there's a LEAM decal, and we can't prove it.

LMP-EVA I'll go prove it, Bob. I'll go by there. Stand by.

CC Okay.

LMP-EVA What's the other question?

CC And the second question is, is there a decal and was it aligned on the ... the 20-degree decal on the LSG. Was that also aligned?

LMP-EVA Yes, sir.

CC Okay. Copy that.

LMP-EVA The orange one.

CC Roger. Agree.

LMP-EVA As per drawing.

CC Roger, sir.

LMP-EVA As per drawing.

CC Roger. You don't have to prove it to me.

LMP-EVA Yes, I do.

CDR-EVA Okay. Okay, Bob, I was able --

CC Okay; and, Jack, how far --

CDR-EVA -- to pull the core out --

CC Okay, go ahead.

CDR-EVA -- with the drill. I was able to pull the core out with the drill, about 3 inches. And it's all jacking material from there out.

CC Okay, copy that, Geno. And we finally got some word from the Cape to prove to people that there's a decal on the LEAM, so you don't have to go back by that, Jack. Just at the right time.

LMP-EVA I already have. It's reading - it's reading 30. And here's the decal.

CC Okay. Copy that.

LMP-EVA Okay. I guess I'd take ALSEPs word.

CDR-EVA Good.

LMP-EVA One more, Once more I tempt the fate of the god of the cables.

CC Okay; and, Jack, we're getting ready here to try and save a little bit of time. And we're saying that why don't we just take two stereo pans for the ALSEP photos. First stereo pan will be in the vicinity of the original stereo pan; and the second one, they suggested, will be to the northwest - of that original one.

LMP-EVA Northwest. Okay.

CC Yes, and I suggest that you go far enough so that you can see the LEAM past the central station.

LMP-EVA Yes, sir.

CDR-EVA Hey, Bob, (laughter) you'll be interested to know I just put a - I just put a plug in the top of that core; and it disappeared from sight down the center - center of the core. I'll put a cap on it, too; but I want to plug it first. I want to - I want to get the rammer to plug it down.

04 22 07 43 LMR-EVA Hey, Bob, where do you want the focus on the pan-to be?

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 22 08 27 CMP - - within the crater rim.

CC Roger.

CMP But I'm sure it isn't that way.

CC Yes, we've got - -

CC Ron, if you're right there, we'd like you to take the H₂ tank 2 FANS to OFF, please.

04 22 09 42 CMP Okay. H₂ tank 2 FANS to OFF.

CMP You know, from the pictures of Maraldi Gamma, looked to me like it might have been some sort of a - a - well, maybe even a volcanic dome or some kind. Now when you look at it up there now and compare it with the rest of the surrounding material, it looks just like any other - any of the other sculptured hills. They have small domical structures on it, the same type of material that carries on through south of Maraldi. And it looks like maybe some kind of a mare fill has come in and filled up, Maraldi itself. You can see flow lines, it looks like, going down into Maraldi from Tranquillitatis. Now - The impact on the craters that are inside Maraldi, they're smaller-type craters and they have a - they have a definite bluish tinge to the halo that comes out as opposed to the bright - opposed to the bright craters or white-type thing and those are - have more of a bl - a darkish bluish tin - tinge to them. And - -

CC Thank you, Ron.

CMP - - oddly enough, that's the same type of - That's the same type of bluish tinge that I see right in the landing site right now. In the Pentagon complex, MOCR shows up that - that same type of a bluish tinge to it.

Tape 79B/2

CC Roger. Did you have any luck locating the LM area in the landing site this time?

CMP Yes, I don't even see the bright spot there anymore. I know - I know where to look for it and I don't even see it.

CC Roger. Understand.

04 22 12 30 CMP Well, South Massif just went into a hole, too, so -

CC Roger. Our best estimate of their location down here. Ron is - 83 - Delta Mike 83. Delta Mike 83.

CMP Delta Mike 83, huh?

CC Yes, and that's - that's seen on the southeast sheet - the FE sheet with the landing site and the first EVA on it. The one, the 25,000 grid map on the - one of those you had put in at the last minute there.

CMP Okay.

CC And I assume you're set up for these pictures coming up at 121, right?

CMP Yes. It's funny, I can see Bessel, but I'll be darn if I can see a Copernican ray going across it - I mean a Tycho ray going - Copernican ray, I guess.

CC I think you were right the first time, weren't you?

CMP Yes, it's a Tycho ray.

CC Ron, I'm sorry we missed this last time. If you'll give me a hack when you start on the earth-shine photos on P17, the Copernicus one, I'll - I'll time your 30 seconds for you down here and save you looking at the clock. And - -

CMP Oh, okay. Hey, that's a good idea.

CC I guess even though the start time we passed and everything is the time, Farouk wanted to remind you that when you pass Eratosthenes is a good time to be looking into the heart of Copernicus, there. If you'll remember from the map, there.

CMP Okay. Hey, that's a good idea; thank you.

04 22 16 28 CC Were you able to see the Sul- Sulpicius Gallus Ridge there, Ron?

CMP Yes, man oh man. That thing really sticks up there.

CMP I'm trying to estimate the height of it with respect to one of those craters down there, but - I - I still can't get over the - the difference in the color and the annulus around Serenitatis. And that thing is really apparent.

CC Roger.

CMP And it looks like - the color - the color distinction - stops right at this ridge here, just as we're going into the sunset right now.

CC Roger.

CMP I'm trying to determine a - a flow with respect to those ridges, if there is such a thing.

CMP I'll have to look at it again when I come around the next time. Okay, Ki - Kilo's got 69 frames.

CC Roger.

04 22 21 48 CC Okay, Ron. You're about 2 minutes from T-start time, but again bias your T-start time with respect to the crater Eratosthenes.

CMP Okay. Why don't you just kind of give me a - ... gouge when I should be at Eratosthenes (chuckle).

CC Okay. I'll give a call and, of course, your first frame is - -

Tape 79B/4

CMP I think I'll - -

CC - - first frame is $f/1.2$ for 1 second and you'll take two frames.

CMP Okay.

04 22 23 27 CC Okay, Ron. You're about 30 seconds from T-start time.

04 22 23 45 CMP Okay. I think I got her.

CC Okay, just give me a call when you start. You're about 10 seconds out, now.

CMP Okay. Stand by 3, 2, 1 -

04 22 23 59 CMP MARK it.

CMP Okay; switch to a half.

CC Okay, coming up on 30 seconds.

04 22 24 27 CC MARK it.

CMP Okay, got it. The fourth.

CC Okay, coming up on another 30 second, here -

04 22 24 57 CC MARK it.

CMP Okay. Okay, I'm down to $1/15$. I'm just now passing it, Bob. So there's a one on $1/15$.

CC Okay, you're one ahead on the figure. You should be at $1/8$ - -

CMP Two on the 15 - -

CC - - right now.

CMP - - I'll start my time from there. Yes, I've - I've already passed it so I had to get them quick (chuckle).

CC Okay, there you are $1/8$ there.

CMP Okay, tell me when to - Okay.

CMP Okay. The rest of them 1/8?

CC No, at 1/16 or 1/15.

CMP Okay. Give me a time hack every 30 seconds.

CC Well - okay.

CMP Or whenever, tell me to switch windows.

04 22 26 00 CC HACK it.

CC Coming up on 30 seconds.

04 22 26 30 CC MARK it.

CC Coming up on another mark, Ron.

04 22 27 00 CC HACK it.

CMP Okay.

CC Just a reminder, the end of this line goes up to Encke and Kepler; you've probably reviewed that.

CMP Okay.

CC Coming up on another mark.

04 22 27 30 CC HACK.

CC Coming up on our other mark.

04 22 27 58 CC MARK it.

CC Okay, Ron.

04 22 28 30 CC MARK it.

CMP Pictures in here. Okay.

CC Okay, Ron. You'll be coming up on another mark here.

Tape 79B/6

04 22 28 57 CC MARK it.

CMP Got it.

CC Okay, according to my calculations you've got two more sets of two frames each to take. You've taken 20 and you've got four more to go, I believe.

CMP Okay, I want to get some for Reiner Gamma right?

CC Roger. As soon as you do that, you just switch windows to the north side and - Reiner Gamma - You got two more to go. Here we go. Coming up on another 30 seconds.

CMP Okay.

04 22 29 29 CC MARK it. You probably should be able to see Encke out there now. That's your last target there.

CMP Okay. Switch over to window 3, then.

CC Okay. Did you take that last one on Encke or you got two more to go on Encke there?

CMP ... I've got - I've only got 19 frames left so -

CC Okay. That's the last ... it marked there.

CMP Same thing on the Eratosthenes? Okay.

CC Okay, Ron. On these Reiner Gamma pictures, you don't have to wait 30 seconds. You just shoot the frames as soon as you get it in view there. Shoot two frames at 1 second, two at 1/2, two at 1/4, and two at 1/8.

CMP Okay. Would you - would you believe that's what I did on Eratosthenes and also on Copernicus?

CC Roger. That's what you're supposed to do on Copernicus so you remembered better than me on that one. It wasn't 30 seconds - -

CMP (Laughter)

CC - - until after Copernicus.

CMP Yes. Well, I made a mistake too. I thought Eratosthenes was Copernicus. But anyhow we got - we got a series on Eratosthenes and also a series on Copernicus. So we're in good shape.

CC Okay. You should be seeing Gamma about now, shouldn't you?

CMP Yes, but I don't see it yet.

CC Okay.

CC Ron, you can just run this mag all the way out to frame 40. After you finish on Gamma, you just continue on out that line up towards Riccioli; and - and then run out to frame 40 and stow it.

04 22 32 19 CMP Okay; will do.

04 22 36 54 CMP Okay. Got her in sight now.

04 22 46 48 CC Okay, Ron. Did you get that mag finished up?

CMP Okay. All but one picture and I was going to try to take one of Orientale. I've saved one there just for right on the edge.

CC Okay.

CMP So I'm just kind of looking out the window now. Why, do you have some Flight Plan stuff?

CC I've only got one minor Flight Plan and that's all so any time you're ready, don't - you know, don't tear yourself away from the window as long as you can see anything here.

CMP Okay.

CC We would like you to select OMNI Alfa.

04 22 47 30 CMP OMNI Alfa.

Tape 79B/8

CC And, if you're looking at anything and you can see anything interesting, we wouldn't mind hearing about it.

CMP Okay.

CMP The big difference right in here, of course, is the - the ejecta and the radial furrows and ridges and what have you from Orientale - there isn't - doesn't seem to be that type of a pattern at all on the back side.

CC Roger. Understand.

04 22 50 27 CC Can you still see - see things in earthshine or is it getting pretty black down there?

CMP Actually, you know. You can still see it. That's what kind of amazes me. It's almost like - you know, sunrise and sunset.

CC Roger.

CMP Pretty soon, the shadows get longer and longer.

CC I tell you, we got the television screen here of the - -

04 22 51 07 CMP Okay; that's my last picture off.

CC Roger. You're going to have a couple of dirty companions when they come back up, I'll tell you.

CMP (Laughter) What are they doing? Getting all dirty?

CC Well, I think they've just fallen a couple of times, and they're black all over.

CMP Yes, it looked like a dark area down there.

CC Well, they sure are dirty. Okay, Ron, I - in the Flight Plan at 133:12, way on ahead, you just might mark this down somewhere. It's a real simple - "MAPPING CAMERA/LASER ALTIMETER COVER, OPEN," and "MAPPING CAMERA, EXTEND," you'll just delete those since they're already there.

CMP Okay. Let's see - where was that now, about 131, Bob?

CC 133:12. It's in the other volume, in the next volume of the Flight Plan.

CMP Oh, (chuckle) I'll just write it down, I don't have that volume out.

CC Yes, just mapping - it's delete the "MAPPING CAMERA/LASER ALTIMETER, OPEN," and "MAPPING CAMERA - EXTEND." Just delete those two functions. You remember it's already out and the cover is staying open because it's out.

CMP Oh, okay. And that's about 131, huh?

CC 133:12, 133:12.

CMP Okay. 133 plus 12.

CC And, Ron. We made a trip around the room here and the CSM systems are all GO. They all look good and the lunar sounder is looking good also.

CMP Hey. Real fine. I guess I'll grab a bite to eat then here pretty quick.

CC Yes, do that, will you? Sorry you missed that other one.

CMP (Laughter) Oh, I filled in, every once in a while so that's not too bad.

CC Good enough.

CC And just a reminder, which is in the Flight Plan, DSE voice recorded at the back side will not be dumped - so -

CMP Oh, okay.

Tape 79B/10

CC

And, Ron, the reason why we've got all the H₂ FANs, OFF, now is we're trying to get the pressures to drop some and we'll come up with a sleep configuration this next half.

04 22 54 12 CMP

Oh, okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 22 07 51 CC Stand by on that.

LMP-EVA About 15 feet?

CC Stand by.

CDR-EVA Where's my rammer? There it is.

CDR-EVA Hey, Bob, that's strange. That plug was too small for the core.

CC Hey, Jack. You got a focus that's somewhat short of 7 - Well, between 7⁴ feet and - just a little short of 7⁴ feet?

LMP-EVA I've already taken it at 15, Bob. I think that's pretty good.

CC Okay; that's - Okay. We couldn't get an estimate.

LMP-EVA It's not a calibrated detent, but I don't think you need it here.

CC Okay.

LMP-EVA How far northwest?

CC Go ahead, 17.

LMP-EVA About the same - about the same position as the heat flow down-Sun - or up-Sun?

CC Stand by.

LMP-EVA Okay, Bob, I - I was able to - -

CC Yes. That sounds pretty good to me, Jack.

LMP-EVA - - to get. Bob, I ran that plug three-quarters - two-thirds of the way down the rammer, and it - it hit solid paydirt.

CC Okay. That sounds good.

Tape 80A/2

LMP-EVA And I'll put a cap on it for you, too.

CC Okay. That'll make people happy. Did you copy me, Jack, that ... 6 o'clock to the - -

LMP-EVA I knew it would. And that - -

CC And -

LMP-EVA Roger, Bob.

CC And, Jack, would you confirm for the ground that you got the LSP enabled?

LMP-EVA That's cap Alfa. No, I didn't. You interrupted me. Good boy. I was on my way, and the LEAM interrupted me. I'll get it.

CC Roger.

04 22 11 01 LMP-EVA Keep after me.

CDR-EVA Bob, that's cap Alfa - that's on the - that's on the - the core.

CC Say again there, Geno.

CC Jack, you're taking your second pan, right?

CDR-EVA I'm not sure they're hearing us all the time.

LMP-EVA Yes, but the camera just stopped.

CDR-EVA Oh, man!

CC Okay, what - -

CDR-EVA Oh!

CC - - was your question, Geno?

CDR-EVA I just said that was cap Alfa on the core. And let me tell you it's coming, but this thing is really in something. Oh.

LMP-EVA Would you believe I'm out of film, Bob?

CC Okay. I'm afraid I'll have to.

LMP-EVA Why didn't I look at the number?

CC You want to give me a frame count, Jack?

LMP-EVA Mag Alfa is empty.

CC Okay. Copy that.

LMP-EVA It's 158.

CC Copy, 158.

CC Okay, Jack, we're recommending magazine Hotel, and we also suggest you take the second pan, when you retake it, at 74 feet.

LMP-EVA Okay.

CDR-EVA Man, it didn't feel like this stuff was this hard.

LMP-EVA What's the problem, Geno? You need some help?

CDR-EVA No, nothing you can do. Just - just jacking away. See if I can get this thing out of the way. See if I can get it out, is what I'm really saying. I may be jacking the treadle down into the surface.

LMP-EVA Change hands.

CC Okay, Jack, if you haven't put magazine Hotel on, we want to recall that and make it magazine Golf - Gail.

LMP-EVA Well, Bob, I've already got it on.

CC Okay. Sorry about that.

LMP-EVA Is that okay?

CC Leave it on.

LMP-EVA I know what you want. You want color.

CC That's affirm.

LMP-EVA Well, anyway, it's black and white also.

Tape 80A/4

CDR-EVA Gail is not - you mean Charlie.

LMP-EVA Do you want color, or do you want Charlie?

CC Stand - stand by, Jack, if you're still at the Rover.

LMP-EVA Well, I'm still here, but I got Hotel on.

CC Okay. Leave Hotel on. That's - we - we goofed. ... accepted.

LMP-EVA Well, okay. We don't have much time; otherwise I'd change it. I should have thought of that myself.

04 22 15 37 CC Well, couldn't get ... there - -

CDR-EVA We got a little time because I've got a lot of jacking to do. Man! I - -

LMP-EVA Let - let me finish the pan and come and help you.

CDR-EVA Well, there's not - not a lot you can do, Jack.

LMP-EVA I'll get the neutron flux ready.

CDR-EVA Well, thanks a lot.

CDR-EVA Okay. Come on, baby. I'm going to get this thing out, now that I got it.

CC Boy, you know, that's what you call getting down into your work.

CDR-EVA Bob, I'll save my comments until later. I hope - this core is appreciated.

CC Roger, Gene. And I have word from the back room that it is appreciated.

CDR-EVA Yes, that makes me feel warm. I'll get it. You're going to have to bear with me. Man, I don't know what it's in.

LMP-EVA I was afraid that would happen - with all those rocks.

CDR-EVA Yes, but it didn't go in that hard.

CC Hey, Geno, how about slacking off for a minute there. You got pretty - going pretty hard.

CDR-EVA Okay. One more turn and I'll get up. I've got to hit an easy spot sooner or later.

CC It seems that way.

CDR-EVA You're right, Bob. I'm going to take a rest. You bet you. Man, I hate to say it, but I - I had that 25 percent of the way there. I can feel it ticking now. I'm going cold.

CC Okay.

04 22 18 19 LMP-EVA Okay, Bob. I got your pans and a couple pictures of the heat-flow probe.

CC Okay - -

LMP-EVA Now, let's see - -

CC - - okay, Gene - Jack. If you've got the two separate pans there, we're suggesting that you - in since the - the CDR is still working on the core recovers, we suggest that you sample the large boulders and loose material on top of some of the smaller large boulders in the vicinity. I would look through some sampling here while Geno's pumping on the old jack. Unless you've got something that - -

LMP-EVA You want me to help him?

CC Well, unless you guys - Okay. If you'd let me finish. Unless you guys think that two guys can do that better than one, I'm not sure.

LMP-EVA Gene, you want me to spell you a little?

CDR-EVA Jack, I don't think there's a lot you can do. Come on over here 1 minute. Let's see if I can - -

LMP-EVA Well, I can use up some of my water.

Tape 80A/6

CDR-EVA Let's see if I can't get a bigger bite - you on one end, and let me stand on the treadle and we might be able to get a bigger bite. See, I can't get a very big bite. That's one of the problems.

CC And, Jack, could you verify we have the LMP ENABLE on ... - -

CDR-EVA I just hope that jack doesn't break.

LMP-EVA No, I'll get it. I knew there was something I needed to do.

CDR-EVA Get the jack end over here - other side. Let me - let me put some weight here. See if you can - see - what - what kind of bite you can get.

LMP-EVA Oh, man.

CDR-EVA Yes, that's what I've been doing. See if you can get a bigger -

LMP-EVA Oh, no.

CDR-EVA It's coming, though. See, just - Here, let me get my foot down there and you get - you get - jack. See, that's the key. No, I think I can -

LMP-EVA Okay. If I do it that way -

CDR-EVA Get her way down there.

LMP-EVA Okay. Now try it.

CDR-EVA See, we got a couple of inches there to throw. We're all right. There you go. Do that for a little bit.

LMP-EVA Okay. Let me put my foot on it.

CDR-EVA Okay, ready?

LMP-EVA Yes.

CDR-EVA It's got to loosen up sooner or later.

LMP-EVA Okay. That's another good one. When you're tired, I'll do that and you can do this. See, this way, I can - you can get a bigger throw. Okay. Let me know when and I'll do that.

CDR-EVA Oh, that's all right.

LMP-EVA Does it feel like it's loosening up at all?

CDR-EVA Yes.

LMP-EVA (Laughter)

CDR-EVA Excuse me. Yes, go ahead. (Laughter) Okay, okay, okay (laughter).

LMP-EVA Stay there. Stay there. Okay, back. Thank you. Fell on my UHT, among other things. Okay. Let's try that again.

CDR-EVA You want to get over here and I'll do that for a while.

LMP-EVA Oh, that's all right. I'm - I just lost my balance. Let me - can I hold there?

CDR-EVA Yes. You can hold there, and I'll hold, too.

LMP-EVA That seems like a little easier.

CDR-EVA Yes. That looks to me like it should be getting easy. Just hold on to me and -

04 22 21 51 LMP-EVA What was that?

CDR-EVA Huh?

LMP-EVA I had a tone. It was probably a -

CDR-EVA You still got it?

LMP-EVA Gone, momentary. I probably got a -

CDR-EVA You get over here. Get over here, Jack.

LMP-EVA This is all right.

CDR-EVA No, let me get over there.

Tape 80A/8

LMP-EVA It's coming now.

CDR-EVA Why don't you come over here?

LMP-EVA Come on, one more. I think we're going to get it.

CDR-EVA Okay. Come on over here and hold your foot against that thing. Just hold that - that little thing down. That's the main thing. Ready?

LMP-EVA Yes, we're getting it now.

CDR-EVA I need your foot on that thing. See if - -

LMP-EVA There you go. I don't know what kind of hole we're going to have.

CDR-EVA Okay. Put it - get your foot down on that thing again.

LMP-EVA Wait a minute. Let me - Okay. I jacked the treadle down about 6 inches. Okay. It's loosening up a little bit. I keep saying that, don't I?

CDR-EVA No. It - it didn't change while I had it there.

CDR-EVA I can get it. Why don't you go get your - your pan.

LMP-EVA You got that?

CDR-EVA Yes. Why don't you get your pan and your - -

LMP-EVA I've got that. I got - -

CDR-EVA - - LSPE, and I'll - -

LMP-EVA I'll get that and a few samples, I guess.

CDR-EVA Okay. Go ahead and do that. I can get it.

CDR-EVA Whee. Let me tell you, Red Rover, let me tell you.

LMP-EVA I know whose face is smiling back there.

LMP-EVA You don't suppose this is why we didn't have much dust from the LM, do you?

CDR-EVA I think it is (laughter).

LMP-EVA (Laughter) I saw all the way to the ground during landing.

CDR-EVA Yes.

04 22 24 24 LMP-EVA Okay, Houston. Mark it, enabled.

CC Okay, finally. Thank you.

LMP-EVA Whoops, I moved your an - your central station. I've got to realign on your antenna.

CC Stand by, Jack. Wait a minute.

LMP-EVA Well, the gnomon's still aligned. I thought I moved it.

CC Okay. Well, let it be.

LMP-EVA Yes. We should have raised the flag on this thing. It looks just the same as when I left it, but I thought I moved it.

CC Okay, Jack.

LMP-EVA Is it okay, Bob?

CC Okay. Leave it alone for right now, Jack, and we'll get a reading on it.

LMP-EVA Okay.

CC For a minute or so. And, Jack, I guess right now, you might get some fairly rapid samples in the area, since you're probably almost ready to leave. And can you tell us what you saw there in the vicinity of the - you were giving us a description of the boulders there and flatness of the - and alignment of the crystals - the plug. You want to amplify that a little bit?

LMP-EVA Okay, then. I will as soon as I get back over there with the sample bag. Bag 10 Echo - 10 Echo - is a sample of a very large boulder that's just beyond geophone 3. Just west - just south.

Tape 80A/10

CC Copy that, 10 Echo, and boulder east of which geophone?

LMP-EVA South of geophone 3 - southwest. And I got a few photos to doc, here - document the boulder. I'm not sure I documented the sample, though.

CC Okay, copy that.

LMP-EVA It - it's a - it's the - the same kind of rock - the same kind of rock I saw near the LM - and the gabbro - I'm beginning to lean towards 50 percent plagioclase, though.

CC Okay.

04 22 27 13 CDR-EVA Bob, I had to remove the treadle from the hole and I'll tell you later why.

CC Okay, go ahead.

CDR-EVA Oh, me. No, I'll tell you later why. I'm just figuring, oh me, how am I going to get all this stuff now? I'm going to lose my hole. Okay, it was right there. In our fiasco over here, we knocked everything over.

LMP-EVA Did I ruin something?

CDR-EVA No, I've just got to stoop over to get things and that's a major - major - effort these days.

LMP-EVA Can I help you?

CDR-EVA No, I got it here. I've got a delicate core in one hand, and I'm trying to get some core caps in the other. You'd be glad to know it's full, Bob. And while I'm the only one to see the bottom end right now, I'm going to tell you, it - it looks like - it looks like what I'm walking on, but it's obviously now powdery. It's obviously very - very cohesive, because it - it - The bottom of the core is not smooth, it's very jaggedy, and fragmental-like.

CC Okay, copy that, Geno. Very good.

CDR-EVA Yes. I'm - I'm being very careful with your core here, but I've got to do a few - little housekeeping chores first.

CC Okay. Have you got that neutron flux over there in the vicinity, or is it still back at the Rover?

CDR-EVA No, sir, I already got it.

CC Okay, good enough.

CDR-EVA Yes, I've been looking.

CC And Jack, in your travels there, while you're doing some sampling, if you hap - happen to wander by in the vicinity - approximate vicinity of the double core - the deep core, you might get us a Rover sample of the soil there.

LMP-EVA Okay.

CDR-EVA Bob - Bob, and - the core is filled to within a - an eighth or certainly less than a quarter of an inch from the - from the bit.

CC Okay. Sounds good to me. Sounds like a good - good candidate for a cap.

CDR-EVA Yes, sir, and it's got Bravo on and the plug has been discarded.

CC Copy that.

CDR-EVA Now, let me see what else I can get here, before I get too upset. I need my - my - the - the - the drill, besides performing admirably, is a tool of necessity to lean over and pick things up with. Except when you let it fall down.

CC Okay. And our next priority is to put the neutron flux down the hole, we hope.

CDR-EVA Well, we shall see. Man, I don't even know if I can find the hole. It's in the shadow now. I guess I can see it down there. There it is. Okay. You asked, and with a little bit of luck, you shall receive.

Tape 80A/12

CDR-EVA Listen, I'm earning my three and a quarter a day today. Oh, boy, I don't want to lose the rammer either. Let me get that before that gets lost in the shuffle. We don't want to lose that for sure.

04 22 31 07 CDR-EVA I bet you all think I'm stepping on that hole, don't you?

CC I don't. John doesn't, either.

LMP-EVA Bob, I see no - no clear alignment of plagioclase or pyroxene in this rock. That's the one with the parting in it. It looks as if - integrating what I've seen here and over at the big rock - the geophone rock - I - that the layering or the foliation or the parting, whichever it is, is the result of variations in vesicle concentrations. The sample 10 Echo is a sample of the more coarsely vesicular rock. I could not get one of the finer - more finely or nonvesicular fragments. But I got pictures of it.

CC Okay, copy that. And do you see any - any - -

LMP-EVA I'm having trouble - -

CC Go ahead.

LMP-EVA Go ahead.

CC Can you see any evidence of soil on top of some of these medium-sized boulders?

LMP-EVA There's soil. A little bit of dust in some of the holes. But I - there's not enough to sample at this point. I may find some later.

CC Okay, copy that. He's picking up ...

LMP-EVA Vesicle walls do not seem to be as shiny. Most of them seem to have dust in them.

CC Copy that.

LMP-EVA The vesicles are not cleanly spherical - they're spherical but they have fairly rough outlines. They look as if there's been some recrystallization.

CC All right.

CDR-EVA Bob, I will ver - verify that the lower section is on.

CC Okay, thank you, Geno.

LMP-EVA I picked the wrong rock to sample with a scoop, I'll tell you that.

CDR-EVA Boy, I'll tell you, housekeeping is the key to the world right now.

CC Okay, Geno and - let's - -

CDR-EVA Okay, another key to the world is one of - -

CC Geno, stand by. Hold it.

CDR-EVA Yes.

CC Okay, make sure that the top of it doesn't go down through the hole, too, and disappear, either by putting it through the treadle, or if you're sure this the - or whatever.

CDR-EVA Boy, Bob, that sure is a good thought. You know, I had to take the treadle off because the jack wouldn't go down and no way I could put that treadle - Well, let me turn it on first. That was a good thought. It may - it may go down that hole. That would be terrible.

CC How big's the hole look, Geno?

CDR-EVA See, the jack wouldn't - Well, looks big enough to put this down. Let me - let me use my judgment on it. And a little ingenuity.

CDR-EVA I verified the top was on, by the way.

CC Okay, thank you.

04 22 35 27 CDR-EVA Shazam!

CC How about that, loud applause, loud applause.

Tape 80A/14

- CDR-EVA See what happened, here, to that treadle, Bob. I couldn't get the jack to go down and it - it - it made the hole oblong when I - but it's all right now.
- CC Okay; beautiful, beautiful.
- CDR-EVA And it ended up all right.
- CC Okay. And why don't we get you two guys together again, now, and break down the core and press on. And we've got a little revision here to the EVA. I'll get with you in just minute on, as soon as I find out what it is.
- CDR-EVA Bob, I feel pretty good about that - that - that makes me feel pretty good.
- LMP-EVA Bag 174 - 474, 474, soil from next to this big rock, it's the fillet. I can't get a chunk of the rock.
- CC Copy; 174, fillet beside the big rock. And, Jack, while you coming back here to the Rover, why don't you get one more Rover sample in the vicinity of the deep drill, while you and Gene get ready to take on the core stems. And because of being a little bit behind here, what we're doing is, we're getting prepared to drop station 1 in favor of doing Steno. Over. And I'll get with you on more details on that in a minute.
- LMP-EVA Well, how far behind are we?
- CC Stand by. You're about - between 35 and 40 minutes. And part of the problem is that we're a little short on oxygen on Gene's PLSS. It looks like it's a 6 minute and 4 - 6 hours and 45 minute EVA from that point of view, which means that we have to - we'd have to leave station 1 too early, which is another - which is the reason to curtail station 1 apart from just behind which is what the hooker was.
- CDR-EVA Okay, Bob, I'm approaching the rear of the Rover. I've got the core, the cap, the wrench, and the rammer.

CC Okay.

CDR-EVA I didn't mean to breathe up all that oxygen.

CC Well, there's something you can't help. Even the Surgeon agrees with me on that one. And for your thinking, Jack and Gene, what we're doing is planning on going to the west side of Steno and that boulder field that's part way out to station 1.

LMP-EVA Okay, you want me to get a - you want to break that and I'll go get this sample, Gene.

CDR-EVA Yes. I'll - I'll break this Jack; no sweat.

LMP-EVA Gene has pretty well chewed up the ground. I helped him. Do you want me to get a little ways away from it?

CC Stand by. I don't think we're interested in a surface sample in the last top little bit ring, it's just a - in the top - just a surface sample. Stand by 1.

CC Anything there in the dirt, Jack. It doesn't have to be a skim sample of any sort.

CDR-EVA Okay, Bob, I'm breaking down the core at the tail end of the Rover, here.

CC Okay, congratulations.

CDR-EVA Well, don't do it yet, I haven't gotten it broken down yet. But I got it out of the ground with a little help.

CDR-EVA Okay, first piece of three sections - Bob, it's full.

CC Okay, beautiful.

CDR-EVA And I have to tell you which end I'm taking it from. I don't remember which end I've got here.

CC That's all right, since we got the cap and Alfa on one end and Bravo on the other end - Bravo.

Tape 80A/16

CDR-EVA Man! There's a cap that's going to be tough to get on. I put that on with a hammer. Oh, boy.

LMP-EVA Okay, Bob, there's a mixture of soil and rock in 475.

CC Okay, copy 475.

LMP-EVA The soil came from about - the soil came from about 5 centimeters - 0 to 5 centimeters.

CC Okay, copy that. Beautiful.

LMP-EVA And it's about 3 meters - 3 meters - 3 meters from the hole. Well -

CDR-EVA Hey, Bob, cap Charlie is opposite Alfa, that was the first 3-section.

CC Okay, copy that.

LMP-EVA Bob, it's about 3 meters from the hole. I got stereo before with - at 11 feet and one after at 11 feet.

CC Okay, copy that. And how about a frame count there, Jack.

LMP-EVA Stand by.

CDR-EVA I tell you.

CDR-EVA No - no, I can get it. Boy, this system works good.

LMP-EVA Okay, let me see. Let me configure the old LRV sampler, here.

CC Jack, when you - -

LMP-EVA Oh - -

CC Jack, when you - -

CDR-EVA Oh, boy; oh, boy; oh, boy; oh, boy.

CC Jack, this is Houston. Over.

LMP-EVA Go ahead.

CC When you took those two pans off the ALSEP, was one at 15 feet and one at 20 feet?

LMP-EVA One was at focus for 15 and 74.

CC Okay.

LMP-EVA There's a partial pan - there's a partial pan on mag A, which was taken at 15.

CC Okay. Understand.

CDR-EVA Okay, Bob - I can't see what it is - I guess Delta and Echo is the - the 2-section core. Delta being adjacent to the first section of 3.

04 22 43 08 CC Roger. Copy that, Gene.

CDR-EVA Okay, baby, just go on there - nice. The last - the last one is Foxtrot. And it's on tight.

CDR-EVA Ouch.

LMP-EVA Arm's tired?

CDR-EVA That hurts. Oh, me; oh, my. I'm going to take a big drink of water here. We got three cores; we got the neutron flux down; and we got two heat probes, and an ALSEP. I don't care if we are 30 minutes late. Bob, did I give you the last cap?

CC That's okay, Gene. We don't really need it - the way they're broken down, there's no problem. The 323 stands out and the Bravo on the bit end - there's no problem there.

CDR-EVA Hey -

LMP-EVA What do you need, babe? Okay, pull that off. Pull this off. Here.

LMP-EVA Rotate it 180, there.

CDR-EVA No, no, no, just the - the total thing. That's good. There you go.

LMP-EVA Like that?

Tape 80A/18

CDR-EVA Yes.

CC Okay, and, 17 - -

CDR-EVA Now you'll have to line it up.

CC Go ahead.

LMP-EVA Okay. I'll hold it. You do it.

CDR-EVA I got it.

LMP-EVA Okay.

CDR-EVA ... give you a reading, Bob, before you speak. Wait a minute, let me - let me get it over with. It's 670, 002, 601. That's 670, 002, 601.

CC Did you punch GRAV a second time? That's identical to the first one.

CDR-EVA You just did to read it. That's what you want, isn't it?

CC Yes, is that - but you - did you punch GRAV after the first reading you gave me there at the ALSEP? Or are you just reading me the same measurements you did before?

CDR-EVA Bob, I called them out every time - Bob, I'm reading it right here. Everywhere I've punched GRAV, you've got it written down somewhere.

CC Yes, and I didn't copy your punching GRAV, but the one - -

CDR-EVA Bob, I did not - when I went back - Bob, I did not - when I went to get the treadle and the neutron flux and rammer, I did not punch GRAV.

CC Okay. So that's the same as the first one. Never mind, thank you. And guys - we're ready for you guys - as you go along here, to do the geo prep and press on. As I say, we'll go to Steno and come back from there and do the SEP. Over. Any questions about that? We'd also like to know if you have the gnomon, back of the Rover?

CDR-EVA Yes, we're just - -

LMP-EVA Yes, we do.

CDR-EVA Okay, lay cores in. Okay - -

LMP-EVA Can you - can you put that in that sampler tool bag, there?

CDR-EVA Yes, sir. We're configuring for geology, now, Bob.

CC Okay, copy that.

04 22 46 44 CDR-EVA Bob, right now, 10 Echo is in my suit pocket, I hope.

CC Okay.

CDR-EVA Okay, my 20-bag dispenser is SCB 1. Let me get at them.

LMP-EVA I've got mine on.

CDR-EVA Okay. Oh.

LMP-EVA This probably goes under the seat, doesn't it?

CDR-EVA The camera - where the devil mine is - where the devil mine is. Excuse me. Oh, I see the gnomon.

LMP-EVA I put it there so I wouldn't forget it.

CDR-EVA (Laughter) Okay, I tell you, dexterity is the key. We might leave - Look at those cover gloves.

LMP-EVA I guess we can take those off. I don't know whether we ought to or not.

CDR-EVA I'm going to leave mine on for a while. I changed my mind. I want to look at my gloves before I take them off. Okay, where are we? You got your camera, obviously. This is my camera. I got the bag dispenser on it. It's not a bad day's start. Bob, is the ALSEP working good?

CC The last we heard, it was working great, guys. We'll check again, though.

Tape 80A/20

CDR-EVA Okay. You got your camera. My camera is in the floor pan. Cap dispenser, SCB to Gate 1. Let me get that, Jack.

LMP-EVA Yes.

CDR-EVA You haven't been on the Rover yet. It's real easy, but it's also very easy to kick dust all over those battery covers, so don't even get on it until I put those bat covers down.

LMP-EVA Yes - Hey - I guess - I should - we ought to press on as if we're going to station 1.

CDR-EVA Yes, you've got to walk - you got to walk back to the LM anyway - I got to - we got to - -

CC Roger. Guys, we are going to play it per the checklist. Jack will carry the things back. Gene will get the thing aligned. We'll go out to the SEP site. And then we'll press on from there down to Steno. Over.

CDR-EVA Okay, very good.

CC And right now -

CDR-EVA Okay. Stow LMP - you want to come over here and I'll stow your PLSS?

CC Go ahead. Never mind.

LMP-EVA Yes.

LMP-EVA My camera's under my feet.

CDR-EVA Okay, you can turn around. Oh, man, what have you been in? Hallelujah.

CDR-EVA I'll keep the hammer, I'll give you this. Can you reach the rammer? It's right in front of you. On the - -

LMP-EVA Oh, yes.

CDR-EVA Let me - I haven't got that cap in, yet - there it is. Okay, the caps are in. If we ever come out here again, I want to get your hammer, here ...

CC ... you might give us a frame count on Hotel.

CDR-EVA Okay, Bob.

CC And we're going to hand over stations. You might get a dropout.

CDR-EVA Yes, it's under the seat right now. I'm - Okay, rammer - I got the hammer. Turn around. I'll give you a SCB 2.

LMP-EVA Okay.

CDR-EVA Okay. Now, guess who's watching to see how these hooks are going to work?

LMP-EVA Oh, man. Like a charm, so far.

CDR-EVA Oh, except your doggone harness of off, too, Jack.

LMP-EVA Is it?

CDR-EVA Yes.

LMP-EVA Okay, you've got to undo the strap - -

CDR-EVA Let me - let me get at it.

LMP-EVA You got to loosen that strap and then just put her underneath, and tighten it up again.

CDR-EVA This one here?

LMP-EVA The one on - the one on my right. Yes.

CDR-EVA Now - let me turn around then. I got to get on your - oh, on your right. Right here.

LMP-EVA I think it is - Yes. That's where it is on yours.

CDR-EVA Yes, I'd like to make sure the other side is all right, though.

LMP-EVA Oh, okay.

CDR-EVA Let me - Yes, it's all right. Turn around. Let me just get it underneath.

Tape 80A/22

04 22 51 14 LMP-EVA I got it so tight now, the Rover - Okay, now.
CDR-EVA I got it on.
LMP-EVA Okay?
CDR-EVA Okay, now, I'll get this hook. That hook's going to be a piece of cake, Jack.
CDR-EVA Keep it in, and it's all on and locked.
LMP-EVA Okay, you got a SCB 2. You got the rammer. You got a cap dispenser.
CDR-EVA Okay. You can secure SCB 1. Doesn't this go under your - -
LMP-EVA Not yet, I don't think. I think it stays there.
CDR-EVA This does. No - -
LMP-EVA That does. Yes. That goes under the seat.
CDR-EVA And this goes here.
LMP-EVA Yes.
CDR-EVA Okay.
LMP-EVA Bob, the long can's going under my seat.
CC Okay. Copy that, Jack.
CDR-EVA They got a handover, I think.
CC Handover's complete, guys.
CDR-EVA Okay.
LMP-EVA *** which way it unlocks, though.
CDR-EVA Okay, you can pull it off.
LMP-EVA It's unlocked.
CDR-EVA It's unlocked. There it is. It's usually stiff. Okay. For once, I have my camera off.

CDR-EVA Did you get the heat-flow pictures, by the way?

LMP-EVA I got most of them. Not all of them. They revised the whole camera.

CDR-EVA Hey, Bob, is it going to hurt to leave the UHT in the heat-flow electronics?

CC Stand by.

LMP-EVA Wait a minute. I ought to get that, I guess.

LMP-EVA One - tall.

CDR-EVA Here, let me lean down.

LMP-EVA Two, and the hook's still hooked. Check for sure. Those hooks weren't designed for new bags.

CC Okay, Jack - -

LMP-EVA Okay. I think that will ride all right.

CDR-EVA Okay.

CC They don't want us there. If you - if one of you guys can get to it and pull it out.

CDR-EVA I'll get it right now.

LMP-EVA Okay.

CC Thank you.

LMP-EVA Watch the alignment, as you said.

CDR-EVA Yes. I sort of thought you might like it out of there. Let's stay away so I don't get a cable and I don't get dust in the mirror. The alignment is still good.

04 22 53 48 CC Okay.

LMP-EVA Now, if I can get it out. Okay, I'm going back to the LM.

CDR-EVA Okay, Bob, the alignment's good on the heat flow, and I've got the UHT out. Jack, do you need this?

Tape 80A/24

LMP-EVA You better leave - save it. Save it.

CDR-EVA I'm going to leave it right here by the ALSEP.

LMP-EVA Save it. Careful.

CDR-EVA Jeeminy, I just threw it right here in this little - little ditch.

LMP-EVA Yes, right. Okay, the other UHT is by the ALSEP. We probably ought to have it with us, Geno. For the sampler.

CC Have you got one - -

CDR-EVA Well, you've got one - -

CC - - UHT sampler?

LMP-EVA Yes. That's all right. Keep it on the ...

CC Okay, we gather you're on the way back to the LM with the core stems there, Jack.

LMP-EVA Yes, sir.

CC Okay.

04 22 54 44 CDR-EVA Okay, Bob, I'm going to take the TV away from you and get these battery covers squared away before I put the tongs and the camera on.

04 22 54 53 CC Okay, Geno, and you guys have the gnomon in the little quiver, right?

04 22 55 00 CDR-EVA Yes, sir. The temperatures on the batteries are 96 and 110.

CC Okay, thank you.

CDR-EVA Can I close the covers?

CC Roger.

CDR-EVA Can I close the covers?

CC Roger; Roger.

CDR-EVA Hey, you're turning our voice around, Bob.

CC No, I said - -

CDR-EVA We're getting a repeat.

CC I said, "Close the covers, please."

CDR-EVA That's right. I heard what you said, but you're turning our voice around.

LMP-EVA (Singing) I was strolling on the Moon one day -

LMP/CDR- - in the merry, merry month of December -
EVA

CDR-EVA No, May.

LMP-EVA May.

CDR-EVA May's the month this year.

LMP-EVA May - that's right.

CDR-EVA May is the year, the month.

LMP-EVA (Singing) When much to my surprise, a pair of
bonny eyes - be-doop-doo-doo - -

CC Sorry about that, guys, but today may be December.

CDR-EVA Okay, the battery cover - -

LMP-EVA (Humming) Da-da-da-da-da-da-dee-da-dee - -

04 22 56 17 CDR-EVA Okay, Bob, the battery covers are closed. I'm
ready to go MODE switch 1. I guess I'll just wave
goodby. You look pretty clean, so I won't touch
you.

CC Okay, thank you.

04 22 56 36 CDR-EVA Oh, man. It's even hard to move you counterclock-
wise. Here we go. Counterclockwise, facing aft.
Okay, I'm going to go MODE switch number 1. Okay,
we're MODE switch number 1 - -

Tape 80A/26

04 22 56 56 CC Roger. We can confirm that.

CDR-EVA - - and you want me to leave those two blankets open 100 percent, right?

CC Roger. That's affirm.

CDR-EVA Okay, now I got - now I got to mount my camera and tether my tongs. Boy, Jack, I can bare - I can't see you at all. Looking into the east is terrible. All I can tell you is that there's a LM there.

04 22 57 24 CDR-EVA Okay, mount camera, tether tongs. See if my camera's going to work. Bob, I'm on - on Bravo - mag Bravo and frame count 19.

CC Okay; copy that, Gene.

04 22 57 50 CDR-EVA And for EMU status, I can give you about 36 percent, no flags, 3.85, and I'm on - I'm still INTERMEDIATE cooling.

CC Okay. Copy that.

CDR-EVA Okay, inventory. Camera, tongs, gnomon. Okay, I'm ready to get on. Ready to get on.

LMP-EVA Okay, you want us to take the - Ouch! That rock by your front porch is really a major nuisance.

CDR-EVA Oh, doggone it.

LMP-EVA What's the problem?

CDR-EVA Oh! Every time I get on, I get dust around. I still haven't learned how to get on yet. You'd think after three times, I'd know better. I know better, but it's - -

LMP-EVA Okay, I've got the transmitter. I'm heading west - or east. (Laughter) Heading east. Sorry about that. (Humming)

04 22 59 11 CDR-EVA Okay, I'm PRIMARY. Okay, you want a nav initialize here, huh, Houston?

CC That's affirmative.

CDR-EVA By the way, Bob, station 6 is pretty obvious up on the hill. It's fairly high up. I don't know if we'll get to drive up there or not.

CC Okay. I think you can see the boulder and that's how you can tell, right?

CC Okay. Thinking you can see the boulder and that's how you can tell, right?

CDR-EVA Yes. And the crater. A shame not to - Well, maybe that's the wrong one. I'll have to check the map. A shame not to go to station 1. Sure is a shame. Why don't you consider station 1 as a possibility? Okay, Bob, let me give you some numbers.

CC We're ready.

04 23 00 13 CDR-EVA Sun shadow is zero. I am rolled right 4 degrees. I am pitch zero. I can't be rolled right 4 degrees. That indicator can't be right. I question that. If the roll indicator's right, I might be rolled left a couple of degrees.

04 23 00 54 CDR-EVA Are you happy with that, Bob? I'm - roll indicator is indicating - make it 3 degrees right - 3 degrees right.

04 23 01 02 CC Okay, and I copy - Okay, torque to 279 will be the heading - 279.

CDR-EVA Okay.

04 23 01 32 CDR-EVA Okay, the heading when I put the NAV POWER breaker IN, Bob, was 23 - 234.

04 23 01 40 CC Okay, I copy that. We'll torque that to 279.

CDR-EVA Okay. I'm waiting for my minute and a half here.

CC Roger that.

04 23 02 19 LMP-EVA By the way, Bob, LMP is at 39 percent, 3.88, and no flags, no tones.

CC Okay. Copy that, Jack.

Tape 80A/28

LMP-EVA I'm at the SEP site, and I found a place I think we can lay out a pretty good grid.

CC Okay, Jack, and when you lay it down there, we want to put it down with the gnomon side, the side you're going to face, you want to put that facing away from the Sun. We found out a thermal constraint this evening, just as the EVA started.

LMP-EVA Okay. Away from the Sun. Gnomon - you want the gnomon side or corner?

CC The gnomon side away from the Sun. That's those - the side with the solar panel has to be away from the Sun. The sides with the solar panel ... to be in the shade.

LMP-EVA Okay.

04 23 03 31 CDR-EVA Bob, everything's working fine so far. She's zeroed and I'm torqued. And I'm ready to press on. RESET is back OFF. Okay, Jack, here I come.

LMP-EVA Okay. You see me?

CDR-EVA No, I'm facing the other way.

CDR-EVA Boy, I tell you - just about all you can see in that direction is the LM. Boy, that's tough driving into the Sun!

LMP-EVA Go right to the LM, and then a little bit to your left, to the left of the LM.

CDR-EVA Yes, I've got to go to the LM and give them a reading here.

LMP-EVA Okay.

CC That's affirmative, Gene.

CDR-EVA You get that - that shadow up there and you're all right.

CDR-EVA Say again, Bob?

CC That's affirmative. We want the range and bearing at the LM. I'm glad you remembered.

CDR-EVA Yes, sir, I'll give it to you. I even got - Oh, oh, don't get in there. Whoo! I even got the low gain working for you. I don't know if you're using it.

CC I think we're using the LM right now.

CDR-EVA Boy, that LM is pretty. Whoo!

LMP-EVA Bob, everything I've seen so far indicates that the so-called subfloor boulders, if we have gotten that deep, are this gabbro. I'm out here at the SEP site, and the large blocks are still the plagioclase pyroxene - -

CDR-EVA Jack, let me give them a range. I'll be on my way out.

LMP-EVA Go ahead.

04 23 05 45 CDR-EVA Okay, bearing 292, 0.2, and 0.2. I'm standing right in front of the MESA.

CC Okay. Beautiful, Geno. Thank you.

04 23 06 00 CDR-EVA Okay. I'm coming, Jack.

LMP-EVA The zap pits are nice white halos, although, for the most part, the rock's too coarse to show them very well. Some of the larger ones have white halos. We may not be down to the subfloor, but - it's hard to say.

CDR-EVA Hey, Bob, making 8 to 10 kilometers, and I'm barely moving.

CDR-EVA Where've you got the SEP, Jack?

LMP-EVA Right out over there.

CDR-EVA Okay, let me give them a bearing, distance, and range, and some numbers here. Meet you over there.

LMP-EVA Okay.

Tape 80A/30

CDR-EVA Oh!

LMP-EVA Bob, I did see a dense gray rock that's different than the others on my traverse out here. We'll try to find some of that, too.

04 23 07 12 CDR-EVA Okay, Bob, I'm reading 278, 003, and 003 at the SEP site.

CC Okay. Copy that, Geno. And how about giving me amp-hours and batteries just as long as you're there?

04 23 07 30 CDR-EVA Yes, sir, it's coming at you. Amp-hours are 112 and 110; batteries are 9 - 92 and about 1 - about 112.

CC Okay, copy that, Geno.

CDR-EVA Motors are all off scale low.

CC Yes, okay thank you.

04 23 07 54 CDR-EVA NAV is going to RESET.

CC Say again there, Gene. You're going to go to RESET, right?

CDR-EVA Yes, sir; going to RESET.

04 23 08 04 CC Okay. Jack, you can be getting on. You won't need a bomb, and I guess you won't need the LMP camera unless you want it. We'll be deploying the bomb at Steno.

LMP-EVA (Laughter) I thought we were playing it by the checklist, Geno. Here's the bomb.

CDR-EVA Okay, give it to me.

LMP-EVA The charge.

CDR-EVA I've got it.

CC Yes, it just happens that the station is at the place we're going to deploy the charge.

LMP-EVA Okay, well, we got it off.

CDR-EVA Okay. Do you know which side of Steno he wants us to go, Jack?

LMP-EVA Not yet.

CC Yes. We're going - Okay, let me fill you in on the plan, guys. We're going to go to the west side of Steno, which is where you would have driven by anyway, and the stop is - will be at the 340/1.2, which is where you've got the little Delta for EP 6, in your checklist. And we will plan on spending about 30 minutes there sampling primarily boulders.

LMP-EVA Okay, Geno, west side of Steno there.

CDR-EVA Okay. I got it here. Okay - -

LMP-EVA You got a good feeling on how to head out of here?

CDR-EVA Yes. I want to get around the back side - now that I'm down there, on the back side of Trident, and make sure that that's what I'm looking at, is Trident over there.

LMP-EVA Okay, let me try to get on this thing.

CC Okay. And, 17, just to fill you in a little bit more here. We're looking at a 6 plus 45 EVA. We've given you 15 minutes to drive to station 1; 30 minutes at station 1; and 15 minutes to drive back to the SEP, and then deploying the SEP for 22 minutes. And then a 40-minute closeout at 6 plus 45.

CDR-EVA I'm sorry, Bob. After 30 minutes at station 1, what did you say?

CC Okay. Then we're going to drive back. There's a 15-minute return to the SEP site, and then 22 minutes at the SEP site to deploy the SEP, and then return to the LM in 45 minutes for the closeout.

CDR-EVA Okay. Understand.

Tape 80A/32

CDR-EVA Okay, you strapped in?

LMP-EVA Yes, sir.

CDR-EVA Yes, we've got to start getting on this Rover facing 90 degrees to the seats, I think.

LMP-EVA I did the same thing.

CDR-EVA Right through dust?

LMP-EVA Yes, we both did. I tried to knock it all off my feet.

CDR-EVA Yes. That's impossible. Okay, Jack. Let's see if we can't get around - around Trident East over here.

LMP-EVA Well, I don't - I wish I didn't have this charge. If they played it by the checklist - I wasn't paying attention. Okay - -

04 23 11 02 CDR-EVA We're on the move, Bob.

LMP-EVA Okay, this is Trident, isn't it? So we're starting out - -

CDR-EVA Yes. It's got to be.

LMP-EVA Yes. So, you're starting out on the - You really want to hit about 29 - -

CDR-EVA No, no, no.

LMP-EVA No, wait a minute. Where are we?

CDR-EVA We want to go southeast.

LMP-EVA 181 - -

CC 17, we'll start out on the same general traverse that you've been on. It's just that we'll stop it sooner.

LMP-EVA Yes, we understand.

CC Okay.

LMP-EVA We're just getting our bearings, Bob.

CDR-EVA This has got to be Trident East, right, right here, Jack. See that? That's got to be Trident East. That's the big one.

LMP-EVA On the right or the left?

CDR-EVA On the right.

LMP-EVA Yes.

CDR-EVA And we - and Poppy - and was just over about where - -

LMP-EVA Watch your -

CDR-EVA Yes. I just want to get our bearings here. You can't look to the east.

LMP-EVA Okay. I've got to - That's an awful big depression over there, isn't it? Says go along this way.

CDREVA Boy, it sure is. Whee!

LMP-EVA Watch it. Ho - ho - ho hold it, hold it, hold it!

CDR-EVA Got it, got it, got it ...

LMP-EVA Boy, I tell you I've got to get out east.

CDR-EVA Stand by.

LMP-EVA Gene, I think - I'm going to head about 120 out of here.

CDR-EVA Well, it's a -

LMP-EVA You've got another hole on your right here.

CDR-EVA I got it.

LMP-EVA Whoa, whoa. I'm not sure what's wrong. Why don't you go left there?

CDR-EVA Okay.

Tape 80A/34

LMP-EVA Go left around this thing.

CC And, 17; Houston. For your advice, we're trying to use the low gain antenna on this traverse also. Might try and be good guys and turn it for us when you have to.

04 23 13 05 LMP-EVA Okay. Bob.

CC That's general reminder number 1.

LMP-EVA Gene, I think we need to head south.

CDR-EVA Yes. We've got to go out here southeast. What's that big map look like in relation to Bare Mountain to you?

LMP-EVA You mean the - I'm not sure I can get to it. Okay. Okay, I won't - -

CDR-EVA It calls for 116 at 0.62 - -

LMP-EVA ... near the SEP. I ended up with this charge in my hand. There's a big - What are you headed now, south pretty much?

CDR-EVA Yes.

LMP-EVA I think you're getting - That must be station - that must be Emory over there. See with all the blocks in the wall?

CDR-EVA Where you looking? Which way?

LMP-EVA Southeast. Way over there.

CDR-EVA Yes.

LMP-EVA That may very well go - this is very easily Steno right over here. Let's - let's see, we're between the two big ones - that would be - -

CDR-EVA That would be Powell.

LMP-EVA That would be Powell on the right.

CDR-EVA You think?

LMP-EVA Certainly doesn't look like th LNA yet.

CDR-EVA No, it sure doesn't.

CC How about a range and bearing, guys, I think we can help you.

CDR-EVA Okay, 330, 0.3.

CC Okay, it sounds like you're probably just driving by the East Trident or Trident 3.

04 23 14 45 LMP-EVA You think all that right there is Trident?

CDR-EVA My gosh, if it is, that's incredible. I - I - That's hard to believe.

LMP-EVA Well, there - you're going to go in a hole with your right - No problem.

CDR-EVA I can't see the lip too well because of the - -

LMP-EVA Well, if that's Trident -

CC Okay. And, Jack, if you - do you have your camera on - -

LMP-EVA Boy, I wish ...

CC - - If so, could you give me a frame count some time?

LMP-EVA Bob, I got my hands full with this charge.

CC Oh, okay, forgot about that one. Sorry about that.

LMP-EVA Looks like 45.

CC Okay, copy that. Thank you.

LMP-EVA Boy, if that's Trident, whoo!

CDR-EVA Hey, you know that is - don't you suppose that's Trident?

Tape 80A/36

LMP-EVA Well, it sure looks like it, doesn't it?

CDR-EVA Yes. We were quite a ways from Trident.

LMP-EVA I bet you it is.

CDR-EVA If that's true, we're at 342.4. That's about right; we're half a mile - that's about right. Boy, what I was looking at Trident isn't nearly that - any where near that big.

LMP-EVA Okay, if that's true, then we want to go - -

CDR-EVA Yes, sir.

LMP-EVA - - we want to go 181.

CDR-EVA Yes, sir, we're all right now. That's got to be Trident. Wjt we were looking at before - I've got to stop and see what that is. I've got to look at those maps when we get in.

04 23 16 12 LMP-EVA Well, it's a triplet all right, with some septar between. Well, wish I could take pictures. Take a few, but - -

CDR-EVA Well, let me get a few here.

LMP-EVA No. You keep pressing. We can get them coming back.

LMP-EVA Take a few, but it's not continuous. My hands are giving out. I wish I hadn't said follow the check-list. Okay, we're at 0.5 and 346. And the surface has not really changed except slightly more hummocky and rolling, because of a larger number of irregular depressions, or craters. The - boom! - the rocks at first glance from the Rover look very much like what we had around the LM. That's the big ones.

04 23 17 21 CC And, 17, you might be - -

LMP-EVA There are occasional - -

CC - - Jack, you might be expecting WATER flag and a tone in a couple of minutes, to go to AUX.

LMP-EVA Okay.

CC And CDR will be about 5 minutes after that.

CDR-EVA I'll get stopped here in a minute, Jack - as soon as I get -

LMP-EVA Okay. I think maybe that might be Steno over there -

CDR-EVA I don't think we're too far off.

LMP-EVA Okay, there's my - I've got to go to AUX.

CDR-EVA Can you reach it?

LMP-EVA I hope so.

04 23 18 09 LMP-EVA Okay, Houston, do you see me in AUX?

CC Stand by. Roger. We see you in AUX.

CDR-EVA I'm going to hit some of these broadside, Jack, and then we won't get any roll angle.

LMP-EVA Okay, how far have you come?

CDR-EVA I've got to go 0.7 - about another 0.7 mi - kilometers. I may be coming up on the edge of it. I don't know, I may - I'm on the right bearing. Yes. We're all right. Steno has got a dimple on the north. Boy, this is a heck of a way to start out our navigation because it's into the cross-Sun here - not cross-sun - but Sun. Now, that's got to be Powell, wouldn't you say?

LMP-EVA Yes. Must be.

CDR-EVA Must be.

LMP-EVA Listen, you - -

CDR-EVA Then that's Steno with all the blocks in it.

LMP-EVA Boy, am I glad we didn't land out here! Whew!

Tape 80A/38

CDR-EVA See this high point up here coming ahead?
LMP-EVA Yes.
CDR-EVA That should give us our bearings, I hope.
LMP-EVA I can't hold that bomb any longer.
CDR-EVA What are you going to do with it?
LMP-EVA I'm going to drop it at my feet.
CDR-EVA Okay.
LMP-EVA Okay, it's there.
CDR-EVA Keep it between your feet.
LMP-EVA It will. My hands aren't going to be any good for sampling.
CDR-EVA Okay, that's Powell, huh?
LMP-EVA Yes.
04 23 19 53 LMP-EVA Okay, if that's Powell. Quite a ways over there, but I think the thing to do is get up on that little ridge there.
04 23 20 03 CDR-EVA I think we may end up looking right into Steno when we get up there. Bob, we're 342.9.
CC Okay. Copy that.
CC 3.0 and 1 - -
CDR-EVA Are you reading the low gain, by the way?
CC Yes. Roger. Beautiful. 340 and 1.2 is what we expect the station to be.
CC And it should be up on the top of a little bit of a rise. That you see coming up there. Almost to that rise. You ought to be in the vicinity of some very large boulders.

CDR-EVA Houston, there's a - there are certainly a lot of big boulders = Whoops! Let me take a look into the Sun here. That doesn't look what I thought Steno looked like. There's no dip there. 1.2 he said. All right. This is it over here, though, I guess.

CC Yes, Steno ought to be at - right at your 9 o'clock there, Gene.

CDR-EVA At my 9 o'clock. Yes.

CC Either that or your 3 o'clock. I forgot which one it is.

LMP-EVA How do you know where we are?

CDR-EVA I think you're probably right, although it doesn't impress me as what I saw in the LNA. How much time have we got to drive now, Bob?

CC Okay, stand by.

CDR-EVA I think that's probably Emory up there.

LMP-EVA That's Steno, I guess.

CC Yes, yes, Steno - Gene and Jack, we'd like you to - If you're in the vicinity, we think you're just about there. We were planning on you leaving the SEP and getting to this place at about 4 plus 58 and we're showing about 5 plus 00 right now so you're right on time. And if you're at 340 and 1.2 in that vicinity, you must be at the station or very close to it where you can see. Over.

CDR-EVA Well, it doesn't look real familiar, Bob, as far as Steno's concerned.

LMP-EVA Okay, I got - I think they can locate us if we work that block field right there.

CDR-EVA Let me get my water.

CC Okay, on the map we're showing, Jack, that you're probably looking at, you're seeing that there's a couple of boulders at - just above - at about the - With north being 12 o'clock, there are a couple of boulders at about the 09:30 position on Steno.

Tape 80A/40

And then there's a couple of more at about the 9 o'clock position on Steno. And we're putting the station right in the midst of all those boulders. Over.

CDR-EVA Well, Bob, I don't know. It's hard - hard to follow that that's where we are. I'm not sure. It doesn't look like what I expected Steno to look like - -

LMP-EVA No, me neither.

CC Okay. What's the range and bearing one more time?

04 23 23 03 CDR-EVA Okay, 346; 1.1. I think it would almost be worth - I bet that's Emory up on that hill. It's got to be.

LMP Yes.

CDR-EVA Okay, well, let's - -

LMP-EVA We better park in this boulder field here.

CDR-EVA ... boulder field.

LMP-EVA ... Wish we could have gotten near one of the big ones, but let's do it. We're going to run out of time.

CDR-EVA Yes.

CC That's affirmative, guys - -

CDR-EVA ... big one anyway.

LMP-EVA Okay. You want me - -

CC - - There's no point in deviating around and spending 15 minutes trying to get a particular spot or down to a bigger boulder. You must be in the near vicinity. If you're really worried about it, I guess you might drive a little bit to the east to the rim of the - -

LMP-EVA Okay. We got - -

CC - - crater, unless you're there. Over. Your judgment.

LMP-EVA No, we're okay. We got a good place.

CC All right.

04 23 24 02 CDR-EVA Okay, I'm parked - I'm parked 180.

CC Roger. Stand by on that a minute.

CDR-EVA You want us to get off? What do you mean?

CC Okay. No - -

CDR-EVA What heading?

CC - - Okay. I was just wondering about where you were going to park. Go ahead and park 180. There was a question on whether they wanted us to park into the Sun, but don't worry.

CDR-EVA Okay, I'm heading - -

CC 180 is a good heading.

04 23 24 27 CDR-EVA Okay, I'm headed - I'm headed - I'm headed 182, 346, 1.2, 1.1, 110, 108, 100, and 118, and off scale low on all of the bo - motors.

CC Okay. I copy that.

LMP-EVA Bob, can we deploy - Okay. You want this charge deployed here?

CC That's affirmative, Jack.

LMP-EVA I'll deploy it now.

CC You can deploy it right now. That's good.

04 23 25 25 LMP-EVA Okay, the centers [?] are still on, thank goodness.

CC Beautiful. We'll give you the Taper of the Year award.

Tape 80A/42

LMP-EVA Boy, you're going to have to give me the Duncie of the Year Award after this.

CDR-EVA Pan 1, ... two -

04 23 25 44 CDR-EVA MARK, SAFE.

CDR-EVA Pan 3 -

04 23 25 47 CDR-EVA MARK, SAFE.

LMP-EVA That will be in the pans, Geno.

CDR-EVA Okay.

CC Okay, I copy that.

LMP-EVA Bob, you got MODE ... - -

CC ... confirm that is EP-6, right?

CC 17, Houston. Do you read?

LMP-EVA Okay, Bob; we're about 15 meters from a 20-meter blocky rimmed crater. It's about 3 - 3 to 4 meters deep. All the blocks on the rim look like the pyroxene, plagioclase gabbro - the vesicular rocks seen at the LM. At least all that I've seen so far.

CC Okay. I copied that, Jack. And is this crater to the east or west?

04 23 27 01 LMP-EVA It's to the northwest of the Rover.

CC Okay; copy that.

LMP-EVA The vesicu - visicle popula - the vesicle population varies from about a 2 milli - a millimeter to 1 centimeter. It forms about 15 percent of the rock - 10 to 15. And I've given you grain size and - for the rocks near the LM and that goes well for this one.

CC Okay, I copy that, Jack. Very good.

LMP-EVA There is - the parting that I mentioned, still of somewhat unknown origin, and we'll try and get a sample along a parting plane. It's clearly evident in one of the bigger blocks.

CDR-LM Hey, Bob, just as we stopped the Rover, I went on AUX water. Do you want me to turn my primary water off - I don't have to, do I?

CC No, no, no need to.

CDR-EVA That's what I figured. Just wanted to cover all bets. Okay, Jack. I think, I've got my house-keeping done.

LMP-EVA Okay. Hey, get your hammer. We're going to need it.

CDR-EVA I've been carrying it all day, it's about time I used it. Okay.

LMP-EVA Bob, you're going to want a core at this site?

CC Roger. We'd like to get - number 1 priority will be some black samples, including any dirt that was on the blocks, if there is such. And then the second priority is a rake soil sample; the third priority is a double core. Then, also in there, the pans, of course, and other documented samples. But the double core is there although it is third priority.

CDr-EVA Okay.

LMP-EVA Gene, do you think - Got you gnomon, huh?

CDR-EVA Yes, I've got my gnomon, and I've got to give a TGE. When you said, bring a hammer, I came -

LMP-EVA I'm sorry.

CDR-EVA No, no problem.

LMP-EVA Well, I shouldn't have -

Tape 80A/44

CDR-EVA The two go hand-in-hand. Nothing disrupts your thought patterns more than somebody saying something.

LMP-EVA Well, listen, this is my first geology stop. I guess I'm entitled to do that; Bob, you ready for a mark?

CC Roger.

LMP-EVA Okay.

04 23 29 37 LMP-EVA MARK it. The light's flashing.

CC Copy that.

CDR-EVA Okay, you got one picked out?

LMP-EVA Yes, let's hit this - see if we can work on that one, it's at the edge, but it's got - we can chip at the parting plane. And that's one of the things that's come up that I think is of interest that we've got to figure out why they have that foliation in them.

CDR-EVA Boy, that rock is one of the more vesicular ones I've seen around.

LMP-EVA Well, they're all about that, Gene. They're too - they're either that or mixed with that variety. In the same boulder, you'll see a - see a nonvesicular - a relatively nonvesicular. Okay, that's the - -

CDR-EVA Watch your shadow.

LMP-EVA - - that's the down-Sun. Okay, right into the Sun.

CDR-EVA Okay.

LMP-EVA Right at that overlapping fracture, huh?

CDR-EVA Yes.

LMP-EVA Let me get where I can maybe save the rock. If you can hook your -

CDR-EVA That's what I'm going to do. I'm going to try and get it right - right up on top is where I'd like to -

LMP-EVA If you hit it - if you hit it on the right side, it'll go this way, maybe. There you go. Good man.

CDR-EVA Piece right there.

LMP-EVA I can get another one, too. Try another one; don't lose that one.

CDR-EVA Let me get that one for you.

LMP-EVA I can get it.

CDR-EVA Got it? Whoops. Can you keep it in sight here for a minute? Is that it?

LMP-EVA Yes. Go ahead. Try hitting - There you go. Can you use the other end against the right side of the Rock?

CDR-EVA I'm pressing.

LMP-EVA Oh.

CDR-EVA It's coming.

LMP-EVA That's all right.

CDR-EVA I'll get that one, wait a minute.

LMP-EVA Be careful down in there.

CDR-EVA The whole thing is going to fracture off here, in a minute.

LMP-EVA That's why -

CDR-EVA Trying.

LMP-EVA It's trying to fall. Don't wear your hand out. That's good, Gene.

Tape 80A/46

CDR-EVA Wait a minute. Let me give one more whack. The whole thing is - No, that's too tight. Let me get that other piece -

04 23 32 21 LMP-EVA Okay. Bag 476 is the rock sample with a little bit of the soil near it - with a chip - chip off the rock, and it's the - Watch it, Gene.

CDR-EVA Here's your other chip. If I go down there, that thing is about 15 feet deep.

LMP-EVA Right. Got it.

CDR-EVA Okay.

LMP-EVA Now, do you think you can chip off the other side of that plane, up on the edge?

CDR-EVA Yes. Yes.

LMP-EVA Then we'll get the soil, and maybe just a small rock, one nonchipped.

CDR-EVA Let me tell you - my hands from that drill - -

LMP-EVA Yes, I'm sure they are.

CDR-EVA - - Really know I've been out here today.

LMP-EVA 476, Bob.

CC Copy that, Jack.

LMP-EVA It's from the southeast - southeast side of the parting plane -

CDR-EVA There it is - a whole big slab, right there.

LMP-EVA Okay, very good.

CDR-EVA Oh, look at those dark minerals in there. Are those dark black?

LMP-EVA Yes, they may be ilmenite or fresh pyroxene. We'll look at it. Gives the impression of pyroxene.

CDR-EVA Okay, you want my bag? I tell you, if you work on any kind of slope, like this little crater - Okay, I'm going to leave it open for a minute.

LMP-EVA Okay.

CDR-EVA While we get that one.

LMP-EVA I'm going to have to - you're going to have to use your tongs on that one, I think.

CDR-EVA Okay. I got it.

CC And, 17, a reminder to factor into your thinking, this is only a 30-minute stop, and there's about 20 minutes remaining.

LMP-EVA Yes, sir. But we got to sample something.

CDR-EVA Here's a big one. Get him the bag number, too.

04.23 34 27 LMP-EVA Bag 454. Okay, and the flashes are from inside of vugs and recrystallized vesicles. They look like pyr - pyroxene flashes; they could be ilmenite.

CDR-EVA I'll get my after picture.

LMP-EVA Okay; let me - and let me get in there and get some soil.

CDR-EVA Okay, let's get it first.

LMP-EVA From the north side. Whoops. Okay, the bag tore around that; it's pretty jagged rock, but I think it'll hold.

CC Okay. Copy that.

LMP-EVA ... in yours. Okay? It's in Gene's sample collection bag. And a scoop sample. You got a bag handy, Gene? Okay, bag 455, Bob. It's from the west side of the rock. It's under a slight overhang of the rock - in a shadow, anyway. Okay, that's from about 1 centimeter down - deep, 1 to 2 centimeters. And the next one is down to about 5 - 5 or 6. And it's got some chips in it.

Tape 80A/48

04 23 35 53 CDR-EVA That's bag 456, Bob.

CC Copy that.

LMP-EVA Okay. (Laughter)

CDR-EVA I know. I know.

LMP-EVA Oh, shoot. 1.2 kilometers is a long way from the LM. Look at the Challenger down there. Makes you get a feel for how big this valley really is.

CDR-EVA I'd rather not.

LMP-EVA Okay. I'll help you.

CDR-EVA I got it.

LMP-EVA Turn around and let me help you get these in your bag.

CDR-EVA I learned now. You learn of necessity out here. Okay. See if we can't fill this up for Christmas. Okay, let's - You happy there?

LMP-EVA Yes, let's - get your after -

CDR-EVA Okay.

LMP-EVA And if we can, we might get just a block instead of breaking on it, and then we'll go to the rake. Let's go around to the -

CDR-EVA Bob wanted a core here, too, huh?

LMP-EVA Yes, but the rake's next, as you might imagine. Geno, now this - this looks - this stuff here looks a little less vesicular. Why don't we try that one?

CDR-EVA Hey, here's - ro - look at this rock, where the vesicularity changes from a hummocky vesicularity to a very fine vesicular. Look at this. Let me try and crack - get a - See that? The change?

LMP-EVA Yes, that's what I'm after; that's it.

CDR-EVA Let's see if I can't crack - -

LMP-EVA That's it. That's what I saw in that other boulder.

CDR-EVA Let's see if I can't crack the corner and get that contact.

LMP-EVA Yes. And get a piece of both - I think you can get - if you can reach down there.

CDR-EVA See if I can't get a -

LMP-EVA That's a contact in a rock.

CDR-EVA Yes.

CC Beautiful. And you guys - do you guys see any 2-meter blouders around there?

CDR-EVA We just sampled one. ... - -

CC Well, if that one showed up in the photos, I wonder why those down near the ALSEP didn't show up.

LMP-EVA No, we're not where you think we are. We're not sure where we are. Gene, can you get down into that? Need some help?

CDR-EVA Yes, just - give me the shovel to hold myself with. Give me a shovel.

CC I don't know.

LMP-EVA How about that one?

CDR-EVA Yes.

LMP-EVA Get that little piece.

CDR-EVA Okay, I see it. It's pretty hard. See if I can't - It's low and hard to hit.

LMP-EVA How about - how about coming around from this side?

04 23 38 59 CDR-EVA Well, I got the gnomon in the wrong place really.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 23 18 XX BEGIN LUNAR REV 18

04 23 49 22 CMP Houston, America. ...

 CC Go ahead, Ron.

 CMP Okay. Had my headset off here, and I wasn't paying
 much attention when AOS came.

 CC Oh, I wasn't even talk - listening for you. I was
 talking to your wife.

 CMP Oh, okay.

 CC Did you get a decent meal?

 CMP Well, it wasn't too bad.

 CC Jan said - -

 CMP Turkey and gravy.

 CC Jan said she's - you're the last person she would
 ever think would miss a meal up there.

 CMP (Laughter) That's probably true, really.

04 23 59 08 CMP Thank heavens.

05 00 00 05 CC Ron, are you out - glued to a window, or are you
 just eating now?

 CMP I'm really just eating.

 CC Roger. Just thought I'd update here before you
 get into your presleep checklist ... Have a little
 bit of news from the day, but today's - -

 CMP Oh, okay.

Tape 80B/2

- CC - - sure not much news today. It's a good thing you guys made the landing today, because there wouldn't be any news in the paper tomorrow if it wasn't for you all.
- CMP (Laughter)
- CC Let's see. Japanese Prime Minister Tanaka's Liberal Democrats lost 26 seats, but he still has a firm hold on the Diet, and Tanaka still has a firm majority. And Henry Kissinger and Le Duc Tho's secret Paris peace talks have bogged down some more, and they think they are bogged down under some academic situations. And - news out of Kansas City isn't too good, but President Truman is - feeling some irregular heartbeats and has reduced the optimism for his recovery.
- CMP Not too good.
- CC This last one has got to be the height of trivia. I'm just going to read it to you exactly the way it is. It's from Saigon. Question? What does an Air Force enlisted man do when he meets a naked general? He salutes. An order issued by Major Paul M. Boseman at Tan Son Nhut Air Base makes the requirement clear. Salute when you recognize an officer, even though you both are nude. An Air Force spokesman said he didn't know under what circumstances officers and enlisted personnel might encounter - encounter each other in the nude. End of - news for tonight.
- CMP (Laughter) News - a little trivia, isn't it?
- CC Yes, indeed.
- CC Everybody from the homefront sending their love. They are having a little trouble hacking out the - the comm, since we're all on a squawk box together. So they are going to try to get it set up so just the CSM loop will go into your house tomorrow night. Tonight we had all of it, and it was kind of a jumble for them.

CMP (Laughter) I imagine so, wouldn't it? They can't turn one down - or something, huh?

CC That's right. Well, they are going to - they are going to try and get it worked on for tomorrow so that only the CSM loop will go in there. They just had to finally give up on it and go watch the - the surface work on television because over where the loop was, it was just too much.

CMP Yes, I bet.

CC When you get into the presleep checklist, you can delete the stir cryos, which is in the checklist. We won't stir the cryos, and then as you get further downstream closer to LOS here - the sleep period, we'll have you turn the H₂ TANK 2 FANS to the ON position. I'll give you a reminder on that.

CMP Okay.

05 00 05 06 CMP Okay, Houston; America. BAT C is about 36.8 or 9, something like that (cough).

CC Say again. Say again - -

05 00 05 16 CMP PYRO A is 37.

CC Okay.

05 00 05 18 CMP PYRO - okay. PYRO A is 37; PYRO B is 37. BAT C is oh - 36.9. Okay. I think you want the quads now, ...?

CC Roger.

05 00 05 44 CMP Okay. Alfa is 82. Bravo - a 78. Charlie is 80. Delta is - about 83.

CC Roger. We got those, and that matches pretty close with what we got right in front of us on those quads. You can go ahead and take the H₂ tanks 2 FANS to ON at this time - -

Tape 80B/4

CMP Okay.

05 00 06 22 CMP Okay. Tank 2 FANS are going ON. H₂, that is.

CC Roger.

05 00 07 35 CC And, Ron, we'd like OMNI Bravo.

05 00 07 44 CMP Okay. You have OMNI Bravo.

05 00 18 13 CC Ron, you have less than a minute to LUNAR SOUNDER, OPERATE and STANDBY.

CMP Oh, okay. Thank you. 2:59, huh?

CC Roger. 122:59.

CC How about giving me a mark on it so I can see what the actual delay is here in the room? If you're going to do it right at 59, give me a mark, will you please?

CMP Okay.

CMP 55 - 56 - 57 - 58 - 59 -

05 00 19 03 CMP MARK it.

CC Answer: 3 seconds away, big as life.

CMP (Laughter) Okay.

CC You may be far away, but you're as close as your telephone.

CMP (Laughter) That's right.

05 00 20 13 CC You can go RECORDER, OFF, now, Ron.

05 00 20 21 CMP Okay. RECORDER - is OFF.

CC And if you will, you can pick up on the top of the next page, 123. RADAR, OFF; DATA SYSTEM, OFF; et cetera. ... DATA SYSTEM, ON.

CMP Okay.

05 00 21 24 CMP Okay. RADAR is coming OFF, DATA SYSTEM is coming ON.

05 00 21 32 CMP HIGH GAIN ANTENNA is going to POWER.

05 00 21 42 CMP MANUAL, WIDE.

05 00 21 50 CMP 74, 280.

05 00 22 22 CMP Okay. SM/AC POWER is coming ON.

05 00 22 45 CMP MAPPING CAMERA is STANDBY. Self test to heaters.

05 00 22 56 CMP UV is ON. IR is ON.

05 00 23 05 CMP (Cough) UV COVER is going OPEN. Barber pole and a gray.

05 00 23 11 CMP IR is OPEN. Barber pole and a gray.

CC Roger, Ron. Just on those HIGH GAIN ANTENNAS, on your knob settings, we'd like you to tweak those as close to those settings as you can possibly get it, for good comm during the night.

CMP Okay. You want - minus 74 and 280, huh?

CC That's affirmative; we just wanted to tweak them up as best we can.

CC I'll say it again. It's the one in the sleep checklist. You'll get to it at - you get to it down here at about - at about 23:10.

CMP Oh, okay.

CC Sounds like some good music in the background there.

CMP Oh, not too bad really.

05 00 25 30 CC Ron, if you're finished there, we would like the - ACCEPT. We got to get on monitor load, and we got a state vector for you tonight.

Tape 80B/6

05 00 25 42 CMP Okay. You have ACCEPT.

CC Roger.

CC FDO showed me where those - they're plotting on Doppler what those mascons are doing to you. They really - really have effect.

CMP Oh, they are, huh?

CC Yes, you can really see when you are going right over Imbrium and - Serenitatis.

CMP (Laughter)

CC And just prior to getting into the rest - sleep, we can take BATTERY B off the charge; terminate the charge.

05 00 26 36 CMP Okay.

05 00 27 35 CMP Okay. I checked out the tone booster, and it's hooked up.

CC Good show.

05 00 30 34 CMP Well, I guess I'd better chlorinate the old water.

05 00 35 20 CC Okay, Ron. You can go to BLOCK. The computer is yours.

CMP Okay. Will do shortly.

CC Okay. You want me to remind you again while you're - after you're chlorinated here?

CMP No, I'll get it out.

CC Okay.

CC The - the sur - the surface boys are on the way back to the LM, completed their EVA, and they're getting - they're driving back to LM right now.

CMP Hey, good.

CMP They got out and did a little riding around on the Rover too, huh?

CC That's right. It - they - they - -

CMP After the ALSEP was all deployed?

CC Yes. The ALSEP's deployed. They had to cut their time at Station 1 a little bit. They got to curtail the EVA slightly short of 7 hours due to the high oxygen usage during the - deploying the ALSEP. Only 15 minutes early, so it's no big deal.

CMP Oh, I see. Well, that's not bad.

CC No, they're - Gene was working pretty hard putting that drill in the ground, and it was some pretty difficult work. And they - they each fell a couple of times, so they were really pretty busy.

CMP (Laughter)

05 00 39 00 CMP Are we going to leave tank 3 - I mean, tank 2, H₂ FAN, ON, all the time?

05 00 39 05 CC Roger. H₂ tank 2 FAN, ON, for all night.

CMP Okay.

05 00 39 32 CC Only thing we've got, Ron, is it looks like you've got to get the BAT B off the CHARGE and then - configure the comm, and you are already to bed down.

CMP Okay.

05 00 39 59 CMP Okay. BATTERY B relay's breakers IN. Charger's OFF.

CMP Okay. I've got to clean the old suit circuit return screen yet.

CMP Plus X forward here so - plus 25 and 195. No, wait a minute. Minus 10 and plus 25.

Tape 80B/8

CC Roger. That - that's affirmative. Minus 10, plus 25. And as tight as you can get it to those numbers, Ron.

CMP Well, I'll tell you what. I believe the dials more than I believe the set knobs, so - Was that the AOS there? No. Not quite.

05 00 42 37 CC Ron, we just been debating here; you need to be sure to do the knobs at the minus 10 and plus 25.

CMP Okay. I'll put the knobs there.

05 00 44 27 CC Ron, everything is looking great down here. It was a really great day, really busy. We're sorry about that eat period; and it's been real - lot of - lot of things accomplished.

CMP (Laughter) It was a good day. Don't worry about that eating. No problem there.

CC And the bird looks great, and we'll see you when we wake you up. You can sign off any time.

CMP Okay.

CC One point, Ron. They would like to have the ... here - -

CMP ...

CMP Got it?

CC Yes, beautiful.

05 00 47 57 CC Ron, just a reminder on the S-BAND NORMAL, VOICE, OFF, when you're ready to - back out.

CMP Okay. Let me throw a little ... solution down in the water here for about 10 minutes, I think.

CC Roger.

CMP It takes a little longer to do all this stuff by yourself (laughter).

Tape 80B/9

CC It sure does.

05 00 53 24 CC Okay, Ron. We're going to drop the up-link here
in 1 minute, so see you tomorrow.

CMP Okay. Thank you all. We'll see you in the
morning.

CC That's all right. You - you can call us, but we - -

05 00 53 36 CMP ... VOICE is going OFF. You can call me, but I
can't call you. (Laughter)

05 01 17 XX BEGIN LUNAR REV 19

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

04 23 39 01 LMP-EVA ... let me see here.

CDR-EVA Can you reach it?

LMP-EVA Well, I'm going to lean on the - on the rock maybe. I got that other little piece in sight.

CDR-EVA Okay, I got that piece in sight, too. Let me -

LMP-EVA Get them both with your -

CDR-EVA Let me get them both right now.

LMP-EVA You can stick that in the ground if you -

CDR-EVA Okay, this is a sample of the - of the more coarsely vesicular rock.

LMP-EVA You got it in your hand?

CMP-EVA I got them both. I think, actually, we got a sample of both sides; but I wouldn't bet on it.

LMP-EVA Okay, I just got a chunk of that side.

CDR-EVA Okay, I got both of these.

LMP-EVA See that rock right over there on the little mound, just projecting out of the edge of it?

CDR-EVA Where are you looking?

LMP-EVA Right over there.

CDR-EVA Here?

LMP-EVA No.

CDR-EVA Here?

LMP-EVA Where I'm pointing.

CDR-EVA There?

Tape 81A/2

LMP-EVA There you go; you just about touched it. Right there, that piece.

CDR-EVA Okay, let me get these in a bag here.

LMP-EVA Well, I'll get that piece; and that's the samples from either side of the contact anyway. Can you get a bag - -

CDR-EVA They're pretty small.

CDR-EVA Give me a hammer, and get a bag and I'll - -

LMP-EVA You take the hammer.

CDR-EVA I got these in my hand I want to put there.

LMP-EVA Okay. Bag 477 is the - coarsely vesicular rock.

CDR-EVA Are two of them there? I hope two of them fell in.

LMP-EVA No, I only got one.

CDR-EVA Okay, here's that other one. It had to fall right here.

LMP-EVA I don't think it ever - Is that - There it is; get your tongs.

CDR-EVA Right here?

LMP-EVA Now you're full of dirt in the scoop; you just covered it up.

CDR-EVA Got it; I got it.

LMP-EVA Here, put it in here with the dirt. That's good.

CDR-EVA A little dirt never hurt anybody.

LMP-EVA Got it.

CDR-EVA Okay.

LMP-EVA 477 are two chips of the - They're small, but I think they'll give you the - if there's any compositional difference.

CDR-EVA But these two are the ones you saw - that right there? That's what you pointed at.

LMP-EVA Yes, I think you got it.

CDR-EVA Okay. I'm going to take a - a closeup stereo on that contact.

LMP-EVA Yes, definitely.

CC Okay; and, Jack and Gene, when you get done with that boulder, we'd like you to move on to the - the rake soil sample, please; and that'll be a kilogram sample, please.

CDR-EVA Yes, sir; we're going to. We're going to.

LMP-EVA In bag 478 is the chip from the finely - more finely vesicular rock. Both of them are coarse. It's a small chip; but it'll tell the story, I think.

CDR-EVA Dust, dust, dust, dust. Here you are. I'll go ahead and get a closeup stereo - -

LMP-EVA Get a closeup, and I'll get the rake. I'll get started on the rake.

CDR-EVA Okay.

LMP-EVA Gene, if you can pick up one more rock in that picture, with your tongs, let's bag it.

CDR-EVA I'll get it.

LMP-EVA As you come back.

CC And, 17. We'd like to have you guys - -

CDR-EVA Sure wish I could read this.

CC - - driving in 10 minutes, please.

Tape 81A/4

CDR-EVA Nag, nag, nag.

CC That's right, that's right, that's right.

CDR-EVA Boy, I can't see my camera setting, it's so full of dust.

LMP-EVA Okay. I guess you want to sort of - out in nothing's land here, huh?

LMP-EVA I can bag it for you, Geno.

CC Roger.

CDR-EVA That's all right. I want to get this closeup here.

LMP-EVA Okay, I've moved about - 5 meters - 5 to 8 meters northeast of the Rover. And - as soon as Gene gets here with the gnomon -

CDR-EVA Coming, coming.

04 23 43 50 LMP-EVA Bob, I've got a - a sample that was laying next to that boulder. I did not get an after picture of it, but it's - as I was taking my closeup pictures, it - is on my side of the boulder just 4 or 5 inches, covered with the dark mantle.

CDR-EVA I think we - I think we probably disturbed that one. It'll probably show up in the before's.

CC Okay. Copy that.

LMP-EVA Okay, we want a rake.

LMP-EVA That's in bag 479.

CC Okay.

LMP-EVA Gene, let's rake - let's rake right out there.

CDR-EVA Look, let's go ahead and bag that one; and I'll get the gnomon out there.

LMP-EVA Okay.

CDR-EVA Bob, as you might have seen from the camera, up towards where we think Emory is you get a pretty high concentration of boulders up there.

CC Okay. And I think that that's where we thought we were a little bit closer to Emory than you are.

CDR-EVA Well, we thought about going on up there; although - we're in a pretty good area here, too, from the standpoint of boulders.

CC Yes.

CDR-EVA Again, I think - Face the Sun.

CC ...

CDR-EVA I think for the most part, large and small, all the frag - all the fragments seem to be - seem to be filleted or even mantled by the dark material.

LMP-EVA Let me get out of your way.

CDR-EVA Boy, I've got to clean my camera; I can't even see. What area are you going to rake?

LMP-EVA To the - your left of the - well, ahead of the - ahead of the gnomon and to your left, there.

CDR-EVA Okay, I got it.

CC Okay, Gene, we copy that. That's a good observation. And I also gathered that most of the rocks look pretty much the same.

LMP-EVA That's what I said.

CDR-EVA Yes, except a change in vesicularity - -

CC Roger.

CDR-EVA - - in terms of the size of vesicles, where I described one as being a more hummocky vesicular-type rock. The first time I've noticed any of the dark minerals was when we took that one big flat chip off that boulder.

Tape 81A/6

CC Okay; copy that.

CDR-EVA I didn't look at it that close to see what it was.

CC Copy that, guys.

CDR-EVA I'm going to get a pan, Jack, while you're doing that.

LMP-EVA Okay.

CC Good idea, Gene.

04 23 46 41 CDR-EVA Man, are there some good targets for the 500 around here. We've got to get those massifs with the 500.

CC And, 17; again, we'd like - -

LMP-EVA And, Bob, I'm really only penetrating - I'm only penetrating about, at the most, 3 centimeters into this area with the rake. I've picked up a very good sample of bla - of boulders but most of them were - were in that distance of the surface and projecting out of it.

CC Okay; I copy that.

LMP-EVA You ready, Gene?

CDR-EVA A couple of more, Jack. Okay, coming at you. Bob, the pan is complete. I'll give you a frame count shortly.

CC Copy that, Geno.

CDR-EVA There's two bags, I think.

LMP-EVA Two bags full. First bag is 457 - -

CC Copy that.

LMP-EVA - - 457.

CDR-EVA Let me, let me - don't let me lose them. That's enough. Give me a couple of small ones.

LMP-EVA Okay.

CDR-EVA Okay, that's good. That's good. Okay.

LMP-EVA Here, ... They are.

CDR-EVA Okay, in bag 458 is the rest of the - the rake sample. They're all fragments.

CC Copy that. Now we need the kilogram of the soil.

CDR-EVA Yes, sir.

LMP-EVA Okay, Bob. All the fragments, of course, are - are completely covered with - the mantle; and they are slightly - oh, maybe 20-percent vesicular. I just took a glance at them. But, for the most part, they appear to be rounded and subrounded fragments.

CDR-EVA Okay. Let's get the kilogram.

LMP-EVA Okay.

LMP-EVA Oh, well, shoot. Start all over.

CDR-EVA Try it again. 459 will get the kilogram, Bob.

CC Copy that.

LMP-EVA Get some more.

CDR-EVA Okay, fill it up.

LMP-EVA Can you close it?

CDR-EVA Yes, yes, I can close it.

LMP-EVA That's a good kilogram.

CDR-EVA Well, I just can't even read my camera anymore. I've got to learn how to control the dust. Okay, that's in.

LMP-EVA Okay; you get the answer?

CDR-EVA I tried to blow the dust off my camera - -

Tape 81A/8

LMP-EVA If we could get a - I think it's going to be hard to get a double core here. We could try a single right there. Bob, we got time to get the core?

CC Negative. The core has been deleted. We'd like for you to get your second pan, Jack, and then we'll press on.

LMP-EVA Okay.

LMP-EVA I'll get it over here where our two sample sites are in view.

CC Copy that.

CDR-EVA Well, now I know why I felt that we were much too close to Trident than what I thought. We weren't really too close to Trident because Trident is way out here. That makes me feel better. A guy would know if he landed 100 meters from a big set of craters like that. You know, on a landing site like this, you ought to know exactly where you are. Anyway, I landed where I wanted to. Okay, Bob, here's a reading for you.

04 23 51 34 CC Okay. Ready for it.

CDR-EVA 670, 012, 901; 670, 012, 901.

CC Okay; copy that, Geno.

CDR-EVA Okay, and we - no more charges to deploy back - going back, right?

CC No, we will deploy charge number 7 on the way back.

CDR-EVA On the way back. Okay.

CC Roger. It will be deployed at the same location we were originally planning on deploying it, which was in the checklist there.

CDR-EVA Okay. Very good, sir. We'll get at it.

LMP-EVA Okay. I'm taking your camera.

CC Okay. And, Jack, you got the pan or getting it?

LMP-EVA Yes, sir.

CDR-EVA And, Bob, CDR is on frame count 60.

CC Okay.

LMP-EVA Which one? And the LMP is on 95.

CC Copy, 95.

LMP-EVA Okay, Gene.

CDR-EVA We need EP-7, Jack.

LMP-EVA You got the gnomon?

CDR-EVA Got the gnomon.

LMP-EVA And the rake and the scoop?

CDR-EVA The rake and the scoop are back on. Okay, get the charge. I'll set the low gain, and we'll be - ready to do it.

LMP-EVA Bob, my impression right now is that the dark mantle may just be a - a - well, at least in here, it's indistinguishable from a regolith that might be derived from these other rocks. It seems to be a little dark for that, but that might be the answer.

CC Okay. We'll - -

LMP-EVA EP-7?

CDR-EVA EP-7.

CC We're ... to do on that again tomorrow. And EP-7 is the charge, right?

CDR-EVA Jack, I figured out if you - if you mount the Rover at 90 degrees, when you kick up your feet, you - you'll miss the dust.

Tape 81A/10

LMP-EVA Let me hook you in before I do that.

CDR-EVA Okay.

LMP-EVA Just put your seat 90 degrees to it.

CDR-EVA Yes.

LMP-EVA Well, you certainly ride high.

CDR-EVA Do I?

LMP-EVA Yes. I'm surprised the belt fits.

CDR-EVA Yes, it fits fine. Okay. I'm in.

LMP-EVA Okay.

CDR-EVA Oop -

LMP-EVA Not too good, huh?

CDR-EVA Yes. We're learning. I hope my bag was closed. Yours was. Did you get it?

LMP-EVA Yes - yes. I - as a matter of fact, I did. I thought that.

04 23 55 07 CC Okay, we mark you underway.

LMP-EVA Hey, you ought to put that sampler d - -

CDR-EVA Not yet.

LMP-EVA It's not the sampler - it's these bags with Emony [?].

CDR-EVA This thing is too high for you. You're hitting it all the time. No, we're not on our way, Bob.

CC Okay.

CDR-EVA Okay. And you want the - charge deployed at 320.7, huh?

CC Roger. It will be 0.6. We'll change that to 0.6 on EP-7 but - and it will really be just wherever you cross 0.6 on the range.

CDR-EVA Okay.

LMP-EVA Well, it fit once.

CDR-EVA Did you twist it, Jack? 180, that took out some of your - Wait a minute - here.

LMP-EVA Which way?

CDR-EVA Well, I can't see. Your left hand's in the way now. Away from you. Twist it away from you 180 degrees.

LMP-EVA Like that?

CDR-EVA Yes, now the other 90. Okay, now try it.

LMP-EVA Well, let me see.

CDR-EVA You got it?

LMP-EVA That should - that should do it. Okay.

CDR-EVA Okay?

CDR-EVA Here's your charge. I think you're learning. That's half of the first EVA. Okay, Bob, we are rolling.

04 23 56 47 CDR-EVA MARK it.

CC Okay, copy that, Jack - Gene.

LMP-EVA Okay, what was it - where did they want it deployed?

CDR-EVA Six-tenths of a kilometer.

LMP-EVA Back, huh?

CC Roger. It'll be at a range of 0.6, guys.

LMP-EVA You've got a block right ahead of you.

CDR-EVA I got it.

Tape 81A/12

CC Okay. And remember you'll be taking photos coming back here, Jack - -

LMP-EVA Okay.

CC - - if you get a chance.

LMP-EVA Yes, sir. Thank you. I got a few going out, Bob, but they weren't too well spaced.

CC Okay. And I assume you've got the low gain antenna aligned.

LMP-EVA Yes, sir; it's aligned. Okay.

CDR-EVA That's got to be Trident, Jack, because that's too big for anything else.

04 23 58 52 LMP-EVA Okay, Houston. There's - the classic raindrop pattern over this fine debris. I'd say that the surface definitely is sorted, the fine regolithic material forming one fraction and then the blocks another. The blocks are prob - those blocks are greater than a - 2 centimeters in diameter. In general, make up less than 10 percent of the surface. But there are some big ones. And it - fairly uniformly distributed. There are blocks a meter in diameter.

CC Copy that.

CDR-EVA Hey, Jack, that big crater out there at 2 o'clock has probably got to be Sherlock. That's got to be Sherlock over there.

LMP-EVA Yes, probably. I think the only place I've really identified that we can go to is to station 6.

CDR-LMP Yes, but you can't - we've got to get on a high vantage point here one of these days.

LMP-EVA Yes.

LMP-EVA Well, I think we'll find Camelot without any problem.

CDR-EVA Yes. Okay, watch. I'm going through it.

LMP-EVA Okay. No problem.

CDR-EVA No, I'd rather straddle or go through those little ones.

LMP-EVA Okay, Bob, here's another crater about the same size we sampled - the last station. And it doesn't have as many blocks, but it does have blocks. And from this distance, their vesicular texture and their light color shows up very well. I suspect they're the same general kind. There's a glass-bottom crater.

CC Okay. You got a range and - -

SC-EVA ...

CC - - bearing, there, guys, please.

CDR-EVA Okay, 341.8.

CC Copy that.

CDR-EVA Did you take a picture, Jack?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA You're pointed right at station 6, I think, Gene.

CDR-EVA I think you may be right. There's that boulder. I just want to get up here where I can ... - -

LMP-EVA Not the one on the track but the one over there to the right of that.

LMP-EVA Unless the one with the track - I'm - I've got mixed emotions which is 6.

CDR-EVA That's - that's probably - look over there to the left. You see that.

LMP-EVA Yes.

CDR-EVA That's Trident. Man, I'll tell you.

Tape 81A/14

LMP-EVA Look at this thing. That looks like the same kind of rock except it doesn't have any vesicles.

CDR-EVA There's some white stuff in that rock. Just let me take a quick pic ...

CDR-EVA See that one right in front of it? Take a picture of it.

LMP-EVA Oh, you mean this one, here.

CDR-EVA Oh, that's a - that's a big zap pit, isn't it? Take a picture of that?

LMP-EVA Yes, they're big zap pits. Same rock with big zap pits. I got to change the - well, ... Okay. Although there are - I think those are zap pits. It's a little hard to say.

CDR-EVA Looks like a big chip out of the rock.

LMP-EVA They're white halos; it just has more of them.

CDR-EVA But it's a big one; it's about an inch and a half or 2 inches across.

LMP-EVA Yes.

CDR-EVA I tell you, I've got to go and get my skies and geometry squared away.

CC Okay, 17, how about - -

CDR-EVA Did you see this one?

CC - - range and bearing?

LMP-EVA Yes.

CDR-EVA Okay. 341.7. Bob, we're moving at about 11 clicks right now.

CC Copy that. Beautiful. Remember the charge goes off at 0.6.

LMP-EVA Doesn't sound like - Okay.

LMP-EVA Okay, we want to - -

CDR-EVA Over there's the mantle - there's the white mantle.
Jack, look over there. Can you look to your left?

LMP-EVA Yes, it does. Yes.

CDR-EVA That's the white mantle.

LMP-EVA Swing around that way.

CDR-EVA Call it a slide or not, but that's the white
mantle. Whoo! That's my first real good picture
of it. That is something.

LMP-EVA Okay, I got some of that. Okay, how are we doing?

CDR-EVA I don't want to go in that crater, that's what I
don't want to do. Okay. We're at 0.6; how about
339 ...

LMP-EVA Okay. I got a couple of shots right in there.

CDR-EVA Okay. Coming right around to you.

LMP-EVA Oh, that's good. Hold that heading. Whoa.
That'll be good.

CDR-EVA Right here?

LMP-EVA Yes, whoa.

CDR-EVA Okay. Let me get my - Okay, I got my locator.

LMP-EVA Okay, now this one we want me to get a partial pan
until something's identified.

CDR-EVA Okay. We'll do that. We've got to turn that way
anyway.

05 00 02 32 LMP-EVA Okay, pin 1, pull, SAFE. Pin 2, pull, SAFE.
Pin 3 -

05 00 02 41 LMP-EVA MARK it, pull, SAFE.

CC Okay. And I copy that as charge number 7.

LMP-EVA That's affirm.

Tape 81A/16

CC Okay. And we'd like a frame number when you get done there, Jack, after you get it on the ground.

LMP-EVA Okay, stand by. Okay. I think we'll miss that.

CDR-EVA Okay. Bearing is 339.6.

LMP-EVA Okay, start a - a pan around it, Gene - -

CC Copy that, Gene - -

LMP-EVA Okay, let me get it out - Okay, camera starts slowly ... Okay.

CDR-EVA Going to miss it?

LMP-EVA Yes, by a lot.

CDR-EVA Okay, taking your pictures?

LMP-EVA Yes, sir. Wheels cleared it by - it's got to be a lot. Is my low gain dropping out?

CDR-EVA How much are my wheels missing it by - going around?

LMP-EVA Lots. About a meter. Okay.

CDR-EVA Okay. We're on our way. The low gain is set again.

CDR-EVA Okay, we're heading on back to SEP.

CC Okay, and a frame count there, Jack.

LMP-EVA Okay, pan - was more - the pan was more or less complete at 146.

CC Copy, 146 on auto[mobile].

LMP-EVA Bob, you know, the more I look at this - Watch out for those babies there - at this - at this dark dust, if you will, the more it doesn't seem like the kind of thing you'd expect to have been derived from the underlying bedrock. But I think you're going to have to play that game in the lab right now.

CC Okay, I copy that. Can you - -

LMP-EVA We'll see how it works out later.

CC Roger.

LMP-EVA It just seems dark and much too fine grain. It - don't have the impression that you're getting the size distribution you'd expect to get by having all these blocks around.

CC Okay, I copy that.

LMP-EVA Definitely, I think, at least in my mind, ... population - size population - -

CDR-EVA Jack, that almost looks like bedrock over exposed in there. See that?

LMP-EVA Yes, why don't you take a pass over that way. Get through there?

CDR-EVA Yes, I can get through there.

LMP-EVA Do you know where you are?

CDR-EVA Yes.

LMP-EVA In Trident?

CDR-EVA Yes, no - no, we're not in Trident. That's awful - that's pretty steep down in there. I'd walk down there. I'm not sure I want to drive down there yet.

LMP-EVA No, I didn't mean down in there. I meant right over there.

CDR-EVA Well, here's some right here.

LMP-EVA Yes. ...

CDR-EVA Take a picture of that?

LMP-EVA Yes.

Tape 81A/18

CC And how about a range and bearing when you stop, to take the picture.

CDR-EVA Okay - -

CC We need a - -

CDR-EVA 336.4.

CC 336.4. Roger.

05 00 05 59 CDR-EVA Bob, I get a distinct impression that - Jack says it's going to be hard to tell whether this is regolith composed from the rock field we see around, but - I get a distinct impression - you can see that dark mantle over on top of almost all the rocks. Except we have fresh glass, possibly, in the bottom of some of these small craters.

CC Okay.

CDR-EVA Everywhere else there is actually mantle, I believe, in and around some of the crevices and in the vesicles and what have you.

CC Okay, I copy - -

CDR-EVA It's all material though, that could be - it's material that could be knocked in there by the local impact.

CC Okay; but I gather you find a lot of material on top of the rocks.

LMP-EVA I think we lost them.

CDR-EVA Not a lot, Bob. Not a lot. It's there, though.

CC Okay; copy that.

CDR-EVA They're not nearly as covered with dust as they - as they get when - when you drop one. It's just a - it's really a salting or a scattering of debris in the depressions - -

CC Okay.

CDR-EVA -- on the rock. The projections of the rock are perfectly clean.

CC Okay. I copy that.

LMP-EVA Yes, but most of all - most of all the craters are - have relatively ..., except where the rocks are showing the boulders on the side, or - within the craters are evident - are suddenly covered over with this mantle. You don't see any good sharp ridges on - walls on some of these craters. Even the small ones.

CC Okay. Roger on that.

CDR-EVA Man, I tell you, you could lose the rear end of this thing in a hurry, if you'd like.

LMP-EVA I think you have lost a fender. I keep getting rained on here.

CDR-EVA Oh, no.

LMP-EVA Look at that rooster tail - look what's ahead of us here.

CDR-EVA Yes, that's probably it. It probably didn't stay. I can see it in a shadow.

LMP-EVA Sure, look at it.

CDR-EVA Oh boy, that's going to be terrible. That is really going to be bad.

LMP-EVA I didn't see it. We probably lost it. I think I know when because I just started to notice it. Bob, I'm going to state what Gene said slightly differently. There just aren't a lot of very sharp, bright craters, but there are some. All the craters seem to be pretty well formed. It isn't an extensive mantle. Matter of fact, for example, hasn't filled the ... Are we due to deploy that thing now?

CDR-EVA Yes, I - want to - want to - come in at a -

LMP-EVA Hasn't filled the bottom of the craters.

Tape 81A/20

CDR-EVA I'm going to come in at a heading here and see if I can get on it for you.

LMP-EVA Okay, drop me off there.

CDR-EVA Look at that fender. Look at the dust it's produced. Look at the LCRU.

LMP-EVA Yes, it's going to make - -

CDR-EVA I don't know how to keep that thing on.

LMP-EVA Make it west.

CDR-EVA Okay, I'm rolling west right now.

LMP-EVA That looks good. That looks good. Hold that heading.

CDR-EVA Boy, I don't like losing that fender.

LMP-EVA We're back at the SEP, Bob. I'm starting to lay out my first track.

CC Roger. Copy that.

LMP-EVA How's our time, Bob?

CDR-EVA Okay.

CC Roger. You're about 5 minutes behind on the - the arrival time at the SEP. But we're - we're - No real problem. And I assume that the range and bearing, when you got there, was about zero.

05 00 11 02 LMP-EVA Okay, get - Let me leave my camera.

CDR-EVA Well, let me read it. 252, 2.5, and 0. I'm resetting.

CC Okay. Copy that.

LMP-EVA And the LMP frame count is 19 - 197, and it was still turning.

CDR-EVA Amp-hours are 108 105, and batteries are 100 and 120.

CC Okay. Copy 100 and 120.

LMP-EVA Okay. Oh, wait a minute. I need my camera, don't I?

CDR-EVA Yes, sir.

CC I don't think it's much good to you with a 197 there, Jack.

LMP-EVA No, I don't. I don't need my camera.

CC Roger on that.

LMP-EVA We're deploying it. No, you take the pictures. I don't need it. Go ahead, play it out.

CDR-EVA Okay; you're right. Okay, here we go. I'm headed out.

LMP-EVA Okay, Houston. The location is in about the least cratered area I could find, between a large crater or a large depression that's about - oh, ranges from maybe 50 to 150 meters behind the LM. That's maybe - south - or east-southeast; and it's between that depression and another large depression that is really a doublet with a blocky septum between them. That's to the northeast of the LM about 200 meters; that's the start of that second depression. I think we can get a nice layout, although there'll be a general slope, I believe, towards the LM - of about 1 degree.

CC Okay, that's no real problem, Jack. No problem, Jack.

CDR-EVA Jack, am I about abeam of you? I can't see.

LMP-EVA Yes.

CDR-EVA Okay, I'll turn in around this crater.

LMP-EVA Hey, if you come right -

LMP-EVA That depression to the northeast is at least a couple hundred meters in diameter, and it's joined with one that's probably of comparable size just to the northwest of the first depression.

Tape 81A/22

CC Okay, I copy that too, Jack.

CDR-EVA Okay. How's that look, Jack?

LMP-EVA Great.

CDR-EVA Far enough?

LMP-EVA Yes. Yes, come back.

CDR-EVA ... we head on up to station 2 without that fender and are we going to be full of dust.

LMP-EVA Okay, there's no special -

CDR-EVA I can park 180 but -

05 00 14 03 CDR-EVA Okay, Bob, I've stopped - back at the SEP.

CC Copy that, Gene.

CDR-EVA Dropped the - One came out, Jack.

LMP-EVA Oh, yes. This thing is a lot harder to turn than it was in training.

CDR-EVA Oops. Okay, that's the first two we've got to deploy. Can you bring your tongs?

LMP-EVA Yes.

CDR-EVA Bob, do you want me to dust this? I'll dust back at the LM. We're going to deploy the SEP. God bless..

CC Okay. They all say to dust, Geno.

CDR-EVA Okay. You're going to have to wait for me, Jack.

LMP-EVA Well, I've got antennas all over the place here.

CDR-EVA Yes, as a matter of fact, you do. Stand by 1 second. I'll make it a quick one.

LMP-EVA That's all right. No, I can handle it, I think, here. But we're going to need your tongs to pick them up and not get them all confused. Okay, where's the shadow graph? There it is. Sun quadrant - that's the Sun quadrant.

CDR-EVA For sure we lost that fender.

LMP-EVA Okay, I'll deploy number 2 and 4. And, let's see, that's number 1. This one must be number 2. It is.

CDR-EVA Okay, I'm almost there, Jack. Let me run around and dust. Let me tell you, this dust isn't going to be fun tomorrow.

LMP-EVA Okay, I won't bore you with details on why you see the antenna all over the ground (laughter) but it has to do with 1/6 g.

CC Roger, Jack. Understand you dropped a couple of the antenna reels.

LMP-EVA You know, Bob, they're very - more accurately, I dropped three of them. Bob, you know this fine-grained dust that we're in could be groundup pyroclastic. It might grind more easily than other things, and the blocks are just the - those blocks that have been excavated from below that pyroclastic by the larger craters and some of the smaller ones in the area.

05 00 17 46 CDR-EVA MARK, gravimeter reading.

CC Okay; mark that. Roger, Jack. That would make a nice story, wouldn't it?

LMP-EVA ... Well, you'd think glassy pyroclastic might turn into regolith a little bit faster than some of these other things. But we'll check that one out.

CC Okay.

CDR-EVA You want 2?

LMP-EVA Two, and you get 1. Right there.

CC And, Jack, did you get the reels straightened out again?

LMP-EVA Yes, they're okay.

Tape 81A/24

CC Thank you.

LMP-EVA How can you stop a crew like this?

CC I don't know any way.

LMP-EVA In all modesty, I mean. Okay, Geno, I'm on my way. Pull gently on that thing because I - it's awful easy to knock it over. I had that geophone module all over the place.

CDR-EVA I can't tell whether I'm pulling gently or not.

LMP-EVA Any time you feel a tug, stop.

CC Careful, guys.

CDR-EVA At least we're pulling at the base. I better watch what I'm backing into. There's a lot of holes around here.

LMP-EVA Well, it happened, Bob. I'm glad we Velcroed those - tabs.

CDR-EVA Okay, I'm at the end, Jack. Are you having -

LMP-EVA Well, I - What happened was which we thought might happen. It twisted on my - I'll be there in just a second.

CDR-EVA Okay, I want f/11 at 250 and 74 feet. Well - ah, ah, ah, ah. Ah, ah, yes; you're pulling it over.

LMP-EVA I'm not. You are.

CDR-EVA No, I'm not. I've got all sorts of slack in here.

LMP-EVA Okay, it's okay.

CDR-EVA All right. Are you out there?

LMP-EVA Yes.

CDR-EVA Okay, let me back up - a skosh and take the slack out. And I would say, offhand - Oh, boy, what have you got a - that's about as close to a 1/6-g orthogonal - at least, not orthogonal yet, but straight lined. That's it Jack, here.

LMP-EVA Stay there, and I'll take a picture.

CDR-EVA I thought you did.

LMP-EVA No. Okay, I got it now.

CMP-EVA Hey, if you try and stick that thing in, Jack, you're going to fall over. Just set it down, and we'll stay away from it.

LMP-EVA Yes. You talked me into it.

CDR-EVA That was a good idea, but - that's a good straight line.

LMP-EVA (Singing) We were strolling in the park one day - Well, we've had lots of good ideas in our time.

CDR-EVA Oh, boy; the thing that makes me sick is losing that fender. I can stand a lot of things, but I sure don't like that.

LMP-EVA Okay, I get number 4, which - Where is it? Is that the one on the ground?

CDR-EVA It's probably the one on the ground. Got it? Is that the right one?

05 00 22 16 LMP-EVA Well, 3 - No, this is yours.

CDR-EVA No. Take it; doesn't make any difference.

LMP-EVA Okay, I'm deploying the - the LMP's deploying reel 3 for your photography purposes.

CC Roger. Copy that.

LMP-EVA Oh, - Hey, push that in.

CDR-EVA Roger.

LMP-EVA Ha, ha, ha. Ha, ha, ha.

CDR-EVA Serves you right.

LMP-EVA This doesn't push.

Tape 81A/26

CDR-EVA Okay, I'm ready to stroll.

LMP-EVA (Humming) I found a brown rock that I'm going to bring back.

CDR-EVA Please do.

LMP-EVA I think it's the back side of a piece of glass, but it's brown.

CDR-EVA Well, I think I'm more or less on your track. It wiggled a little bit.

LMP-EVA Well, we're - Oh, oh, oh, ooh, stop, Geno.

CDR-EVA Okay, Jack, wait a minute. That looks orthogonal to me. Got your picture?

LMP-EVA Will have in a sec. Wait a minute. Every time I do something, I change the setting. Okay, I got it. I straightened the line out a little bit better after I took the picture - a few kinks in it. Now where's my brown rock? I saw it when I was driving with the Rover. I knew I'd be able to come back here because of the tracks. Looks like an old piece of bread.

CC Is that the one that came out of the hatch?

CDR-EVA ... the heck is that? Huh? Oh, it's a piece of - Well, it's a piece of glass, all right - crumbled - part of it crumbled but - I got to get that in a bag. Oh, man, is that a nice piece of glass. Just laying out there all by itself. Jack, well - you got a bag handy while I take my pan. I can't reach a bag; I got this sample in the wrong hand.

LMP-EVA I don't have a bag.

CDR-EVA You don't have - well, take one off of mine and give it to me. I'll take it back to the Rover. Wa, wa, wa! Watch it; you've got a wire under your foot.

LMP-EVA Bag number 460.

Tape 81A/27

CC Copy that. 460 has brown glass.

CDR-EVA I'm halfway out on the north course - -

CC Sorry about that.

CDR-EVA - - I'm halfway out on the north course of the -
of the SEP.

LMP-EVA It's brown vesicular glass. Sort of a yellow-brown,
as a matter of fact.

05 00 26 01 CDR-EVA Okay, it says - take locator photo to LM. I thought
I took a pan here. The LM wasn't - Okay.

CC Yes, the locator is really all you need; but a
partial pan to show the area would be appreciated.

CDR-EVA Yes, I'm here. I'm going to get a partial pan,
Bob.

CC Okay.

CDR-EVA The only reason I'm doing it is I know it would be
appreciated.

CDR-EVA Okay, take locator to photo LM; I got it. Bob,
I'm on - if I can get where I can read it - on
about 71 on my frame count; and let me give you -
Boy, we got to stay out of this area, Jack. We'll
pick up these cables just as sure as the devil.
Oh, that fender. Boo - boo.

LMP-EVA Hey, Houston, will you look at your solar panel?

CC Roger. We see the solar panel.

LMP-EVA You notice how they flop up?

CC We noticed that, too.

LMP-EVA I think we need some gray tape.

CDR-EVA Okay, 670, 010, 101; that's 670, 010, 101.

CC Okay, I got that one, Geno.

Tape 81A/28

CDR-EVA The wires have memory. Okay, let me - -

LMP-EVA I need gray tape.

CDR-EVA Let me put this in your bag, and I'll get the gray tape.

LMP-EVA Okay.

CDR-EVA ..., Jack, we didn't break any records collecting samples, but at least we got an ALSEP deployed. That gray tape, Jack, is not going to stick on anything with dust.

LMP-EVA I know; that's what I was thinking.

CDR-EVA Because I just been there with that fender.

LMP-EVA Well, let's try it. You have a -

CDR-EVA I don't need the scissors. I can cut it without it. Come on. Once we - Don't back up in that wire - Just like the cover of a -

LMP-EVA Got it?

CDR-EVA ... that?

LMP-EVA Yes, I guess. Okay.

CDR-EVA Get this side?

LMP-EVA Yes.

CDR-EVA Keep from falling over. You want to take those polar - solar panels off?

LMP-EVA Let me hold on to you.

CDR-EVA Okay, lean on me.

CDR-EVA If not, let's take them off and hold them.

LMP-EVA No, I think it's going to be easier this way.

CDR-EVA Okay, try it. I don't think they're going to be much problem the way they are, anyway.

LMP-EVA You holding?

CDR-EVA Yes, go ahead and lean if you want.

LMP-EVA I don't know how long it will stay.

CDR-EVA No, I don't know. Okay, there's one.

LMP-EVA Give me another one.

05 00 29 49 CC It's only going to stay for 2 days, guys.

CDR-EVA ... pull the whole thing over.

LMP-EVA This will be a - this will be a test. If it holds - holds until we see it again -

CDR-EVA ... Don't knock the whole thing over.

LMP-EVA Okay, I'm leaning on you.

CDR-EVA Okay, lean.

LMP-EVA The piece of tape is so dusty - it may not work.

CDR-EVA Try it somewhere. Okay, are you happy with the alignment?

LMP-EVA I was. Is the gnomon the zero mark?

CDR-EVA Gnomon is right up to zero mark.

LMP-EVA That's where it's supposed to be.

CC ...

CDR-EVA Okay, and the level bubble is just touching the - the inner circle.

CC Okay, copy that. And we have that transmitter switch in STANDBY, right?

CDR-EVA Bob, there's just a couple little bows around the transmitter, is that -

Tape 81A/30

LMP-EVA It will be -

CDR-EVA Oh, those are all right - those are okay.

LMP-EVA Let's forget those.

CDR-EVA Jack, looking where the LM is, if I were you, I'd just walk down.

LMP-EVA Come here, Gene.

CDR-EVA What do you need?

LMP-EVA I need some support.

CDR-EVA Yes; boy, that's the key around here.

LMP-EVA Everything on this SEP is coming off harder than it did in the - when we deployed it at the Cape. See that? It just ... It may not be harder, but it ...

CDR-EVA Okay.

LMP-EVA Now, I got to reorient it.

CDR-EVA Now, let me see. You're STANDBY - now let me look at it - The gnomon's right at zero.

LMP-EVA Okay, right at zero.

CDR-EVA It's just the same - it settled back just the same. Zero gnomon and inner circle.

CC Okay; beautiful.

LMP-EVA Let's go.

CMP-EVA You want to walk back or ride?

LMP-EVA Let's see -

CDR-EVA It's up to you but -

LMP-EVA Oh, I'll walk back.

CDR-EVA Man, I hate this dust. I got to make a new fender tonight.

LMP-EVA Well, let's see, I guess I'm supposed to -

CC Hey, Genc, I presume that the fender that came off is the fender that came off before, right?

CDR-EVA Yes, same one. My tape didn't hold; it was too dusty.

CC All right.

CDR-EVA Okay.

LMP-EVA Hey, watch out for this antenna line I found out here.

CDR-EVA Yes. Okay, travel to LM. Okay, Bob, I'm not going to change anything right now except get in and travel. All right?

CC That's affirm. Time to go home.

LMP-EVA How's our time, Bob?

CC You'll have a nominal closeout, guys, as soon as you get back. We're right about on the time that we've been figuring on for you guys to get back there on. Right now, you are 6 hours and 11 minutes into the EVA.

CDR-EVA Boy, here's a big boulder.

LMP-EVA Gene, I discovered something - I learned a lot today, let me tell you.

CDR-EVA Okay, you're going to lose TV because the high gain is going to be out of whack here in a minute.

05 00 33 39 LMP-EVA Hey, I got a football-size rock of this vesicular - coarsely vesicular gabbro, Bob. It's off a large 3- to 4-meter buried boulder to the north - oh, let's say, northeast of the LM about 30 meters.

LMP-EVA Do you read, Bob?

CC Roger, Jack. Read you loud and clear on that one.

LMP-EVA Okay. It'll be in the big bag.

Tape 81A/32

CC Okay, ...

LMP-EVA Undocumented, it's about - it's roughly tabular - 15 by 25 centimeters and about 5 to 7 centimeters thick. One - one face is very flat; looks like it was off of a parting plane, which were in that rock.

CC Okay, and if it fits in the SRC with all the other samples, you might put it there because the SRC's going to be kind of empty.

CDR-EVA Got any new parking angles for your batteries or anything?

CC No, it will be a heading of 013, which is hardly a change at all from the 012 in the checklist.

CDR-EVA Okay, I'll buy that.

CC Jack, did you copy my comments about putting that thing in the SRC perhaps?

LMP-EVA Well, it was pretty big. It's in the big bag now. We can do that.

CC Well, I'd get the other samples - the small ones and particularly soils in the SRC first.

LMP-EVA Okay.

CDR-EVA Are you through?

LMP-EVA No, I'm going right - right about here. Now I'm done.

CDR-EVA Okay.

LMP-EVA Right there.

05 00 36 15 CDR-EVA Okay, Bob, 086, 0.5, 0.1, 108 - Oh - oh, 102.

LMP-EVA Stand by 1.

CDR-EVA Amp-hours are at 108, 102; volts are 74 and 75. Batteries are 108 and 123. Motors are all off scale low, all four of them.

CC Roger, Gene. Understand 108, 102 on the amp-hours, huh?

CDR-EVA That's affirm; 108 and 102.

CC Okay; copy that.

CDR-EVA I can't read this thing, because it's full of dust, so I've got to get off and dust it.

LMP-EVA Okay, the SEP receiver temp is 45, 45.

CC Copy 45. Beautiful.

LMP-EVA You know, I think they left some Velcro off of this thing, Gene. There's no Velcro holding those flaps down.

CDR-EVA Isn't there?

LMP-EVA No.

CDR-EVA Okay. I've got to get the brush and dust that thing - a minute or 2.

LMP-EVA Okay, ... get the high gain.

CDR-EVA I feel like taking some core tubes tomorrow.

CC I have a feeling you've got a couple left over, don't you?

CDR-EVA Bob, you got -

LMP-EVA Yes.

CDR-EVA Bob, you got the high gain?

CC Okay, thank you.

CDR-EVA Is that - is that my bag, Jack, you got?

LMP-EVA Yes.

CDR-EVA That's pretty good.

Tape 81A/34

CC Okay, let's put all the stuff in that bag, Jack - both the stuff that's in yours and the stuff that's in Gene's.

LMP-EVA Okay. ... Samples - two samples from under the LMP's seat.

CDR-EVA Put these under the seat. Clean you up here while I'm at it. Oh, man, I tell you, it's going to take us half - a dozen Sundays to dust. Look at that fender; that's terrible.

LMP-EVA Okay, you want to get my bag off?

CDR-EVA Yes. If you're ready.

LMP-EVA Yes.

LMP-EVA I've got to put your - those samples in the SRC, in your bag; and we'll save this one, I guess.

CDR-EVA Wait a minute. Let me clean you up.

LMP-EVA Okay.

CDR-EVA Did you get me cleaned up?

LMP-EVA Yes, you've lost your - -

CDR-EVA Wait a minute.

LMP-EVA - - your strap though, here.

CDR-EVA Wait a minute, now, ... Okay, you get my hook back up over here.

LMP-EVA Okay, - my - turn around. Your hook's up, but I'm not sure I closed your - your other one. Take a look at it. Yes, it's all closed. Okay, you're good. There you go.

CDR-EVA Okay, you're filling which bag, the -

LMP-EVA Putting them in the bag that goes into the SRC -

CDR-EVA That's SRC - SCB 1.

CC Roger.

CDR-EVA Okay; let's see, offload LM - PLSS - core cap dispenser tools. Okay, as soon as you get that, I'll take that SCB 1 from you, and I'll close the SRC 1.

CC Okay; and I gather you didn't have any Rover samples today, did you, Jack?

CDR-EVA I've still got my tongs here. I got - -

LMP-EVA No, I have one sample bag in my pocket that has a rock in it.

CC We'll have to take that out when we get in the Rover, I assume.

LMP-EVA Okay. Gene, where's that - you want to put that little rock?

CDR-EVA Yes, is it there?

LMP-EVA Well, what did you do with it?

CDR-EVA It was on the floor on my side.

LMP-EVA Your side?

CDR-EVA There it is; let me get it.

LMP-EVA We can put that in one of the core tube slots here.

05 00 43 02 CDR-EVA Boy, that one fender just - just is an order of magnitude more of a dust problem. Here can you reach it?

LMP-EVA Okay, the rock that Gene picked up - early - right at the start, is in a core tube slot in the SRC 1.

CC Okay, I copy that.

LMP-EVA Okay, Gene, you want this one?

CDR-EVA Yes, I want the full one.

LMP-EVA Yes. Latched.

Tape 81A/36

CDR-EVA Okay.

LMP-EVA Bob, that's almost full of samples, and I think that big rock would be - probably wouldn't fit in there.

CC Okay, then we'll put that in the big bag.

LMP-EVA It's in the big bag.

CC Good enough. And I gather there's no Rover samples today, right?

CDR-EVA Okay - No Rover samples; sorry.

CDR-EVA Okay, the seal is clear, like I promised I'd make it, coming over the top. Bob, the seal is clear.

CC Beautiful.

CDR-EVA I don't know if it's beautiful, but it's clear.

CC It's clearly beautiful.

CDR-EVA Okay, okay, that big mamou is locked. I got a lot of oxygen. I still got 22 percent.

LMP-EVA I expect our feedwater may be getting a little low.

CDR-EVA I'm going to leave this right here until I take it up to you. Okay, close ... verify good seal, place in plus-Z. Okay, LRV circuit breakers: LRV LCRU power OFF. Dust - well, let me get at that dusting first.

LMP-EVA Give me a yell when you need a spell there.

CDR-EVA What, dusting?

LMP-EVA Yes.

CDR-EVA Well, I need a fender, that's what I need. Figure out something we can make a fender with.

LMP-EVA How about one of the others that's not as critical?

CDR-EVA Yes, but I wouldn't ever take one of those off. You know, getting it - I had one to put on and it didn't stay, which is what I figured.

LMP-EVA I thought you said it was broken, though?

CDR-EVA Well, it was. But these aren't supposed to come off, either, unless you break them. I broke that one. My hammer got caught underneath it. It wasn't the fender's fault.

LMP-EVA Okay, the core tube is packed.

LMP-EVA Every time I read containment bag, it fools me; I can't figure out what it is.

CDR-EVA Every time what?

LMP-EVA I read containment bag.

CDR-EVA (Laughter) You've been thinking of the other kind too long. You've been living in the command module too long.

CDR-EVA That's a pretty good day's workout, you know. You know, I don't think we need an exercise period. We get back in there. I don't think we have to apologize to anybody. I'm sorry we didn't get out to station 1. One of the main reasons is, I think, we could have got our navigation bearings a little bit better.

LMP-EVA Well, I'll tell you. That new ALSEP had more to it than met the eye.

CDR-EVA This hole out here - you know, this is just such an easy site to find out and to identify yourself on and to land in. But, I tell you, all of a sudden there is so many local holes that I can't think big enough.

LMP-EVA Does that sound familiar?

CDR-EVA Okay, Jack, ... rest of my dusting until - -

LMP-EVA Am I in your way?

Tape 81A/38

CDR-EVA Yes, I'd like to get over there to get the - this last battery cover. I can. That's good enough. I can get over there now. I want to make sure these things stay clean because I don't want to walk.

LMP-EVA I agree. Okay, Bob, containment bags and two cameras are stowed in the ETB.

CC Copy that. And don't forget the scissors, guys.

LMP-EVA Don't worry. I've got them right here.

CC Beautiful - don't want to go hungry.

LMP-EVA It's a good call, Bob. That's right.

CC And, Jack, give me your consideration - or Gene - on that question of bringing back the big bag into the cabin. The people down here are saying they want to bring it in, and then we'd end up bringing it back out in the second EVA. What do you guys think about that?

05 00 47 23 LMP-EVA That's all right; we can do that.

CDR-EVA Yes, we can do that - I guess just because that rock's in there, huh?

LMP-EVA I'd like to do that - look at that rock with the handle in it.

CC All right; so then we'd be taking it back out in the second EVA, if you guys are agreeable to that.

LMP-EVA Yes, we'll do that, Bob.

CC And, Jack, do you think it'll go in the SCB?

LMP-EVA Say again.

CC Do you think it'll go in the SCB number 2?

LMP-EVA What would - the bock - the rock?

CC Yes, that's right.

LMP-EVA Well, it'll go in there. It's not that big.

CC Okay, why don't you put it in SCB - why don't you put it in SCB 2 and bring that in, instead. Leave SRB out, and then we'll just leave SCB 2 in forever.

LMP-EVA Okay.

05 00 48 18 CDR-EVA Okay, verify SRC plus-Z pad. What are those things going over? What is that, Jack? Hey, something just hit here! What blew? Hey, what is that?

LMP-EVA Oh, your antenna - your - it's that styrofoam off the high-gain antenna package.

CDR-EVA On the LM?

LMP-EVA No, the one you deployed. The Rover high-gain antenna.

CDR-EVA My gosh, it blew up!

LMP-EVA Yes.

CDR-EVA I thought we'd been hit by a - by a - Look at that stuff just keeps flying over the top of our heads. I thought we were the closest witnesses to a lunar meteor impact. I wonder if ... that's the same glass I picked up?

LMP-EVA Oh, I don't know.

CC John says it blew up on his mission too, guys.

LMP-EVA Isn't that what you thought it was? Isn't that what you thought it was? Huh? I thought you were kidding.

CDR-EVA No, I've never seen that before.

LMP-EVA Oh, I'm sorry. I thought that was -

CDR-EVA No - you just - you just - Well, you saw that stuff coming. I didn't see that at all. Holy Smoly!

Tape 81A/40

CC Roger, 17. And John says that it blew up on his mission, as well.

CDR-EVA Okay, Bob, I guess I'm going to take the TV away from you.

CC Okay. And, Gene, one thing we'd like before you guys leave the Rov - -

CDR-EVA ...

CC - - one thing we'd like before you guys leave the Rover is a fairly good description of what happened to the rear fender when it came off. Is the damage primarily to the piece that you've lost, or are the rails on the pieces remaining fairly bad?

CDR-EVA Okay.

LMP-EVA Mag - -

CDR-EVA - the - -

LMP-EVA - - Romeo.

CDR-EVA Well, a piece of the rail on the - on the aft - aft inboard side here - the rail isn't missing - it's just a piece of the flange - the rail that fits against the fender - but that doesn't hold any part of the fender on. I don't remember what I saw on the fender - The rails look pretty good, Bob. And I had one of them completely on, and I just couldn't get the other one on. If I had known what that dust was, I would have tried an awful lot harder.

CC Okay, do you have any feeling that - -

CDR-EVA I heard John telling me, but - -

CC Do you have any feeling that you could get away with putting a front fender on?

CDR-EVA Well, I have done it before, but it's not easy.

CC Okay, as far as you can tell, so that we can look at it over night, the rear fender - the part that's remaining - looks in fairly good shape, right?

CDR-EVA Let me take a good look at it. Yes, the part you need, I think, to hold that fender on -

LMP-EVA Let's see - we better take those dustbrushes up there.

CDR-EVA Yes, there's enough here to hold the fender on, Bob.

CC Okay, we'll take a look at it here while you're sleeping.

CDR-EVA Okay, let me get some breakers here. LRV breakers Alfa, Bravo, Charlie, and Delta.

LMP-EVA Bob, while you were talking, I got all the mags - Romeo, Alfa, Bravo, Charlie.

CC Hotel. Hotel.

LMP-EVA That's on a magazine. That's on our camera.

CC Okay. Got you on that one; you're right.

LMP-EVA Is it not?

CC You're right; my fault - you've got the maps, too.

LMP-EVA Okay, I need those maps, Gene. Could you hand me the maps?

CDR-EVA I don't know. Pretty good clip, splitting apart a bit, too, aren't they?

LMP-EVA Getting hot.

CDR-EVA This thing keeps falling out of your clip, in case you're interested, or I keep knocking it out.

LMP-EVA Put it down here. Okay, I've got the maps, the 500 mag, yes - and the three - two cameras.

CC Okay, we'll have to get the contamination bags, too, there.

CDR-EVA Huh?

Tape 81A/42

LMP-EVA Say that again, Bob.

CC Roger. We've got the contamination bags to get, too - out of the MESA.

LMP-EVA I've got them.

CC Okay; copy that.

LMP-EVA Mentioned that earlier.

CC Sorry about that.

LMP-EVA They're in there.

CC Okay; do you know when you're brushing LCRU, we'd like the blankets left at 100 percent rather than 65 percent - we'd like them all left open; and it's been a little warm, also.

05 00 53 56 CDR-EVA Okay, Bob, I've already dusted everything. And it all looks pretty good. The bay - the breakers are OPEN; the LCRU power is OFF ... Where do you want the TV camera? Do you want it tilted down and aft?

CC Roger. Down and away from the Sun, like we talked about. Think that's what you mean by aft.

CDR-EVA That's what I thought. Okay. It's down - yes, it's there.

CC Okay; can you confirm that that's 100 percent on the LCRU blanket rather than 65 percent as per the checklist?

CDR-EVA Yes, sir; I sure can.

CDR-EVA Okay, I'm opening all the battery covers. The batteries are not dirty. I've been dusting the covers every stop.

CC Okay; good.

LMP-EVA Are you through - are you through with the SRC?

CDR-EVA Yes, I just left it there.

LMP-EVA I've got to get to the table.

CDR-EVA Okay.

CDR-EVA Okay, the batteries look pretty good. Bob, you got - you got - The left-hand forward reflector on the batteries is about 10 percent in shade. The others are in the Sun. Is that what you want?

CC Stand by. Okay; that sounds right, they say.

CDR-EVA Okay, the LCRU has been dusted; everything is dusted. Our blankets are open 100 percent. ... I'll check. Battery covers, open; LCRU blanket is open 100 percent; samples off. You got them all off, Jack?

LMP-EVA Yes.

CDR-EVA And anything else? Let me look around. I got to get the TGE.

LMP-EVA Check it one more time.

CDR-EVA Samples off; let's look under here. There's nothing under here. This bag is empty. Those are sample bags.

LMP-EVA Okay, we do not bring up the LM ECS canister. Is that correct?

CC That's correct, 17.

LMP-EVA Okay.

CC And, Jack, confirm you have the scissors in the ETB. Roger.

LMP-EVA Just a second. (Laughter) Yes, sir. Thank you, again.

CDR-EVA Okay, ... the old blanket.

05 00 56 39 LMP-EVA Okay, that pin's green; that pin's green. Both pins are green.

CC Copy that.

Tape 81A/44

CDR-EVA Boy, that's dirty.

LMP-EVA Okay. Okay, I'll take some stuff up. SCB 2, we don't have. Oh, wait a minute. What did we decide to do - -

CC SCB 2 for the big rock there, Jack.

LMP-EVA Put that big rock in the - Oh, okay.

CDR-EVA How's our time, Bob?

CC No problem on time.

LMP-EVA A little in on those ... Can I sneak in and get a bag?

CDR-EVA Yes.

LMP-EVA See you later, Rover.

CDR-EVA Okay, the SEP blankets are open; it is dusted. Okay, and I verify that the DSEA is OFF, and the power's OFF.

CC Copy that, Gene; thank you.

CDR-EVA Okay, you want the TGE, right side of the MESA, but in the shade. Okay.

CC That's affirm.

CDR-EVA Boy, did it get covered with dust, too.

CDR-EVA Bob, no trouble with the TGE in the TV, huh?

CC None so we can tell. We'll get another reading here when we see it on the ground here.

CDR-EVA Hey, Jack, if I set this here, we'll - Jack?

LMP-EVA What?

CDR-EVA Okay, I just want to set it here so you don't knock it over.

LMP-EVA What's that?

Tape 81A/45

CDR-EVA The TGE, right where you left foot is.

LMP-EVA Oh, well.

CDR-EVA I'm afraid we'll knock it over if I set it anywhere else.

LMP-EVA Well, stand by; I've got a lot of stuff here.

CDR-EVA Okay.

LMP-EVA You should have volunteered to take the big bag in.

CDR-EVA Why? You having trouble getting that thing in?

LMP-EVA Oh, it's just ... Yes, I'm having trouble.

CDR-EVA Well, here; let me help you.

LMP-EVA Hold this big bag, please.

CDR-EVA Just don't back up if you can help it.

LMP-EVA Hold the bag. This big one, this one. No, the other one, the other one; don't.

CDR-EVA I can't ...

LMP-EVA I got it. That's a big rock.

CDR-EVA ... fit there is long ways.

LMP-EVA Okay, there should be another one in there. Is there? Feel it, squeeze it, hit it.

CDR-EVA ... the box, see if there's any in there.

LMP-EVA ...

CDR-EVA Okay.

LMP-EVA Well, let's leave it. ... let's get it out. Here, pick it up. We'll get it out.

CDR-EVA Hold the top.

Tape 81A/46

05 01 00 39 LMP-EVA Shake it. Well, I thought there was one in there.

CDR-EVA I don't think there's anything in there.

LMP-EVA I thought I put one in there.

CDR-EVA Okay.

LMP-EVA Well, I guess not. If I did, it's gotten out.
Okay, got away.

CDR-EVA Okay, I'm going to leave the TGE right here. I'll
put the TGE right side of MESA. Okay, I might
give them a gravimeter reading, believe it or not.
Boy, I'll tell you, the only thing bad about put-
ting this thing on the ground - it's like every-
thing else - you have to bend over to get at it.
And you need support to get back up. Okay.

05 01 01 18 CDR-EVA MARK, gravimeter.

CC Roger. Mark.

CDR-EVA And she's flashing, Bob.

CC Thank you.

LMP-EVA Okay, I'm supposed to take this and the core
stem bag up there.

CDR-EVA I'll get it for you.

LMP-EVA Can you get the core stem bag?

CDR-EVA Yes, I'll get it for you.

LMP-EVA Okay, you got a core stem bag?

CDR-EVA Yes, let me give it one zap with the brush.

LMP-EVA Okay. I didn't mean to drop that, but I did.

CDR-EVA Yes, we got to - we got to keep from dropping
everything. I'll tell you, the big lesson
today - -

LMP-EVA Dropped.

CDR-EVA Dropped, I guess.

LMP-EVA The big lesson is that it's going to get dropped if your hands get tired.

CDR-EVA Yes.

LMP-EVA ... come down. Got it.

CDR-EVA Okay. Me see. Okay, the TGE is reading. We got to stow our antennas and ... dusting down here. I'll make a check of what you've got up there. What have you got up there so far?

LMP-EVA Just the SRC 2 and the core stems.

CDR-EVA Okay, SRC 2 and the core stems. Okay. Where's EVA pallet?

LMP-EVA It's on the MESA table.

CDR-EVA Okay, that's good; that's ready. Where's ETB? That's ready to go up.

LMP-EVA Yes.

CDR-EVA Okay, core stem bag, SRC 2; SRC 1 is in the - SCB 1 is in SRC 1. ... It's there. Big bag is not required. Okay, any more room up there? If not, why don't -

LMP-EVA No, I think - -

CDR-EVA Why don't I dust you here.

LMP-EVA Okay. This rock you laid it on here.

CDR-EVA Watch your foot; you're caught in that thing.

LMP-EVA Yes.

Tape 81A/48

CDR-EVA Pick up your right foot. Jack, you're just going to have to get up on that ladder somewhere so I don't - don't get the dust all over this thing.

LMP-EVA Well, I've got to dust you, too.

CDR-EVA Well, okay. Go ahead and get me.

LMP-EVA Yes, where's your brush?

CDR-EVA Right on the hook.

05 01 04 18 LMP-EVA Right; see what I can do. Kick most of it off, I hope.

CDR-EVA You have to go anywhere else, now?

LMP-EVA Just right around here; no place but right around here. Man! That's a - that's like a super-endless task.

CDR-EVA Get the top of that thing if you can.

LMP-EVA Oop - oop. It landed on a slope.

CDR-EVA Yes.

LMP-EVA Okay. That's good.

CDR-EVA About the arms?

LMP-EVA Yes, hold them up and shake them, too, in case there's anything down in them?

CDR-EVA Let me just - Yes.

LMP-EVA Let me get lower so you can get at me. Okay, how's that? At best, it is going to be bad but we want to get as much off as we can.

CDR-EVA How about this one?

LMP-EVA Guess I can come around on the other side, if you want.

CDR-EVA Yes, I can hold on better that way.

LMP-EVA Just take some of it off.

CDR-EVA Yes.

LMP-EVA Hold still.

CDR-EVA I'll get up on that ladder and you get a whack at my legs, best you can. And I'll kick my boots clean.

LMP-EVA That fender is really going to be a nuisance.

CDR-EVA Mean going?

LMP-EVA I'm going to have to get you to bend over, too, so I - not now. Know there's a lot on the OPS.

05 01 06 45 CDR-EVA I just will stow - my antenna while you're up there.

LMP-EVA Oh, boy! That's really putting the finishing touches on the old arms, isn't it?

CDR-EVA Yes.

LMP-EVA How'd you get so dirty?

CDR-EVA Wait until I show you the picture I took of you.

LMP-EVA Didn't. Okay, Gene. Most of what's left is up on your - get your antenna. Oh, you're going to go up there, first.

CDR-EVA You want -

LMP-EVA Okay.

CDR-EVA I don't know how you do that.

LMP-EVA Just - just really spring. You got it. Beautiful.

05 01 07 47 CC Okay, 17, do we copy - -

LMP-EVA Okay.

Tape 81A/50

CDR-EVA Better get my legs, then I'll ...

CC - - both antennas up?

CDR-EVA No. No, sir, Bob. I'm still getting dusted. We're trying to go over this thing pretty thoroughly.

CC Okay.

CDR-EVA Pocket is fairly full of dirt.

LMP-EVA That brush does pretty good, though.

CDR-EVA Want me to move, or anything now?

LMP-EVA No.

CDR-EVA Okay. I'm just a mess. Course, when I do this, I get dirtier.

LMP-EVA Yes.

05 01 08 34 CDR-EVA Once I get you this far, I'm just going to shove you on up that ladder and not let you get in the dust. Who!

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 03 15 XX BEGIN LUNAR REV 20

05 05 14 XX BEGIN LUNAR REV 21

05 07 13 XX BEGIN LUNAR REV 22

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 01 07 38 CDR-EVA Okay?

LMP-EVA No. You're not okay. You're awful dusty, but I don't know that I can - -

CDR-EVA Okay.

LMP-EVA -- do too much more.

CDR-EVA That looks pretty good. I'll walk -

LMP-EVA Hit your boots real hard when you come up.

CDR-EVA Yes.

CDR-EVA Okay. I've just got to stay on my feet here for a while.

LMP-EVA Want me to -

CDR-EVA Stand in - stand in the pan. Yes. Stay there and I'll get your back and your PLSS while I'm at it - to start with. Stoop down, if you can. Stand on the bottom of the p - there you go.

LMP-EVA How's the old ALSEP, Bob?

CC It's looking great, guys.

CDR-EVA Don't forget, Jack; you'll have to stow my antenna yet.

LMP-EVA Right.

LMP-EVA Okay, while I'm up here let me get the top of your OPS and I'll stow your antenna at the same time.

CDR-LM Okay.

LMP-EVA I - You're going to have to get further down. I can't reach you.

Tape 82A/2

CDR-EVA That's good. I feel like I'm praying. I guess I am.

LMP-EVA Now, maybe I can get some dust off you, if you stay there. The antenna will be stowed in half of a jiff.

05 01 10 40 LMP-EVA Oh, my fingers. They do not have the dexterity that they once had.

CDR-EVA Okay.

LMP-EVA Make sure you don't have anything hanging on you. Wait a minute.

LMP-EVA Okay. You can stand up. I'll work on your arms.

LMP-EVA I'll come around that side and get the other one. No, maybe I won't either. Maybe I'll get it - hold onto the ladder some. It'll give me stability, too. Okay, I'll get the backside of your arm from the other side. Let me get around - around your waist here now.

LMP-EVA Getting there - kilter. Ah.

LMP-EVA Here, let me try your left arm.

LMP-EVA Okay.

CDR-EVA Okay?

CDR-EVA Why don't you go - up the steps.

CDR-EVA Okay. You're there.

CDR-EVA Oh, boy. Hallelujah. Yes, do that. That gets a lot off, Jack. Keep doing that. Keep doing that. Boy, that gets it off your shoes.

LMP-EVA Okay. Okay. Put this foot out here.

CDR-EVA We're still at it, Bob.

CC Yes. It seemed to go a lot faster down there in the clean room at the Cape.

CDR-EVA Boy, you bet you. And I know why we didn't do it. It was just as tough down there as it is here.

LMP-EVA Okay?

CDR-EVA No, not yet. I want to get - the other leg. And then I want you to lean over and get my antenna.

LMP-EVA Roger. Right. I need to brush off the top, too. I'll stow your antenna first.

CDR-EVA Okay, babe. That's about all I can do for you. Okay, get my antenna. Oh, I think all the dust I took off you went on me.

CDR-EVA Can you reach it from there?

LMP-EVA Well, yes; I think I can. Oh, whew.

05 01 15 13 LMP-EVA I have 7 hours from the time I looked at my watch. That's got to be pretty close.

05 01 15 19 CC You guys have got 6 hours and 53 minutes and 40 seconds.

LMP-EVA Okay, Gene, you're stowed. Let me -

LMP-EVA Okay. Let me see your brush.

CDR-EVA Okay. Here it is.

LMP-EVA Okay. That's the best I can do.

CDR-EVA Okay. Let me get the top of this pocket.

CDR-EVA Okay. Go on up; stay clean.

LMP-EVA Well - you've got - let's see -

CDR-EVA I hand you something.

LMP-EVA You've got to bring stuff up I guess, huh?

CDR-EVA Yes.

LMP-EVA Okay, Bo - I need the EVA pallet.

Tape 82A/4

CDR-EVA Okay, I've give you that and then I'll get to work. I've got some work I've got to do for Bob. Ah. Okay, everything on the EVA pallet?

LMP-EVA Yes. Just hand it to me and I'll start unstowing it up there.

CDR-EVA Okay. Man, I forgot I had my visor up. Zowie! See if I can get back in the shade.

CDR-EVA Got it?

LMP-EVA Yes.

05 01 16 37 CDR-EVA Okay, Bob. I'll try giving you one at a time. LMP's got the EVA pallet. Let me give you a MESA reading, then I'll tidy - or - reading, and I'll tidy the blanket.

CC Okay.

05 01 16 55 CDR-EVA Okay. The reading is 000, 133, 201, and I can only assume that one of us hit it. I think I've got time to give you another one.

CC Okay. Quickly.

CDR-EVA Well, that's the way it'll be, because it's already punched.

05 01 17 16 CDR-EVA MARK it.

CC Copy that.

CDR-EVA Okay, I'm tidying up the MESA blanket. I'm pretty tidy.

LMP-LM I did that.

CDR-EVA Okay, MESA blankets are tidied. Okay. Open TGE - I'll do that. Brush to ladder hook. Final transfer, Jack. I'm going to - Okay, I'll tell you what I'm going to do. You've got the - I'm going to - I'm going to inventory here. You got the pallet. ETB is here, and you got the core-stem bag. SR - SCB-2 is there; SRC-1 is here; big bag is not required. Bob, I think we got

everything. The two things on the surface yet are the ETB and the SRC and me.

CC Okay, we copy that. But, of course - -

CDR-EVA Jack, get down a little bit more, and you've got another 2 or 3 inches.

LMP-LM I can't get any lower, Willie, [sic]. Me buttons are in the way.

CDR-EVA Okay. Keep going. Get your pockets over the sill - There you go. There you are - you're in. Kick off your feet if you can - kick them right there. That's good. That got a lot off. Okay, go on in. You're over to the right - Okay, there you are. You've got all the room you want now.

LMP-LM That's not as easy as in the J-bird.

CDR-EVA Okay. I think I'll give this rockbox a quick dust in here.

LMP-LM Your hoses - we've got to have a better way to store your hoses.

CDR-EVA Yes, I don't like them there either. I saw that when we went out.

LMP-LM (Heavy breathing) Whew, boy.

CDR-EVA You in?

LMP-LM Yes.

CDR-EVA Sounds like it.

LMP-LM Oh, come on get up there.

05 01 19 31 CDR-EVA Okay, Jack, coming up with the rockbox.

LMP-LM I'm not ready.

CDR-EVA Well, I've got to - I've got to -

LMP-LM You ... put it on the porch?

Tape 82A/6

CDR-EVA Well, I only got one more thing to do and that's taking out there - just clean up the TGE. Okay. I've got to come up there anyway.

CDR-EVA God speed the crew of Apollo 17.

LMP-LM Who signed it? I forgot to read it.

CDR-EVA I'm not going to tell you, but I like the message. Probably shouldn't tell you.

CDR-LM Okay, that ought to stay up there.

CDR-EVA Okay, I can't hand you anything in anyway. I'm going down and clean up the TGE.

CC Roger. It should be ready to read by now.

CDR-EVA Oh! That last step down again. Okay? Bob, before - well, let me get this for you.

05 01 21 11 CDR-EVA Okay, Bob, 670, 021, 501 - 670, 021, 501.

CC Okay. Got that, Gene.

CDR-EVA And the cover is up. Cover is up, if I can keep it up. If I can keep it up. That'll keep it up. It's been dusted. And I'll get it to STANDBY.

CC Okay. Copy that. And did you dust the radiator?

CDR-EVA Yes sir, I dusted that a little earlier. Okay, it is STANDBY, Bob. Radiator is up.

CC And dusted.

05 01 22 03 CDR-EVA Cover is open. Okay. I'm going up to the porch. All I've got down here is ETB, and it's on the LEC.

LMP-LM I'm ready for you.

CDR-EVA Have you got anything else?

CC Negative.

LMP-LM I'm ready for you up here.

CDR-EVA Let's see what kind of dusting job I can do on myself.

05 01 22 49 CDR-EVA Okay, Jack, coming up. Wheel!

LMP-LM Okay.

CDR-LM Okay.

LMP-LM A little higher. ...

CDR-LM I got it.

LMP-LM Watch the seal.

CDR-LM Okay. Okay, here's an SRC; okay?

LMP-LM Put her in here.

CDR-LM Oh, me. Well, I'll get it up for you.

LMP-LM No. That's all right.

CDR-LM Ah. I think you got the ticket right there. Ah.

LMP-LM I'll watch that.

CDR-LM No sense making it hard. See if I can't stand this one up. Okay. Okay. There come the core tubes. Boy let's - protect that core tube. Man, that was - that was the turning point today.

CDR-EVA Got it?

LMP-LM Got it. Yes, we had a lot of turning points.

CDR-EVA Do you want the LEC in there? You don't, do you?

CC Negative, you can leave the LEC outside.

LMP-LM No, just the bag.

CDR-EVA Where are the scissors, by the way?

Tape 82A/8

LMP-LM They're in the bag.

CDR-EVA Okay. I hope they don't come out this time.

LMP-LM Well, I stuck them down in there. I hope they don't.

CC Yes, Jack - -

LMP-LM We'll have to figure out something else if they do.

CC - - You guys put the tools in the ETB?

LMP-LM I think so, Bob. I'll take a peek down there. If they fell out, they'll be right on top. Okay.

CDR-EVA Mama me.

CC Okay, Gene. And you got the SCB number 2 in and the pallet out, right?

CDR-EVA Right. Here it comes, Jack. Take that. There are no scissors on the ground beneath where the ETB was. So I would say that they're probably in the ETB.

CC Well, good enough.

LMP-LM Okay. You got everything, now?

CDR-EVA Yes sir.

LMP-LM Okay, let me get out of the way.

05 01 26 38 CDR-EVA Okay. Whoops, that's me dusting. Well, I guess I got about - 25, 20, 15 - I guess 13 percent oxygen, 3.8. Okay, babe.

CC I copy that. Fifty percent oxygen, Geno - that's - -

LMP-LM Come on in.

CDR-LM ... Comes through that hole. No; 13 - 13 percent, I think.

CC One, five [sic].

LMP-LM Okay. Put your but - put your buttons down. You're great. Now your head up. You're right against the top, right against the ... 27. Come towards me. Okay, now up.

CDR-LM Okay.

LMP-LM Tight fit.

CDR-LM What am I caught on back there?

LMP-LM You're just getting - you're just scraping against your PLSS.

CDR-LM Okay. I'll just bend.

LMP-LM Watch your - - your - your pockets. Your leg pockets might be part of the problem.

CDR-LM Okay.

LMP-LM Okay. Come on in. Just hug as close as you can. Okay, you're there.

LMP-LM Okay?

05 01 28 09 CDR-LM Yes, let me just get on my feet here. Oh - ah - Wait a minute. Got to turn one way or the other. Does this look better?

LMP-LM Yes. I'd turn towards your right.

CDR-LM Well, can't do that.

LMP-LM Try the other way. Get your PLSS back in there towards the circuit breakers. Move your right - your left arm.

CDR-LM (Laughter) Where? Okay.

LMP-LM There.

CDR-LM Okay. Let me make sure there's nothing in that hatch.

LMP-LM Well, there's dust. That's one thing that's in there.

Tape 82A/10

CDR-LM Well - Take one quick peek.

LMP-LM I can't - From where I stand, all I can see is dust.

CDR-LM Okay, it's clear. Did it. Now what do we do next?

LMP-LM Pockets - your pockets.

CDR-LM Okay?

LMP-LM Okay.

05 01 29 07 LMP-LM Primary water, CLOSED. Forward hatch - Turn that WATER OFF.

CDR-LM Do you have to turn the PRIMARIES or just the SECONDARY, Bob?

LMP-LM Primary.

CC Primary only. That's why you don't turn your PRIMARY WATER, OFF, when you go to AUT.

CDR-LM Okay. I've got them both OFF. Is that all right?

CC That's okay, too.

CDR-LM Well, wait a minute. Got yours?

LMP-LM No, I can't quite reach it.

CDR-LM Well, if you can roll to the left, I'll get it for you.

LMP-LM Yes, I can.

CDR-LM Let me get - let me get back here. I've gotten bigger since I've been out there. You've got to go more. You've got to go more.

LMP-LM Yes. There's something keeping me from going more.

CDR-LM Okay. Okay, let me see if I can't -

LMP-LM ... to be awfully far inboard for what I - fitted it.

05 01 30 23 CDR-LM Okay. Your PRIMARY WATER is OFF.

LMP-LM Okay. LMP's WATER is OFF.

CDR-LM Now you're going to have to move way over there, so I can get the hatch.

LMP-LM Yes, I have to go back the way I was.

CDR-LM Back up against the circuit breakers.

LMP-LM Yes.

CDR-LM Can you see what I'm catching on, upward?

LMP-LM Yes. You're just hitting the rail over there.

CDR-LM Okay. Now.

CDR-LM ... I can't - Close and lock forward hatch, huh?

LMP-LM Yes. Can you do it?

CDR-LM Yes. Can't see it. Okay.

05 01 31 08 CDR-LM Forward HATCH is CLOSED -

LMP-LM Locked?

05 01 31 12 CDR-LM And LOCKED. Which one of those dump valves is - That one up on top. I can get that one.

LMP-LM Okay. Take it easy.

CDR-LM Oh, whew!

05 01 31 35 CDR-LM It's AUTO, and it's locked.

LMP-LM You're sure? Is that locked there?

CDR-LM Yes, sir.

LMP-LM Okay. And it is AUTO. Okay.

Tape 82A/12

CDR-LM Okay.

LMP-LM Hey, I got a tone and a - and I got an H₂O flag.

CDR-LM Okay.

CC Roger, Jack; we saw it.

CDR-LM Okay, PLSS O₂ is not less than 10 percent.

LMP-LM Yes. Okay.

CDR-LM Okay, let's go.

LMP-LM If we're not less, go to manual control repress.
Okay. I've got to turn -

CDR-LM Okay. Let me get out of your way.

LMP-LM Okay.

CDR-LM About as far as I can go. Okay. I'll read it
to you, when you get there.

LMP-LM I think part of our problem is - is this - slope.
There's no purchase - as my Father used to say -
no purchase.

CDR-LM Okay, are you ready? Are you ready?

LMP-LM Wait a minute.

CDR-LM I need you on CABIN REPRESS, AUTO; and then on 16
I need you.

LMP-LM Okay.

CDR-LM Okay, CABIN REPRESS, AUTO.

05 01 32 44 LMP-LM Going AUTO.

CDR-LM Okay. ECS CABIN REPRESS, CLOSED.

LMP-LM Okay. Stand by - for repress.

CDR-LM I'll try and get cabin ... master.

05 01 32 54 LMP-LM Okay, there's the MASTER ALARM. Heck, I can't get it.

CDR-LM I'll catch it.

LMP-LM Okay.

05 01 33 01 CDR-LM Cabin is coming up. ... closed at 1 psi.

LMP-LM Okay.

CDR-LM Okay. Verify cabin pressure increasing. PRESS REG A and B to CABIN.

LMP-LM Now?

CDR-LM Now.

05 01 33 19 LMP-LM A's CABIN; B's CABIN.

CDR-LM Okay, and I want your PLSS O₂, OFF - when I give you a call. That's when we get greater than 2.5.

05 01 33 33 CDR-LM Okay, now. We're at 3. Can you get it? If you can't, I'll reach it for you.

05 01 33 39 LMP-LM It's OFF.

05 01 33 40 CDR-LM Okay, CABIN warning light OFF. Verify cabin pressure stable at 4.6 - Okay, it's coming up. It's 3.6. And you use the PURGE valve to depress.

LMP-LM What's our pressure?

05 01 33 57 CDR-LM Cabin pressure is 4. Let me just take a look here at 4.6. Okay. I'm coming down. She's coming down. Cabin's up to - Cabin's up to 5, Jack.

05 01 34 09 LMP-LM Okay, it's 5. It shut off.

CDR-LM Okay. Okay, I'm about depressed.

LMP-LM So am I.

CDR-LM Okay. Post-EVA configuration. White dots out and EVA decals. Okay. Checking.

Tape 82A/14

LMP-LM White dot.

CDR-LM Okay. Give me a chance to turn around and look.
Okay. White dots are out - out - all the white
dots. Okay, they're all out here.

LMP-LM Boy, does this feel good to get soft suits. Oh,
my hands. Okay, they're all out here.

CDR-LM Okay. Okay, on 16, SUIT FAN number 2, CLOSED.

05 01 34 54 LMP-LM SUIT FAN 2, CLOSED.

CDR-LM And SUIT FAN DELTA-P, CLOSED.

05 01 34 58 LMP-LM CLOSED.

CDR-LM ECS caution and WATER SEP component lights on [sic].

LMP-LM Okay, ECS - I think it's on. It's hard to see it.

CDR-LM Okay. Doff your gloves. Stow on comm panel.
Hallelujah! Cabin's stable, Houston. How's it
look to you?

05 01 35 28 CC Looks good to us, 17. And I'd like you to know
you had a 7-hour and 12-minute EVA, from 3.5 to 3.5.

CDR-LM Well, until I get out of this suit, I'm still EVA.

CC Roger.

CDR-LM Oh, doesn't that feel good. Who!

CC And I think it's a tremendous job for what we
might call a "challenging" EVA.

CDR-EVA Bob, that's no pun. It really was. It really
was.

CC I know it, men. I know it.

CDR-LM I tell you, I really wish you guys could have
been here with us. You worked as hard at it as
we did, if not harder.

LMP-LM Harder, I think. Until today. Oh! You don't have a tub of hot water I can soak my hands in, do you? Wait until that dust hits the sweat of your hands. Oh! I tell you.

05 01 36 57 CDR-LM Man! Okay. My gloves are off. Doff helmets with visors, lower shades, and stow in BRA. Well, I guess the first thing is to get this thing off. Boy, let me tell you.

CC Okay. And 17 - or Jack and Gene, I'm going to turn you over to Joe now. I'll be back in a while.

CDR-LM Okay, Bob. Thank you for a job well done.

CC Well, job well done on your side, guys.

CDR-LM Oh, I can't do it. I don't know if I - How about getting my glove off?

LMP-LM Can you handle it?

CDR-LM I'm not sure.

LMP-LM Thank you.

CDR-LM Jack, the big one's out of the way. What we really had to get out there on. Boy, look at that visor. No wonder I couldn't see.

CDR-LM Jack, do you read?

LMP-LM Yes.

CDR-LM Okay, I thought you knocked your thing to AR - -

CDR-LM - - or to A or something. There's a lot of noise in the background. That's why I was wondering. Need some help?

LMP-LM Stow the visors, huh? What is it?

CDR-LM Yes, stow them in the BRA.

LMP-LM No, but I mean - Keep the protective visor down.

Tape 82A/16

CDR-LM Keep the protective visor over it, and stow the whole thing in the BRA.

CDR-LM Verify safety on the dump valve. I guess I can do that now -

05 01 39 39 LMP-LM Again?

CDR-LM That one's still safe. And that one's still safe.

LMP-LM That was like gunpowder, just like the boys said.

CDR-LM Oh, it does, doesn't it?

05 01 39 54 CDR-LM Okay, DESCENT WATER valve, OPEN. Oh, boy. I ran out of water out there. I mean the drinking kind.

LMP-LM Okay, what's next?

CDR-LM Okay, DESCENT WATER valve, OPEN.

05 01 40 24 LMP-LM Okay. Coming OPEN.

CDR-LM Okay, and then you get your purge valve out.

LMP-LM It's too hard ...

CDR-LM ... (Laughter)

CDR-LM (Laughter) ... If they say anything, just say, "I told you so." Okay. Remove your purge valve - -

LMP-LM (Laughter)

CDR-LM - - and disconnect your OPS hose.

LMP-LM Yes, sir (laughter). If I can. Okay.

CDR-LM I tell you, I haven't seen anything - Drilling those holes was a piece of cake until I couldn't get that core tube out. I thought that whole - -

LMP-LM I'm glad there were - -

CDR-LM I thought that - -

LMP-LM I'm glad there were two of us.

CDR-LM I thought that whole thing was going to break.
It was bending about - at about (laughter)

LMP-LM Well, next time we have to do it -

CDR-LM Yes.

LMP-LM Let's see, OPS. That must be this one.

CDR-LM Disconnect OPS hose. Connect LM hoses - red to red, blue to blue.

LMP-LM I don't want LM hoses yet. I'll just get on water right away.

CDR-LM Let's put -

05 01 41 01 LMP-LM I'm going to - DIVERTER valve, horizontal.

05 CDR-LM SUIT ISOL, both. I'm going SUIT FLOW, get some flow in this cabin. Okay.

LMP-LM Here, you want me to get it?

CDR-LM I tell you, my hands, after working - at - picking up little things.

LMP-LM I feel the same way. I think you had the worst of it.

CDR-LM Hey, let's keep as much dust out of those connectors as we can (laughter). Wise guy.

LMP-LM Okay. Let's wait on these.

CDR-LM Okay, your diverter valve horizontal?

LMP-LM Yes. And if we - -

CDR-LM Okay, and if you can get to the SUIT FLOW, you can go SUIT FLOW. In the meantime, get your FAN - your PUMP OFF.

Tape 82A/18

05 01 42 08 LMP-LM FAN's OFF. PUMP's OFF.

CDR-LM Joe, are you still reading us down there?

CC Loud and clear, Gene. We're following you close and - -

CDR-LM Okay. I just wanted to see whether you were there.

CC Roger. Following you close here.

LMP-LM Keep us honest.

CDR-LM Okay, we're just looking at 5 psi and all the hatches are battened down, and the safeties are on. You can keep a look at the rest of it for us.

CC Copy that. And we're saying the same thing -

CDR-LM Okay, disconnect your PLSS water. Now what I do, Jack, is - I was going to say put your cover on, but we're going to stow those.

CDR-LM Okay, guess we've got to go off the air for a little while. We're both going O.

CC Okay.

CDR-LM And we'll get on our LM comm here, shortly.

05 01 42 53 CC Roger. Check back in.

05 01 44 49 LMP-LM ... Okay, we got to do some more switching, yet.

05 01 44 51 CDR-LM Okay. Connect the - Okay. Now in - AUDIO circuit breakers CLOSED. Now, both panels, VHA - VHF A, RECEIVE; B, OFF. Okay. MODE ICS/PIT.

05 01 46 01 CDR-LM Hello, Houston. Do you read Challenger on LM comm?

CC Okay, Challenger. This is Houston. Reading you 5 by.

CDR-LM Okay, we're going to go ahead and charge up the - let's see, the LMPs - PLSS.

CC We copy.

05 01 52 56 LMP-LM Hello, Houston. The recharge on the LMP:
95 percent.

05 01 53 03 CC Copy that.

05 01 59 40 CDR-LM Hello, Houston. It's CDR with a recharge of
93 percent.

05 01 59 45 CC Sounds good, Geno.

05 02 08 18 LMP-LM Okay, Houston. OPS pressures: LMP, 6100, and
CDR, 5900.

CC Thank you, Jack.

05 02 18 01 CDR-LM Joe, we're changing a cartridge out in my PLSS.
We've got the battery changed.

CC Okay, Geno; thank you.

CDR-LM You don't have a cold something or other, do you?

CC I'm sorry you even mentioned it.

LMP-LM We can think about it, can't we?

CC Mercy, yes.

LMP-LM Hey. Does Captain America know all about this?

CC Roger, Jack. He does. He's been fully advised,
and his response is - he's sound asleep, now.

LMP-LM Yes. I forgot. He was going to bed before we did
today.

LMP-LM Did he have a good day up there?

CC He surely did. Fine day. And I want to make the
observation - as a casual bystander. It was a
real pleasure to watch your EVA unfold down here.

Tape 82A/20

05 02 19 55 CDR-LM Thank you, Joe. I think you are more than a casual bystander though.

05 02 27 23 CDR-LM Hey, Joe. We've got - 1 and 3 - or correction, 1's replacing the 3s and 2's replacing the 4s on the PLSS.

CC We copy.

05 02 30 51 LMP-LM Joe, we're in the right-hand column of 3-3 now.

CC Roger.

05 02 35 24 LMP-LM Joe, bag - collection bag 2 is 16.

CC Thank you.

05 02 35 01 LMP-LM And the SRC is 32 pounds.

CC Copy; 32 pounds.

05 02 37 03 CDR-LM Okay, Joe. The HEATER is ON for the dump.

05 02 37 10 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 02 41 51 LMP-LM Okay, Joe. The circuit breakers are verified.
On both 11 and 16, with the exception of the line
heater.

CC Okay, copy that. Thank you very much.

LMP-LM Okay, Houston, we're going to turn the BIOMED, OFF.

05 02 44 12 CC Okay.

05 03 06 44 LMP-LM Houston, Challenger. We'll both be off the air
briefly here as we swing into getting our suits
and LCGs off. The Commander presently has his
suit off, and I'll start on mine.

CC Roger, Jack.

05 03 29 43 CDR-LM Hello, Joe; you there?

CC Waiting patiently.

CDR-LM Okay, if you're keeping score on the bottom of
3-4, we're both out of our suits. And does that
feel good.

CC Roger, Gene. Thank you.

CDR-LM Okay, I'm out of my LCG, if you want to turn the
page.

CC Okay, Geno, and how are your hands feeling?

CDR-LM Oh, they're a little tired. On both sides, here.

CC Can't imagine -

CDR-LM But I think they'll pull through.

CDR-LM Do I read this that the - that the LMP sleeps on
bio tonight? Is that right?

CC Stand by. Roger; that's affirm.

Tape 83A/2

CDR-LM Okay, so I can take mine off, huh? My sensors?

CC That's affirm, Gene.

CDR-LM Okay.

CDR-LM Well, we'll - we'll be up to the EVA debriefing time here very shortly.

CC Roger.

CDR-LM Joe, do you know how much time has elapsed since we initially charged our PLSS's with O₂?

CC Geno, it's time to charge them again, if you want to.

CDR-LM Okay, I just might pick that up.

CC All righty.

CDR-LM We'll let you know where we are, though.

CC Okay.

CDR-LM Say, Joe, I guess the home front was probably listening in. Any one talked to them?

CC Haven't talked to them today, Geno. I haven't at least.

CDR-LM Hello, boss, how are you doing down there?

CC Just, fine. Waiting for you guys to go to sleep so we can do the same. Had a great day up there, guys.

CDR-LM Oh, you don't have to wait for that. We're - it was super from here - it's quite an experience, Deke, and quite a challenge.

CC Yes, it looked beautiful from here.

CDR-LM I tell you it makes you feel - feel like you had a good day's work behind you, though.

05 03 34 42 CC I can believe that.

CC We're about to give you the rest of the day off, Gene.

CDR-LM Thank you, Joe.

CC Geno - While you troop are -

CDR-LM Hey, it's 3 o'clock in the - -

CC Go ahead.

CDR-LM Go ahead, Joe I was just going to say, it's 3 o'clock in the morning back there.

CC We know it.

CC It's 3 o'clock in the morning up there, too.

CDR-LM Yes (chuckle) and we know that too.

CC Troops, while you're in a listen mood up there, we're going to be coming at you with a number of items here, not too many, but the first will be some surface block data. Then we're going to read up to you a LEVA cleaning procedure which is fairly simple, a real short geology debrief, a one-line change in the Lunar Surface Checklist. And then, we've been doing some thinking down here about how to fix the fender. And it's going to involve, we think, although we'll work on it while you guys are getting some rest, it's going to involve using utility clamps, from inside your LM there, instead of tape, to fasten some sort of stiff material onto the Rover in place of the missing fender. And we'll go with either with one of your - your cue cards, or possibly with part of insulation that, was the flame blanket protecting the Rover during the landing. Or perhaps part of the packing material that was between the Rover wheel and is probably lying on the ground underneath the LM there.

CDR-LM Joe, you couldn't be reading our mind more. We were talking about that, and there is a piece of it right outside my window. I saw it after we got in here. Either that or back of a part of a data book or something - I hate like the devil to tear one of those other fenders off. And the reason tape won't stick is that everything's got a fine coating of dust, and the only way I could finally get it to stick was to put tape on it - rip the tape off - or take the tape off - which took some of the dust off and then tape would tend to hold it. But it just won't hack it up here.

CC Roger, Gene. That's exactly what we're thinking. And what we're going to do is run through the fix in a pressure suit a few hours from now. And if it looks like we can do it, and it won't cost you many more than say 10 minutes, we're going to have you go through with it. If it takes longer than that, we're going to go back to the drawing board and see what else we can do here.

CDR-LM Well, you know John and Charlie can tell you just had bad it is. I wouldn't have believed it - I guess I didn't believe it, or I would have worked a little harder to make sure that fender was going to stay on. But it - Man, just that short trip back from where we lost it, and we were just covered. The whole - I couldn't even read the parts of the panel on the Rover, plus all the battery covers and everything.

CC Roger, Gene. What we really need, I think, is some white mud flaps up there.

CDR-LM That's a little too old fashioned, Joe.

CC I guess we'd know wouldn't we?

CDR-LM I'm afraid so.

05 03 39 56 CDR-LM Okay, Joe.

CDR-LM MARK. I'm giving my PLSS a second charge right now.

CC We're watching.

CDR-LM You sure of that? You should be getting LMP biomed.

CDR-LM And Joe, give me a hack after about 10 minutes in case I forget on that PLSS recharge.

CC Roger.

CDR-LM Can I do both the - I can do both the water recharge and the O₂ recharge at the same time, can't I?

CC That's affirm.

CDR-LM Okay.

CC Gene, I caution not to tilt the PLSS while you're doing that.

CDR-LM Yes, good idea. Mine's in the station.

CC And, Gene, if - if you want to get the geology debrief out of the way anytime, just give us a whistle on that.

LMP-LM Joe, why don't you give - give me the block data, and then we can go on that geology brief?

CC Okay, are you ready to copy?

LMP-LM Go ahead?

05 03 43 03 CC Okay, Jack surface block data; lift-off times, T21, 128 plus 47 plus 12; T22, 130 plus 45 plus 44; T23, 132 plus 44 plus 18; T24, 134 plus 42 plus 50; T25, 136 plus 41 plus 28. Over.

LMP-LM Okay, Joey, 21, reading in order 128:47:12; 130:45:44; 132:44:18; 134:42:50; 136:41:28. And what's the present rev?

CC Present rev is 20, and readback is correct.

Tape 83A/6

- LMP-LM Okay, Joe, you can go ahead and fire away at the LMP.
- CC Okay, Jack, and for the geology questions. I'm going to turn the console over to the well-known geologist of the Seifort Galaxies.
- LMP-LM Can't hack it, huh? You've all forgotten everything I taught you.
- CC I draw my sword.
- CC Okay, guys, you want me to address first those to Gene - those to Jack, and then address them to Gene later on, or you guys both want to answer them at the same time?
- LMP-LM Well, we're both listening. We can answer them.
- CC Okay, the way you asked that, I wasn't sure.
- CC Okay. Question number 1 is - concerns the Rover mobility rate. The Rover mobility rates over the short span you drove, which is hardly representative, are slower than people had anticipated. Do you think this is due to visibility, terrain, or what? Do you think you can still hack a 7.3 or 8-kilometer minimum or average to Station 2 tomorrow?
- CDR-LM The answer to that is yes, Bob. I think it's partly - partly fam, but it's also the fact that we did a lot of circling. We didn't drive in many straight lines. Trying to find, for the most part, our bearings, and tried to pick some high spots so we could look around. So I think straight-line navigation out in the area we're going is going to be easily 8 kilometers.
- CC Okay, great. Okay. Another question here, Gene, that you should be able to answer with a simple yes or no. Was there any spillage of the material in the drill core while you were breaking it down?

CDR-LM Simple no.

CC Okay. And - -

CDR-LM Spillage out of it?

CC - - Yes, you know, when you broke the sections, did you lose much material out of it?

CDR-LM No, sir; I didn't lose any.

CC Okay, next simple question. When you were drilling the deep core where the neutron probe was, could you see the RTG over the rock?

CDR-LM Yes.

CC Okay. You have any feel for how high the rock is or how low - how deep the thing was with respect to the - with respect to the RTG? Where you down in a level that was below, even without the rocks being there?

05 03 48 10 CDR-LM Yes, I think I - yes. I was in a - in a slump. There was a ridge between us and the RTG, and I had the rock in a line of sight between it and where I put that core. And I'd say the rock was certainly near the ridge and it was - what, Jack? - I don't know was it meter to - meter high for the most part. And it sloped off, and I'd say at least a half a meter high in the line of sight from where the neutron probe is to the - to the RTG. Plus, there's a lot of undulations - I think it'll be below the line of sight, anyway.

CC Okay. And a somewhat more general question, here. It says - and I'll read it. We're still puzzled as to whether there is a dark mantle. Could you say something more about the dark regolith surface? There's a lot of discussion, today, about whether or not it could have been a regolith derived from the intermediate gabbro which you were sampling as boulders.

Tape 83A/8

CDR-LM Bob, I - I think I don't have too much to add to what I said, near the end of the EVA, is that I do not have an intuitive feeling that the regolith has been derived from most of the boulders that we're seeing. But - because those boulders are fairly light-colored, they look like they're probably 50 percent plagioclase. The - it could be that the regolith is derived from some other material that has blanketed the area. I don't think we have that answer, yet.

CC Okay. I copy that.

CDR-LM Bob, the boulders - the boulders we are sampling - I think Jack and I both feel that it's probably - we feel we sampled the subfloor because we saw on the sides of the craters where some of these boulders were exposed almost as if they were bedrock down there. In driving back from what we called Station 1, we - we could definitely see the light mantle out in the area where the potentials of a slide are.

CC Okay, very good. Yes, I think that the - At least, it's a going bet around here that we're sampling the subfloor when we're sampling - at least the top of the subfloor when we're sampling the intermediate gabbro there. The rocks and the boulders.

CC Okay. We also - -

CDR-LM Yes, the -

CC Go ahead.

CDR-LM Bob.

CC Go.

LMP-LM It is sort of strange that we don't see a good population of fine - of finer-grained rocks. These rocks look very much like igneous rocks, but

they're considerably coarser than comparable - well, they're about the grain size of some of the coarse-grain Mare basalts that tend to differentiate the crystalloidalite and tridymite - but we didn't see any of the finer-grain versions. If it's an intermediate crystalline rock, we have not seen any fine-grain equivalents yet. At least not in abundance.

CC Okay, I copy that.

CC We get - we gather that there's no color change in the dark-mantle material at depth. In other words, the footprints, wheel tracks, and the rake sample, et cetera, were sort of uniform in color.

LMP-LM No, there's no major change, but looking out the window and I think I commented on it, the disturbed regolith is darker. Oh, I don't know, maybe by 10 percent albedo, something like that, than the undisturbed surface.

CC Okay, I remember your commenting that when you were walking to the ALSEP, I think, Jack, in fact.

CC Okay, during drilling of the heat flow holes, Gene - -

CDR-LM That's right.

CC - - Was there change in color of the cuttings as they piled up - as you went down in depth? Do you remember any of that?

CDR-LM Yes, Bob, both in the core and the heat flow holes, it really didn't - didn't seem to pile it up like you're accustomed to it at the Cape, and I guess maybe that's because I was kicking so much dust around there. But I looked specifically when I cleared flutes, and what have you, and I didn't see any difference in terms of color, texture, or anything else coming up.

CC Okay, copy that.

Tape 83A/10

05 03 53 04 CC

On the - the outcrops you think you see in the North and South Massifs, do they appear to be linear horizontal, or subhorizontal? Can you see layers, and do you have any feel for the thickness or the attitude or the continuity of them? Can you discuss these outcrops?

CDR-LM Bob, the - going over yesterday, I thought I could see a - a structure dipping off to the southeast, apparent dip anyway, on the eastern side of the South Massif. Or northeastern side. We haven't examined them in detail because we were in a rush to get out. We'll put the binoculars on them and try to examine that question. There's nothing very obvious, any more than you can see on the photos, that the ledges were concentrated in the upper portion (cough) - excuse me - in the upper portion of the Massif's units.

CC Okay. We copy that. Here's a short one that I'll ask Jack since he did it. Again I guess we'll have to prove this - the shade portion of the cosmic ray experiment. The question is, and I repeat - I quote - "Are you sure that the detectors, not the decals, were facing out?"

LMP-LM I am, Bob, because I said I was sure, and I called you on it.

CC Roger. I was sure, too, but I had to ask the question.

LMP-LM I - I under - I know. I understand why it was asked, because I did it wrong at the Cape. But that's why - that's why I mentioned it when I deployed it.

CC Roger.

CC And ready to - Okay, and we can go and recharge the other PLSS whenever you're ready there, guys.

LMP-LM Okay.

- CC Okay, the next question which calls for a little bit of discussion is: The layers of lineaments that you remarked on in the Sculptured Hills, can you say anything about them?
- CDR-LM Yes, Bob, I did. I think I said - and I commented, I'm not sure whether it was the Sun angle or not, but see, I was not looking at the Sculptured Hills. I was looking back at Bare Mountain, I believe. And, to me it looked like there was some organization that was dipping back to the east, somewhere between, oh, 20 and 25 degrees maybe. And it was very obvious to me but I'm a little - a little hesitant because of some of this Sun-angle stuff.
- CC Okay, I copy that. I gather we didn't get any 500-millimeters of these lineations, that right?
- CDR-LM No, but I think we will. I - they were on the western side of Bare Mountain back there, and I think I commented that I thought that Bare Mountain is probably what the Sculptured Hills look like.
- CC Okay, I copy that. Is there a scar above the light mantle material? In other words the slide, is there a scar above that on the South Massif? Can you see anything up there to indicate that it might have come off of there?
- CDR-LM Nothing obvious yet, Bob.
- CC Okay, copy that. On the way back to Station 1, you described a small crater with light material on the bottom. Can you say anything more about that crater?
- LMP-LM Bob, I don't remember saying that, or Gene doesn't either.
- CC Okay. You talked about something that was light I don't remember - I thought it was a boulder, but the question's about a crater.

Tape 83A/12

LMP-LM You're right. You're right, there was a large zap pit in a boulder that was very white. It must have been - the crater for the zap must have been 2 centimeters diameter anyway. And it had about that, or maybe 3-centimeters worth of crushed minerals around it, that gave it a white, very bright white appearance.

CC Okay. Well that was indeed a small crater, so I guess the question was right.

05 03 57 59 CC Let me change the mode here and ask you three or four simple ALSEP questions again, to verify for various people, exactly what happened. Just to make sure that they're clear on it. When - Jack, when you were laying out the geophone leads, you mentioned and asked me if it was all right if the geophone leads crossed one another, if there was EMI problems. And so that made people wonder whether or not it was possible the geophone positions were reversed; i.e., geophone 1 was laid out in geophone 2s' direction, et cetera.

LMP-LM No, that was just a geophone 4 problem. The geophones are in the right directions.

CC Okay.

LMP-LM Geophone 4 fell out of the module and rolled under one of the other lines, or vice versa, I don't know which, and it was - it's crossing one of the other lines, geophone 1, I think.

CC Okay, no problem. Was the - When you went to put the LSPE antenna in the heat-flow socket, you didn't have - weren't able to do it at first, was it because of there was a lot of dust in there?

LMP-LM No, I think it was the same old problem of that piece of - of aluminum foil or whatever it is going down in the socket and jamming briefly.

CC Okay, I copy that. Did you clear out that foil when you did it, or did you just push it on through?

LMP-LM I pushed it.

CC Okay. When you taped the SEP solar cells down, did you - how much of them did you cover with tape?

LMP-LM We taped the back.

CC Ah, very good thinking. And, Geno, a question for you on the Rover when you parked it. Do you have any feeling for the roll angle it was parked at the LM? The roll angle?

CDR-LM Here let me look. Bob, it's pretty flat. If I had to guess, I'd say zero. And you can bias that by a degree or so, but basically zero.

CC Okay, is the pitch scale still on it, or did it fall off yet?

CDR-LM No. I was going to comment on that. It's still there.

CC Okay, very good. Okay, when you went to Station 1A, we're calling the new Station 1 - Station 1A, were the blocks there as well-filleted as those near the LM and the ALSEP? Do they all look the same?

CDR-LM Bob, they - All the boulders had filleting to a slight degree, but not an extreme amount. I think it no more than what is being caused by the redistribution of the darker, fine-grained regolith.

CC Okay, I copy that.

LMP-LM Bob, if had to answer - -

CC Go ahead.

Tape 83A/14

- LMP-LM - - if I had to answer that question, I'd say yes. Yes that the fillet - boulders are filleted over there about like they are over here. That would be my impression.
- CC All right. Is there any indication that the fillets are directional, in other words, that the fillets are heavier on one side than the other?
- CDR-LM Bob, haven't noticed that.
- 05 04 01 49 CC Okay, I copy that. Do you have the feeling that some boulders are more rounded - -
- CDR-LM Well that's a good - - that's a good -
- CC Roger. I agree with that.
- CDR-LM That's a good re - that's a good reminder, Bob.
- CC Okay, do have any feeling that some boulders are more rounded than others? Apparently this looked this way in some of the TV pictures.
- CDR-LM Some of the big ones that are just barely exposed above the regolith looked quite well-rounded. Most of those around the craters are subangular. I think - I got the impression that it's just purely a function of how long the same material's been exposed; but some of the big boulders like the one out near the geophones is quite angular in part and quite rounded on other parts. It's quite variable.
- CC Okay, do you want to say any more about that boulder? Did it seem to have more or less the same morphology, in addition to the variation in vesicle size that the other rocks in the vicinity of the ALSEP, and the other rocks out at Station 1 had?
- LMP-LM It's very comparable to the ones that we saw at Station 1, as a matter of fact.

CC Okay, I copy that.

CDR-LM Both types of rocks were there, both variations.

CC Do you have a feeling for where the big blocks in the LM ALSEP area came from? Do you think they were from Camelot, like I've been saying?

LMP-LM Don't have an idea yet, I'm really not sure.

CC Okay, and as you drove along on the traverse from the SEP to Station 1, did the size of the small craters with blocky rims vary? In other words, what we are looking for here is the variation in the thickness of the dark mantle?

LMP-LM I can't answer that one yet, Bob.

CC Okay. Let me sum up by saying, that I guess as I indicated before, our best guess is that the vesicular crystalline rock, probably gabbro, or I think you've been calling it intermediate basalt or gabbro, forms at least the upper part of the subfloor. I don't think we've been close enough to a large crater rim to say that it's a - what the deep sections of the subfloor form, but we think that this intermediate gabbro vesicular rock, at least medium-grained, perhaps coarse-grained rock, forms at least the upper layer of the subfloor. Over.

LMP-LM Yes, Bob, I think that's pretty safe, right now. Once again, I'm surprised that it's as coarse as it is, that being the upper portion of a plains unit.

CC Roger.

CDR-LM Say, Bob, driving back from Station 1, driving back from Station 1, where we did some of our circling and what have you. We didn't have time to get off, but we did see down in - I don't remember whether it was in the slopes of some craters, or down on the slope itself, but I'd say several meters down below the mantle where there was, what we almost agreed to, might be bedrock at least, a deeper portion of the subfloor.

Tape 83A/16

CC Okay, well, I think we'll get to it tomorrow. I think I might just give you a clue to our thinking for tomorrow. But, I don't think we've seen, or done anything today that is going to make us change very much from the nominal station of - nominal EVA-2 plans. The fact we didn't get the station - to the EVA-1 at the large boulders at Emory is probably going to mean that Station 5 might be shifted a little bit to the boulders on Camelot. But certainly Station 5 on the subfloor and also to Station 10 have assumed a higher priority than they originally had. Other than that I, don't think we'll see an awful lot of changes to EVA-2. Over.

05 04 06 15 LMP-LM Okay, Bob. I think that's safe. I suppose somebody's thinking about the possibility of going down to Emory. Maybe you just said that. Going down to Emory late in EVA-3.

CC I think at the moment they're thinking primarily they're going to Station 10, and not going to Station 1.

CC Okay, Jack, I've wrested control -

LMP-LM Some of your experts might - -

CC Go ahead.

LMP-LM - - some of your experts might think about what they might expect to happen to put the regolith on a bigrain pyroclastic would look like.

CC Okay.

CC We'll tell them. I'll see you tomorrow, guys.

LMP-LM Sleep well, Bob.

05 04 07 29 CDR-LM Okay, I've just got one question, Bob, before you run off. Did the TGA perform okay, with the - with the camera on?

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 04 07 39 CC

As far as I could tell, Geno, it did. As a matter of fact, I didn't see the gravimeter people afterwards to talk to them. But as far as I could tell, it did. We had one funny reading back at the LM very early when it was on the ground, which I'm at a loss to understand right off. But other than that everything seems to have gone very well. The readings were quite uniform in fact, which makes me think they went well.

CDR-LM Okay, well, I'd like to leave it - You know it's a little change in my thinking - I'd like to leave it on the Rover if we can, although it's a piece of cake to take off. It's very difficult to lean over that bar without losing your balance and taking your - your readings and what have you. So if we can leave it on it would be far better.

CC Roger. I was noticing that. And I also noticed the only three - three-ball reading we got was when it was on the ground.

CDR-LM Yes.

CC Gene and Jack, if you'll get Lunar Surface Checklist 3-5, I've got an easy change to read up to you.

CDR-LM Go ahead.

CC Okay. After the line: "Empty ETB As Follows," change the first line which reads, B&W Mag Golf In Forward RHSSC to read, B&W Mag Hotel In LCG Compartment. And then go into the next column, which begins, "Stow In ETB." Change the second line, which reads: LMP's Camera With B&W Mag Hotel to LMP's Camera With B&W Mag Golf. That's Mag G, ETB. Over.

CDR-LM Got you. Hotel, stow it; and go out with Gulf.

Tape 84A/2

CC That's got it. And I've got a LEVA-cleaning procedure which maybe you could pencil in there. It's an easy three-step procedure. And I'll go ahead and read it step-by-step here. Step number 1 is tap LEVA base to remove loose dust. Step number 2 reads: If excess dust still remains, use a towel from the LM tissue dispenser, which has been wetted with water, and gently wipe the visor from the top to the bottom; that is, in one direction. And fold this towel after each wipe to keep the contact surface clean. There's a note. "Take care not to wet the inside that is, the concave surface of the gold visor." And the last step is: Allow it to air-dry. And that's it on the LEVA cleaning.

05 04 11 20 CDR-LM Okay, Joe, we got that. The Commander's PLSS has had its final charge, and we're in the process of working on the LMPs PLSS now. I guess there's no way to verify how much water you've got in there except to go through the procedure.

CC That's right, Geno. And we think you fellows have earned a good meal now, and maybe you can take the rest of the day off.

CDR-LM Okay, Joe. Thank you.

05 04 17 45 LMP-LM Okay, Joe. Just to bring you up to date on magazines. Mag Bravo has 77 frames.

CC Okay.

LMP-LM Mag Hotel has 83 frames.

CC Roger.

CC Jack, on your mag Hotel, we'd showed you all the way up to 183 at one time, on that. Did you miss the 1, this time?

LMP-LM I may have clipped it out, Joe. 183, yes.

CC Okay, yes, you did clip it out, clipped it out cleanly. So thanks for verifying that.

LMP-LM Joe, mag Romeo has 21 frames. And I took a few, random, and probably not very good 500-millimeter of the North and South Massifs - North and South Massifs.

05 04 22 46 CC Okay, Jack. Thank you.

LMP-LM And, Joe, verify that you want mag Charlie substituted for Mag Bravo on the CDRs camera.

CC Stand by.

LMP-LM Don't get me wrong. I think it's a good idea, Joe. Don't let everybody work all night on that one.

CC Jack, I think the answer to that is yes. Per the checklist, by the way. That's the way we show it in our checklist here.

LMP-LM Roger. We just have - probably have a - about 100 frames left on Bravo, so we'll just keep track of that.

CC Jack, it'll go out later on - Bravo will - It's - apparently, it's kind of your backup magazine there.

LMP-LM Okay.

05 04 25 30 CC The reason being, we want to start that EVA-2 with a fresh mag.

05 04 30 31 LMP-LM Hey, Joe. Bob told us earlier, the sounder looked like it was working.

CC Gene and Jack, just a general comment on that. SIM bay's cooking along beautifully. We are getting lunar sounder data. It looks quite interesting. We've only got one or two annoying problems, but nothing major, that is with the SIM bay, not with the sounder. One of them being that we have our usual mapping camera extend problem. And we've just decided to leave it extended and it will serve it right if it gets a little contaminated with an occasional dump. And

Tape 84A/4

I guess there's a minor problem with one of the big antennas. It didn't pass its retract check properly, so I guess it may have to be jettisoned when we do a plane change. Otherwise, things are working beautifully. Over.

05 04 32 05 LMP-LM That sounds great, I'm glad to hear that.

05 05 02 56 LMP-LM Houston, Challenger.

CC Go ahead.

LMP-LM We're sort of around 27:30 in the checklist, more or less, and you want the POWER AMP and TM to high?

CC Ready when you are. And, troops, are you raiding the pantry up there yet?

LMP-LM Yes, we are. We've been hitting it as hard as we can. Okay, POWER AMP is going to PRIMARY and PCM to HIGH. And, while we're waiting for Gene to look at this computer, shall I do the battery management?

CC Jack, stand by, until we get the high bit rate, on that battery management. And, a reminder, are you recharging that PLSS number 2 there, or have you taken that off the line?

LMP-LM No, we're - we're through with that. We caught it with 10 minutes.

CC Okay. We've got high bit rate now. Go ahead with battery management.

LMP-LM Okay, we'll play it - Gene'll work the computer, and I'll work the batteries. And the ED volts are 37.2, both batteries.

CC Thank you.

05 05 05 56 LMP-LM Okay, you got POO and DATA, Joe.

05 05 07 35 CC Thank you.

LMP-LM Okay, Joe, the battery management complete. How does the rest of the spacecraft look, what you can see of it?

CC Okay, Jackie. Copy the battery management complete, and the Challenger's looking beautiful from down here.

LMP-LM I guess you don't have telemetry on dust yet, huh?

CC Negative on the dust. And the computer's yours. Sounds like you've got hay fever sensors, as far as that dust goes.

LMP-LM It's come on pretty fast just since I came back. I think as soon as the cabin filters most of this out that is in the air, I'll be all right. But I didn't know I had lunar dust hay fever.

CC It's funny they don't check for that. Maybe that's the trouble with the cheap noses, Jack.

LMP-LM Could be. I don't know why we couldn't have gone and smelled some dust in the LRL just to find out.

CC Goodness knows we've tried.

LMP-LM Okay, I'll wait for your cue on the rest of it.

CC Okay, Jack. TELEMETRY PCM - LO, and your POWER AMP - OFF, please.

LMP-LM Roger.

CC Challenger, this is Houston requesting DOWNVOICE BACKUP, and then configure your ECS for sleep at your convenience.

05 05 10 51 LMP-LM Okay, we're working in that direction. DOWNVOICE BACKUP, now.

Tape 84A/6

CC Okay, Jack and Gene. And, unless you've got questions, or we can help you out in some way, we'll say good night to you.

CDR-LM Good morning.

CDR-LM The reason I say that, Joe, it's going to be another 30 minutes or so anyway before we - probably more like an hour before we actually close our eyes.

CC Roger, Gene. You think you'll be able to use about 30 more minutes of sleep tomorrow morning? What's your wish on that?

CDR-LM Yes, I'd like to try to get the full amount. As I recall, tomorrow's a little bit flexible. If we get up 30 minutes late, it doesn't really hurt us.

CC Sounds like a good way to proceed. We'll give you the full 8 hours. Good night, Geno. And, you do have a time pad in there, so it shouldn't hurt a thing.

CDR-LM Yes, as long - the big object tomorrow is to get out, and get back in, and the same thing with the next day. I don't think we're really that time critical either day that we can't go an hour either way. And I think we'd prefer to have the full 8 tonight.

CC Roger. We couldn't agree with you more. And if there's anyway we can be helping you now, just speak up.

CDR-LM No, you've been doing - doing fine. We just got a little housecleaning we got to do that's going to take us - I expect we'll be an hour late, Joe.

05 05 21 56 LMP-LM Hey, Joe.

CC Go ahead.

LMP-LM Some ambiguity in your statement. You want us to use a tissue or a towel on that visor cleaning?

CC Jack, they call it - they call it a towel, but it comes from the LM tissue dispenser, so I would interpret that to mean tissue.

LMP-LM Well, you and I are thinking alike. But can you ask back there and find out?

CC Asking right now.

CC Jack, our guess was right on the cleaning of the visors there. We're to use a tissue from the LM tissue dispenser. And I've got an unrelated question for you. We're tracing water usage down here. Could you tell us, please, if you filled your drink dispensers - refilled the drink dispensers in the suit already? Over.

LMP-LM That's affirm. We have.

CC Okay. Thank you.

LMP-LM We have been drinking quite a bit of water, Joe.

05 05 24 59 CC Okay. Thank you.

LMP-LM Houston; Challenger. How do you read?

CC You're loud and clear. Go ahead.

LMP-LM Joe, I just took a - quick look with the hand lens at that large rock I brought in, and I'll - I don't think there's much more than 30 percent plagioclase. I'll go back - could be more of a standard basalt or gabbro. It has a fair proportion of ilmenite in it, I believe. There's a bright platelets - in the vugs or vesicles - of ilmenite. Now it could be that the glass - if the soil is very glassy, that it's developed the darker color from the contribution of the - of the basic minerals through the glass, particularly the iron and the titanium.

Tape 84A/8

CC Roger, Jack. Copy that. Sounds interesting.

LMP-LM All it means is that we don't yet know the origin of the dark mantle.

CC Roger.

LMP-LM That rock - looks I may have, by accident, sampled the front side of one of the parting planes that I mentioned. Very, very sharply bounded on one side by a planar surface.

05 05 29 52 CC Roger, Jack. Say again. You may have sampled by accident the side - the side of what?

LMP-LM No, I didn't. I mentioned when I sampled it, it had one very planar surface, and looking at it more closely, it looks like one of those parting planes that I talked about even earlier in the EVA.

CC Roger. Copy. Parting planes, thank you.

LMP-LM It's like a parting shot.

CC Of which you've been known to have an overabundance, by the way.

LMP-LM Oh, I didn't know that.

CC All us fast finishers do.

LMP-LM That's right. You got to figure out what race you're in though, first, Joe.

CC I'm sure that Sherlock Holmes would have a suitable quotation to answer that, Jack. I just can't come up with it right now. Something like "therein, Watson, lies the problem" - -

LMP-LM That, in itself, is a singular event.

LMP-LM But the dog did nothing in the nighttime, Joe.

CC And when you've examined all possibilities and eliminated all but the very improbable ones, then the improbable one must mean the truth.

LMP-LM I told you, he was a good geologist, one of the experts on the soils of London. Not to mention their relationship to all kinds and brands of tobacco.

CC Jack, maybe we better get off onto another vein. Surgeon's giving me a puzzled look over here. We may be getting in trouble.

LMP-LM You want to talk about veins - now that's something an old ore geologist could talk about all night.

CC Ore geologists and cardiologists alike.

LMP-LM Thou strikest for the jugular.

CC Jack, we running a contest down here to come up with a reply to that. We're getting a request, many requests, for a weather report. We've been missing your weather report and wonder what the weather is on the Moon right now.

LMP-LM Well, the Moon's weather is clear and sunny. It's only scattered clouds, and all of those seem to be attached to the Earth.

CC Except for a cloud of dust around the right rear wheel of the Rover, we've noticed.

LMP-LM Yes, but dissipates in the morning warmth. Believe it or not, Joe, I'm going to be off the air briefly.

05 05 35 15 CC So far, I don't believe that.

LMP-LM Well, if you don't get any heart beat for a little while, don't worry.

05 05 35 32 CC Okay.

END OF TAPE

Tape 85A/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

03 06 22 37 LMP-LM Joe, we're asleep. There's no need to answer.
See you in the morning. [Talking in his sleep
apparently].

END OF TAPE

Tapes 86A-89A/1

APOLLO 17 AIR--TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 08 43 33 CC Hello, America; this is Houston. Good morning, sir.

CMP Roberta?

CC Hey there, Ron. I heard some signs of life there.

CMP Let's see. I - got my DUPLEX, OFF, there so I won't talk to those guys on the surface.

CC That's a good idea. We don't want to wake them up.

CMP (Laughter)

CC Ron, we're going to be going LOS here in about 3 minutes. Just wanted to get you up. We're letting the LMies sleep over - sleep in an extra hour this morning. Over.

CMP Oh, okay. I'll get my Flight Plan out here and see what I'm supposed to be doing. Probably just eating though, I think isn't it?

CC That's right. Get up, turn the VHF A, OFF, change your canister, and have breakfast.

05 08 45 49 CMP Okay. Sounds good. That's what we'll do then.

05 09 11 XX BEGIN LUNAR REV 23

05 09 43 05 CC Hello there, America. How's breakfast this morning?

CMP Scrambled eggs and bacon. Not bad at all.

CC Sounds better than what I had.

Tape 86B/2

CMP It's really not bad. Cocoa and orange juice along with it. Even have four toasted bread cubes.

CC Very good.

CMP Hey, Gordo. Do you have any sort of - some kind of a ground truth wrap-up of the first EVA as far as the type of material they ran across down there and things like that?

CC Ron, I kind of personally - on and off. Let me work on a good summary, and I'll come back to you on that.

CMP Okay. Nothing elaborate but just - you know -

CC Okay. Talking about the America though, your consumables - You're 3.8 percent high on RCS quantity. On the O₂, well - all the points of the three tanks have fallen between the - the two sets of lines on your graph with a total result as on O₂ you're about 10 pounds below the average quantity expected. However, your trend is paralleling the lines and that's of absolutely no concern. On hydrogen, by best guess is you're probably a little bit high, total. Your Tank 1 is right on the line; Tank 2 is - oh, about 6 or 7 percent high; and Tank 3 is about 4 percent high, so you're fat on hydrogen. Over.

CMP That doesn't sound too bad then, does it?

CC No. It sounds great.

05 09 45 45 CMP Sounds good, I think.

05 09 48 56 CMP Houston, America. I can give you the old CMP's medical log, if you want to do it.

CC Okay, Ron. Go ahead.

CMP Okay. PRD is - You didn't cut out on me (laughter). My orange juice is leaking. Okay. PRD is 15038. Had about 6 hours of good sleep. Took me about an

hour to get things squared away last night. Then I woke up early this morning. Didn't take any medication. And I had four cans of fluid.

CC Okay.

CMP Okay, on the menu. Did I give you day 5, meal A, yesterday or not?

CC I guess you did not.

CMP Okay. Spiced oat cereal, sausage patties, instant breakfast, coffee, and a half an ambrosia. Okay. Four frankfurters, ate the pears, chocolate pudding, grape drink, and, in addition, I had a grape punch, package of brownies, package of graham crackers, and two gingerbreads. Yes, for the bottom one there, I had turkey and gravy, and an orange beverage, and if I find my chocolate bar, I'm going to eat it today. But I didn't eat it yet. Oh, yes, and I had the vitamins yesterday too.

CC Okay, Ron.

05 09 52 09 CC Ron, if you'd like, I could give you a summary of the EVA-1. I'm just sort of editing the report put out by the back room on that.

CMP Sure. Go ahead, Gordo; Appreciate it.

CC Okay. I'll read a few selected excerpts here. The surface around the landing site is generally an undulating plain, which was somewhat rougher and had a greater abundance of blocks than was expected by the astronauts. It is saturated with small craters not exceeding a few centimeters in size but not with larger craters. Small craters commonly have glass on their floors. Boulders ranging from about 1/2 meter to 4 meters are common. All of them are partially buried or covered with the dust of the dark mantle. In one locality, a crater of about 1 meter deep penetrated the relatively fine dark surface material and excavated small blocks. Other shallower craters

Tape 86B/4

in this area did not fully penetrate the mantle. This fact, together with the abundance of small boulders on and near the surface, indicates that the dark mantle is relatively thin. A minor amount of dust noted upon landing suggested a thin layer of fine grain unconsolidated material. Footprints and LRV tracks left firm impressions in the fine grain material when darker material was kicked up from underneath. At the ALSEP site, the drill encountered harder material several times and definitely seem to reach harder material at about a 7-foot depth. The deep drill core apparently also bottomed in harder material. In the core, the material was noted to be cohesive, and it contained more fragments than did the surficial material. Predominant rock type between the LM and Steno Crater is medium grained, vesicular or nonvesicular basalts or gabbro. They contain about equal amounts of plagioclase and pyroxene along with less abundant opaque material. The guys took a total of - well, they took a lot of pictures. They had 229 color and 197 black-and-white during EVA-1. And they got 17 samples in addition to the deep drill core. Three were large, unbagged rocks, and the total, excluding the core, estimated to weigh about 13 kilograms so far, and they traveled about 3 kilometers in the Rover. As a summary conclusion, the observations made on the first EVA support the premission interpretation that at least the upper part of the subfloor materials consist of basaltic lava flow. The overlying dark mantle may be part of the regolith on subfloor material, but the possibility that it is an independent unit remains open and will be tested by observations on second and third EVAs. Both the dark mantle and upper subfloor units contain remarkably little foreign material between the ALSEP site and Steno with suggests comparatively young ages. Over.

CMP

Hey, that sounds like a good report there. They - sounds like they got a lot of stuff done and also getting a lot of good information out of it already.

CC Yes. I think that's a safe conclusion. They're going to get a lot more today.

05 09 55 52 CMP Oh, you bet.

05 09 58 01 CC Ron, for your information, the ALSEP seems to be working pretty well. The central station and all the experiments with the exception of one are working normally. The one that's giving them trouble is the LEAM, and the data on the LEAM doesn't seem to want to sync up properly. They're thinking that one over and maybe have something for them to try to get that to - to work right. Over.

05 09 58 33 CMP Oh. Okay. Mighty fine.

05 10 11 45 CC America, Houston. I have a couple of Flight Plan updates to give you. We suggest you take them down before you start the P52, at your convenience. Just so we don't interrupt your preparation for the zodiacal light.

CMP Okay. Got mag XX from the camera, finally. Something about the zero g - it kind of pulls that crazy little cassette back out of the way, and you have a heck of a time getting the lid closed on that.

CC Roger.

CMP Okay. Ready for updates.

CC Okay. Your T-start time for zodiacal light, goes in there at 133:25, is 133 - -

CMP Okay. Have it.

CC - - 28:03.

CMP T-start, 133:28:03.

CC That's correct, and then flip the page over to 134:35.

Tape 86B/6

CMP Okay.

CC And write in "Charge Battery A."

CMP Charge Batt A at 134:35.

05 10 13 12 CC Affirmative. At bottom of the same column, at 134:54, delete "MAPPING CAMERA, RETRACT." And also a couple of lines later, delete "MAPPING CAMERA/LASER ALTIMETER COVER, CLOSED."

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 10 13 36 CMP Okay. We deleted the retraction of the mapping camera and also deleted covering the - closing the mapping camera/laser altimeter.

CC That's affirmative. Above that whole sequence, we have some verifies for you. You can write this in about 134:50. Actually, you better start - start a little higher to have room. "Verify all VHF OFF for sounder pass." And here are the - the steps. "VHF AM, A and B, OFF. VHF AM, RECEIVE ONLY, OFF. VHF BEACON, OFF. And VHF RANGING, OFF." Four steps there. Over.

05 10 14 46 CMP Okay. We'll just verify that all VHF is OFF for sounder operations. VHF, A and B, OFF. RECEIVE, OFF. And RECEIVE ONLY, OFF. BEACON, OFF. And RANGING, OFF.

CC Okay. That's all you got - -

05 10 15 00 CMP RANGING is OFF. BEACON has been OFF. RECEIVE ONLY is ON. Okay.

CMP Hey, Gordy. How's the fidelity on my transmissions with the way I got the microphone set now?

CC Okay, Ron. You sound pretty good to me.

CMP Okay. I don't have this comm carrier on very tight. I just wanted to make sure I was still coming through all right.

CC Yes, think it's perfectly adequate.

CMP Okay.

05 10 18 22 CC Ron, we'd like HIGH GAIN to AUTO.

05 10 18 27 CMP HIGH GAIN to AUTO. You have it.

CC Thank you.

CMP (Cough)

Tape 87B/2

CC Looks like another good one, Ron.

CMP Okay.

CC Was it good? Torque them up.

05 10 19 51 CMP ... at 133:01.

CC Okay.

05 10 25 58 CC America, Houston. Give us ACCEPT, and we give you a vector.

05 10 26 07 CMP Okay. You have ACCEPT.

05 10 28 14 CC America, Houston. It's your computer now.

CMP Okay. Back to BLOCK.

05 10 31 36 CMP Okay. I'm going to enable jets Charlie 3 and Dog 3. Disable Bravo 3 and Alfa 3.

CC Okay, Ron.

CC Ron, just for general information on your platform drift rates. Not too bad. X is minus 0.007 degrees per hour, Y - min - plus 0.002, and Z is really hard to believe. It's a minus 0.0003 degrees per hour.

CMP (Laughter) Hey, that's beautiful.

CC That's got to be some kind of record.

CMP Boy, I guess.

CC We may just cancel all further P52s.

CMP (Laughter) Yes, they're kind of easy here in lunar orbit. All except that one that I didn't get done on time yesterday. By the time I got around to doing it, I was pointing right at the Moon. Roll and pitch. It was daylight, and I couldn't see any stars. Finally got to the right attitude, so that the PICAPAR would work.

CC Roger.

05 10 41 30 CMP Well, Gordo. Looks like I'll lose you right in the middle of this zodiacal light sequencer.

CC That's right. We aren't going to be able to be much help. I'll give you a little warning before T-start. But you're on your own after that, I guess.

CMP (Laughter) Okay.

05 10 47 31 CC Ron, you have about 30 seconds now until T-start.

CMP Ah, hah. Okay. 28:03, we'll start the clock.

CC That's affirm.

05 10 48 49 CC Ron, it's about time - coming up on time to start the 90-second exposure.

CMP Okay.

05 10 50 19 CC Coming up on time to close the shutter now.

CMP Okay.

CC Okay, America. We're just about LOS. See you on the other side.

05 10 51 43 CMP Okay, Gordo. Thank you much.

05 11 10 XX BEGIN LUNAR REV 24

05 11 37 57 CMP And out on the - on the sides of the wall, also, there's another fresh impact just south of ... I guess it's more west really.

CC Hello, America.

CMP Okay, Houston. America's here. The - the zodiacal light sequence worked real well. Oddly enough, I ended up right (laughter) on the right setting with the right times and everything. The only thing is on the 8-minute - on the 8-minute picture, for some reason, I didn't notice that the shutter shut as soon as I took it instead of 60 seconds later. So we just missed that picture altogether.

Tape 87B/4

CC Okay, Ron. Understand.

CMP But the time we worked out good. It was about 2 seconds after the 14:50 - sequence. Not 2 seconds - about 1 second after the 14:50 sequence. And the Sun came up.

CC Okay.

CMP It's going to be hard to - to determine any real relief around the vicinity of Saenger right in there, because it's right at the zero phase point now.

CC Roger.

05 11 43 14 CC Ron, here's some words on what we've been seeing in the sounder and the optical recorder when you get a free moment.

CMP Okay. I'm just kind of looking out the window now, Gordo. Go ahead.

CC Okay. According to our rather crude read-out on film remaining, it looks like we're using more film than we should be in the recorder, and - it's - if you add up the amount of film used according to that telemetry compared to some times when the RECORDER has been ON and also in STANDBY, it looks like there's a possibility they jive to show that we might be pulling film through the RECORDER in - while we're in STANDBY. This is unlikely because it takes a couple of failures that we don't think are really likely at all, but we're going to try to run a little test at 134:50, during that sequence of getting set up with the VHF sounder pass.

CC It will just involve a couple of switch throwings by you to try to conclusively prove that this is or is not the case. Over.

CMP Oh, okay. Mighty fine. Sure. When you get to it there, just holler out the switches because I'll be over at the panel at that time.

Tape 87B/5

CC Okay.

05 11 46 51 CMP I kind of hope our telemetry is wrong.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 11 45 50 CMP Microphone set now?

05 11 49 22 CMP How'd you like to have the PAN CAMERA POWER, ON, here?

CC Okay. We're ready.

05 11 49 35 CMP Okay. MODE is to STANDBY; PAN CAMERA POWER is coming ON.

CMP You know, Houston, just west of Condorcet and on the edge of - -

CC Okay. We need the PAN CAMERA, OFF now, and then go - -

05 11 51 14 CMP - - the hills down in there. Oh, okay. PAN CAMERA is OFF.

CC Roger. Go ahead.

CMP But you get the same vertical - you get the same vertical streaking that we do on the edge of Serenitatis, off in the Massif units.

CC Roger.

CMP Coming up at Picard now. Looking at it - a little bit from a distance, there's a darker albedo that goes about a half a crater in diameter from it. And then, on top of that darker albedo - It only goes out maybe a fourth of a crater diameter - there's a lighter type material - that seems to be covering it up. The lighter type material though only goes in a generally westerly - well, from the south around to the west side and then kind of from the northeast around to the northwest side, and it leaves the dark material draping down in the side of Picard on the east side of Picard.

CC Roger.

Tape 88B/2

CMP It looks like it's a - fairly easy to - When you go around the south to the west side, it has a light material on it. You can pretty well carry a light layer in the top portion of the wall all the way around to that - that part where it stops - where the light part stops. And then you come to a dark layer again - and then - as you continue around from the west to go on around to the north side. It's a little bit in shadow on the east side, so I can't tell for sure whether that light layer's in there or not. But starting on the south side, going around to the west again, you can see a layer of dark - dark material, although it - there doesn't seem to be a change in the slope - in the slope or the inner wall of the crater.

CC Okay.

CMP And then just below - just below the dark layer, again a change in slope a little bit. It maintains that a slope throughout the - all the way down to the crater floor, where you get into the slump blocks. And then in the center of the crater, it looks like a maria-type film with - Yes, I'm about to lose sight of it again, but with something comparable to a central peak in it. And I'll have to get the rest of that a little bit later on.

CC Roger.

CMP You know right west of - I think it's Yerkes or Yerkes or whatever it is - between there and Proclus, there's a real small crater I'm looking at with the binocs. And the reason it stands out is because it's a fresh - fresh crater and yet it's a dark - dark halo all the way around it.

CC Roger.

CMP And it's also dark down on the inside of it. I still don't have a feeling for the relative size of things. I'll try to get that one in the next - next pass around through here. But that's what I would call a small, maybe even in the - thousand-meter bracket. Probably somewhere in there.

CC Roger, Ron.

CMP Am I suppose to charge battery A here somewhere?

CC That's affirm when you get a chance. And also, you are due to turn some switches on panel 230.

05 11 57 29 CMP Okay. Let's see, BATTERY VENT VALVE is still on VENT, and we're not tied together. BAT RELAY BUS BAT A is OUT. Okay; 32 volts. Go to BAT CHARGER BAT A. About 2-1/2 - 2 - 2-1/4 amps.

CC Okay.

CMP And 34 volts on the charge.

CC Okay.

CMP This work gets interesting. After that, I got to go to 230, huh?

CC Right.

05 11 58 19 CMP Okay; let's - You want to get that lunar sounder stuff, now? Sounder's STANDBY; RECORDER is ON. RADAR is ON. RECORDER is OFF. MODE went to VHF.

CC Okay; sounds good.

05 11 58 50 CMP And all the VH - all the VH switch - VHF/AM switches are verified, OFF.

CC Ron, I got one more update for the Flight Plan, unless something interesting at the window. There is no - no hurry on that update.

CMP Okay; let me take another look at the landing site, and then I'll get it. Okay?

CC Okay; fine.

05 11 59 57 CMP Okay, the Sun's getting a little bit higher now. And as I look at the landing site and the albedo - differences in the color in there - the color in the Maraldi Gamma is the same as in the landing site itself. And, also, it looks like the type of material that we say is essentially covering the whole area - goes on out to and includes the annulus of Serenitatis.

Tape 88B/4

CC Roger.

CMP Let's see. Did I mention that - that it looks like - the flow out of Maraldi has gone on around it and down to, and almost encroaches on the Vitruvius A. But, it's breached out of the side of Maraldi. Gone around that depression and up to the side of Vitruvius A.

CC Roger, Ron.

CMP You still get that same bluish - bluish-type tint from the area in the landing site. At station number 2, on the landslide - it's going to be a pretty good - pretty good little depression there. The scarp itself - it looks like they had picked the least-slope portion to go up it. And, that's kind of between Lara - I think Lara's the one, right - the crater just to the west of the scarp.

CC Roger. I haven't been on all your revs. You ever had any - anything you'd call a visual on the IM?

05 12 02 36 CMP No, I really haven't looked that much, Gordo. See, my optics are always pointing up in the air; so I can't use the sextant. The binocs - I'm having a heck of a time holding them still enough to - to concentrate on anything very small.

CC Roger.

CMP Oh, when we're coming around the dark annulus, follow it around, by Menelaus and Tacquet, and then - it kind of changes - seems to change colors a little bit when we get up to the Sulpicius Gallus.

CC Roger.

CMP I guess the only thing you can say is that - the southern part there, in the Tacquet region, has a more of a bluish tint. And, then to me, this has more of a brownish tint to it when you get to the Sulpicius Gallus region.

CC Roger.

CMP Hey, wait a minute. I'm just now passing Menelaus now. So, it changes color right at the - Tacquet and then - at about Tacquet and Menelaus. Sulpicius Gallus is just now coming up.

CMP You know, I think Sun angle has got a heck of a lot to do with that, because this whole thing - in the Sulpicius Gallus region looks kind of brownish to me.

05 12 07 35 CC Okay.

CMP I'll have to check that when the Sun gets a little bit higher when I'm coming across there again.

CC Roger.

CMP Okay, Gordo. I guess I'd better get some work done here. (Laughter)

CC Okay. I would like you to go through all those switches as shown on the Flight Plan. And, when you finish all of those with SM/AC power OFF, I have a couple more for you.

CMP Okay. I forgot to turn the lights on in here. I can't see in the dark.

CMP Okay, MAPPING CAMERA - Is that the right time? Let's see - 49? No, wait just a second on the mapping camera, there. It takes good terminator pictures, too, doesn't it?

CC Ron, go ahead and turn the mapping camera off. Just a minute or 2 ago, it started acting up. We'll turn it off now and troubleshoot it later.

05 12 10 38 CMP Okay. The MAPPING CAMERA is OFF right now. Eight, 30 seconds.

CMP Okay, MAPPING CAMERA is STANDBY. IMAGE MOTION is OFF.

Tape 88B/6

CMP Okay, there we go - STANDBY. Now, IMAGE MOTION is OFF. We got a barberpole ... - a gray, okay. Now MAPPING CAMERA to OFF. LASER ALTIMETER to OFF. Okay, you want the RECORDER to ON, huh? All right. IR is going OFF. PAN CAMERA, SELF TEST is going OFF.

05 12 12 14 CC Wait until sunset on the next one.

CMP And, the o - oh, okay. I can really tell sunset because the - that EVA pole that sticks out here by window 5. Looks like it's lit up now the way the Sun's shining on it.

CC Roger.

CMP Hey, Gordo. How good is that VOX? Could you hear me chewing?

CC No, I can't hear you chewing. Hear you talking fine.

CMP Okay. That's good, then.

CMP That has to be sunset.

CC About the right time.

05 12 16 29 CMP Okay, V is OFF. Now, I'm gonna close the IR COVER, barberpole, gray; UV COVER, barberpole and gray. Okay, turn the old SM/AC POWER, OFF.

CC Okay, Ron. Now - now we want LUNAR - LUNAR SOUNDER OPERATE switch to OPERATE.

CMP Okay. Go to OPERATE -

05 12 17 15 CMP Now.

CC What we're doing this for is to get a readout of the film quantity.

CMP Oh, I see.

CC Okay, we got her. You go back to LUNAR SOUNDER OPERATE switch to STANDBY, now.

CMP Okay, LUNAR SOUNDER is in STANDBY.

CC Okay, that completes that test. I have a couple more additions to the Flight Plan for - for 136:35, is the first one.

CMP Okay, I'm there.

CC Okay, 136:35, add VERB 48 (11102) (01111).

CMP Okay at 136: 35, VERB 48, (21102) and (01111).

CC Okay, that first one is three ones - 02.

CMP Okay, three ones - 02 and a zero, four ones.

CC Right. What we're doing here is making a 20-degree roll by keeping P20 going, to allow them to cal the VHF - I guess they had some unexpected noise on the VHF sounder and they want to - slip this in as another check on it. So, the next step is 136:44 and at that time put in VERB 22, NOUN 78 (plus 072.24), then VERB 58 ENTER. Then some words, "When maneuver complete, wait 20 seconds." Then, a VERB 22, NOUN 78 (plus 052.25). That's plus 052.25. And follow that with a VERB 58 ENTER. And, then one more line - you still with me?

CMP Yes, still with you. Got it.

CC Okay, at 136:47, write in "VERB 48" and we go back to (11101) and zero and four ones.

CMP Okay. At 44, we - VERB 22, NOUN 78 [sic] - that changes to 72.24 degrees. And VERB 58. Okay, then we - we're going to stay at that attitude for 20 seconds. Then change it back to plus-X forward SIM bay attitude again. And as soon as we get back, we'll change our DAP back to two tenths of a degree per second.

CC That's right and what this will do is stick the VHF antenna right straight down at nadir for a count.

CMP Okay.

Tape 88B/8

CC Hey, at your convenience, we need AUTO and HIGH GAIN.

05 12 22 34 CMP You have AUTO.

CMP Pretty convenient when you're laying in the center couch. (Laughter)

CMP (Humming)

CC Ron, I got the morning news, if you're interested and I can watch the clock there for that DATA SYSTEM ON time. Or OFF time, rather.

CMP Okay, sure. Go ahead.

CC Okay. - -

CMP ... setting up the camera.

CC Front pages around the country; they're headlining last night's EVA, as you might expect, with photographs taken from TV monitors showing Cernan and Schmitt doing their tasks. And by the way, their TV camera is spectacularly clear and sharp. It's almost like a regular studio TV. In other news, South Vietnam's President Thieu is - -

05 12 25 47 CMP Outstanding.

CC - - is suggesting that all prisoners of war be released before Christmas. He's also asked that all Vietnamese parties be included in peace negotiations. South Vietnam and the Viet Cong are not directly represented in the secret talks now underway in Paris. Meanwhile, Henry Kissinger met for more than 4 hours, yesterday, with Hanoi representative Lec Duc Tho. The two negotiators are expected to meet again this afternoon. The former President Harry Truman is still resting quietly although his condition remains serious, according to his doctors. American poet, Mark Van Doren, died at the age of 78. He was a professor of literature at Columbia and a winner of the 1940 Pulitzer Prize for his poetry. President Nixon announced,

yesterday, that he wants to extend wage price control beyond the scheduled April 30 expiration. He also plans to freeze new hiring, promotions, and pay increases for executives of the Federal Government. I guess that doesn't include us. The Republican National Committee has a - -

05 12 26 59 CMP (Laughter) I don't think it does either.

CC - - a new chairman - George Bush of Houston, who is now ambassador to the United Nations. He will continue his UN post through the present session of the General Assembly. Both national political parties are now headed by Texans. I simply mention to you, Robert Strauss of Dallas became chairman of the Democratic National Committee last Saturday. And, when you see Jack again, you can tell him he has been replaced by the Nimbus 5 weather satellite which is operating in orbit after being launched from Vandenburg very early Monday morning.

05 12 27 41 CMP (Laughter) Outstanding.

CC Joe Namath - I think you might have heard the football score last night - the Oakland Raiders got to Namath and the Jets in a - in the fourth-quarter and beat them 24 to 16. Namath passed for more than 400 yards, but only scored one touchdown. And Houston weather, we've had two kinds of weather since you've left: it's been either cold and rainy, or chilly and rainy. And, it's foggy and drizzly here again today and temperatures are expected to rise to the mid 40's and go down to a low of 32 tonight. There you have it.

CMP Gee, whiz. I thank you.

CC Any time. You need to get to the DATA SYSTEM switch. And turn on the sounder at - in about a minute.

CMP Okay.

Tape 88B/10

05 12 29 48 CMP Okay. DATA SYSTEM is OFF, 58, 59 - oops.

05 12 30 03 CMP MARK it. Okay, went to OPERATE.

CC Okay.

CMP All talkbacks are still gray.

CC Roger.

05 12 48 16 CC America, Houston. About 3 minutes to LOS.
Spacecraft looks good and the sounder's filling
the Moon with RF energy, just the way it's
supposed to. Over.

CMP Hey, outstanding. Trying to consolidate all of
my trash. Man, I didn't realize you had so much
junk.

CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 13 08 XX BEGIN LUNAR REV 25

05 13 37 22 CC Hello, America. Houston. Over.

05 13 37 28 CMP Hello, Houston. This is America; loud and clear.

 CC You, too.

05 13 46 50 CMP Houston, America. Magazine Lima Lima will be
 starting with frame 54.

 CC Okay. We copy that, Ron. The sounder still looks
 good, perking right away. And the mapping camera
 funny I mentioned earlier - we haven't nailed down
 exactly what it is. Most likely, we think it's
 just an instrumentation erroneous indication.
 And so, we're going to continue with the normal
 schedule of activities on the mapping camera,
 except, of course, for the deploy and retraction.

 CMP Uh-huh. Okay. Well, hey, that - let's hope that's
 what it is then.

 CC Roger.

05 13 49 22 CMP I'd like to change that instruct to frame 55
 instead of 54. I just took a picture of the crater
 on the - well, I guess southwest of Crisium.

 CC Okay, Ron - -

 CMP - - ... different. It's got a light-color -
 light-colored dike or something through the
 central peak in the bottom of the small crater.
 The crater's about - oh, 30 to 50 kilometers, I
 guess, in diameter.

 CC Roger.

 CMP The small crater west of Condorcet.

 CC Okay.

Tape 89B/2

CMP You know, the Crater Peirce has got that same dark halo around its crater, and it extends out - again, you can see it real well out to about a half a crater diameter. You don't see any of the light-colored ejecta on top of it though, like you do on Picard.

CC Okay.

05 14 00 30 CMP Boy, that Scarp sure looks like a flow down there to me.

CC Roger. On the landing site Scarp?

CMP Yes. I don't know how you get it to go up the North Massif, but it sure looks like it runs that way - just from the shadows and everything.

05 14 02 45 CMP Gordo, does this go all the way out to Bessel? Does it cross the annulus ridge there?

CC It doesn't go all the way to Bessel. It stops short of Bessel. About halfway across Serenity from the Taurus-Littrow to Bessel.

CMP Oh, okay. Forgot to look where it stopped.

05 14 04 13 CMP Okay. I ended up on frame 92.

CC Okay. We copy that. Frame 92.

05 14 04 21 CC Okay. Ron, HIGH GAIN to AUTO when you get a chance.

05 14 06 22 CMP Okay. There's our 20 seconds or so.

05 14 18 15 CC Ron, Houston here. We're coming up on some TEI-38 pad, and some flight - and a solar corona pad, and some Flight Plan update any time you're ready?

CMP Okay. Let's see. I think I've got the - ...

CMP Okay. Let's see. I'll get my TEI book here. Okay. All set for TEI-38.

CC Okay, Ron. TEI-38, SPS/G&N; 37580; plus 0.55, plus 0.97; 163:21:54.04; NOUN 81s are plus 2668.0,

minus 1238.0, minus 0414.1; roll, 181; pitch, 114; yaw, 338; rest of the pad is not applicable. Good ole Sirius and Rigel for our set stars; 133, 200, 030. Ullage, four jets, 12 seconds - that's 12 seconds. Ten, the longitude of the Moon at the T_{ig} time is minus 153.71. Over.

CMP Okay. TEI-38 is SPS/G&N; 37580; plus 0.55, plus 0.97; T_{ig} is 163:21:54.04; NOUN 81s, plus 2668.0, minus 1238.0, minus 0414.1; roll, 181; pitch, 114, 338; Sirius and Rigel; 133, 200, 030; four jet, 12 seconds; longitude at T_{ig} is a minus 153.71.

CC Good readback, Ron.

CC Okay. All the rest of our readup here is in the Flight Plan.

CMP Okay. Just a second.

CMP Okay. Go.

05 14 21 59 CC Okay. At 137:33, the solar corona photo pad is T-start: 137:33:48. Over.

CMP Okay. Solar corona pad, 137:33:48.

CC Roger. The next one's over at 139:20.

CMP Okay. Go.

CC Okay. The old one, delete "MAPPING CAMERA/LASER ALTIMETER COVER, OPEN." And at 139:21, delete "MAPPING CAMERA, EXTEND," since they're already there.

CMP Okay. Got them.

05 14 22 54 CC Okay, Ron. At 139:21, where it says, "UV COVER, OPEN," move that down to 139:23. Make the following note. "Delay opening 2 minutes to check operating current with cover closed." We'll be checking that and giving you a cue on that.

CMP Oh, okay.

Tape 89B/4

CC And there's nothing - no problems expected there, Ron, We're just getting some extra data that OSO wants.

CMP Okay. Good deal.

05 14 23 35 CC Okay. The next one is at 141:50.

CMP 141 -

CC 141:50.

CMP 141:50; okay.

CC Okay. We got - -

CMP Okay, I got it.

CC We've got a little - seeing some funnies on the V/H OVERRIDE, so after PAN CAMERA, STANDBY, STEREO, and POWER, we want to add the following: V/H OVERRIDE, HIGH ALTITUDE - HIGH ALT.

CMP Okay, V/H OVERRIDE to HIGH ALTITUDE.

CC Okay, make - -

CMP After you get the PAN CAMERA POWER, ON.

CC Pardon me, Ron. I missed that.

CMP That's right. That's - after you get the PAN CAMERA POWER, ON, V/H to HIGH ALTITUDE.

05 14 24 40 CC Roger. Okay, Ron, the next two are just a couple of info notes for you. I don't know where you want to write this one, but FAO would like to remind you that you don't have any margin on mag Lima Lima anymore; you used up all your margin on that mag. Everything else is needed for planned operation.

CMP Uh-huh! Okay.

05 14 25 10 CC And, the last one just - -

CMP Discontinue spares on Lima Lima.

CC Roger. Just use Lima Lima as scheduled, but don't - don't use any spare shots on it. And the last one is just a sum up here, Ron.

CMP Okay.

CC You obviously are aware of it, but you have not missed any mapping camera, pan camera, or lunar sounder operations to date. And we're all on schedule and right on the Flight Plan - outstanding Flight Plan.

CMP Yes. You bet it's an outstanding Flight Plan. That's great!

CC Yes, Ron. I think you had a really outstanding Flight Plan to be flying at this time of the year, because the weather in Houston is so miserable that you can't believe it.

CMP (Laughter) Oh, boy. That's what everybody keeps saying.

05 14 25 57 CC Roger. I just drove in, and it's kind of a sleety rain. It feels like it might snow at any moment, although it's really not that cold. The ceiling is probably down about 6 - 700 feet. It is really rotten out there.

CMP (Laughter) Yes, we did - we did pick a good time to make the flight then.

CC That's affirmative. It's been this way since you left.

CMP (Laughter)

CC You guys - you realize, of course, that you're going to get - -

CMP Well, we want everybody to get ... - -

CC - - blamed for that, because with two people on the Moon, that's what happens.

Tape 89B/6

CMP (Laughter) Yes, right.

CC Okay. You can get back to work then, if you want.

CMP Okay.

05 14 26 54 CMP See if I can get my solar - solar corona squared away here.

CC Okay.

05 14 27 35 CMP Okay. Solar corona is mag QQ, and we're on frame 69.

CC Okay. Mag QQ, 69.

05 14 31 56 CMP And, Houston; America. Let's see. You're going to send me over the hill in high bit rate this time for sure, are you? As usual (chuckle).

CC Stand by on that, Ron. Let me check in the go on that.

CMP Looks like it.

CC That's affirmative, Ron. You'll be going over the hill in high bit rate.

05 14 36 14 CMP And, Houston; America. Just so I won't get confused there, I put two protect frames at the start of this.

CC Roger. That's affirm. We got that.

CMP I just wanted to try out that - mode contrable [sic] - control cable with the PCM stuff, you know?

CC Roger. Understand.

05 14 44 42 CC Ron, we're coming up on 5 minutes to LOS and just want to update you. We went around the room, and the spacecraft is looking great. We just have one reminder and that's at the end of the solar corona period. Please use only one protect frame - one protect frame per the Flight Plan or per the checklist. And the other thing is - the lunar sounder - the little check you did at the beginning of this pass - the recorder is pulling film as normal.

Tape 89B/7

The glitch we saw was a telemetry grit - glitch and the lunar sounder is looking great.

05 14 45 19 CMP Hey, outstanding! That's good to hear. Sounds like we're getting kind of low on VHBW film though is what you're saying, huh?

CC On that particular magazine; yes, Ron. That's the problem, I think. Looking at the total thing is more - is which magazine has got what on it.

CMP Oh, okay.

05 14 45 52 CC And we'll see you at 01:38:15 when you'll be just about eating. So give us a call if you want anything. We'll be listening.

CMP Okay. I'll be on the loop. Oh - Hey, one thing. Can you check on mag - what do I have on the Nikon now, XX, I guess? It seems to me like - we just need that for another zodiacal light thing.

CC Okay. We got FAO working on that.

CMP ... know is, in other words, are there two or three frames available? Do we have two or three frames available on that one?

CC Okay. Let me check on it, Ron?

CMP Okay.

05 14 46 44 CMP I want to take a red and a blue picture of the landing site sometime.

CC It's going to take a little bit of chasing on that, Ron. We may not have the word before you go LOS, but we'll have it definitely when you come up AOS.

CMP Oh, okay. Yes, don't - No - no problem. I won't use it until we get to the landing site anyhow.

05 14 47 24 CC Okay, Ron. There are 18 spares on X-ray X-ray that you could use.

05 14 47 31 CMP Oh, okay. Good.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 14 15 05 CC (Music: Rite of the Valkyrie by Wagner)

05 14 16 39 CC Good morning, Challenger.

LMP-LM Sounded like Parker has the duty. Both monumental and epic.

CC Jack, that's supposed to take you back to Cal Tech final's week.

LMP-LM (Humming)

LMP-LM How's everything look, Gordy?

CC Couldn't look better. How's it look to you?

LMP-LM Well, it's nice to have rested some.

CC Roger. I'm sure of that.

LMP-LM How do our consumables look today?

CC They look good, as expected. Right on.

LMP-LM Be through in a jiffy.

LMP-LM Stow your sleep restraint up there. I mean, your - hammock. Either way. I'll - I'll just stuff my - I'll stuff all mine in this compartment here, if you'll just get yours in there. Otherwise, we can rearrange it. See how it looks first.

LMP-LM Gordy, you guys held comm pretty well last night, I only remember one - one break.

CC Roger, Jack.

CC Take you off biomed for a minute.

05 14 24 28 LMP-LM We have ...

LMP-LM Well, how about it, Gordy? Are we STAY or NO STAY for EVA-2 prep?

Tape 90A/2

CC It's STAY. Never any doubt.

LMP-LM Thank you, sir.

CC Have any medication?

CDR-LM My report to ...

LMP-LM Okay, Gordy. Status report is excellent. No medication for either one of us. CDR slept 6 hours pretty good; I slept 6 hours intermittent, but generally good.

CC Okay, Jack.

LMP-LM And we've eaten well, I think. The food's a little bit confused since we had our little - minor explosion in the cabin, but - I think you can just say it's good. We've had a lot to drink, a lot of juices. We ate the frankfurters. We're sharing a lot of the stuff because it's not symmetrically packed. If you want more details, it will take time.

LMP-LM Huh? No.

LMP-LM And, Gordy, we did not eat the corn chowder.

CC Okay. Roger. You did not eat the corn chowder, but most everything else on the menu. Is that right?

LMP-LM Yes, we got just about everything else. We got into - maybe mixed up two meals, but essentially - meal B and C for yesterday were eaten, except for the corn chowder.

CC Okay, Jack. We copy. We're wondering if you could come up with a quantitative estimate on the water you've each drunk - drunk and also your PRD readings.

LMP-LM Stand by, Gordy. That may be difficult. Yes, we'll get the PRD a little bit later when we start suiting up.

CC Yes; okay. That'll be fine. My mistake.

CDR-LM Hey, Gordy, on this water. We saturated ourselves before we went out. I finished my drink bag out in the suit on the surface. Jack finished about better than three-quarters of his. We've had water and tea and then the juice, and we have been drinking water constantly - post-EVA. And to give you a quantity is almost impossible.

CC Okay; that's fine.

CDR-LM If the water is down, it's probably because we've been drinking it. And I'm ready for your lift-off pad data.

05 14 29 30 CC Okay. For rev 26, lift-off time is 138:40:15; 27 is 140:38:49; 142:37:22; 144:35:55; 146:34:29; 148:33:03. And the last one, rev 32, is 150:31:37. Go ahead.

CDR-LM Okay; rev 26. Is that the first one, Gordy?

CC That's affirm.

CDR-LM Okay. Rev 26 is 138:40:15; 140:38:49; 142:37:22; 144:35:55; 146:34:29; 148:33:03; 150:31:37. And what's our present rev?

CC Okay; I'll have to check that myself. We're on rev 25. He's about three-quarters of the way across the front side. Coming up back side will start 26.

CDR-LM Okeydoke.

CC And, for your information, he's running the VHF SOUNDER, and it's working fine.

CDR-LM That's good to hear. By the way, good morning, Gordy.

CC Good morning, commander.

CDR-LM How does America itself look?

Tape 90A/4

CC Just as good as ever. I added on the consumables. No problem on the spacecraft systems. Only minor funnies in the SIM bay, but even it is almost 100 percent.

CDR-LM Okay. And I guess from - I didn't hear your comment, but I guess Challenger is the same way.

CC That's affirm. That's the way it looks here, anyway.

05 14 33 15 CC Challenger, Houston. We've been working while you've been sleeping on a fix for the missing fender. John Young has been over working it out in the suit with the mockup Rover, and we have about probably 5 to 10 minutes worth of words. And how do you want to go about that? Whenever you have that much time to listen - It'll be mostly listening on your part - let us know.

CDR-LM Okay, Gordy. Will do.

LMP-LM No. Well, I did but I covered it.

LMP-LM ...

05 14 35 33 LMP-LM Gordy, you've implied that we may be a little behind on water. Is that correct?

CC No. That's - that's not the problem, Jack. I think our concern was more that you - that you were taking enough - enough onboard internally.

LMP-LM Our water.

CC That's right. That you were drinking enough. That's what we were worried about.

LMP-LM Okay; we'll keep pushing it.

LMP-LM Huh?

CDR-LM Oh, a ...

LMP-LM And cold scrambled eggs.

CDR-LM Gordy, we're going to start to eat here. Why don't you talk to us about that fender?

Tape 90A/5

CC Okay; let me round up - John Young. He stepped out - for a second. We'll have him here in a minute. Might as well let the resident expert on fenders talk.

CC Okay; I'll now turn the microphone over to Captain Young.

MCC Hey, Geno. This is John. We spent - -

CDR-LM Hello, John. How you doing?

05 14 40 11 MCC Oh, just fine. You guys are doing a superb job; really beautiful. Hey, we spent some time on this - fender problem and worked out a pretty simple-minded procedure, which involves essentially taking four of those chronopaque pages out of your lunar surface map, ones which are not going to be used for discussing the site, taping them together with gray - gray tape so that you end up with a piece of paper about 15 inches by 10-1/2 inches, and then using the AOT lamp clamp, preposition them full opened, and taking them out, and taking that piece of paper out, laying it on top of the fender guide rails and - and clamping the edges of it with the AOT lamp clamps. It's simple and straightforward, and the beauty of it is you're only spending about 2 minutes in the clamping operation, and it could save you up to about 12 dusting, I think maybe. What do you think?

CDR-LM Yes, John. I - I - I think we ought to try something because you told me, but I - I guess you can't appreciate it until you see it happen yourself. That - that dust without that - that fender is just almost unacceptable. It - this sounds pretty good. How do you want those things taped together?

MCC You just take four pages and allow - Well, I've got the detailed procedures here, if you're ready to copy. Over.

Tape 90A/6

CDR-LM Well, no. I'm not ready to copy yet, but what do you do? Tape the four squares into a bigger square about 16 by 20.

MCC Yes. Allow about an inch of overlap, and tape both sides of them.

CDR-LM Okay.

MCC And then you get the AOT clamps off the utility lights and open the clamp jaws to max. And you stow the clamps, and you roll up the paper - roll up the - roll up your fender shortwise and put a gray tab over that and stow it in the ETB. You got both the clamps and the paper fender in the ETB. And then when you get out to the Rover, you lay the edge of your fender over the inboard guide rail and clamp it, and then you lay the other edge of the sheet over the outboard rail and clamp it. And the only thing you're - really have to worry about is making sure that the inboard clamp is right over the shock strut so that you don't get any interference with the LRV structure when you turn the wheel.

CDR-LM Yes, that's the type of thing I was going to ask about, some of those subtle points. There - there really should be quite aways - Well, I'll look at it - but almost vertical over the hub. Right?

MCC Yes, on the inboard one. On the inboard one. On the outboard one, if you put it a little further back aft on the wheel, it - it allows you to - it allows you to give your paper fender a little more rigidity.

05 14 44 10 CDR-LM And you just say lay them over the guide rails, so the clamps - put the clamps - so the clamps are also over the guide rails. They're not trying - align that - the makeshift fender in the guide rails itself, huh?

MCC No, it - Just clamp the thing right to the rails. Just allow a little overlap, and clamp that rascal right down. And I know you can tighten those clamps down so good it'll never get loose. I know - I know you can do it if I can do it.

CDR-LM Okay, John. I think I know what you're talking about, and I'd sure like to give it a stab. The only hooker is I hope that tape holds the fenders together well enough - -

MCC Yes, they - -

CDR-LM - - the pieces together well enough.

MCC Roger. One of the things - when you're taping the - the pages together that you want to be careful of is that you - is that you make sure and get the air bubbles out so when you get in a vacuum, it doesn't open up by itself. And maybe you can put an X across there to - to make sure that you - if you get any separation - that's it's still held together pretty good. We think the tape will work - -

CDR-LM Okay.

MCC - - think the tape will work because back about in 13, we were using it just sort of incidentally in the thermal vacuum chamber, and it worked okay there for some reason.

CDR-LM It would seem to stick on the surface okay if I could find a dust-free spot when I put that other fender on earlier.

MCC Yes, I agreed.

CDR-LM As far as - as far as how much of the new fender to overlap on the present fender, just make it about symmetrical with the other side, and that probably ought to give me plenty of overlap, huh?

MCC Well, if you - are you talking about over the dovetail part of it, or are you talking about off the aft end of the - of the vehicle?

CDR-LM I'm talking about - about the present fender that's on there, the aft end of that fender. About how much overlap do you want with this makeshift fender? Just give me an idea. I think I could figure out when I get there, but I'd rather have your feelings before I do.

Tape 90A/8

MCC We think if you get it out about 4 inches past that fender - You understand what this looks like when you get it put on the fender. It just looks like sort of a roll, and you end up with a sort of a straight fender right at the back end of the - of the - of the Rover - a sort of a straight - about half a pipe straight out there. And, if you get it out 4 or 5 inches, that will keep the dust from coming back over the vehicle.

CDR-LM Yes, that would be about where I want it. That would be about 4 or 5 inches.

MCC Yes, it's just sort of like a - a horizontal fender, like on a - a old automobile.

LMP-LM I thought I understood what he was talking about.

MCC Say again, Geno.

LMP-LM Hey, John. This is Jack. Did you say pipe there a minute ago? P-i-p-e?

05 14 47 56 MCC Yes, but it doesn't roll up into a circle; it's sort of a - a hemisphere. I mean it's half of one.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 15 07 XX

BEGIN LUNAR REV 26

05 15 36 33 CMP Houston, America.

CC Hello, America. How are you doing?

CMP Well, I think I've got it back under control again.

CC What happened - any problems?

CMP Let's see. Let me go back to my - Well, I almost got into gimbal lock (laughter).

CC Okay. You almost got into gimbal lock. Go ahead - -

CMP Just at the last step of the - last step of the solar corona thing which says go back to CMC AUTO - which wouldn't have been too bad, except as soon as you get a waste water dump, it really torques it around, I guess. And, somewhere - you ought to be able to check it back on the tape - at about 137:50 - between 50 and probably - no, between 55 and 58, somewhere in there, I got the GIMBAL LOCK light and all those good deal things; and got her under control. Took her back. And we got back to SIM bay attitude at 137:59:20. In the meantime, while I was doing all that, looked like my waste water dropped down kind of low, too. How much are you reading down there?

05 15 38 25 CC Okay. Stand by on that, Ron.

CC We're reading 0.16 percent and 0.9 pound - 1.6 percent and 0.9 pounds, Ron.

CMP I didn't quite make it to zero, did I?

CC Ron, that's affirm.

CMP Okay. Caught that in time, anyway.

Tape 90B/2

CC Hey, Ron, just a question, here. Pick up where you were briefing us there. Did you go to CMC AUTO after the solar corona, or did you get the GIMBAL LOCK light prior to going to AUTO.

05 15 40 04 CMP (Laughter) I got it prior to going to AUTO. I forgot to go to AUTO after the solar corona thing.

CC Okay. We've got you.

CMP The full cell purge and the waste water dump. Yes.

CMP I saw it before it tumbled the platform, though.

CC Roger. We've got you, and the platform looks good then, too?

CMP Oh, yes. The platform's okay.

CMP And if Enco's [?] timing his bit rate forces there, high bit rate was - I mean going to low bit rate is about 137:42 - was pretty - -

CC Okay. We copy that.

CMP ... this thing. Okay. And then going to high bit rate, I've got the high bit at 137:50:30. And I hit LOW BIT RATE again at 138:08; went to HIGH BIT RATE at 138:14.

05 15 42 05 CC Roger, Ron. We copy those times.

CC Sounds like you might have got your heartbeat going good for your eat period. Is that right, Ron?

05 15 43 17 CMP (Laughter) Yes, might have. I'm going to have some peanut butter now, if you guys don't care.

CC Roger. It's your eat period.

CMP (Laughter) Okay.

CC At least he didn't forget this one. Ron, we've got some data here for you.

CMP Yes, that's right, by gosh. I've even got one scheduled. Go ahead.

CC We've got some data here for you, for - if you're planning on taking those red and blue filtered exposures across the landing site - if you want this information.

CMP Oh, yes. Okay; go ahead.

CC Okay, Ron. Here is - here it is. It's a Nikan [sic] - NK - November Kilo 55; VH - VW; mag X-ray X-ray. Okay. With the red-blue filtered exposure you want it at F/11, 1/125, one frame each filter; F/11, 1/250; one frame each filter. With no filter, expose at F/11, 1/1000. And if you want to use the polarizing filter, expose at F/11, 1/500 of a second.

05 15 45 25 CMP Okay. Looks like we'll bracket it, there: F/11, 1/125, one frame on each filter; and F/11 at 1/250, one frame on each filter; and without a filter, one - F/11 at 1/1000; and polarizing F/11 at 1/500.

CC Okay. Here's a note that I'm not sure I understand totally, but let me read it to you. "Observe targets through viewfinder and shoot as desired with polarizing filter in different positions. Mark exposure time with polarizing filter as data analysis requires the incidence angle."

CMP Okay. So we need the GET time when we take the picture.

CC That's - that's affirm - with the polarizer.

CMP ... Yes. Yes, with the polarizer. Right.

CC And there's another note here. Do not exceed 18 frames total for the above pictures. 18 frames total.

CMP Okay.

CC And your TCA - TCA is - for the landing site - is 138:39:11.

Tape 90B/4

CMP Okay. TCA is 138:39:11.

CC And, Ron, if you'll just give us a MARK when you make the shot. That'll be close enough and we'll - we'll mark the time here on those polarizing ones. So we'll get the angle that way.

05 15 47 22 CMP Oh, okay.

05 15 49 37 CMP Lost the freaking camera. ...

CC Ron, we'd like ACCEPT on the computer. We have a new state vector for you. Your downtrack there got to be in excess of 30,000 feet, and this has nothing to do with your backside water dump just now - it's just accumulation of errors in the path.

05 15 51 53 CMP Oh, okay. You have ACCEPT.

CC Ron, it's your computer.

CMP Okay. Going to BLOCK.

05 15 57 11 CC Okay, Ron, anytime you want to reach up and go AUTO on the HIGH GAIN - your - your convenience.

CMP Okay. Stand by. Is it 1/500? Yes. Stand by.

05 15 58 37 CMP MARK it. And the polarizer all the way to the left. Stand by.

05 15 58 45 CMP MARK it. That's the polarizer all the way, counterclockwise.

CC Got you.

CMP Okay. That's eight pictures. Okay. Stand by. Okay. Wait a minute. I lost the landing site. Stand by. Okay. Stand by.

05 15 59 34 CMP MARK it. It's all the way to counterclockwise. Stand by.

05 15 59 42 CMP MARK it. And that's all the way clockwise.

Tape 90B/5

CC Roger. We got them.

CMP Frame 23 and 24 - I mean - yes, 23 and 24; we're looking north along the ridges there. The other two polarizers - the two before that were looking at the landing site. Then I had three - three red ones at a 1/500 and 1/250 and a 1/25th and the rest 16. And, the blue one's at the same thing.

CMP And we're setting on frame number 25 on mag XX - that's XX ...

05 16 01 03 CC Roger, Ron.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 14 48 08 LMP-LM Oh, okay. I thought I was with you until you said pipe, and then you lost me. Okay. I think I understand, too.

CC You know the problem I have with communication.

LMP-LM Hey, thank you, babe. We'll give it a try. In a week, we can get something to work.

CC Okay. And we can watch you on the tube - and make recommendations if - I think you've got the idea of it. And, you know Terry Neil thought of these AOT clamps, and that's a great idea because you can - you can clamp those things on that - that old dog tail, you can put a force on there, that - those pages - that chronopaque pages will never get loose.

CDR-LM Yes, on those other clamps we had, I was thinking about - paper clip - type clamps would never hack it.

CC We tried that - they just don't have - they don't have the push.

CDR-LM Sounds good, babe; appreciate it.

CC Okay. We've got a detailed procedure here if you're - if you want to copy it; just in case.

CDR-LM Yes. Stand by 1, though.

CC Okay.

CDR-LM Hey, you know, after thinking and looking at the map last night, and recalling what I saw during landing and where I was planning on putting it down and everything, I still think, to the best of my knowledge, that we are about 1 or 2 o'clock, and I'll increase up to about 200 meters or so west and slightly north of Poppy.

Tape 91A/2

CC Okay, Geno.

CDR-LM ... ahead of you ...

05 14 50 56 CDR-LM Hey, Gordie, the thing that fooled me yesterday is this depression out at - out at 9 o'clock here, which I - is greatly undersized for Trident, really isn't Trident, and I said yesterday, I didn't think how we could be that close. Well, we really aren't. Trident is way out there, and I'll still hold to my 200 meters at 1 to 2 o'clock of Poppy.

CC Okay. We're thinking you might have, on the way to the geology stops, driven between a couple of the Trident craters then.

CDR-LM Yes, we may have coming back. I think I went all the way around to the east of the last one going out, though.

CC Okay.

CDR-LM If you had asked me at 3- or 4000 feet where we were going to land, I could have told you exactly. But, once you decide where it's going to be, then you decide where in that where it's going to be if you forget everything else around you.

CC Roger.

CDR-LM Besides, Gordy, when you land on a boat, all you're worried about is that the boat's there. You let the captain worry about where it is.

CC Roger.

05 15 54 51 CDR-LM Gordy, while we're eating, have you got a short synopsis of the news?

CC Yes. Sure do. Stand by 1. We'd like BIOMED, LEFT, please.

CDR-LM I don't have any sensors on, Gordy.

CC Okay.

CDR-LM You have to wait until I start putting my suit on.

CC Okay. As you might have expected, front pages around the country are headlining last night's EVA with photographs taken from TV monitors showing you and Jack going about your tasks. I might add that the TV camera is really spectacular. It couldn't have been a clearer or more beautiful picture, both for fidelity and color. In other news, South Vietnam's President Thieu has suggested that all prisoners of war be released before Christmas. He has also asked that all Vietnamese parties be included in peace negotiations. South Vietnam and the Viet Cong are now not directly represented in the secret talks now under way in Paris. Meanwhile, Kissinger met for more than 4 hours yesterday with Hanoi representative Le Duc Tho. The two negotiators are expected to meet again this afternoon. The former President, Harry Truman, is still resting quietly, although his condition remains serious according to his doctors. American poet Mark van Doren died at the age of 78. He was a professor of literature at Columbia and a winner of the 1940 Pulitzer Prize for his poetry. President Nixon announced yesterday that he wants to extend price controls beyond the scheduled April 30 expiration date. He also plans to freeze new hiring, promotions, and pay increases for executives of the Federal Government, which doesn't affect us, I guess. The Republican National Committee has a new chairman.

CDR-LM How about me?

CC George Bush of Houston, who is Ambassador to the United Nations. He will continue his UN post through the present session of the General Assembly. Both national political parties are now headed by Texans. As you recall, Robert Strauss of Dallas became Chairman of the Democratic National Committee last Saturday. And Jack, I'm sorry to say that you've been replaced. The Nimbus 5 weather satellite is now operating after its launch from Vandenberg early Monday morning.

LMP-LM Can it talk?

Tape 91A/4

CC Joe Namath tried mightily to lead the Jets to the play-offs, but the Oakland Raiders grounded the Jets in the fourth quarter, 24 to 16. I think you have already heard that score. Namath passed some more than 400 yards, but he was only able - New York only scored one touchdown. And the last item concerns the Houston weather, which is been - there's been two kinds of weather since you all left us: That's cold and light rain and cold and heavy rain, and it's still doing it. Fog and drizzly rain are here now, and we're only supposed to get up to the mid-40's and probably down to 32 tonight. Over.

LMP-LM Holy Smoly. That doesn't sound too good on the weather. I'm going to take a look, right here up the overhead window.

05 14 59 55 LMP-LM Gordy, you're right. There's a band of clouds that comes right up the coast of Mexico. Looks like it comes ... Old Mexico and then gets very dense as it comes up into the Texas area and southeastern part of the United States with a - with a counterclockwise rotation which gets very dense down over the Atlantic, I believe, off the east coast - southern east coastal states and from about, oh, I'm guessing, maybe the center of Texas straight north, straight east. It looks like the whole country's cloudy.

CC Roger.

LMP-LM Baja looks nice; west coast of Mexico looks nice.

CC Roger.

05 15 00 54 LMP-LM At Taurus Littrow, the weather's great.

05 15 04 05 LMP-LM Hey, Houston; Challenger.

CC Go ahead.

LMP-LM Roger, Gordy. How's the ALSEP doing and in that light I hope you people will take as close a look as you can at the signal strength and its variation and see if you get some idea whether, when I

go after the neutron flux tomorrow, if I ought to work on that antenna alignment again. I'm still a little bit concerned about it.

CC Okay, Jack. We'll consider that although they've been getting good performance out of the central station, as I understand, and a couple of problems with the experiments. One was the LEAM data isn't syncing up like it should. I'll have to get a further, more complete story on that. And we're thinking that's - -

LMP-LM I told you --

CC -- mostly on ground software problem. The other one is the LSG isn't leveling up properly, and we'll cover this further in the planning briefing for the EVA here, but we're probably going to let you off - I mean have Geno let Jack off at the Rover - I mean at the ALSEP. Let him off the Rover at the ALSEP and take another look at the leveling on the LSG. That'll be at the end of the EVA.

LMP-LM Roger. I may just run out there and let Gene pick me up after we - after I turn - well - while he fixes the fender maybe - We'll work that out, Gordy. I'm joking, but maybe I could go kick the LEAM - that might help it.

CC Let's make sure we've got all our problems solved down here before you do that.

LMP-LM Okay, hey, Family Mountain, the northeast facing slopes, although lower has boulders and outcrops. I mean, below the outcrop. It has boulders from local block concentrations. Looks very much like the South Massif does.

CC Roger

CDR-LM ... the old sinuses ...

CDR-LM I've about had it, I think.

LMP-LM ... chocolates?

Tape 91A/6

CDR-LM Huh? No, I've had two.

LMP-LM Oh. ...

05 15 09 50 LMP-LM Hey, Gordo, we're still eating, but let me give you a few observations. That outcrop I talked about that was way at the top of the South Massif at the break in slope - at the very top of the break in slope - almost looks - it's hard to tell that it's in place outcrop up there. It's hard to convince myself that it is. Looks like there's some very large and many, many small fragments of large - like 3- and 4-meter rocks up there and a lot of smaller fragments. I've seen that type of thing in a number of places over the South Massif. However, I - do see - they also, they all seem to be sitting on top of the South Massif surface, but I do see one other area that it looks like there is a - it is protruding from within some sort of mantle on the South Massif. So conceivably some of that could be a place [?] An additional impression I got is - is that at least with the monocular, that those fragments - those boulders look much more angular than what we've seen here. And, for the most part, they appear to be - if covered at all - very little by any mantle except the one I just mentioned.

CC Okay. Copy that.

LMP-LM And, Gordy, through the monocular, in contrast to the tan gray of the South Massif, those large blocks up there look blue - very distinctly blue-gray. Not unlike Gene mentioned yesterday, anorthosite - anorthosites look in certain terrestrial environments.

CC Roger, Jack.

CDR-LM And, Gordy, now that I get my - my three-dimensional eyeballs working, I can look up on the scarp - out to 9 and 10 o'clock. It's practically the same color as the South Massif. It just looks to be very undulating. I see no outcrop evidenced from here in the scarp. I think I can just about see where Hole-in-the-Wall is, but it's so subtle that

I can't really tell you much about it. And the local terrain, which I think is the southern rim of Camelot, just about blanks out where Hole-in-the-Wall should be - just about covers it up. But what I can see in a small little saddle to our local horizon here in front of us - I can see out there just about - oh, I'd say a 100 meters or so to the south of Hole-in-the-Wall and it just looks like a subtle undulating slope. We can't really tell too much the steepness from here.

CC Okay, Geno, we're - Stand by 1.

CC Okay. I had something for you, but we just decided to cancel the call. Although, when you do get out the prep and post card, I have one write in for you so just holler when you're - when it's handy.

05 15 13 25 CDR-LM Okay.

CDR-LM We're wrapping up our eating and drinking, here now, Gordy. We'll be ready to go in a minute.

CC Okay.

05 15 17 20 LMP-LM Gordy, Challenger. Could you ask somebody there in the FAO console to, - where the hiking kit is - is stowed?

CC Okay. Will do.

05 15 20 00 CC Jack, take a look on the right-hand side stowage compartment there, on the forward lower corner under the LEC kit compartment.

LMP-LM Gordy, you broke - broke up with the changeover or something. Say again.

CC Okay, Jack. You're right. I got caught right in the middle of a site handover. Look on the right-hand side stowage compartment, the forward lower corner, under the LEC kit compartment.

LMP-LM Fantastic. You picked the one place I'd never look.

Tape 91A/8

05 15 25 57 LMP-LM Houston, Challenger.

CC Go ahead.

LMP-LM One quick thought about the gravimeter. And I'm sure it's been mentioned, but I'll say it. During the CF squared we asked about that bundle of wires that has contact with the gimbal - and when I deployed it, that bundle was - it still had contact with the gimbal and everybody at the CF squared said that was okay. But, you might think about it. I don't know what I could do to help if that is the problem. But that might be causing the problem here that it wouldn't cause on Earth.

CC Okay, Jack. I'll make sure the experts hear that.

CDR-LM Gordie, everthing okay at home today?

CC Yes, everything is fine here.

CDR-LM Well, thank you.

CC I'm not sure I copy your question precisely. Haven't talked to - to your home today, at all.

CDR-LM Okay. Don't - don't worry about it. I just thought you might have heard.

CDR-LM Well, if you hear, Gordie, just tell them they're missed.

CC Okay; I'll sure do that.

LMP-LM Gordie, has anybody heard from Tucson recently?

CC Check on that, Jack. Just a minute.

LMP-LM And, Gordie, if you have any updates to the EVA-2 checklist, give me a yell.

CC Okay. The update I do have - I think the EVA checklist changes, we'll just call you, real time. But, I do have one for the prep card.

LMP-LM Go ahead.

05 15 31 07 CC Okay. On the front side there, middle column, lower half at 138:45 OPS CONNECT, half-way down, it says install PURGE valve in PGA, red to red. Mark that LMP serial number 211; CDR, 208. This is to maximize the OPS operation, should you have to use it.

LMP-IM Okay. Give me the numbers again, please.

CC LMP, 211; CDR, 208.

LMP-IM I take it those are serial numbers.

CC That's right, the serial numbers on the purge valve.

05 15 33 07 CC Okay, Challenger. This is Houston. Would you like to have a little update on the EVA plans?

LMP-IM Do you want me to take notes?

CC No, I don't think there are essentially any notes required. I'll make a few real-time callups to you; but, I don't think there's anything you really have to write down.

LMP-IM Okay, Bob, I didn't realize that things were getting a little hectic yesterday. But, if we end up making any changes where I don't need to get a charge in my hands - that's an awfully good thing to call, because not only does it tire your heart - your hands out holding it, but it means you don't get as many pictures or Rover samples or anything else.

05 15 33 54 CC Roger. You guys are just ahead of us there. We were trying to get that up to you. Okay. No, I don't think there is anything here that really needs to be written down. I'll go through with you first, and we can talk about details and writing in, if you want to on any of them. But, I don't think there is anything that really needs to be written in. The EVA - it is going to be essentially nominal, with two minor exceptions. One is the - we've allowed about 5 minutes extra at the LM before leaving for the Rover fender fix; and, John, we'll be talking to you about that in a minute. And the second big change, is that we're also extend - allowing 5 more minutes at the end

Tape 91A/10

of the EVA so that we can have extra time for dusting. And I suspect that if the Rover fender fix works and we aren't getting as dirty as we did last night, then we may gain back that 5 minutes. We're also allowed - well, what we've done is we've taken the time here out of some of the tasks at station 3 and station 4. And along with the fact that we think you're a little bit farther east than planned - and we're allowing 4 minutes additional driving time. But again, that's all real time, and if we're doing well on time, we can reinstitute all those tasks and get rid of the 5 minutes that we are allowing here, there, or elsewhere. So that's just sort of to keep in your thinking.

05 15 35 24 CC

There is a possibility that we'll have some additional overhead at each stop, depending on what the Rover battery temperatures are when you get out this morning. If the Rover - if they're high again, then we'll have to probably park at least on some of the stops, if not all - with the up-Sun heading and dusting the battery covers and then opening them to let them cool. But, again, that will depend upon what we find on the Rover batteries when we get out this morning.

05 15 35 53 CC

The variations that we found on the surface of the South Massif indicating a possibility of layering - I guess you saw those mostly with the monocular and the observation of boulder tracks and the size of the Massif emphasizes the importance of sampling boulders that can be traced to sources at various elevations of the Massif. And I guess we should say that's hopefully. And we'll just have to see what happens when we get down to station 2 on that. But, if we see boulders with tracks, I'm sure you guys remember that they obviously will have a higher priority. Since we didn't get to Emory, and since we didn't really get to the rim of Steno itself, the question of sampling of the actual subfloor is still somewhat ambiguous although there is a large consensus opinion that says that we sampled the subfloor when we sampled that intermediate Gabbro that we sampled yesterday at both the ALSEP and station 1. The - here is a possible alternative conclusion which says that the subfloor

has not been sampled, but that these blocks that we sampled and the surface are both parts of a later flow. And, in that line, we're still looking for specific observations which will help us distinguish between whether or not the dark mantle is a - whether the dark mantle is a separate unit from the intermediate gabbro that we're seeing or, whether it's the - Stand by.

05 15 37 30 CC

Okay. Whether or not the dark mantle is an entirely separate unit from the intermediate gabbro you were sampling yesterday or whether it just represents the top of very well churned up layer of a flow that was later than the subfloor - if you see what I'm saying there. All this says is that we're very interested, of course now - -

CDR-LM Roger, Bob.

CC

- All this says that, we're very much more interested in station 5, as you might expect, than we were before. And I guess, for this reason, we'll be trying to keep the time line a little tighter than usual to guarantee that we've got some time left over at station 5. And, we're also interested in moving perhaps - in perhaps moving station 5 from its present location there in the southwest of Camelot over to the southeast or east or some location where we have a feeling that we've got big boulders up on the rim. This would be so we could sample, hopefully, some of the light material and some of the boulders together and get a better confirmation that the materials from deep in the subfloor unit is this intermediate Gabbro, as opposed to just material from the upper part of the subfloor. It's just a matter of proving to ourselves whether or not the boulders we sampled yesterday are from deep within the subfloor, or only at the surface of the subfloor; or, perhaps, as I said, the other alternative being that the intermediate gabbro is part of the dark mantle, and we're seeing a churned-up regolith on top of it - sort of being the gaseous upper part of the flow having been broken down rather rapidly into the dark mantle. Okay, stand by a minute.

Tape 91A/12

05 15 39 14 CC

Okay. To summarize that again, reading - I guess I got ahead of myself here in the little deal they wrote up. At the present time we have two working hypotheses for the dark mantle, the gabbro - and the gabbro relationships to each other. One: the crystalline rocks that we found in the gabbro are an upper unit of the subfloor with their dark mantle cover unrelated to them in time. Key observations that they suggest here, are stratigraphy at Camelot, station 5, and other steep craters. Especially, perhaps, the trench and sheltered spots which are unguarded - unguarded, as in plowed - for an older regolith underneath the dark mantle, if such a thing could be found. We don't think we found that yesterday. Or, look at the superposition relations between dark mantles and boulders or, the mantles - instances of the mantle on the boulders or, inversely, of small boulders on the mantle.

05 15 40 06 CC

The second working hypothesis is that - is that the dark mantle is regolith derived from a vitreous, vesicular, flow top of the crystalline rock flow beneath. And, it again goes to say that perhaps the re - gabbro that we sampled yesterday was indeed the late flow; and what the regolith was, was derived from the vitreous, vesicular flow top, as it were. Again, many of the same observations are called for. In particular, they'd be interested then in looking at the coarser fines as they define as from a millimeter to 20 millimeters, for some sort of transitional lithologies and textures. In other words, what do the small walnut-size rocks looklike, if you can in hand specimens? If I can get more specific in terms of EVA mechanics, let me say that we'll call out in real time the deletion of the tasks at stations 3 and 4, if they become necessary. And what we're planning on doing is, deleting the trench in the base of the scarp at station 3, and also, deleting the radial sample of the - on Shorty at station 4. That's the provision that we're planning on. And depending on how the time is going, we'll call that out real time. We also have - The experiments remain pretty much the same. We'll deploy the charges at the same locations as we're planning in the checklist at the present time. We also don't - for your

planning further ahead, we don't anticipate any significant changes in EVA 3. The charge number 5, which we were going to deploy at Emory, will not - but didn't, will not be deployed during EVA 2, but we'll deploy it on EVA 3 out at station 10. And, what we're going to do there, is when you take the 8 pounder and put it between the seats, we'll then have the 3 pounder left over, and we'd like to put that on one of the footpads in the Sun - that's probably either the minus-Z or minus-Y footpad. And, we'll leave it there in the Sun until the start of EVA 3, in which case we'll put in the Rover underneath the IMP's seat. And, thermally, that looks okay. There is a probability that we're going to play the "return to the ALSEP game," and we're going to do this for a couple of reasons. One, we're going to go back and look at getting some more ALSEP photos. I guess Gordy says you've got that. And, that will probably be at the end of EVA - in fact, it will certainly be, if it happens, at the end of EVA 3 when you go back to get the neutron flux probe. I might also say with regard to EVA 3 that, obviously, we're more interested in station 10 than we were before. Another "return to the ALSEP" goodie that we're looking at - if we have the consumables today when you get back from finishing station 5 - is that the lunar surface gravimeter has been unable to level itself over the night, and they sent some, you know, some thousand commands trying to get it straightened out, and they say it looks as though it's not level. And, so, we'd like Jack to go back with his practiced hand-on-bubble levels and recheck that at the end of - after station 5 today, if there's sufficient consumables. And, we've planned for Gene to just let Jack off and let him walk back to the LM, after he gets off and looks at that. And, that's about - everything we have. As I say, in summary, that the big changes are going to be extra time at the beginning, taking care of the fender extension, and the probability of extra time at the end. Although we'll have to see how well the fender works and how things go. The probability of extra time at the end to allow for dusting and the time spent on those particular activities we'll probably end up taken out of the task at station 3 and station 4. Over. Comments?

Tape 91A/14

05 15 44 12 LMP-LM Okay, Bob. We copy all that. Obviously, you're going to have to catch us in real time on some of the details there - on the charges and the task deletion. One question, did you say we were going to delete the trench at station 3?

CC Roger. The trench at the base of the Scarp, in other words, some of the stuff that you would be doing while Gene was taking the double core.

LMP-LM What do you gain by that?

CC Well. No comment on that, Jack.

LMP-LM If you haven't deleted Gene's tasks, then what am I supposed to do?

CC You're supposed to help Gene, I guess.

LMP-LM Well, but that's not the way we worked it, Bob. Let's play that one in real time.

05 15 45 05 CC Roger. That's why I said there's no point in marking up the checklist on that, Jack. Let me hit you with one more thing concerning the battery temps. An initial reaction down here is that the battery temps were high on deployment because of particularly unfavorable heat soaking on the way out. And the Marshall people are hopeful that they'll be back to normal this morning. However, we're obviously anxious, as I'm sure you are, to get an early reading on the battery temp - that's number 1. And number 2, just for the off chance that the meter's not working, I think we've pretty much discounted that, because of the way the meter worked yesterday. But, on the off chance that the meter's not working, you might just lean over and see if the meter is reading zero before you punch in the circuit breakers, because that would give us at least a partial confirmation in that direction, that there's not something wrong with the offset. If they're reading - sitting there reading 30 to 40 degrees, then that probably says something about the offset. And, beyond that - -

SC-LM ...

CC Go ahead.

CDR-LM I'll look at that, Bob, what the meter has indicated in terms of a temperature change. I'll look and see if there's a bias on them at all.

CC Roger. We - we again also think that that's probably not too likely.

05 15 46 26 LMP-LM Bob, I think, based on what I saw yesterday, that the chances are pretty good that all the big blocks out here in the dark mantle area will be pretty much the gabbros. By the way, I looked at that with a hand lens last night, and I don't know that you got the report, and I'm back to saying that it's probably closer to 30 - 40 percent plagioclase. It's very - it's a good gabbro, a final pyroxene gabbro, and it apparently has a fair amount of ilmenite in it. There's some bright shiny flakes within the vugs and some dark minerals in the matrix that are probably ilmenite. And one other additional possibility then, is that the mantling we're seeing here, is the - is just dark fine glass - darker than usual, because of the iron and the titanium in the rock itself. Also, the probability, I think, still has to be considered that you're dealing with a true mantle that has been gardened enough that at least where we're seeing it now, in the first few tenths of a centimeter that it is unrecognizable as a mantling unit yet. The relationship to the large boulders is, I think, one right now, of just filleting and a small amount of covering because of the local gardening process. We haven't seen any clearly mantling relationships between the dark mantle or the surface materials here and the large boulders.

CC Okay. Copy that. And, we'll be anxious to see what else you find out today. And one last word for your interest; the Marshall people have decided to allow us to go to 140 degrees on this EVA with the batteries, if necessary.

CDR-LM Okay.

05 15 48 40 CC Okay, now. John would like to talk to you about the fender fix.

Tape 91A/16

LMP-LM Okay. Hold on for 30 seconds.

05 15 49 22 CDR-LM Hey, while John's talking to me, why don't you check my biopad out. We're going left.

CC Okay, fine. We'll take a check, Geno. Let me ask you one question here on the - on Jack's water - on his PLSS water cell. We're showing about 3 pounds too much water in the LM system, and we're wondering if you got the AUX tanks filled up in Jack's PLSS. Two questions. Did you - were you sure to have the AUX valve open and did you see good clear water in the sight gage with no bubbles after the fill? Over.

LMP-LM I guess we'd have to say yes to those questions, but if you've got a question on it we can go through it again. I'd rather do that than take a chance.

05 15 50 21 CC Let me make sure we want to do that. While we're making sure, I checked with both homefronts and Nassau Bay and Tucson are both in good shape. Geno, Tracy upstaged you for about 30 minutes last night on local TV during her own interview there and drew everybody away from watching EVA during that time. She did very well.

CDR-LM Yes, that sort of - that sort of figures. Hey, Gordo, why do you say Jack's PLSS? Did you see the water drop in the LM when we charged mine?

CC It was the profile of the water quantity as you were filling both PLSS's, and it was the fill - during Jack's fill that looked suspicious like just maybe 3 pounds less than there should have been flow when you were filling Jack's.

CDR-LM Yes, well, you know there - it's all - it's only ... to know whether or not you've got it filled. I sure don't want to go out there and have him just have some partial water. So let's do the conservative thing.

CC Okay. I'll - I'll verify that. There was some drinking water going - going out at that time, too, which muddles up the data a little bit, so we're not absolutely certain on that.

LMP-LM Okay. We weren't drinking water while we were filling the PLSS, however.

CDR-LM Okay. You come up with what you think best on that, and I going to copy John.

05 15 52 00 MCC Okay, Geno, I don't think you need to copy this. Sort of just - ad-lib it. With your four chronopaque maps, tape two maps and allow about a 1-inch overlap to a 15-inch by 10-1/2-inch configuration. That's an estimate. And then repeat with two other maps, and then tape both the two maps - now four maps - tape them together, and you'll end up with a sheet that's about 15 inches by 19 inches, a sheet of chronopaque. And then tape both sides of it - the overlapping edges to strengthen it. And you can further strengthen it, if you tape an "X" of tape across both sides of it. And then, on the roll up, on the long axis, and secure it with a strip of tape and put it in the ETB. And on that strip of tape you secure it with - be sure and leave a tab on the end of it so you can get it off with your gloves. And then remove clamps from both the utility light units, and open the clamp jaws to max. And then tighten the mounting bracket that you've got on it so it will be swinging around; and stow the clamps in the ETB. You got that, Gene?

CDR-LM Yes, sir.

05 15 53 43 MCC Okay. And then - now you've got everything you need. And it's all put together and all ready to - to be fastened to the - to the Rover. And then when you get the ETB in the seat, you unroll the chronopaque sheet and you locate the front edge with the long axis fore and aft, even with - even with the axle. And you lay the edge of the sheet over the inboard guide rail and you clamp it. And you lay the other edge of the sheet over the outboard guide rail and clamp it. And, as I said, the inboard clamp must be directly over the axle to avoid interference while steering. And tighten the clamps securely, both of them. And then while you're driving around out there by yourself, it would be good if Jack could take a look at it and

Tape 91A/18

see if you're getting any unusual dynamics. And at station 2, you should inspect the fender for any unusual wear that might have been caused by this mass out there on the fender, of those clamps bouncing up and down. One thing about it, doing it in a suit, Gene, you have to push in with your leg and hold - and it's sort of a two-handed job. And I'm not sure in 1/6 g if you can position the fender, the pseudofender, on there without Jack say holding on to the long end behind the Rover so that won't - won't fall off. It works okay in one g for one man. But I'm not sure it's not a 2-g proposition - a two-man proposition in 1/6. Over.

05 15 55 27 CDR-LM Okay. We'll take a look at it, babe.

MCC Okay, and you really have to bear down to get those - -

CDR-LM I just - -

MCC - - things on a dovetail there.

CDR-LM I just want to make sure of the geometry now. We want to put the - take two of those pages and put the 10-inch sides together overlapping, right?

MCC Yes, sir.

CDR-LM Then take two more and put the 10-inch sides together overlapping, right?

MCC That's true.

CDR-LM And then take those two pieces you've got now and put them end to end, so you've got the long - a long fender. Sounds right to me. Sound right to you?

MCC Well, you end up with - you end up with four - you end up with all four pieces in a big rectangle. See what I'm - you see what I'm saying, you've got a 15-inch by 19-inch sheet of paper.

CDR-LM Yes, we got it - we got it, John. And I copy the overlap and everything. If you had no overlap, I guess you'd have about 16 by 20.

MCC That's correct. But you need to overlap, and taping both sides of it gives it more strength, which you need in that situation. You just want to make sure it's not more than an inch, or you won't have enough to cover up those dovetails.

CDR-LM Okay, babe, we're going to work on it right now.

05 15 57 25 CC Jack and Gene, this is Gordo again. On the PLSS charge, we're recommending you hook up Jack's according to the decal. Go right ahead and - stand by 1. Okay. Go by the decal and do the full 5-minute fill on Jack's PLSS. It'll take that long to get the AUX tanks filled up, if it was indeed empty. And maybe that's something you can start and then work on the - the paper taping. Over.

CDR-LM Okay.

05 16 00 30 LMP-LM Okay, Gordy. I started - I'm on step 4 on the decal - step 5 on the decal.

CC Okay, Jack. John Covington advises that the sight gage is not a certain indicator that you're filled, and so we're just going to go by time to be sure, and try to disregard the sight gage readings as a positive indication anyway.

LMP-LM Okay, understand that from the past, and we went exactly by time before. We'll try it again here.

05 16 01 06 CC Okay.

05 16 05 41 CDR-LM Okay, Gordy. Is that about 5 minutes?

CC Stand by. See if anybody timed you here. That's affirm; 5 minutes now.

LMP-LM Okay. Step 7 is complete.

CC Okay. And we did not see any water flow to speak of, so it probably was full.

Tape 91A/20

LMP-LM Yes, the condensate indications here were that it was full.

CC Okay. Better to be sure.

05 16 07 11 LMP-LM No questions.

05 16 09 38 CC Geno, this is Houston - we want to be sure to have one look at your BIOMED before you get into the suit in case something is wrong with it. And if you go right by the checklist, we'll miss that look. So when you get to a convenient place, if you can go to LEFT and have us take a look at it, we'd appreciate it.

CDR-LM Gordy, apparently you - Okay. Stand by. I called it out. I didn't give it to you. Stand by.

05 16 10 27 CDR-LM Okay. Now it's yours.

CC Okay.

CC Okay. That looks good, Geno. You can press on with the suiting operation, there.

CDR-LM Okay. Call me the little old fender maker.

CC Roger.

CDR-LM S-BAND VOICE going to VOICE.

05 16 12 06 CC Roger.

05 16 18 47 CC Jack, Houston. With respect to the PLSS water fill, last thing we heard you say was doing step 7. We just want to verify that you did go ahead and do step 8, which is connect the waste management system to the PLSS AUX vent for 10 seconds. Over.

LMP-LM Yes, that was all done, Gordy. We just got side-tracked, and I didn't call you.

05 16 19 08 CC Okay. Thank you.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 16 25 05 CC Ron, you should not see a tape motion light at LOS here, be - or - flag, because we've got the dump done and rewound ahead of time. They're rewinding it right now.

CMP Oh, okay. Want me to configure the DSE, though, at 39:32 right?

CC That's affirmative.

CMP Okay.

05 16 28 49 CMP How's the crew of Challenger? Are they getting about ready to go out again?

CC They're a little bit delayed, Ron, but there's no problem. They just slept a little longer and - Yes, they're in their prep - pre-EVA prep.

CMP Yes.

CC And everything's going good.

CMP Bet they're going to find that Scarp is a pretty good hill.

05 16 29 19 CC Roger. We understand.

CC America, Houston. At your convenience, Ron - no hurry on this - we'd like you to service your ZPN sensors on each side there. We're getting some bad data on that now.

CMP They're itching. (Laughter)

CC Roger.

CMP Yes, it's pretty dry.

CC Roger. The - Dr. Z. recommends you might find a new location for them - just move them around a little bit, and put some cream on the other ones.

CMP Okay.

Tape 91B/2

CC There's no hurry on that, Ron, I wouldn't interrupt what you're doing now to - for that - it's not critical.

CMP Okay, I understand, Bob. I'll - -

CC You sound like a tour - -

CMP I will as soon as I get a chance. Okay?

CC Roger. You sound like a tourist up there.

CMP (Laughter) That's right.

CC Going to need a Kodak store here shortly, I'm afraid.

CMP (Laughter)

CC Okay, Ron, you might want to look at your Flight Plan when you get a chance. We're coming up on a SIM bay reconfiguration here shortly.

CMP Ah-ha. Okay.

CMP 56, 57, 58, 59 -

05 16 35 02 CMP MARK it. OFF.

CC Roger. We got it.

CMP ... wherever that is.

CMP Okay. RECORDER is going OFF, not the HEATERS. RADAR is OFF. DATA SYSTEM is ON. Uh-oh. Should have the SM/AC POWER switch up - up there (laughter) at 230, as much as we use it.

CC Roger. I concur with that one. I thought it would only be in the simulation that it would get to you on that one.

CDR (Laughter) Yes. Okay. SM/AC POWER is ON. The old MAPPER's going to STANDBY. IR is going ON. SELF TEST is going to HEATERS. UV is going ON. Now, we're going to open IR and we're going to wait on UV.

05 16 37 19 CC We concur with that, Ron.

CMP Okay.

CC We'll give you a cue on that UV COVER, OPEN, here.

05 16 37 33 CMP Okay, there's the IR. Barber pole. And a gray.

CMP Houston, America.

CC Go ahead, Ron.

CMP Okay. Are you going to try to ship the back-side DSE back in there for this next pass - on the Orbital science visuals and stuff?

CC Ron, we're calling for the DSE operation exactly as - as it is in the Flight Plan. Is that - do you concur with that?

CMP Oh, yes. I concur, but I mean - sure, that's - that's no problem there. But I mean getting it back to Houston before the end of the flight, you know.

CC Negative. That was not in the plans unless you want us to, Ron. We don't have any provision to - to - to record it and send it back here, until it comes back in the transcript form.

CMP Okay, no problem. I'll paraphrase what I say then, and when I get into AOS over there.

CC Okay. No sweat. And if you have something you really want us to listen to, we can bring up the loop to get it, but it takes a little effort, Ron. That's all.

CMP Okay. Yes. No, I - it's - let's don't do it, yet.

CC Ron, I just heard the voice quality has been real good. We've listened to it several different times, and it's been real good and we can bring it in without too much problem. Probably wouldn't be ready for the next rev, but we can get it in here without too much strain, if you want it brought in.

Tape 91B/4

CMP Okay. I think it might be worthwhile, especially on - on this particular one, where I'll be essentially talking all the way across, on this one.

CC Okay, we'll just plan on it, Ron.

CMP If it's not too much of a problem. Yes.

05 16 40 32 CC Okay, Ron. You can UV COVER, OPEN, anytime.

CMP ... Okay. Okay.

05 16 40 40 CMP OFF, OPEN, barber pole. And it's gray.

CC Ron, we need to precondition our H₂ tanks again. We'd like H₂ tank 2 FANs to OFF, please.

05 16 41 07 CMP H₂ tank 2 FANs are OFF.

CC Roger.

CC And, Ron, just a reminder, we will bring in that voice from the - the rev 27 backside pass.

CMP Oh, okay, good. Thank you. Tell the lunar sounder guys I'm sorry if I pointed their antenna in the wrong direction there, for a short period of time.

CC No problem. Just one question, Ron, that is the Hasselblad we're hearing every once in a while, isn't it?

CMP There's what?

CC Is that your camera running? Every once in a while?

CMP ...

CC Yes.

CMP No, not now.

CC How about during this eat period - on this pass, were you running the camera quite a bit?

CMP No. The only thing was - was the Nikon.

CC Okay, understand. We keep hearing something that sure sounds like the camera is chugging - -

CMP The - might have been picking up the tape re - no, it might have been the tape recorder. Might have been me, trying to clear my ears, you know?

CC No, I don't think so.

05 16 45 29 CC Ron, we're a few minutes from LOS. And you're looking real good.

CMP Okay, Robert. Thank you much. We'll see you on the other side.

CC Okeydoke. And I'll try and get through to the - the homefront here, maybe for this next pass. And you are going to be pretty busy, but I'll give you a little update.

05 16 45 49 CMP Okay.

05 17 06 XX BEGIN LUNAR REV 27

05 17 33 16 CMP ... it as well as the - some of the more Eratosthenian craters around Saenger. Looks to me like you can still have a little bit of a hint - at least of the layering, or a broken-up different-colored material at the top of all these craters.

CMP And supposed to stop and rewind the DSE. Forgot to do that.

CC Roger, Ron. We'll take care of the DSE.

CMP Okay. Okay, I'll let you do it.

Tape 91B/6

CC Roger, Ron.

CMP ... Okay.

CMP Okay. I took three, or four, pictures on mag 00 up to frame 104 kind of looking north across the Arabia.

CC Roger, Ron. We copy.

CC Ron. Just some words for you. We placed - -

CMP Okay, kind of a - Okay, go ahead.

CC No, go ahead - go ahead with yours. We don't want to interrupt.

CMP I was just going to say that on the crater Aitken, on the other side, is probably - there are no - no - rays - visible rays that I can see at the low Sun angle, anyhow, coming across there. There's definitely a mare floor in there. It's a dark albedo-type - flat floor with swirls in it; no definite expression of swirls. One thing that's quite apparent, you have a flow scarp in the north-east corner of it coming out of - oh, a little cloverleaf-type of an area there. I'm going to have to look the next pass over it to see if, on account of the south domical structure that's in there, it's breached. And I can't tell if the flow of material is flowing to the east out of that domical structure or if the flow is flowing into the domical structure. I ought to take a better look at that the next time - the next time around.

05 17 37 11 CC Roger. We got you. See any lava marks on the crater rims, there?

CMP Well, that's - that's the - the lava mark is what I'd call - is almost a lava scarp - in - up in the northeast corner. There are some lava marks along the central peak. They aren't nearly as apparent as the one up in the northeast corner. The northeast corner is definitely a flow front - a lava flow front, that has flown up the - the old interior wall of the crater.

CC Roger, Ron. What's the color of the dome in Aitken?

CMP Well, the color of the dome in Aitken is - the colors are hard to - to visualize - the color of the dome is essentially the same as, as - pretty much the surrounding material around there. Maybe a little bit lighter - a little bit lighter than the surrounding material. Of course it's definitely lighter than the floor. The floor itself, to me, has a tan - had a tan to it.

CC Okay, Ron. We'll have to break away here a second. PAN CAMERA MODE to STANDBY.

05 17 38 41 CMP Okay.

CC If you haven't got your Flight Plan, it's PAN CAMERA MODE to STANDBY, then POWER ON.

05 17 38 55 CMP ... Okay, POWER is going ON.

CC Okay, Ron. And it's time to charge battery A and we'll cue you on the PAN CAMERA POWER OFF. Okay, that should have been deleted. We've already charged the bat A, so - -

CMP ... Yes. Yes. It's already charging.

CC Right. Sorry about that, Ron.

CMP Okay, no problem.

05 17 39 17 CC How about the freshness of the wall and ejecta materials, and the brightness of the rim deposits on Aitken while we have a minute here.

CMP Okay. The brightness of the rim deposits are a little bit brighter than the surrounding area on the thing. The way that you put it, probably early Eratosthenian. It's definitely not Copernican because I can't see - well, at least in that low Sun - I can't see any rays - any rays around it. But probably late Eratosthenian - somewhere in that area because you have the slumping - Well, it's not subdued at all. The walls themselves - of the crater are not subdued. They are fairly fresh - not as fresh as Copernican.

Tape 91B/8

And - and I just can't remember whether we had the - seems to me like it was brighter at the higher Sun angles around there, which indicate that there would still be some remnants of a - of a bright ring around it.

CC Okay, Ron. And whenever you're ready, PAN CAMERA POWER to OFF.

05 17 40 35 CMP PAN CAMERA POWER is going OFF.

CC And we're with all eyes here waiting for a Crisium-Serenitatis visual.

CMP (Laughter) Okay.

CC Anything at all, Ron, while we've got an open area, anything you want to say - we're following you on the map - just sing out.

CMP Okay.

CC Ron, while you're thinking here a second, do you have any views on the possible origin of the domes in Aitken?

CMP Well, I'm pretty sure they've got to be volcanic in origin. That's what - that's what it looks like to me anyhow. And especially if I can determine that the material in the northeast corner of Aitken has flown out of that domical little structure in there.

CC Roger. Understand.

05 17 42 51 CMP You know something - the observation that I think is pretty significant is the fact that most of the 30-kilometer craters on the back side of the Moon seem to be fairly fresh. And any of them that are fresh - by fresh I mean you don't have any real definite ray pattern to them, but you've got a real smooth - not smooth but streaked straight - slope, 45-degree angle going down into the crater and the crater wall. And then you get down to the bottom of the crater, and you get a flat floor down there or sometimes there is a domical type of a floor. And the domical material down there doesn't resemble anything like the stuff that's slumped down the side.

CC Okay, we copy. Ron, if you're handy, you might hit Error RESET on the DSKY. It looks like you might have hit a MARK button or something.

CMP ... Yes, might have hit the MARK button.

CC That - that makes it.

CMP Okay. I just got used to the other attitude, and now I'm at a different attitude. (Laughter) ... attitude, though.

CC Roger. Understand. Roger. Are you able to pick anything up on the Crisium yet?

05 17 44 37 CMP No, just now coming up on Crisium. I just now see it out of window 5. Just off the southern edge. Let me try window 3; I think it might be better.

CC Okay; you might remember we're looking for the colored tones, the shades between units up on Crisium, and we're looking for location of color boundaries relative to the mare ridge system.

05 17 45 10 CMP Okay, I'm looking at the eastern edge of Crisium now. As you come across there, it looks there might be - a little bit darker - You know, I keep seeing browns all the time up here instead of grays - gray tones. Maybe that's just the way I interpret them. They are - to me kind of a brownish tint to them, and it's a darker brown than the - the stuff to the - to the south of the ridge system there.

CC Roger. Ron, our data would show that CM5 might be a better window.

CMP Take a look at that one. Yes, it's a little better. Looking straight down. I am just now passing that crater I took a picture of on the last time - of the pass on there. And instead of having a round bottom, it's got a diamond-shape fill in the bottom. And the diamond, itself, is about - oh, a half of the crater diameter. And this is on the south rim of Crisium.

Tape 91B/10

- CC Okay. We copy. Does the ridge system cross the color boundary, Ron, in Crisium?
- 05 17 46 52 CMP Well, this ridge system is running east and west down here. The color boundary isn't nearly as apparent in Crisium as it is in Serenitatis. Except that right under me right now there's kind of a subdued crater-type thing and with a southern part of a ridge. The ridge runs east - west, and it looks like we've got a flow coming out of it. Let me see if I can get a quick picture of that one. Well, lost my camera (laughter). Here it is. Oh, it's too late; it's gone now. You know something, you see this subsolar point, it's kind of - zero phase - zero phase point, I mean, is following me right along out here in Crisium, so I get a different color straight out from the window than I do out from the edge of it. So I think that's going to influence my thinking.
- CC Roger, Ron. How does color of Picard - the rim deposits on Picard compare to the surrounding mare material there?
- 05 17 48 35 CMP Okay. The color on Picard is - is definitely darker. It's got a darker rim, darker material that goes out to - oh about a half a crater and some points extending out to a crater diameter. And then from south arcing around to the west to - to the northwest corner, you got some light-colored material on top of that.
- CC Is any of that tan or brown?
- CMP It's kind of a - the darker material I'd call tannish-gray. More gray than tan. In other words, the whole mare, itself, I'd consider kind of a - kind of a light tan. And then the type of material, the dark material that's flowing out - has flown out - is kind of a tannish-gray.
- CC Okay. In the inner appearances of Picard, for color variations, can you determine different units based on color and flow characteristics?

- 05 17 49 42 CMP Yes, you can. In the area where you have the white thrown out on top, you essentially got a - as - as you go down the crater wall, you've got a white streak that goes all the way around it, and then you've got a dark layer underneath that. And then a white layer on below that.
- CC Roger. Are you saying the color zones are concentric?
- CMP Yes, the color zones are concentric going around.
- CC Beautiful. How about the central peak material to that of the crater walls?
- 05 17 50 30 CMP Well, the central peak material is - you know, it's more smooth-type stuff. This stuff in the crater walls is - fine, straight sloping, except where it is slumped down. Where it's slumped down, it's just kind of piled up - a jumble of - type stuff, you know?
- CC Roger.
- CMP You know, in the crater nearest over there has the same color distinction around it for - out for about a crater diameter, except it doesn't have any of the light material on it at all.
- CC Okay, Ron, we might direct your attention to the dark halo craters in the western Mare Crisium. Are they impact or volcanic in origin?
- CMP You can see some of the rays from the crater Proclus have spread out all the way across here. And they completely cover up the ridge system that goes around there, so I can't see any color distinction on the eastern - or on the western edge of Crisium.
- CC Roger. We copy. How about those dark halo craters? Are they volcanic in origin?

Tape 91B/12

05 17 51 40 CMP Some of the - Yes, I was looking at the volcanic - or the dark-rimmed craters, and some of them have what I'd call a - an ejecta pattern around them; and the others just have kind of a raised rim with no apparent blocks. The one to the west - let's see, southwest - of that little V that sticks out there by Yerkes - that hill that sticks out there by Yerkes - now, that's the one that, to me, looks like it has an ejecta pattern around it with blocks. It's about a - oh, a thousand-meter crater.

CC Roger. Got it. Oh that crater that you mentioned was a flow pattern, will you be sure and make a mark on your map on that, please? We're really interested in that.

CMP Okay.

CC Should be coming up on Macrobius by now, aren't you?

05 17 53 07 CMP Yes, I can just barely see Macrobius. And - ... be better out of window 3.

CC Okay. We're standing by.

CMP I'm looking for any dark-halo craters in - I was looking for any dark-halo craters in this area that might be sticking through the Proclus rays. Well, you know, you compare on either side of the Proclus ray, though, and the same size crater rather ... Tranquilitatis or the - the moundy stuff before you get to Tranquilitatis are really underneath Coper - the - the Proclus ray. You get the same albedo of ray material from the small craters in either case.

CC Roger. We understand.

05 17 54 12 CMP Oh, here's a Macrobius A and B. Course, J-3 is up there. The two dark craters - well, the one just - north, I guess, of Macrobius A, and also north of J-3 - that's the one that has the dark mound around it. It's got a small dome down in the center. It - it doesn't have any ejecta pattern around it - you know, no rays, no nothing. To me, that looks like - it sure looks like a

Tape 91B/13

cinder cone to me. You get that same type of feeling. The dark halo that goes around it goes out for at least a crater and a half diameter. The raised dome down in the center of the crater is about a fourth of a crater diameter. And there are no rays. And it has a dark halo.

CC See any color tones on that crater at all, Ron?

05 17 56 05 CMP Yes, the color on that particular - color of that is the same color as you see in Maraldi and as you see in the landing site. And that is what I consider the dark tannish - tannish gray.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 16 40 09 CDR-LM Okay, Gordy. Jack's coming up, and I'm going off the air.

LMP-LM Okay, Gordy. LMP is suited, and - stand by. 24128. PRD is 24128.

LMP-LM Hello, Houston. Did you copy the LMP?

CC Roger. Copy. 24128.

CC How come you guys ... not flight directing like I am?

05 16 41 23 CDR-LM And, Bob, 17040 is Commander.

CC Say that again please, Geno.

CDR-LM The last two digits are 40.

CC Copy that.

CDR-LM 17040 - -

CC Thank you. Thank you.

05 16 51 40 LMP-LM Bob, how do you read the BIOMED on the LMP?

CC Stand by, Jack. It looks beautiful, Jack. I think that means loud and clear.

CC And, Challenger, have you changed your ECS LiOH can?

LMP-LM Bob, we did not. I guess we missed that in the checklist.

CC Okay. That's sort of towards the end of 3-9.

LMP-LM Bob, I guess we're not quite there yet.

CC Okay. Copy that.

05 16 59 14 CDR-LM Okay, Bob. The canister's changed.

CC Roger. We saw that. Thank you.

Tape 92A/2

05 17 00 24 LMP-LM Okay. BIOMED, LEFT.
CC Okay. Copy that.
CDR-LM Bob, how do you read me?
CC Loud and clear, Geno.
CDR-LM Okay.
LMP-LM Bat - battery management going.
CC Roger.

05 17 00 44 LMP-LM 37.2, both batteries.
CC Okay, Jack. Just like always.

05 17 00 52 LMP-LM P - PCM is HIGH.
CDR-LM Is he ready for the batteries?
CC Stand by. We're still picking up ... HIGH BIT RATE.

05 17 01 40 CC Okay. And, Geno, we have good data from you on the Surgeon. And we have HIGH BIT RATE.
CDR-LM Well, that's good to hear. I got good data up here.

05 17 02 15 CC Yes, we're GO to do the battery management now, Jack. Pick up the HIGH BIT RATE.
LMP-LM Roger.
CC And a thought for the day. We're not sure if there is going to be any need for the scissors outside today. And if you guys wanted to keep from picking them up off the ground and worrying about them, you might just leave them inside if you haven't packed them already.
CDR-LM Bob, you never know. We're going to take them out with us. So just make a note that we bring them back in, would you?
CC Okay. I'll make a little note again.

LMP-LM Okay. Battery's complete, and your cue on the
LOW BIT RATE.

05 17 03 02 CC Okay. You can go LOW BIT RATE again. We've
looked at the ... too.

05 17 04 48 LMP-LM LMP is 6 - 6100 on the OPS.
CC Copy that, Jack.

05 17 05 00 CDR-LM And about 5850 on CDR.
CC Okay. Copy that, Geno.
CC And you guys got the word about which purge valves
to use?
LMP-LM That's affirm.

05 17 05 45 CDR-LM CDR's OPS is GO.

05 17 05 48 LMP-LM LMP - LMP is GO.
CC Okay. Copy that. Good.

05 17 12 40 LMP-LM Okay. Bob, the forward hatch is unlocked.
CC Okay. Copy that.

05 17 17 47 LMP-LM Bob, the LMP has his OPS on. Would you believe
the PLSS?
CC Say again there, Jack.
LMP-LM The LMP's PLSS is on.
CC Okay. Good enough. And I bet the CDR's doing his
now.
LMP-LM You're right.

05 17 24 23 CDR-LM Okay, Bob. We're in the top of the right-hand
column.
CC Okay. Copy that.

Tape 92A/4

05 17 26 19 CDR-LM MAX. Okay. I'm in VOX. Okay. Going to T/R. B is RECEIVE. A, T/R; B, RECEIVE. Bob, how do you read commander on VOX?

CC Loud and clear, Geno.

CDR-LM Okay, Jack. Won't be able to hear you.

05 17 26 51 LMP-LM And 16, SE AUDIO, OPEN. Okay. Connect your PLSS comm. And when you get done with that, we'll go right into the comm.

CDR-LM Yes, zap me.

05 17 27 36 CDR-LM Okay. You audio closed? Okay. Your PLSS PTT to main, right, verify? PLSS mode A?

LMP-LM Okay.

CDR-LM Okay. You'll get a tone, a vent flag, a press flag, and an O₂ flag.

LMP-LM Press flag, tone, vent flag.

CDR-LM Okay. Give Houston a call, and give them your - your oxygen reading.

05 17 27 59 LMP-LM Okay, Houston. This is the LMP with 93 percent, 93 percent.

CC Okay, Jack. We read you loud and garbled just like last night when the antenna was stowed.

05 17 28 08 LMP-LM Okay. And 93 percent.

CC Copy the 93 percent.

CDR-LM Okay, Houston. You got 93? Okay. He got that, Jack. Okay. We'll leave the antenna in. Okay. On mine, I'm going to OPEN my AUDIO, and connect to the comm, Jack.

LMP-LM Okay.

05 17 29 28 LMP-LM Okay, Houston. ... on ECS. Cabin pressure may be high. I picked out a little pumping in the ECS system - in the hoses.

CC Roger. Stand by on that.

CC Okay, Challenger. We're seeing it at the WATER SEPARATOR.

CDR-LM Yes, we can see that.

CC You can pull the WATER SEPARATOR circuit breaker - -

CDR-LM You don't have a bleed on yours. Hit your - hit your disconnect.

LMP-LM Okay.

CDR-LM Okay. That's better.

LMP-LM That should do her. I think we've fixed it. I had the hoses in my storage box.

CC Okay. Copy that.

05 17 30 22 LMP-LM What was the press ...?

CDR-LM Let me give them. Houston, CDR is reading - 90 - 91 percent.

CC Okay. Copy 91.

CDR-LM Did they get that, Jack?

LMP-LM Yes, they got it.

CDR-LM Okay. LMP comm check - okay. You did them?

LMP-LM Yes ... - -

CDR-LM Okay. You go B, and I'll go A.

05 17 30 49 LMP-LM Okay. Going B, Houston. LMP on B.

05 17 30 54 CDR-LM Okay. And the CDR is B. I - I'm reading loud and clear. Houston, how do you read CDR?

CC I read you loud and clear.

05 17 31 03 CDR-LM Okay. Let's go to AR, Jack. You'll get a tone.

Tape 92A/6

LMP-LM Okay. You're loud and clear. AR.

CDR-LM Okay.

05 17 31 11 LMP-LM I'm AR. How do you read?

CDR-LM And I - you're loud and clear. How me?

05 17 31 15 LMP-LM And so are you.

CDR-LM Got my tones.

LMP-LM Yes, and I got mine, too.

05 17 31 18 CDR-LM You got an O flag and a vent flag, press flag and
a - -

LMP-LM That's affirm.

05 17 31 21 CDR-LM Okay. Houston, how do you read CDR?

CC Loud and clear, CDR.

05 17 31 28 LMP-LM And how do you read the LMP?

CC Loud and clear.

CC Okay. And we have - -

CDR-LM Okay, Jack, VHF B - -

CC - - good PLSS data for both of you.

CDR-LM - - full decrease.

LMP-LM SQUELCH?

CDR-LM Full decrease.

05 17 31 41 LMP-LM Yes, that's SQUELCH. VHF B SQUELCH.

CDR-LM Okay. On 16, ECS LGC [sic] PUMP, closed. Why
don't you close it again.

05 17 31 46 LMP-LM Okay, it's closed.

CDR-LM Okay. On 16, CABIN REPRESS, closed.

05 17 31 51 LMP-LM Repress - is closed. Hit this, too.
CDR-LM Huh? Okay.
CDR-LM Okay. CABIN REPRESS, closed. SUIT FAN DELTA-P,
OPEN?

05 17 32 09 LMP-LM Delta-P is OPEN.
CDR-LM SUIT FAN 2, OPEN?

05 17 32 12 LMP-LM 2 is OPEN.
CDR-LM Verify ECS CAUTION and O₂-- and WATER SEP lights
come on in about a minute. Okay. We'll watch
for it.
LMP-LM Okay.
CDR-LM SUIT GAS DIVERTER, PULL, EGRESS. These are
verify.

05 17 32 21 LMP-LM Okay. That's EGRESS.
CDR-LM CABIN GAS RETURN, EGRESS?

05 17 32 25 LMP-LM Okay. EGRESS, yes.
CDR-LM SUIT CIRCUIT RELIEF, AUTO.

05 17 32 27 LMP-LM AUTO.

05 17 32 28 CDR-LM Okay. You're OPS connect. SUIT ISOL ACTUATE
OVERRIDE, SUIT DISCONNECT. Disconnect your hoses.
Secure about PGA. They're stowed.

05 17 32 35 LMP-LM That's done.
CDR-LM Connect your OPS hose PGA blue blue.

05 17 32 39 LMP-LM OBS [sic] going to PGA, and I'll turn around and
let you.
CDR-LM Okay. Make sure I get that, because it's under
that connector.

Tape 92A/8

LMP-LM Okay. Did you already get - let's see, where are we here?

CDR-LM Right here.

05 17 32 56 LMP-LM Oh, here it is, now. MASTER ALARM and ECS light; WATER SEP light.

05 17 33 10 CDR-LM Okay. It is locked, ... is on.

LMP-LM Okay.

CDR-LM Now, you want 211, right?

LMP-LM Roger. 211.

05 17 33 20 CDR-LM Okay. Bob, LMP is getting purge 211.

LMP-LM And out to the side - there you go.

CC Okay. We copy that. Thank you.

05 17 33 35 CDR-LM Here, I'll lock it. Okay. And you are LOW and you are in and you are locked.

05 17 33 42 CDR-LM Okay. Purge valve is in. And you're vertical.

LMP-LM Okay. You get to do the same. Okay, get my hose?

05 17 33 47 CDR-LM Water hose.

LMP-LM Come around behind my shoulder.

CDR-LM It won't fit in there. Okay, it's in there and it's locked, vented, and the dust cover is on.

LMP-LM Okay.

CDR-LM And now, we get to put your PURGE, in 208.

LMP-LM Make sure it's in LOW.

05 17 34 18 CDR-LM It is, and LOW, and the pin is in. Okay. And you like it where? Down a little bit?

LMP-LM No. Same place just - no, let me show you.

CDR-LM Right there?

LMP-LM Yes.

05 17 34 44 CDR-LM Okay, there. And verify it's still in LOW and locked.

LMP-LM Okay.

CDR-LM Okay. That's good.

LMP-LM Let's get another zap of water here.

CDR-LM If I have any more water I'll float out there.

CDR-LM (Laughter)

CDR-LM Good Navy man.

LMP-LM Be a good place to fill with water, you'd make a nice rec site out of this valley. You could put some cabins up on the side of the massif. Nice flat bottom, no trees. Both mags up. The fishing ought to be pretty good if you stocked it.

CDR-LM Have a bear island and a family island.

LMP-LM (Laughter)

LMP-LM We're going to fill up the other end though, so it doesn't drain out.

CDR-LM Looks funny like that.

LMP-LM ... turn your DESCENT WATER OFF.

CDR-LM Snaps, snaps, snaps; the whole world is held together with snaps!

05 17 36 11 LMP-LM Okay, I've got my hand lube. You can position your mikes.

05 17 36 14 CDR-LM Water is going off.

LMP-LM Okay.

LMP-LM Fasten your mikes now, before we turn the fans on you'd better -

Tape 92A/10

LMP-LM Well let's just look ahead; we've got helmets ready to go - big bag position you happy with.

CDR-LM Yes, more or less a little far out, but I think -

LMP-LM Make sure you've got the plug out.

05 17 36 30 CDR-LM Okay. Plug is out. My end's red now, but that's all you can get it out.

CDR-LM Feel a little pressure in there. You might let out.

LMP-LM Okay. And then we'll lower our protective visor and secure tool harness and self doff straps.

CDR-LM Okay, and that's ...

LMP-LM That's already stowed. Okay. Let's start with you first. You can turn your - let me get your ... then you can get it over your head and turn your O₂ - your fan on rather.

CDR-LM Okay.

LMP-LM Okay, you ready?

CDR-LM Okay, check all that -

LMP-LM Wait what is this right here? Okay, now let me make sure it's in front of everything.

CDR-LM Okay.

LMP-LM The alignment is way over here.

LMP-LM Let me -

CDR-LM That's good. Okay. That's aligned right there.

LMP-LM Oh, boy.

CDR-LM That will never do. With that down in there. Okay. You're still clear. Starting.

CDR-LM Manischewitz.

LMP-LM I think it's caught on the food stick. I think you ought to open it up.

CDR-LM I think you're right.

CDR-LM Okay. Get it all the way off.

LMP-LM Okay. Now let's try it. Looks like it's going to be much better. Getting it back.

LMP-LM Want to make sure that thing is on.

LMP-LM No, not happy yet. Not happy yet.

LMP-LM Guess what now. I tell you, I got my fingers on it all the way around.

CDR-LM Okay. It's locked. It's aligned. Better put your fan on here pretty quick.

05 17 39 13 CDR-LM Okay. Fan's on.

CDR-LM Okay, let me get you dressed up back here. If that center doesn't work, you're going to keep this thing -

05 17 39 22 LMP-LM And I'm vertical.

CDR-LM You are vertical alright. Okay. You're covered down there. You are locked. Okay - whoo! Okay?

LMP-LM This is my turn.

CDR-LM Let's verify all these things.

LMP-LM Okay. Go ahead.

05 17 39 57 CDR-LM Okay. Got your comm. That's you OPS, that's your inlet, that's your oxygen or your exhaust and your purge valve.

LMP-LM Okay.

CDR-LM And your water

LMP-LM Okay, let me take a look at all yours. Okay. That's locked - locked, that's locked, you're vertical. That's locked. That's locked. That's

Tape 92A/12

locked. Okay. Get my helmet on. The main thing is to get this stuff back over here.

CDR-LM Yes.

CDR-LM Way out.

LMP-LM Okay. Can you grab your food stick, cause that - that hung up on mine.

CDR-LM Okay.

CDR-LM Got it. You're locked.

LMP-LM Feels good in the back?

CDR-LM Yes. And it's locked.

LMP-LM It's hard to see with that visor on there.

CDR-LM Okay. That's latched down. You're locked again.

CDR-LM And, she's in the engaged position here, huh?

LMP-LM That's affirm. I'm engaged.

LMP-LM Okay. Verify, verify, verify. Circuit breaker wiped out plus EVA decals.

CDR-LM Whoo! Can you give me a little room to turn?

LMP-LM Yep. Go ahead.

CDR-LM Okay. White, white. Leave the pump on for a minute. You want.

LMP-LM Yes.

CDR-LM Okay; and EVA decals, all right?

LMP-LM Okay.

LMP-LM You want me over here?

LMP-LM Let me turn the page. Don our EV gloves.

CDR-LM Okay. In work.

CC Geno, we don't see your fan on. If you've got your helmet on, you ought to have your fan on.

CDR-LM Thank you, Bob. Good call. The royal MOCR ... Boy, grease and lunar dust really make a nice mobile graphite material.

05 17 43 52 LMP-LM Okay. I'm locked on the right, verified. The old gauntlet's coming on. Okay, and I've got my cover on over here. Get yours?

CDR-LM Yes, I'm getting one of them anyway.

LMP-LM I can get the other one for you.

LMP-LM Okay. Number 2. Okay, ... many.

CDR-LM And it's on, and locked, and locked verified.

LMP-LM I may be learning how on these, finally. Okay. Mine's on and locked. If I can get my black band on here. I think I'm learning how, Geno. Crazy. Like a trained band putter onner. Okay. I feel pretty good. Need some help?

CDR-LM No, mine's all on. I can't figure that out. Must be easier in 1/6 g.

CDR-LM (Laughter)

CDR-LM Get my gauntlet donned. And that's dirt protecting dirt.

LMP-LM Don't throw down a gauntlet, Gene.

CDR-LM That's dirt protecting dirt. Okay. It's all on, Jack.

LMP-LM Okay. Where did we leave off?

05 17 46 11 CDR-LM Right up here.

LMP-LM Okay, PGA is not biting, LCG's cold, let's leave it cold.

CDR-LM Well, I guess you've got to open it now. We've got to disconnect the water.

Tape 92A/14

LMP-LM You ready?

CDR-LM Yes.

LMP-LM Let's do it then.

05 17 46 27 LMP-LM Okay. It's disconnected.

CDR-LM Okay, and did you disconnect your -

LMP-LM Let me come around - okay, let's turn around and let's help each other. Let's get the -

CDR-LM It's still 3 degrees. Pitch up 5 degrees.

LMP-LM Pitch up yours - its an awful nuisance, Cernan.

CDR-LM Hold that for a minute.

LMP-LM I don't know why you don't learn how to land one of these things.

CDR-LM Hold that for a minute - it was a pitching deck. Okay, that is in. Boy, its in. Locked - took a lot to "in" it.

LMP-LM Okay. Dust cover is covering it.

CDR-LM Okay. You know those chamber runs we had were probably some of the best training we ever did. I hate to say that, because it was some work. Push that thing on. There you go. Good. Keep trying. It was just a little sluggish. Let me verify it.

LMP-LM Lock?

CDR-LM It won't turn.

CDR-LM Oh, every time you do that, my stomach gurgles. (Laughter) Okay, let me turn around to stow.

LMP-LM You can stow that, and mine's over here.

05 17 48 07 CDR-LM Okay. Attach our PLSS water hoses. PLSS diverter valve, MIN. Want to verify that?

Tape 92A/15

05 17 48 21 LMP-LM And, connect PLSS water hose, verify lock, PLSS diverter valve MIN, and PLSS pump. Okay?

CDR-LM Wait a minute. I want to make sure this is out of the way when I come in.

LMP-LM Okay. Watch my diverter MIN.

CDR-LM Watch your diverter -

CDR-LM It's MIN.

LMP-LM It's MIN? Your pump's on and PRESS REGs A and B egress.

CDR-LM Okay. Pump's on.

LMP-LM Man, I'm getting a little bite ...

CDR-LM Okay. The next thing is to turn your PLSS O₂ on, anyway.

LMP-LM Oh, okay.

CDR-LM Then we go to egress.

LMP-LM Egress.

CDR-LM Egress on the REGs.

LMP-LM The REGs are egress.

CDR-LM Okay. You ready on my mark.

LMP-LM Wait a minute.

CDR-LM Tell me when you're ready.

LMP-LM Find it.

CDR-LM Say when.

LMP-LM Well, where is it? Okay, let's go aft.

05 17 49 42 CDR-LM Okay mark it. Get it?

CDR-LM If not, I'll get it for you.

Tape 92A/16

LMP-LM No.

CDR-LM Here. Let me get it for you.

CDR-LM Wait a minute. I didn't get it. No, there it is. Okay, I've got it. Okay. We going at the same time I've got us marked.

05 17 49 57 CDR-LM Okay. PLSS O₂ tone on; O₂ flag. PLSS flag clear 3 to 4 - 3.4. CUFF gauge 3.7 to 4.0.

LMP-LM Do you need me to watch the panel or you got it?

CDR-LM No, no sweat I've got that. We'll have to get the PLSS O₂ OFF. I'll get mine; I can reach yours real easy. I can get it in a minute. As soon as we get up I'll get it. Yes, I can reach it, I think, now. And we're going up to HIGH PRESSURE here when we start dumping the cabin.

CDR-LM I've gone through 3.5 now - 3.4 really.

LMP-LM Just off the peg here. My press flag didn't clear.

CDR-LM There's mine.

05 17 51 22 LMP-LM Turn mine off. Okay. Mark it. It's off.

LMP-LM Where are you?

CDR-LM At 385.

LMP-LM Okay, when you get up, you can turn yours off. Give me a hand, and I'll check the time.

05 17 51 32 CDR-LM Okay. Mine's off.

LMP-LM Okay. Check your pressure.

CDR-LM 38. I went at 20, you went at 30.

LMP-LM It looks like it's a little tighter.

CDR-LM That was the suit loop we were checking yesterday up in orbit, though.

Tape 92A/17

LMP-LM Yes, but you know we got two tenths.

LMP-LM Yesterday, too.

LMP-LM I did.

CDR-LM I'm coming down 20 more seconds, you got 30 more seconds.

CDR-LM I'm over about a tenth I guess.

05 17 52 20 CDR-LM Okay; 1 minute for me Houston; 85 to 7 - about 7.2.

CC Copy that, Geno.

CDR-LM Okay. That it?

CDR-LM Okay. Mark yours.

LMP-LM Okay. And the LMP was 8 - .8 to .7.

CC Okay. Copy that.

CDR-LM And I'm back on. Okay, and we'd like your GO, Robert.

CC You're, you're GO for DEPRESS.

05 17 52 55 CDR-LM Okay. Jack, 16 CABIN REPRESS, OPEN and CABIN REPRESS valve, CLOSED.

LMP-LM Okay, CABIN REPRESS. Circuit breaker first. Circuit breaker first. CABIN REPRESS, OPEN.

LMP-LM Okay. Might turn around here. Okay, it's open.

LMP-LM Okay. And REPRESS valve closed.

CDR-LM Okay. It's going closed. And stay over there as far as you can, cause I got to get the overhead dump valve.

LMP-LM Okay, I'm over as far as I can get. I can turn around and give you more room.

Tape 92A/18

CDR-LM Yeah, turn around and you'll have to look at the CABIN.

LMP-LM Watch yourself there. You went awful weak all of a sudden. Are you - Hello. How do you read?

CDR-LM Very weak. You better call again.

LMP-LM Very weak?

CDR-LM Okay. My volume got tang -

LMP-LM You got to hit your volume.

CDR-LM Okay, now.

LMP-LM Let me get over here -

CDR-LM Wait a minute.

CDR-LM Is that enough?

LMP-LM Yeah, your garb's in the way.

CDR-LM Okay. I can get at it now.

LMP-LM You want to go to - you want to get that - OPEN and AUTO at 3.5. Okay, go ahead.

CDR-LM Okay. Coming down. I can see it open. There it is. That's 5, 4 and one-half, 4, stand by.

CDR-LM Mark it.

05 17 54 09 CDR-LM It's off, say about 3.4. And, I go.

LMP-LM ... Look at our watch. Okay?

CDR-LM And my cuff gage went up to 5. - 5.0. Good. Suit circuit's at 4.6. That's okay. And I'm decaying.

CDR-LM Are you decaying?

LMP-LM I'm decaying.

CDR-LM Okay. We can start our watch.

Tape 92A/19

05 17 54 50 CDR-LM Okay. My watch is started at 5:30, more or less.
LMP-LM My watch?
CDR-LM At 5:30.
LMP-LM Yes sir. Okay. Good bye.

05 17 55 01 CDR-LM Okay. OVERHEAD FORWARD DUMP valve, OPEN.
LMP-LM Okay, baby!
LMP-LM It's open all the way.
CDR-LM Okay, and pressure's coming down.
LMP-LM Okay. I believe it.
CDR-LM I get a tone and an HO flag, and you should pop your RELIEF, I think.
LMP-LM Yes, I'm at my relief pressure now.
CDR-LM What's CABIN now?
LMP-LM Cabin is one - a little 1.2. One.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 17 55 59 CC See any color tones on that crater at all, Ron?

CMP Yes, the color on that particular - the color of that is the same color as you see in Maraldi and as you see in the - the landing site. And that is what I - what I consider the dark - tannish - tannish-gray type of material. And again, the fresh craters around Maraldi still look kind of bluish to me, not as much as they did yesterday, but they still look kind of a - have a bluish tint to them from the reflection of the Sun. In other words, they are fresh craters and they are about the size of - one of them is about the size of MOCR, and the other one is about the size of Sherlock or Camelot.

CC Okay. You're around Maraldi now ... - -

CMP ... same way. Yes, I'm still on Maraldi. Yes.

CC Okay - -

CMP I was on Maraldi, and - -

CC How about comparing the floor fill of Maraldi to the light plains in Maraldi E?

CMP The floor fill in Maraldi is definitely a darker color. The light plains in Maraldi E are the - the light-tan material. And Maraldi - The floor of Maraldi looks just like the landing site.

CC How about the color, tone, and texture of Maraldi Gamma?

05 17 57 44 CMP Okay. Maraldi Gamma looks just like the rest of all of the surrounding hills around there. I think that's just a - some of the - what do you call it, the Sculptured Hills type of material that has been - was high and has been inundated by mare flow at one time or another. It had - mare flows kind of come up around it.

CC Okay. How about the domical hills inside of Vitruvius A, as compared to Aitken?

Tape 92B/2

CMP Okay. I just missed that one. We'll have to get that one on the way by.

CC Okay.

05 17 58 23 CMP Next time I guess. Right now, I'm looking at the ridge system around the annulus of Serenitatis. And the dark material stops before you get up to - Oh, what's the crater that sticks into the side of Serenitatis and sticks out beyond the eastern edge of Serenitatis? Anyhow, the dark material stops before you get to there. The dark material only goes up to - let's see - There's a definite rille. There's a wrinkled ridge and at the east of the wrinkled ridge, there are two craters, about 20 kilometers in diameter. And then farther east of that is the - the rille. A graben, it looks like that goes up - and that's about the extent of the dark area that's the same as the - the same material as the landing site.

CC Roger. We copy.

CC Okay, Ron. That - that completes the visuals on this pass. We - if you want to look some more, we've got some time. We do have some Flight Plan camera pads and all that, but no hurry on any of it.

CC We do have some attitude changes - -

CMP - - continue looking here until we pass - oh, do you need an attitude change now?

CC No, that's not until 46. We got some time on that. It's a VERB - change of NOUN 78.

CMP Okay. Give me a clue about a minute ahead of that.

CC Yes, I'll do that, Ron. Just keep talking.

05 18 00 09 CMP Okay. We're in the Tacquet area now, and in this case, the wrinkled ridge system that's out in the middle does not make a change in the color boundary. The color boundary is completely out to the outer edge and is - in the area of those - the rille. Those are - There's kind of arcuate rilles, straight

rilles, and in the Tacquet, yesterday, I said this was Sulpicius Gallus, but it's Tacquet - Tacquet area, but ... - -

CC Roger, Ron. Can you give us a color difference on the dark mantle and the mare at this Sun angle?

05 18 01 07 CMP Yes, the color difference - again the - You know, I just - I just now noticed that when I get down at this Sun angle, out in front of me, I got one color, and then I look straight down and I have a different color. But in this Tacquet area, you've definitely got some cinder cone type - No, I don't want to say cinder cone, but anyhow - volcanic. And it almost looks like a breached cinder cone right next to - I think it's Melrose [?] - is the name of that - that crater - the big one that's right on the edge of Serenitatis. I'll find it on the map and mark it for sure. But just to the east of that, it sure looks like a breached cinder cone in - in - in one of those rilles down there. And then that type of material is - is - kind of a dark tan in - at this Sun angle. And it's definitely darker than the - than the Serenitatis Basin material.

CC I think it's Tacquet is the name of that crater. Isn't it, Ron?

CMP Tacquet is the little one, and then - then there's a bigger one right next to Tacquet.

CC Okay. Menelaus is just to the east of Tacquet there.

05 18 03 04 CC Hey, Ron, I - I blew that. Menelaus is west of Tacquet up there.

CMP Yes, Menelaus; that's the one.

CC Any textural difference between the dark mantle in the site and the Sulpicius Gallus formation, Ron?

CMP Yes, there is.

Tape 92B/4

CC Would you attribute it to the actual ground or would you attribute it to possibly the Sun angle difference?

CMP I think, I would attribute it really to the - to the actual ground. I guess what I am going to have to do is really wait until the Sun angle gets a little bit higher there in that Tacquet region to answer that for sure. But it seems to me like the - the material in the landing site area is - is more smooth, you know, or smoother than what's in the Tacquet region. The part in the Tacquet region seemed to me like it was - is - It's just a rougher-looking-type material. You know, not - not massive. Hey. There's D - D-Caldera. Hey, what do you know?

05 18 05 06 CC Do you have - do have any dark - do you have any dark halo craters near Sulpicius Gallus?

CMP Yes. The - I'll be darned.

CC We're - we're with bated breath, waiting.

CMP ... Picture 28 of D-Caldera with the Hasselblad. I mean with the Nikon (laughter), and Sun angle must be about 1 or 2 degrees.

CC Roger. We copy.

CMP You know, I really didn't concentrate too much on - on Sulpicius Gallus at that - that particular passing, I was concentrating on the Tacquet area, and in that - in that case, all of the - the rilles and the ridges - not the wrinkled ridges out in the middle out in there, but the rilles and the area built up around the rilles and also associated maybe - Oh, I was going to say 10 times the width - the rilles width is all one color.

CC Okay, Ron. We'd like HIGH GAIN to AUTO, and we'd like to load your NOUN 78.

05 18 06 41 CMP Okay. HIGH GAIN to AUTO. Let me see, 22 NOUN 70 to ENTER. Okay. Let's see, plus 52.25. Plus 52.25. Up-link. VERB 58 ENTER.

... PROCEED to ... gets out of the way. Okay. D-Caldera was taken on picture number 28. It was f/8 at 1/500, and then I took three more before that. They're terminator photos, looking north across Sulpicius Gallus and farther north. And they were 1/500 at f/16 to start with and then f/11.

CC Roger, Ron.

CMP That's probably about all I'm allowed, I think, on this XX film.

CC What was your last frame number on XX, Ron?

CMP Yes, that was - I'm on number 29 now.

CC 29. Roger. You're on 29, right here.

CMP Say, on magazine Oscar Oscar, did we get enough of our required photos out of that, or are the rest of those - opportunity or not?

CC We'll check on that with FAO, Ron. I do have one Flight Plan update for you on the pan camera photo pad. But you first ought to go to the IMAGE MOTION, INCREASE, barber pole plus four steps, to ON, and LASER ALTIMETER, ON.

CMP Right now, you mean?

CC Yes, it's - it's time, Ron. It's time for that.

05 18 09 35 CMP Okay. IMAGE MOTION - let's see - I think that was barber pole plus three before. There it is. 3 - 4 -

05 18 09 56 CMP LASER ALTIMETER, ON.

CC Okay, Ron. That pan camera - -

CMP I hope to pick up some answers to some of those things on a couple more passes. Okay. That's right. Go ahead.

CC Okay. Did - did it bother you, me - me reading some of those questions to you? I know you'd probably had time to study them, but I thought I'd jog your memory on them.

Tape 92B/6

CMP Oh, no. That's - no, that's good. I appreciate it.

CC Okay. I'll get a conference here with Farouk before we start the next pass on the next rev around and see if we can improve it. Things worked perfect down here. We - I had the questions in front of me, and Farouk flipped them into the screen and it really worked great.

CC Okay, Ron - -

CMP Yes. That's good, okay.

05 18 10 44 CC - - at 141:50, I've got the pan camera photo pad.

CMP Okay. Ready to copy.

05 18 10 54 CC Okay. T-start time, 141:54:01; T-stop time, 142:18:24.

CMP Okay. T-start, 141:54:01; T-stop, 142:18:24.

CC Good show, Ron. It's - your bird now for a while.

CMP Okay.

05 18 12 37 CC Ron, just for your information, we're playing back the voice playback from the last rev, and it'll be recorded in house. It is readable, and we can read it.

CMP Oh, okay. Good. I purposely tried to keep one of the microphones right on my mouth on those things. I don't know if that helps or hinders it.

CC Roger, Ron - -

CMP At least I could hear myself talk that way.

CC Roger. It worked. We can read it, and somebody can listen to it here when we get a chance. How about on this back side of this next rev? Looks like you're pretty busy with some pads and - and some photo work in there. Do you expect to be doing any recording - much recording there?

CMP No, probably not. I'll just try to - try to make notes of it or something, and then pass it on out when I come out the other side.

CC Good show, Ron. Good show.

05 18 14 07 CC And your - your grounded friends down there are busy working around the LM right now and doing some loading the Rover and that, getting ready for the EVA-2 work. They're out on the surface and loading the Rover.

CMP Very good. I'll be glad to - curious to know if they can make it up that hill or not - to Scarp.

CC Roger.

CMP Looks like they should be able to go right up that valley, the way they've got it planned there.

CC Gene's got to take some time here on this EVA and make a fender. We're - we're piecing together a couple of maps and trying to get a fender, because they lost a piece of the fender last night.

CMP (Laughter) They did, huh?

CC We're going to give Gene his auto mechanic's license if it works.

05 18 14 57 CMP How's my - yes, right. How's my ZPN? All I did was move it. I didn't put in a new sensor yet. Do I need to put on a new sensor?

05 18 17 34 CC Ron, the ZPN data isn't too good. It's the sensor sponges need to be replaced, if you didn't already replace them.

CMP (Laughter) Thought I'd get by without replacement. Yes, I'll replace them pretty quick.

CC Hey - you know - your choice. We can - we can stand the crew exercise period without replacing them, I'm sure.

Tape 92B/8

CMP Okay. While I was eating my peanut butter awhile ago, I lost my lobster bisque and my juice. And I just now found it.

05 18 19 08 CC Okay, Ron. Here's your word on some magazines here. X-ray X-ray has to be left for the Zodiacal light. You - you should not take any more on X-ray X-ray until after Zodiacal light. Mag Oscar Oscar and Papa Papa are yours to play with, as long as you stay with the Flight Plan on the rest of the mags.

CMP Okay.

CC And those are your crew options for the rest of the mission, those two mags.

CMP Okay. In other words, we made it up on Oscar Oscar, I guess, on that one pass, huh? Rest of them are - are crew options.

CC Roger.

05 18 25 38 CC Hey, Ron. You got a 110 heart rate. What are you doing?

CMP (Laughter) Shaking the couch.

CC (Laughter) I thought we could hear that. That's pretty good.

CMP Shaking the couch (laughter).

05 18 26 19 CC Okay. Keep it up, there; you got 120 now. Dr. Berry would like to keep it there for a while.

CMP (Laughter) I'm getting tired.

CC That's the whole idea of the thing, Ron.

CMP (Laughter)

05 18 26 51 CC Okay. Got you 130 that time.

CMP Oh.

05 18 31 47 CC Hate to say this, because it's very dead serious work, but I'm kind of watching a lunar comedy as the - the two lunar stalwarts are trying to plan the new fender on the vehicle down there.

CMP (Laughter) I'll bet that's really no easy job, you know.

CC That's right. They've got a couple of their clamps - what they did is they - -

CMP ... kind of hard.

CC They took a couple of their clamps, and they took - taped together in the cockpit a couple of their big lunar maps - the big heavy maps - and they're - now they're clamping that map to the fender where the removable part is.

CMP Oh, I see. Must be pretty dusty down there or something.

05 18 32 33 CC Yes. Well, they lost a fender, and it was throwing dust up on Gene. It's just ridiculous how much dust they got on them, so they - they just decided they just had to go ahead and do something.

CMP Yes.

CC I would hate to be paying for that fender repair job by the minute.

CMP (Laughter) Boy, that's for sure.

05 18 39 18 CC ...

CMP Say again, Houston.

CC Oh, that was me - went off on the wrong loop, - loop there, Ron.

CMP Oh, okay. (Laughter) Okay.

CMP On that Crisium Serenitatis - number 4 of 5 - that - dark dome just to the northwest of J-3 - the one I was talking about that had the typical cone-type shape with the dome down in the side of it.

Tape 92B/10

CC Roger. We had it. Farouk had a pointer on it the whole time. I knew just what you were talking at.

CMP Yes. Okay. Okay.

05 18 40 45 CC Just talked to the home front a little while ago, and everybody's fine, Ron. And they were able to get the squawk boxes squared away, so she should have been listening to you for last couple of passes - all on the ... The problem was it wasn't able to shut off one loop or the other, so today we've been - they've been able to get all - just the CSM loop in there for - during the AOS periods.

CMP Oh, I see. Otherwise, they - they were both coming in, huh?

CC Yes. Last night, they were both coming in. Today, they got it squared away, so you're just coming in, and they are able to watch and listen to the other one on - on the TV camera.

CMP Yes. TV, yes.

CC And they say they are looking forward to good weather tomorrow. Supposed to finally get a break in this stuff tomorrow.

05 18 41 38 CMP Hey, good. We can say that's because the guys went to the Moon, see?

CC Roger. Okay (laughter).

CMP ... get the good break's in the weather (laughter).

05 18 41 56 CC About 5 min - 4 and 1/2 minutes to LOS now, Ron. We went around the room, and all systems look good and you're just looking great.

CMP Okay. Mighty fine, I'm feeling pretty good.

CC That's great. We noticed your heart rate went up pretty well on the exercise. Looks like you got some exercise, and we'll be seeing you at 142:12.

CMP 42:12. Okay.

Tape 92B/11

CC And we'll be all set up with our backroom for those orb science visuals from Copernicus on down to Reiner Gamma; and you know, ... too, but we'll be up for all - everything in between. So, just standing by for your word.

CMP Okay.

CC And Stu's mentioned if you hadn't earlier, that you might try the binoculars when you look at Copernicus for that dike you said - if you hadn't thought of it before.

CMP Yes. I'm going to try that this time.

05 18 42 54 CC Okay. Good show.

05 19 04 XX

BEGIN LUNAR REV 28

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 17 55 50 CDR-LM Well, let's see if I can partially get this hatch open.

LMP-LM That's 0.7 still.

CDR-LM Okay.

LMP-LM 0.5. 0.3. You got it at what - about 0.2 yesterday?

CDR-LM Why don't you move over as far to the right as you can - -

LMP-LM Okay.

CDR-LM - - So I can bend down.

LMP-LM Well, I think that's - -

CDR-LM Okay.

LMP-LM That's good. I can reach it.

CDR-LM No, too much pressure on it yet.

LMP-LM Okay. About 0.3.

LMP-LM Okay. There's my H₂O full - flag.

CDR-LM Flag.

LMP-LM Well, in that case, let me see if I can't get the - Oh, man. No.

CDR-LM No.

LMP-LM It's unlocked, huh?

CDR-LM Yes, I unlocked it earlier.

LMP-LM 0.2.

CDR-LM Hey, it's unlocked. It's on again. Here it comes.

Tape 93A/2

LMP-LM There goes all the junk out there again. Guess that's ice.

CDR-LM Yes.

LMP-LM Okay.

CDR-LM Probably cleaned some of the dust out, I hope.

LMP-LM Yes, there goes a lot of junk.

CDR-LM Sure wish it would clean the dust out. But it isn't. It's cleaning everything else out.

LMP-LM Okay, Geno. We turn our PLSS water on.

CDR-LM Okay.

LMP-LM If we can get to it.

LMP-LM Feels like a water valve.

05 17 58 09 CDR-LM Okay. Mine's on.

05 17 58 10 LMP-LM LMP's water's on.

CDR-LM Okay.

LMP-LM Okay.

CDR-LM Open -

LMP-LM We're right there.

CDR-LM What? My water flag is clear.

LMP-LM That just means you've got feedwater pressure.

CDR-LM Okay. Open hatch. Rest until cooling sufficient; verify PGA 3.7 4.6. Now mine's coming through 4.8; let me stand there a second. CB status PREAMPS and ECS.

LMP-LM Roger.

CDR-LM Water SEP component light ON?

LMP-LM Roger.

CDR-LM Okay.

LMP-LM I mean affirm. Get my terminology straight here.

CDR-LM Okay, Jack. I'm going to start doing about a 90 here.

LMP-LM Okay. Let me - I need to turn around as soon as you do so I can help you get under that -

05 17 59 24 LMP-LM That's better.

CDR-LM Okay; I knocked it off. Okay. I'm out of the way now, if you can move your left leg. Okay. I got an O₂ FLAG. And it's cleared. The pressure is 4.6. Okay, Houston. If you're happy - CDR is going to get out.

CC Roger. We're happy, Geno.

CDR-LM Okay. ...

05 18 00 05 LMP-LM Okay. Hatch is full open.

CDR-LM Okay.

LMP-LM And you're still - your scraping your - just a little bit. Just get your buttons down there. That's good. Okay. Oh, hey, remind me to fix your -

CDR-LM Foot straps.

LMP-LM Your - your donning straps.

CDR-LM Okay. That is ice, by the way, Jack.

05 18 00 37 CDR-EVA Oh, man, I tell you, with a stiff suit - still at 4.5. But, I am out here on the porch.

LMP-LM Okay.

CDR-EVA Oh, man. Okay, I'm out here.

LMP-LM ... assisted you.

LMP-LM Here comes the jett bag whenever you're ready.

Tape 93A/4

CDR-EVA Well, let me get - Okay. I'm all set. Man, I wish this suit would come down to 3.8. Here it comes. Okay, any time.

CDR-EVA Give it a swat; there you go.

LMP-LM Oh, the beauty of - ...

CDR-EVA Okay; let me look at something here (laughter).

LMP-LM What's that?

CDR-EVA I was just turning my checklist pages.

LMP-LM Oh. Here you go.

CDR-EVA Okay. Jett bag. I need - What you got next; ETB?

LMP-LM ETB.

CDR-EVA Okay.

LMP-LM Can you reach it?

CDR-EVA Yes. Get it hooked up here.

05 18 02 14 LMP-LM Okay. Turn the tape recorder off.

LMP-LM Tape recorder's off.

CDR-EVA Big ... that's a legacy of Gemini 9.

LMP-LM Mags.

LMP-LM EVA decals. ETB is hanging.

CDR-EVA That all I need?

LMP-LM I think so. You hit your comm again.

CDR-EVA No, I didn't; I'm okay.

LMP-LM What happened to the static? Did we lose Houston?

CC No. We read you loud and clear.

LMP-LM Hello, Houston. Oh, you must have switched to - Oh, I don't know.

CDR-EVA Okay. I'm going down the ladder.

LMP-LM All of a sudden, all the noise is gone; that's very good.

CDR-EVA God speed the crew of Apollo 17. I think I'll read that every time I come down the ladder.

05 18 03 32 LMP-LM Okay. All the circuit breakers are verified. Noise is back. Okay -

CDR-EVA Okay. My visor's coming down; utility lights are off. We're not going to use the camera?

LMP-LM Hey, I get to get out.

CDR-EVA Okay, Houston. On this fine Tuesday evening, as I step out on the plains of Taurus-Littrow, Apollo 17 is ready to go to work.

CC Roger, Geno. Good deal.

CDR-EVA And the first thing I'll do is give you a TGE. Let me turn it on. And you want a reading. Okay. It's on. Bob, and the reading is 222, 262, 207; that's 222, 262, 207.

CC Roger. We copy that, Gene.

CDR-EVA Looks good from here, Jack. Keep coming. Come on, hatch. Oh, what a nice day. (Laughter) Funny, there's not a cloud in the sky. Except in the Earth. Take it nice and easy today and get accustomed. Whee!

LMP-LM Okay.

CDR-EVA I'll be right there, Jack, to get the antenna, as soon as I turn the LCRU on.

05 18 05 16 LMP-EVA Okay. I'm on the ladder. Door is closed.

CDR-EVA Okay, POWER switch is INTERNAL. I'm in MODE 3. LCRU blankets are open 100 percent. AGC is 40 plus, and power is about 1/8. Sensors are about 1/6 or 1/4.

CC Okay. And we have a good picture there, Geno. Thank you.

Tape 93A/6

CDR-EVA Already, huh?

CC Already.

CDR-EVA Well, let me just tweak you up a little bit. Okay, I've got you tweaked, right in the middle.

CC Thank you. And, Gene, after you set both those - -

CDR-EVA Okay.

CC - - battery covers - up front there, why don't you go back and give us that temperature reading and then put the breakers in and then give us another temperature reading on the batteries.

CDR-EVA Yes sir, I'll do that. Jack, here, let's get the antennas.

LMP-EVA You want to get - you want to hang on the Rover?

CDR-EVA I guess - well, okay.

LMP-EVA I think it's easier.

CDR-EVA Now, I'm below, so get mine, now. I'm in a hole.

05 18 07 00 LMP-EVA Okay; you're up.

CDR-EVA Okay.

CDR-EVA ... get down there yet. Got to secure the flaps. Okay, you're all right.

LMP-EVA Okay, you're up.

CDR-EVA Okay.

05 18 07 41 LMP-EVA Okay, POWER switch is going to STANDBY. And the temperature is 80. And I'll close the blankets.

CC Copy 80 on the SEP.

LMP-EVA That's affirm. You know what happened? The Velcro came unbonded. That's why those don't hold down. We probably ought to get a piece of tape on those. Because they've got to set and it's going to get

dusty. The blankets - there's no Velcro left to hold the SEP blankets down, Bob.

CC Okay, I copy that, Jack.

LMP-EVA Do you have a reading on the gravimeter?

CDR-EVA Yes, I took a reading, Jack.

LMP-EVA Okay.

CC It's measuring right now, Jack, we'll get it later.

CDR-EVA All right.

LMP-EVA Okay. I hope I didn't hit it with some dust.

CDR-EVA Hey, it is not regis - measuring, Bob - -

CC That's right. Sorry about that.

CDR-EVA - - All I did was take a reading. I turned it on and took a reading.

CC Yes, you're right, you're right, and I'm wrong.

CDR-EVA Okay, Bob.

LMP-EVA Hey, Bob.

CDR-EVA The battery temperatures are 0 and 0.

CC Copy that. Okay.

LMP-EVA Bob, there's your pendulum [?].

CC Okay.

LMP-EVA It's not a very good one. I'll work on that.

LMP-EVA Are you going to be there for a minute, Gene?

CDR-EVA Just putting these batteries in. I'm done on this. Oh, you'll be glad to hear this. We got 70 on battery 1 and about 92 on battery 2.

CC Beautiful. Beautiful. 70 and 92. I copy.

Tape 93A/8

LMP-EVA Yes sir.

CDR-EVA Let me just verify this ..., Jack, and I'll be all done.

LMP-EVA Okay. You've got it.

CDR-EVA I'm all done.

LMP-EVA Okay. Okay, here's your old fender.

CDR-EVA Now work on that.

LMP-EVA Shortly.

CDR-EVA Well, I think I'm going to INTERMEDIATE cooling to start with here.

LMP-EVA Okay. I think I will, too. Good idea.

CDR-EVA One zap of cold to see if it's working. It's working, and back to INTERMEDIATE.

05 18 10 48 LMP-EVA Okay. ... go to mags.

LMP-EVA Okay; mag.

CDR-EVA I'll have the same problem with this SRC, I'll bet.

LMP-EVA Mag Romeo is going to go on the - the old 500 in a minute. Mag India is in there. Mag Kilo, Mag Juliet, Mag Bravo, Mag Delta.

05 18 12 05 CDR-EVA Okay, Bob, the SRC organic sample has been sealed. And the SRC lid is staying almost closed, about 2 or 3 inches open; if that's fine, I'd like to leave that.

CC Okay. Go ahead and leave it, Gene. If it's not we'll get back with you on it.

CDR-EVA Okay. I'm going to hit your gravimeter here.

LMP-EVA Polarizing filter - -

CDR-EVA Torque it - -

LMP-EVA - - ... light clamps.

CDR-EVA - - and the light is flashing.

CC Copy that.

CDR-EVA ...

CC Okay. And, Jack, you're getting ready to take care of the charge; remember EP-4 goes within the Rover seat, and EP-5 we're going to put on one of the footpads in the Sun. Probably either the minus-Z or the minus-Y footpad, whichever is more convenient, probably the minus-Z is. Just as long as it is sitting in the Sun is the important thing on the footpad.

LMP-EVA Okay.

CDR-EVA Boy, oh boy. Going to be a - Why won't that come out? Yes, Bob, I'm having a little trouble getting the LCRU battery out. I'll have to - I'll have to go back and use two hands.

CC Okay. That sounds like a familiar problem.

CDR-EVA Well, you got any familiar answers?

CC Someone who's been there before says you just got to work it back and forth until it comes loose.

CDR-EVA Okay. I can get that, Jack. I've got to - -

LMP-EVA ... hang it up?

CDR-EVA Yes. I've got to work here anyway.

05 18 15 48 LMP-EVA Okay, Bob, it's on the minus-Z and the - One corner is facing directly into the Sun.

CC Okay; copy that.

LMP-EVA That was - that's EP-5.

CC Roger that. And I copy number 4 was put - was put between the seat.

LMP-EVA Yes, it's - a - yes, it's between the seat, or will be very soon.

Tape 93A/10

CDR-EVA Boy, this is ridiculous. Ridiculous.

LMP-EVA Whoops, I need that other track.

CDR-EVA Well, it's nothing worth getting upset about it, but it sure makes you start out - But, you shouldn't have to this way.

LMP-EVA Come on, just don't wear your hands out now.

CDR-EVA Yes.

CC Hey, Geno - Geno - -

LMP-EVA Need a little help?

CDR-EVA No, I think I can do it, just got to wiggle - -

CC - - jiggle it gently and sort of let it come free there. It's a matter of it wedging itself in, of course, on the parallel rail.

CDR-EVA Yes. I - I see what's happening, Bob. Still ridiculous.

CC Okay - -

05 18 17 37 LMP-EVA Bob, did you hear my comment about the - about the SEP receiver?

CC Roger. That the blankets won't stay closed. We're talking about that down here.

CDR-EVA Boy; a bag of peanuts. Whew. Man in space. Without them we'd be lost.

LMP-EVA Without them we wouldn't have the LCRU and the MESA probably.

CDR-EVA (Laughter) Manischewitz. Okay. Let me see what I can do for you while I'm here. Okay. LCRU battery under seat, dustbrush to LCRU. Okay. I'll go get that; then I'll get to work.

LMP-EVA Hey, Bob, what's my shadow length right now?

CC Stand by. I'll ask. We'll get it for you momentarily.

CC Okay, Jack. We've got 4.5 meters or 15 feet.

LMP-EVA 4.5 meters, huh? 15 feet? Is that how long I am on the ground? No wonder I've misjudged distance. Zap! Hello there, Houston.

CC Hello there. Okay, Jack. And do we have the new charge transporter on the pallet?

LMP-EVA I'll say yes, but you could have looked for yourself.

CC Well, we just looked away.

CDR-EVA Yes, it's here. It's here, Bob.

CC Copy that. I won't ask if we got the LCRU battery. That one, I did see.

LMP-EVA Yes, we got it. You don't think I'd leave it here. Okay, 7.

CDR-EVA Boy, this gate's working like a charm.

LMP-EVA Okay. Transfer from 5 to 7. Okay?

CC Okay and - -

05 18 21 22 LMP-EVA Okay. The pan's complete.

CC Okay, Jack. Copy that.

LMP-EVA And, Bob, those pans around here have more pictures because I'm having to be sure I get the massifs - I'm having to take extra pictures.

CC Okay. Copy that. And I guess we'd suggest that, if you haven't talked about it already, that you work on the fender before you do the geo prep. You don't have your cameras and bags to worry about at that point.

CDR-EVA Okay. Would that be a good time for Jack to go to the ALSEP, do you think? Or do you think we both have to do this fender?

CC No. The ALSEP work - we're not going to do until the end of the EVA.

Tape 93A/12

CDR-EVA I heard John's words.

CC - -

CDR-EVA Okay.

CC And, Jack, if Gene's working there on unstowing SCB, whatever it is, 5 - yes, 5. Maybe when you put the camera down, you might want to shoot off a few 500-millimeter frames of the North and South Massifs, if they look interesting. I - I can't tell from the TV. That might be an opportune time to grab a couple.

LMP-EVA If they look interesting! If they look interesting! Now what kind of thing is that to say?

CC Then, when Gene gets done configuring that SCB-5, we'd like to get on with the fender fix. Then, we'll do the geo prep after that.

05 18 22 55 CDR We'll get on with it, Bob.

CDR-EVA My gosh, we got a lot of loose stuff in SCB-7.

CDR-EVA Okay, Bob. I got three core tubes - well, wait a minute - only got one core cap dispenser. Let me get the other one. Okay. Well, it's all on wide. Okay; three core tubes, two 20-bag dispensers, one ca - that's one core cap dispenser, and a short can.

CC Okay. Copy that, Geno.

CDR-EVA Jack - -

LMP-EVA Yes.

CDR-EVA - - Are you ready to work? See this right here?

LMP-EVA Yes.

CDR-EVA I'm going to put that right - there.

LMP-EVA Okay.

LMP-EVA Are you ready to work?

CDR-EVA Just let me turn my page here. ... Stand by.
Okay; I already got one on the gate. That didn't
count.

05 18 24 52 CDR-EVA Okay. Want a couple 20-bag dispensers?

LMP-EVA Well, I - Okay, - waiting for you to -

CDR-EVA Well, let's get this done.

LMP-EVA You want to -

CDR-EVA Here.

LMP-EVA Well, what are you doing now?

CDR-EVA I was just getting this gear out now ... to work on
the fender.

LMP-EVA Okay.

CDR-EVA I'm not to geo prep yet.

LMP-EVA Okay.

CDR-EVA Here you are.

LMP-EVA Wait a minute.

CDR-EVA We'll just set these here.

LMP-EVA And there's another one.

CDR-EVA Okay; SCB-7 goes under your seat.

LMP-EVA Okay. I'll get that. The camera has the - bags on
it. You might - just put it there, and I'll come
over and get those maps and everything.

CDR-EVA Okay. That goes under your seat. Let me get 4 -
Okay, we got 4 and 6. I'm going to start on a -
We got SCB-4, goes to you, and SCB-6 goes on the
gate yet Jack, but let's pick that up with geo
prep, and let me get that fender gear. Where's the -

LMP-EVA It's in your seat pan.

CDR-EVA In my seat pan? Okay.

Tape 93A/14

LMP-EVA I should have put it over here. That was just where it ended up.

CDR-EVA You already used the 500?

LMP-EVA No, I didn't get a chance to.

CDR-EVA Okay. You might do it while I try the fender, and then you're here to help me in case I need it.

LMP-EVA No, it's all - all your stuff's right there, Gene.

CDR-EVA Oh, okay. I see it. Well, let's hope it does the job.

05 18 27 19 LMP-EVA Okay, SCB-7's in my seat. And I put the return-to-LM map in there, too; it's just going to be in the way anywhere else.

CC Okay. Copy that.

LMP-EVA Let me check something, though. On the way to - the Hole-in-the-Wall, we want to drive ...

CC ... notch.

CDR-EVA Okay. Hope this thing gets stiff. It's just a flapper. Sure isn't stiff like I want it to be.

LMP-EVA You want me to hold it there?

CDR-EVA Yes, you're going to have to, I reckon. But, that may do the job. Let's see, does it come over the - I want it about right above the axle - let me - move your hand a minute. Let me align it. Okay. Hold it right there. Let me get the -

LMP-EVA Okay.

CDR-EVA Let me move it up just a little bit. Right there. Okay. Hold it right there. Let me see how much room I've got coming out. I want to turn this around. We can tape that other end, Jack. There you go.

05 18 28 42 LMP-EVA It's tending to fold a little bit -

CDR-EVA I think - Yes, but the dust will be coming up from under us. Let's see.

LMP-EVA Temperature; I think is making it fold.

CDR-EVA Now, that'll give us plenty of room down there, that - Yes, I just don't want to interfere with the steering.

LMP-EVA You think - you think that'll stop the dust that way?

CDR-EVA Well, it'll stop some of it if it stays on.

LMP-EVA Well, what I mean, it's not projecting outward at all. It's curling back under.

CDR-EVA Well, when I - when I put a clamp here, and a clamp here, see what will happen.

LMP-EVA Oh, okay.

LMP-EVA Is that about how - where you want it?

LMP-EVA Lean against me, if you need to.

CDR-EVA Trying to figure out - No, I've got to clamp it right in that rail; it's not much to clamp it on the inside.

LMP-EVA No. Keep the knob up. There, you got it.

CDR-EVA Hold it right there. We got it all folded up on this side?

LMP-EVA Why don't you try the outside.

CDR-EVA Let it go a minute. Okay.

LMP-EVA Okay. Why don't you try the outside, first?

CC Fix it inside first; probably be better, guys.

LMP-EVA Got enough overlap there.

CDR-EVA No, I want a little more.

LMP-EVA Okay.

Tape 93A/16

CDR-EVA And, I am going to try this side because I can get my overlap over here.

CDR-EVA Okay. Now, hold it right there while I clamp it down.

CDR-EVA No, that paper isn't going to come off, and the clamp's not going to come off, I'll say that. I don't know how much we're going to get out of the fender but -

LMP-EVA Okay, that's - fixed?

CDR-EVA Yes.

LMP-EVA Can you fix that at all?

CDR-EVA Yes.

LMP-EVA That ought to give us a little strengthening, stiffening.

CDR-EVA Yes.

LMP-EVA ... tight?

CDR-EVA Yes. Tighter for the road. I don't want to lose that. Man, that's tight. Now, let's see if I can get this one. Jack, why don't you come on this side and hold the fender down right there. Hold it right about there.

LMP-EVA Okay. You want to get it outboard a little more - I mean aft?

CDR-EVA No, I want to keep it above this - this center - The - the hub here.

LMP-EVA Yes, Okay.

CDR-EVA For steering purposes. See this - -

LMP-EVA Is that - is that fixed for the - well -

CDR-EVA I'll take a look at it. I'm going to tighten it down so it stays, then I'm going to take a look at it. I might turn this thing down too.

LMP-EVA Yes. I was just going to suggest that.

05 18 32 15 CDR-EVA Let me take a look before I get it too tight. Well, I'll tell you, that's going to help some.

LMP-EVA Yes. It may do the trick.

CDR-EVA I can't see what's under this rail too well, but I know that clamp is on. It's on tight.

LMP-EVA Gene, it looks -

CDR-EVA Let me move this -

LMP-EVA Move your left hand a little. Okay. Tighten that now.

CDR-EVA Get this out of the way.

LMP-EVA Looks as if -

CDR-EVA Let me loosen it, and get it a little straighter.

LMP-EVA Yes, I think you need to straighten it.

CDR-EVA Well, I had it tight.

LMP-EVA Yes, but you know you've got another piece in there so -

CDR-EVA Yes, yes, that's why it's crooked, it's over those pieces.

LMP-EVA Yes. Well, you might want to move it - if you could move it this way about a - an inch, you'd be past the ridge you got.

CDR-EVA Well, I'm just taking John's word on the steering. I - I - -

LMP-EVA Okay.

CDR-EVA - - keeping above the hub here.

LMP-EVA Okay; tighten her down then.

LMP-EVA I think that'll stay.

CDR-EVA I think it'll stay.

Tape 93A/18

LMP-EVA Why don't I turn this one - -

CDR-EVA Okay. You won't get that any tighter.

LMP-EVA No, I mean, why don't I turn that down because it'll keep - that much less to run into. There you go.

CDR-EVA No, not too close to that wheel.

LMP-EVA Okay? I think that's good.

CDR-EVA Too bad we don't have one more clamp - well, one more clamp would probably interfere with the steering.

LMP-EVA I think that'll stop the rooster tail, because that's - -

CDR-EVA I think that'll stop a lot of it, Houston.

LMP-EVA - - that's swinging forward. Okay. Let's go.

CC Okay. It's - -

05 18 33 59 CDR-EVA The maps are configured.

CC - - That sounds like a good attempt, men. We'll hope it works.

CDR-EVA Does that look - does that look good to John, from what he did.

CC It looks exactly what his did, he says.

LMP-EVA That tape will keep it -

CDR-EVA Yes, but he didn't run in the dust, so I guess we'll have to give it a trial run.

CC Roger on that.

CDR-EVA That ought to help some - -

CC We're anxiously waiting.

CDR-EVA Okay, Jack. Let's - I'm going to HIGH for a little bit. Okay. I need S - S - oh, shoot. Now, I want 4.

LMP-EVA I took 8 off.

CDR-EVA No, sir. I want 4 and 6. Why don't you just substitute - -

LMP-EVA Hey, I just took 8 off. Can we use 8 instead of 6?

CDR-EVA Yes, we can.

CC Yes, I don't see there's any reason why you shouldn't be able to use that, Jack. Go ahead. We'll just mark it down.

CDR-EVA Okay. Turn around, Jack. Hey, Bob, we'll use 8 instead of 4.

CC Okay. Understand 8 will be on the - -

CDR-EVA 8 instead of 4.

CC - - 8 will be on the LMP.

CDR-EVA That's affirm; 8 will be on the LMP.

CC Geno, you went to MIN instead of MAX.

CDR-EVA I think you're right. I just realized that.

LMP-EVA Got it.

CDR-EVA Yes, let me go to MAX here for a minute.

CDR-EVA We need 6 off of there, Jack.

LMF-EVA Oh, your 5 stays back here, huh?

CDR-EVA We need - we need - we need 6 to the gate.

LMP-EVA It's probably behind 4, isn't it.

CDR-EVA Well - -

CC Well, put 4 on the gate - -

CDR-EVA Yes.

LMP-EVA Probably.

Tape 93A/20

CC - - then put 5 on the commander.

CDR-EVA Yes. Okay; 4 is going on the gate and 5 on the commander.

LMP-EVA Okay, Bob, a little paperwork for you, but that's all right. Okay.

05 18 36 00 CDR-EVA Now, I got to do some more stowing on you when you get that on.

LMP-EVA Okay.

CDR-EVA Okay. They're in the -

LMP-EVA Where do you want me?

CDR-EVA Your left side.

LMP-EVA Anywhere - Which way are you going to turn?

CDR-EVA Oh, man, does that - that Velcro get tough.

LMP-EVA Here you've got a core cap dispenser.

CDR-EVA Stand by; let me fix these for you while I'm here. Okay. Here's your doffing harness on this side. Don't move yet, I've got to - I've got something I've got to do to you.

LMP-EVA Okay.

CDR-EVA Okay, okay. Turn around, I'll get your harness on the other side.

LMP-EVA Let me get yours too.

CDR-EVA Okay. Okay, there you go. Okay, you've got a cap dispenser, you've got a rammer, and you've got - well, I guess SCB-8, if I'm not mistaken.

LMP-EVA Yes, that's all right, they got it. Okay. That's 1.

CDR-EVA Okay. You can give me SCB-5 then, and -

LMP-EVA Yes. Can you move - move a little bit? There you go. Okay. There you are.

CDR-EVA You got it?

LMP-EVA No - no, I'm sorry. In fact, I've got to tighten up your -

CDR-EVA We've got to take a picture of that fender if it works.

LMP-EVA Wait a minute - No, if you weren't so tall - and you - you are always saying - you just invariably stand so I have to get in a hole. Okay. Now let me tighten up your whole shooting match here. It's loose again. Hang on. Okay. Between Velcro and snaps, the world could never fall apart.

CDR-EVA Okay, all set?

05 18 39 00 LMP-EVA You're set.

CDR-EVA Okay. I'm going to get a hammer, and then I'll get the TGE.

LMP-EVA I'm going to get my camera, and I'll go to the SEP site.

CC Okay. Why don't you start to the SEP site - -

CDR-EVA Hey, Jack, when you start running - -

CC - - and, also, I presume that the dustbrush is on the Rover now.

CDR-EVA It is.

CC Okay. Copy that.

CDR-EVA It is. Jack, when I drive out there why don't you watch the rear wheel.

LMP-EVA I will. Give me a yell when you start to drive.

CDR-EVA Okay. Both the steering and the rooster tail - Oh, I hope it's not all zeros. Okay, Bob. 670, 017, 701; 670, 017, 701.

CC Okay. Copy that.

Tape 93A/22

05 18 39 53 CDR-EVA Okay; and the SCB is good. It's closed. It's in the shade. The rest ... I guess.

CC Okay. And, Jack, when you get out to the SEP site, you might give us a reading on what the solar panels look like - how they survived the night with the tape on them.

LMP-EVA I wouldn't think of not doing that. I'm curious myself.

05 18 40 32 CDR-EVA Okay. The TGE is on the LRV.

CC Okay. Copy that.

CDR-EVA Okay. I'm making an inventory. I've got the LCRU battery. Okay. We got 1, 3 and 2 and 8; LCRU blankets are open 100 percent. Battery covers are CLOSED. Dustbrush is on the LCRU. TGE is on the Rover. Jack, can you verify we got the right mags and a polar filter? Polarization.

LMP-EVA Yes sir. I verified that.

CDR-EVA Okay. Very good.

LMP-EVA You better put that 500 back under the seat.

CDR-EVA Yes. That's where it's going.

LMP-EVA Well, Bob, it looks like - it survived. There is a - as I stand behind the panels - the left-hand panel may be tilted at about - well, less than 5 degrees, probably about 2 or 3, but that's all. Looks pretty good right now.

CC Okay; beautiful. Thank you. Good fix.

LMP-EVA Okay.

CDR-EVA Okay, Bob, I'm going to take the TV from you.

CC Okay. Copy that, Geno.

05 18 41 36 LMP-EVA And the transmitter's going on.

CC Copy that, Jack.

LMP-EVA (Laughter) If I can do it without destroying it.

CDR-EVA Yes. That's hard to do out there, Jack. Okay.
TV camera going POSITION 1.

LMP-EVA Transmitter's on and - ... fix the level there.
Okay. The level is on the inner ring again. And -
well, the gnomon has moved a little bit, but
not much. But you would expect that, I guess.

CC Yes. Seeing the other end of the gnomon up there
in the sky it's moved a little bit.

LMP-EVA Yes. That's what I said.

CDR-EVA Okay. Camera, tongs, and I'll drive. West leg,
heading 270.

LMP-EVA Camera is on. Bob, I'm on - I guess 26.

CC Okay. Copy - -

LMP-EVA This here's frame 27, mag Charlie.

CC Copy that. Charlie 26 - 27.

LMP-EVA I had to relearn how to document samples, Bob. I
just have. The first part of my roll will have
a lot of random exposures and focuses.

LMP-EVA Okay. We're back in business. And I'm - while I'm
waiting for Gene, getting a rock - it looks a little
finer grained than the others we've seen in the LRV
sampler, along with some soil. And that's done.
Hey, that's a neat sampler. Only way to fly. Okay,
and that's in bag 22E. It has the stereo documen-
tation and a locator to the LM, and it's about
2 meters from the S - from the SEP.

CC Okay, Jack.

05 18 44 02 LMP-EVA 22 Echo.

CC Roger. Copy that. Did you ever find any sign of
that brown fine-grained rock you saw on the way
out to the SEP yesterday?

Tape 93A/24

CDR-EVA Bob, let me give you some readings, so I can get going.

CC Okay. Go ahead, Geno.

CDR-EVA Okay. Amp hours, 108, 100; volts are 68, 68; batteries are 80 and 102; and motors are all off scale low. I'm on the way. On the way, Jack.

LMP-EVA I'm waiting.

CDR-EVA Oh, there you are over there, huh?

CC And, Jack, how's the rooster tail look on that fender?

LMP-EVA Looks like it's going backwards. I don't see any coming up over the top. Looks like a good fix.

CC Beautiful.

CDR-EVA Okay, Jack, I got to come around - I'm going to come on this side and head west.

LMP-EVA Okay. Watch for - You got the antennas?

CDR-EVA I've got one over here.

LMP-EVA Okay. I'll - give you a line on the other one.

CDR-EVA Okay. I'm getting close.

LMP-EVA Okay. Turn.

CDR-EVA Where is it?

LMP-EVA Right here. I'm on it.

CDR-EVA Okay. Okay. And I see the other one - let me parallel that line.

CC Low gain, Gene, please; after you get stopped.

CDR-EVA I guess that's about 2 or 3 meters, huh, Jack? You can better see where it - is at.

LMP-EVA Yes, that's good, Geno.

CDR-EVA Okay. Heading 270.

LMP-EVA You want to - -

CDR-EVA Am I 10 meters from the transmitter?

LMP-EVA Probably not, huh? You're pretty - no, you need to go about 5 meters.

CDR-EVA How far am I? See if it's okay.

LMP-EVA You're about 3 meters - 4 meters.

CDR-EVA Hey, Bob, I'm 3 meters to the west of the transmitter and about 2-1/2 meters south of the line going west - -

CC There's no problem there, Gene.

CDR-EVA - - Is that okay?

CC Don't move. It's just they had to be less than those numbers.

05 18 47 05 CDR-EVA Okay. That's where I am.

LMP-EVA I'm getting your photos.

CDR-EVA Okay; and let me give them a voltage reading, and I'm still reading 68 and 68.

CC Okay; copy that. We don't need those, we just got them. And - -

CDR-EVA I know, I just wanted to keep you on it.

CC - - give me the nav numbers. And give us some nav numbers.

CDR-EVA Okay. 265, 0.2, and 0.1.

CC The - that heading - we want heading, pitch, roll, and sun dial there, Gene.

Tape 93A/26

CDR-EVA Okay. I'm sorry, Bob. Okay; you want a nav update here?

CC Nav initialized, Geno.

CDR-EVA Yes, sir; you do.

CC Roger.

CDR-EVA Yes, sir; I'm sorry.

CC Go to the next page.

LMP-EVA Let me - let me change my position here, just a sukosh. Let me change my position a sukosh.

CDR-EVA I knew you'd - Bob, what was that last LRV sample number I gave you?

CC 22 Echo, 22 Echo.

05 18 48 24 LMP-EVA 23 Echo, if that followed in sequence, is another rock about - near the SEP documented in the same way.

CC Okay; copy that.

CDR-EVA Okay, Bob. 265 - 265, 0.3, 0.1; roll is 1 right, pitch is 0, and the sun shaft device is 0. I'm heading 281 degrees.

CC Okay; copy that. Stand by.

05 18 48 56 LMP-EVA Okay. The recorder is ON - -

CC Copy that.

LMP-EVA - - and the RECEIVE POWER switch is on.

CC Copy that.

LMP-EVA And, I guess you're going to hand me EP-4. Get rid of this.

CC Okay. 282 is the preferred but that's too small to bother torquing, Gene; you're good as is. We're ready for you guys to go.

CDR-EVA Okay. That looks good because I have to come left just a sukosh there to proceed parallel down the west line.

CC Okay. We're ready for you guys to go. We presume you have the SEP photos, Jack.

LMP-EVA Yes, I do.

CC Okay. And get your frame - we don't need - you can give us a frame count if you want. Remember to pick up EP-4 when you get in the Rover.

LMP-EVA Okay. We got it, and the frame count is 17.

CC Copy 17 for the LMP, and we need a nav reset to verify there, Gene.

CDR-EVA I did nav reset; I'm reading all balls.

CC Okay. And did you happen to check the - -

CDR-EVA And it is back off.

CC - - SEP temperature when you turned it on, Gene? Jack? The receiver?

LMP-EVA No. I didn't; I didn't. Doubt if it changed much since I called you.

CC Okay. We'll catch it at station 2.

CC Okay. Low gain - -

CDR-EVA Okay, Jack, we got transmitter and receiver both on, huh?

CC - - antenna is 240 and we're ready for you guys to leave.

CC Give us a mark on the leave.

Tape 93A/28

CDR-EVA Okay. Here you go, Jack; we need - The SEP antenna and receiver - receiver and transmitter, both on, huh?

LMP-EVA Yes, sir.

CDR-EVA Okay. ... - -

CC Okay. And, Gene, remember we want a mark when you pass the end of the antenna.

CDR-EVA Okay.

LMP-EVA Can drive fairly slowly, huh?

CDR-EVA Yes, until I get past the end. I got to get my heading changed about 10 degrees to parallel. We're still in the same relative position, Bob.

CC Okay. Very good.

CDR-EVA Okay.

05 18 51 04 CDR-EVA Okay. We are moving right now.

CC Okay. We're marking that.

CDR-EVA Slowly. Okay. Stand by, Bob.

05 18 51 43 CDR-EVA MARK it.

CC Okay. Copy that.

CDR-EVA Okay. We want to go past ... at heading 260, Jack.

LMP-EVA Well, we want to get at 080 and 0.4 and get rid of this charge.

CDR-EVA Okay. ... - -

LMP-EVA Yes. I want to ... - -

CC Okay, 17, a couple of words there as you drive along. Let me give them to you early here. One, we didn't bother to change all the numbers on the checklist; but, by and large, because we think

we're 200 meters east of where we were, you should probably increase all those numbers except for the explosive package numbers by about two-tenths to get the distance at which you will come across these areas. Again it's about 0.4, 0.5, and we expect to deploy EP-4. The more important number though is that it's 0.2 west of the ALSEP. As you pass the ALSEP, you might know what the range and distance are reading at that point.

LMP-EVA Okay. Range - range is the one that changes - on No, wait a minute, that -

CDR-EVA I got it.

LMP-EVA I'll get it. Which is it? Range changes every half - on the half kilometer.

CDR-EVA Yes.

LMP-EVA Distance.

CC Roger, Jack. The range is - -

CDR-EVA ... go around ... - -

CC What changes in the middle at 0.50 meters and 150 meters.

LMP-EVA Okay. We - The fender fix is working so far.

CC Beautiful.

CDR-EVA Let me get around your flag. There's your flag way out there, isn't it?

LMP-EVA Yes.

CDR-EVA Let me get around that. Man - That's really giving the ALSEP some room.

LMP-EVA Yes. Okay, Bob. We're still seeing - the light-colored gabbroic rocks. I think the reason I said 50 percent was because in this light they look light-colored, and that's probably largely because of the zap pit halos.

CC Okay. I copy that, Jack.

Tape 93A/30

LMP-EVA But, in the ..., it looked like the standard - standard gabbro.

CC Okay.

CDR-EVA And, Bob, I'm - I'm full out at about 11 - -

LMP-EVA Okay, you can - you can turn right, now.

CDR-EVA I'm full out at about 11 clicks right now.

CC Beautiful.

CDR-EVA Oops. ... (Laughter)

CC You can give me a call as you pass by the ALSEP as you get ready to deploy the charge, please.

CDR-EVA Okay. We're almost due south of the ALSEP now.

CC Okay - -

CDR-EVA ... that. I've got to work my way through here.

CC - - copy that. Go about 0.2 kilometers further than that.

LMP-EVA It's a little rocky out here.

CDR-EVA Yes, it sure is.

LMP-EVA Every - In the area we are now - you get a distance that was -

CDR-EVA Okay. We just clicked to 4. I want to move over this way just a sukosh.

LMP-EVA Yes.

CDR-EVA Okay, I can - I'm just south of my geophone 2 flag now.

CC Okay. If you just clicked to 4, let's go to 6 then, just past the click on 6.

LMP-EVA Okay. And you want about 080?

CDR-EVA Plenty good enough. I got to start heading right out here, right toward my - upper graphic - -

LMP-EVA Okay. Hole-in-the-Wall should be just to the left of the notch.

CDR-EVA Yes. That's exactly where I'm heading.

LMP-EVA And I think we're coming up closer to the rim of camelot. It's starting to look like a crater now.

CC Okay; very good.

05 18 55 00 LMP-EVA Looking down-Sun, I see no major albedo changes except for the very fresh craters which are brighter. By a few - by a - maybe 20 percent. The surface - -

CDR-EVA How are we doing.

LMP-EVA 5.

CDR-EVA Okay, Bob. Here's your charge. Pick a spot, Jack.

LMP-EVA Okay; can you swing right out over there - -

CDR-EVA Yes.

LMP-EVA - - about 10 meters ahead?

LMP-EVA Okay. Give me a shallow turn.

CDR-EVA How's that?

LMP-EVA Okay. And I'll set it right there on that - in that - Can you move forward, and I'll get it in that little depression.

CDR-EVA Okay.

LMP-EVA You see on the other side of the rock.

CDR-EVA Yes.

CDR-EVA Okay, Bob; 083, 0.6, and 0.5.

Tape 93A/32

CC Okay. Copy that.

05 18 55 57 LMP-EVA Okay. Pin 1, pulled and safe; Pin 2 is pulled and safe; Pin 3, pulled and safe. Ever stop and ask yourself what I'm doing.

CC I copy that, Jack - -

CDR-EVA Yes (laughter).

CC - - if you can give us a frame count, we'd appreciate it. And I might remind you two to both check that - -

CDR-EVA Don't fall over.

CC - - you're at MIN cooling since you've got a long drive ahead of you there.

LMP-EVA Hey, I lost my sample thing.

CDR-EVA Threw it in the floor?

LMP-EVA I hope so.

05 18 56 43 CDR-EVA That look good?

LMP-EVA Yes, it's going to stay.

CDR-EVA Okay. Have you got anything to ... If not, I'll do a partial for you.

LMP-EVA Yes. We got to do a partial. I'd like to know where that sampler is. Well, we can do without it, I guess.

CDR-EVA Yes. Sure be nice to - What did it do; come off the end?

LMP-EVA Yes, I think I can check it though.

CDR-EVA Get your pan?

LMP-EVA Yes. If you go around to - to seeing that big block there by the ALSEP, then you can - Forget it.

CDR-EVA Okay. Okay. I'll just come on around, and I'll pick up my tracks. Do you want to get that sampler? Can you see it?

LMP-EVA I think I'd better look.

CDR-EVA All right. Take a look. Bob, one stop here for about 2 seconds.

CC Okay. Copy that.

LMP-EVA Okay. It's down there.

CDR-EVA Why don't you put it on real quick and -

LMP-EVA I don't know why - It was hard to put on. Surprised it came off. Here let me - let me hold the end.

CDR-EVA You got to - got them retracted?

LMP-EVA Retracted.

CDR-EVA They'll retract. And let me know when.

LMP-EVA Okay. Okay. It's - it's loose.

CDR-EVA Retracted. You want it - how you want it?

LMP-EVA Retract it again.

CDR-EVA Okay. Retract it.

LMP-EVA No - Let go, let go - no, it's just hooking.

CDR-EVA Okay. Try it - push it in once more.

LMP-EVA Okay. The best I can do. I'll just lock - I'll twist it down on there and maybe it'll hold.

05 18 58 20 CDR-EVA Okay. Twist it tight. I got the rod.

LMP-EVA Okay. I'll just have to be careful. Okay. I've got it.

CDR-EVA Okay. Oh - oh.

Tape 93A/34

LMP-EVA I've got it.

CDR-EVA Okay.

LMP-EVA You don't have to put it in - push down.

CDR-EVA Okay.

LMP-EVA Okay. Okay. Let's go. Every time you pick your seatbelt up ... It's untwisted now.

CDR-EVA Okay?

LMP-EVA Okay.

CDR-EVA All set?

LMP-EVA Just about.

CC Okay, Jack, a reminder. We're still seeing you in intermediate. You probably will want to go to min before you get back on.

CDR-EVA He's back on now.

LMP-EVA And we're rolling.

05 18 59 22 CC Okay, copy. You're moving.

LMP-EVA Okay. Let's go to Hole-in-the-Wall. Yes, sir.

CC Okay. One other thing I might mention to you guys as you're driving here, Jack, before you start talking again, is that - as you go by Camelot, you might keep an eye out for blocks along the rim there, because remember - we may be wanting to come back and move station 5 to an area where there's blocks, unless there are blocks at the present nominal station 5. So you might keep an eye for that and plan for the way back. A second thing a reminder, if you do stop for a Rover sample or one thing or another along the way, give us a call and keep us informed, because we're timing you on the way out and the assumption is, of course, that driving time out equals drive-back time. And we're under a 63-minute limit to get you from the LM out to the station 2 because of OPS drive back. So, keep us informed so we can keep a good tab.

LMP-EVA Okay, Bob. Okay. We'll keep you informed.

CDR-EVA Bob, I got the thing tube-locked, and I'm averaging probably 10 to 11 clicks. It's not exactly straight-line navigation, but I think I can hold most of it.

CC Roger. Beautiful.

LMP-EVA Watch the crater - there you go.

CC And, Jack, a reminder - -

LMP-EVA I tell you, when Gene decides to turn - whoo!

CC And, Jack, a reminder on photos yesterday. You apparently took quite a few on the way back from station 1 to the SEP, and we're right nominal on budget now. But, considering the fact that we didn't do much sampling if you continue to use them at the rate you did yesterday coming back from station 1, at least as we understand it, you'll be pushing us pretty hard in the budget. Should be every 50 meters or every 100 meters.

LMP-EVA Bob, okay. And you want to hear something?

CC Roger. I'll listen now.

LMP-EVA Okay. The surface is not changing in terms of the detail. The surface texture of the fine-grained regolith still is - has a raindrop pattern. We're more - the blocks still look very much like what we sampled yesterday around the LM. They're light colored, apparently gabbros, with zap pits - zap halos. Occasional craters show lighter colored ejectas both all the way down to - say half a meter in size. Other craters that are just as blocky as those with bright halos have no brightness associated with them. Most of the brightest craters have a little central pit in the bottom which is glass lined. The pit is maybe - a fifth of the diameter of the crater itself. It's a fairly standard thing for most of these fresher craters, is that little central pit.

Tape 93A/36

05 19 02 20 CDR-EVA Okay, we're just south of the rim of Camelot. There is a light mantle on the other side. Look at that crater. Whoo!

LMP-EVA We've got the ... - oh, and there's Camelot.

CDR-EVA Oh, Whoo! Manischewitz. Take a couple of pictures looking at that.

LMP-EVA Okay. Can you swing a little?

CDR-EVA Yes.

05 19 02 36 LMP-EVA Okay, I got them.

CDR-EVA That is a 600-meter crater.

LMP-EVA Okay. I - I - -

CDR-EVA And it is very likely we won't have any problem finding blocks on the rim of Camelot.

CC Hey, how about a bearing and range there to help us pick out the LM ... Roger. How about bearing and range to help us pick out the LM location.

05 19 02 50 CDR-EVA Okay. 08, 31.2, and 1.0.

CC Okay. Thank you. Thank you.

LMP-EVA Bob, listen -

LMP-EVA Okay. There's a little -

CDR-EVA Man, are there blocks there.

LMP-EVA Now that - little crater in the ejecta did not - of Camelot, at least the rim of Camelot, did not bring up blocks on the rim. It may have been an old depression. Bob, there is extremely blocky area. This would - I think station 5 was over there where that block area is. The light-colored areas on the photos are essentially - blocky. They're probably 30 percent blocks. All of them are in the - many of them are in the 2- to 3- to 4-meter size range. All of them look light colored, look like the gabbro we sampled from

a distance. They have light-halo zap pits on them. I see only occasional grayer varieties, which I believe are the nonvesicular ones like we also sampled.

CC Okay. Copy that, Jack. Very good.

LMP-EVA But the light-colored gabbros are dominant.

CC Thank you.

LMP-EVA Okay. Station 5 would have been - rather than in a light-colored area would have been in a very blocky area. Station 5 is probably still very good for blocks.

CC Okay. Thank you.

LMP-EVA There is probably as big blocks there as anywhere on the rim that we've seen.

CC Copy that.

LMP-EVA Okay. We ought to be going be - really between Horatio and Camelot now.

CDR-EVA No. I'm going to give them a call when we're due south of Camelot and see if they can't get a position on us.

CDR-EVA Hold it, Jack.

LMP-EVA Ooh, watch it.

CDR-EVA Hold it; hold it.

LMP-EVA You can go around that one.

CDR-EVA You bet you (laughter). Whoo! That slowed the speed up a little bit.

CDR-EVA You can un wrinkle your toes now. Okay.

Tape 93A/38

LMP-EVA Oh. I wasn't worried, Gene. Watch that block there; it's probably more than 14 inches. And got a fairly close look at the rock, and it is the vesicular - looks very much like the vesicular clinopyroxene gabbro.

CC Thank you.

LMP-EVA Now, the surface of Camelot is mantled - or the rim - is mantled with the same dark-gray material, and it has the same surface texture - a very fine raindrop pattern. The saturation crater size does not look bigger than a half a meter, if that.

05 19 05 30 CDR-EVA Okay, Bob, I'm going to give you 081, 1.6, and 1.4. We're south of the center of Camelot.

CC Okay. Thank you, Gene.

LMP-EVA One crater - Okay. We ought to see Horatio here pretty quick. I think it's right up in front of us.

CDR-EVA Yes, I think you're right.

05 19 05 52 CDR-EVA We can definitely see the light mantle as it comes out over the valley here, and we're looking at Hole-in-the-Wall, although it's still too subtle. We're looking right at Lara, as a matter of fact.

LMP-EVA Yes. There's Lara, very clear; and Hole-in-the-Wall, you can see it.

CDR-EVA Yes, yes.

LMP-EVA Yes.

05 19 06 09 CDR-EVA There's Horatio way over there where those blocks are. See it?

LMP-EVA Yes, that's Horatio. We're right on course, sir. There's a little depression we didn't talk about, though, between Horatio and Camelot. But it's a depression and not a blocky crater at all. As a matter of fact, the total block population has changed out on the - once we get away from the rim of Camelot the block frequency is quite a bit smaller. It's down - maybe to only - less than 1 percent of the surface.

CDR-EVA Much easier driving with the Rover. Boy, am I glad we got that fender on. Very obvious that the Rover navigation - because of the blocks and because of the smaller ... craters, and very subtle type craters are in this area.

LMP-EVA There are up to 2-meter, bright-halo, blocky craters - and that's blocky wall craters that may be incident rock rather than - I think it is rather than bedrock - in the rim area of Camelot.

05 19 07 27 CDR-EVA Horatio has got to be - there's Horatio, right there.

LMP-EVA Yes. That's Horatio.

CDR-EVA Let me give another mark on the southern rim of Horatio.

LMP-EVA Okay. The scarp looks very smooth from here - no obvious outcrops at this time. Don't seem to be penetrating to any bedrock in the area we're traversing now, just to the southeast of Horatio. Horatio has a blocky wall; however, the upper several tens of meters, probably, of rim look as if it's either mantled or composed of - the light-gray regolith material we've been driving on. The blocks do not come to the rim of Horatio.

CC Okay. Copy that, Jack.

CDR-EVA - - know if I want to take you down there or not. Yes, Jack, hold on ... you down there.

LMP-EVA Horatio has quite a different appearance than Camelot. It is - and that's the main one - the rims - the blocks do not get to the rim.

LMP-EVA What's your roll? (Laughter) I know it's not much, but it seems like a lot.

CDR-EVA ... go around that crater.

LMP-EVA Yes. The - It looks like - if Horatio is any gage, the rim thickness of maybe, and this is a wild guess, Bob, but maybe an average of 20 or 30 meters stratigraphic thickness lies above the exposures

Tape 93A/40

of the subfloor; exposures being blocks in the wall. And some of those blocks, again, are several meters, if not 5 to 10 meters in diameter. And they're concentrated on the west rim that I can see. There are very few blocks on the east - excuse me, the west wall - there are very few blocks on the east, north, and south walls of Horatio.

CC Copy that, Jack.

05 19 09 41 CDR-EVA Okay, Bob. We're on the southern rim; 078, 2.3, and 2.0.

LMP-EVA Yes. We're maybe 100 meters south of the rim. Actually, we're on the rim crest. We're 100 meters south of the break in slope into the crater.

CDR-EVA There's a lot of - it's an undulating, hummocky traverse terrain in there, Jack.

LMP-EVA Yes.

CDR-EVA These little craters make it bumpy; but, other than that, it's really smooth sailing.

LMP-EVA That's right. This is what I sort of expected dark mantle to look like, rather than what we landed on. Not more than 1 percent of the surface, and that - and that percentage continues right over the rim crest of Horatio down onto the wall until you hit the big blocks.

05 19 10 24 CDR-EVA What's this depression? That's not - No, we're not to Bronte yet.

LMP-EVA No, I don't have any - No, we're not at Bronte -

CC Okay, 17. And how about an amps and a mobility - a speed reading.

05 19 10 38 CDR-EVA I've been pushing anywhere from 9 to 11 clicks, and most of the time that's full out, and amperes are bouncing around 100 apiece.

LMP-EVA Hey, watch these down-Sun craters. They're hard to see.

CDR-EVA I know they are. We're climbing, Jack. Because I've been full bore most of the time, and all I can get out of it is 10 clicks; and when I decelerate, she decelerates in a hurry. What's our next stop here, a sample at 3.9?

LMP-EVA A - 080/3.9.

05 19 11 13 CDR-EVA Well, I'm sitting on 080 right now and 2.6. I think we've got to add a little bit to that ...

05 19 11 21 CC Okay. Stand by. We'll get a new correction for you guys on that shortly.

LMP-EVA Okay, Bob. The surface is not changing. We see no craters that seem to penetrate into bedrock out in here - that is with blocky rims, and that's quite a contrast to the area we sampled at station 1A yesterday. I see - I cannot see in my field of view any blocky-rim craters. There are slight craters with - with fragmental walls and rims, but it looks like incident rock rather than the subfloor material.

CDR-EVA Jack, can you see over there to the left? I'll turn a little bit - on the - on the dark area of the South Massif where you get those - those impressed lineations. See them going from left upward to the right?

LMP-EVA Yes. I see what you mean; right.

CDR-EVA That's what I saw out my window.

LMP-EVA Yes - lower left they - they go obliquely up the slope.

CDR-EVA They're more like wrinkles, they're - linear wrinkles.

LMP-EVA Yes. Crenulations, you might say, in the slope that look something like those I saw from orbit - looking in the shadowed area - at the edge of the shadows. Bob, we've seen craters as much as - 20 meters, maybe 30 meters in diameter without blocky rims.

Tape 93A/42

05 19 12 44 CC Copy that, ... Thank you.

LMP-EVA The rim block population is not much dif - The rim block population is not much different than the average for the terrain in here.

CDR-EVA Boy, I'll tell you. If we can't recognize a change in that albedo when we get onto that white mantle, I'm going to be surprised.

LMP-EVA Mark my words. Okay. The light mantle is just what Gene has said, it's a - that's it, right now - there are some very bright craters in it - they stand out, bright-haloed craters scattered over it, that - seem to be quite a bit brighter than anything we have out here on the dark mantle. See those blocks over there? That's the first different colored blocks I've seen; they're sort of gray looking.

CDR-EVA Where are you looking?

LMP-EVA Over to the right a little bit.

CDR-EVA Darker gray, a little bit.

05 19 13 41 LMP-EVA Watch yourself here. Okay. There's a crater with a big mass of block in the bottom. It looks like there - it might be a secondary fragment from somewhere.

CDR-EVA Do you want to get a photo as we go by?

LMP-EVA Yes, let's - can you swing a little bit to the right?

CDR-EVA Yes.

LMP-EVA That might be worth a - How's our time for traverse, Bob? Do we have time for an LRV sample?

05 19 14 03 CC You're doing great, so far. We're looking for that first LRV sample at about 4.2 - that's in the light mantle, if you can do it quickly. But it's - we weren't planning on it.

CDR-EVA Want one here?

LMP-EVA Yes, let's get -

CC Target of opportunity there, Jack.

LMP-EVA Can you get -

CDR-EVA Go ahead.

LMP-EVA Okay. Swing a little bit to the right now.

CDR-EVA Okay.

LMP-EVA Right up across that little ray.

CDR-EVA Okay.

LMP-EVA And I'll try to get a chunk of whatever - okay, I want - keep going - keep going -

CDR-EVA Look at that big ... - -

LMP-EVA Whoa, whoa, whoa.

CDR-EVA Okay.

LMP-EVA Let me get the switch off.

05 19 14 34 CDR-EVA 082, 3.0, and 2.6. And, Bob, I've been making - 10 to 12 clicks coming across the surface; and, as I say, for the most part, that's full bore except where I have to do some rapid changes.

CC Okay. And, by and large, the back room is interested in you guys pressing on to station 2.

CDR-EVA Okay, we are. Just watch the batt - or the - LCRU.

LMP-EVA Okay, Gene. That's a pretty big rock in there.

CDR-EVA Okay.

LMP-EVA And, Bob, I think there's - -

Tape 93A/44

CDR-EVA Hold it. Hold it down farther - down. It's got quite a bit of dirt in it.

LMP-EVA I think this is a sam - this is a block from a linear-strewn field of very irregular and jagged rocks that are - that are southwest of the - of a crater that's 10 to 15 meters in diameter. If - if - if - it looks like the material that may have formed the crater, and you can look at some of the pictures and make up your own decision.

CC Okay. Copy that.

LMP-EVA Can you get it in there? Okay. You got it.

CDR-EVA No, no. No, I didn't.

LMP-EVA No?

CDR-EVA Okay.

LMP-EVA The bag's not open.

CDR-EVA Well, okay. Yes, that's bad.

LMP-EVA Can you push it in? Pull down.

05 19 16 02 CDR-EVA Okay. It's down. 26 Echo, Bob. We're on our way.

CC Okay. Copy that - -

CDR-EVA Go ahead.

CC - - And, you got a frame count, Jack?

LMP-EVA Oh, yes. Let me -

CDR-EVA And I did get my locator here.

LMP-EVA Okay. I got mine.

CC Thank you, Jack, Gene.

05 19 16 17 LMP-EVA And the frame - the frame count is 95.

CC Copy that.

LMP-EVA Holy cow! I'd better slow down my picture taking.

CC Roger, Jack.

LMP-EVA Okay. We're in a little area where the fragment population may be up to 3 percent. It's getting a little more like what we saw around the LM. In fact, I would say it was comparable now.

CDR-EVA I'm going down this slope and up the other side, Jack.

LMP-EVA But nothing like station 1.

CC Okay. Copy that. And the next planned Rover sample will be at a distance of 4.2; so, 080 and 4.2. And it will be in the light mantle if - -

LMP-EVA Okay. We got it, Bob.

CC - - that's the big reason for those numbers.

LMP-EVA Okay. It's in the first fall of light mantle, as I recall. Is that right?

CC Roger; the thumb.

CDR-EVA Okay, Bob. Your heading at 260 looks like it's right on, by the way, from what I see on the skyline.

CC Okay. And how's the low-gain antenna holding up?

LMP-EVA Look at that ... - -

CDR-EVA Well, I'm moving it, so I guess you're getting it.

CC Yes, we're getting it - just checking.

LMP-EVA Bob, I'm still - the blocks I see still seem to be the gabbro, except for that one sample we took, which I hope was what I thought it was -

CDR-EVA Gee, it's blocky here.

LMP-EVA Let's see - -

CDR-EVA Oh, that's a big crater. We got to get around here.

Tape 93A/46

05 19 17 50 LMP-EVA Okay. That must be Bronte.
CDR-EVA My gosh, is that big.
LMP-EVA That's bigger than I expected.
CDR-EVA Whoo! I got to go around this thing.
LMP-EVA Yes, yes. There are some very - -
CDR-EVA I got to go back here.
LMP-EVA (Noise) Blocks, greater than the normal gabbro we've seen, that are very - have very large, egg-sized vesicles in them.
LMP-EVA Watch it - you got one on your right there - Here you go.
CDR-EVA Yes. I got them.
LMP-EVA Okay. I - don't mind me, Gene.
CDR-EVA No. No problem. That's all right, because some of those down-Suns are hard to see. I want to get off this slope.
LMP-EVA I wonder if I took a picture of that block deal? (Laughing) I hope I did. Getting to be so automatic that I'm not sure what I'm taking any more.
CDR-EVA Okay. I'm going to go through this niche between - on a high point in the saddle here.

05 19 18 48 LMP-EVA Okay. How does it figure, Bob? I think we're just north of Bronte. Does that figure?

05 19 18 54 CC Roger. That seems to be about where you should be on the map here. We gather you're circumnavigating a little bit. Comm's dropping out from time to time.
LMP-EVA Yes.

05 19 19 03 CDR-EVA 0.8, 3.5, and 2.9; and we're on the north side of Bronte.

LMP-EVA And it looks like Bronte has penetrated the dark mantle in here. It got the subfloor, but there's not an awful lot of blocks around the rim - There are just some small ones - compared to what we saw around - Watch it.

CDR-EVA Yes. Yes.

LMP-EVA What we saw around Horatio or in the walls of Horatio and around Camelot. Nothing, also, like we saw yesterday at station 1. Bob, that characteristic little dimple in the bottom of the craters is still with us, and it's invariably glass-lined in the fresh ones.

CC Okay. Very good.

LMP-EVA Now, that's not a complete lining. It just - there seems to be glass agglutinates, if you will - that's holding the fragments in the bottom of the crater together. There's one on the side of an older crater. We're back into about a 1-percent coverage. I suspect that the reason we - our block population went up there was because of Bronte.

CDR-EVA An awful lot of these ... glass-lined little craters around.

LMP-EVA Yes, and you notice, Gene, what I was saying about the little dimple in the bottom?

CDR-EVA Yes.

LMP-EVA Watch the fresh ones, and they all have that little dimple as if that - You see, there's one right there.

CDR-EVA Yes, right there.

LMP-EVA Man, you can predict it.

CDR-EVA Jack, you know, I think the white mantle is starting right over there. See on your right?

LMP-EVA Yes, that's the first -

Tape 93A/48

CDR-EVA The place you can really see it is where it's reflected off the slopes of the - or the - -

LMP-EVA Yes.

CDR-EVA - - Of the cliffs out there, but I think - I hate to say it, but Charlie may be right.

LMP-EVA Well, but you know, one thing that may distinguish it is the - the bright-halo craters are brighter.

CDR-EVA But I can see it from here - -

LMP-EVA Yes.

CDR-EVA - - On the floor of the valley here.

LMP-EVA Yes.

CDR-EVA On the scarp it really shows up.

LMP-EVA Okay. Block population is unchanged; still appears to be the - when I can see large enough blocks - appears to be the gabbro, although there's not as - not as much to look at now in terms of blocks. The surface characteristics have not changed. There are no craters that we see that are bringing up clear, blocky rims. There's a - most of the fresh craters have incident rock around them. The craters are the same size. They are older and more subdued. That incident rock is apparently broken down. I suspect a small zapping breaks that down fairly quickly.

CC Okay, 17. Copy that. You still making about 9 to 11 kilometers?

CDR-EVA No, sir. I've been making from 10 to 12, Bob, - mostly 12.

CC Okay. Can you give me a reading on the amps this time, Geno.

CDR-EVA Okay. You're getting - Stand by. I've got a little navigating to do.

CC Okay; standing by.

05 19 22 11 CDR-EVA Okay. I'm read - I'm reading - I'm reading 100 -
bouncing - around 100 on both of them.

CC Okay. How about amps and not amp-hours?

CDR-EVA ... up-and-down, hummocky terrain, I think with -
Oh, I'm sorry.

LMP-EVA Watch your - you got a hole in front of you.

CDR-EVA Yes.

LMP-EVA Oh. There you go. Spun out a little bit.

CDR-EVA Here, let me get up here.

LMP-EVA Good vehicle you got here.

CDR-EVA Yes. It takes a little getting used to, though.

LMP-EVA Yes.

CDR-EVA I'm not sure I want to go through many of those.

LMP-EVA No.

CDR-EVA Okay, Bob. I'll give you an amp reading as soon
as I can. Just stand by for it.

CC All right. There's no hurry. No hurry.

LMP-EVA Would you believe my camera handle's coming off?

CDR-EVA The terrain gets a lot more locally hummocky with
some - with some well-rounded rims but very - very
large-aspect-ratio craters, which you got to get
around in here - in the 4- or 5-meter size.

05 19 23 27 CDR-EVA Charlie, that - Charlie - I was thinking of white
mantle. That's the white mantle we're coming up
on right up here.

LMP-EVA Yes.

CDR-EVA See that on your right?

Tape 93A/50

LMP-EVA Yes.

CDR-EVA That's it, there's not going to be that much difference.

LMP-EVA Oh.

CDR-EVA Not going to be that much difference, but - look where you're going.

LMP-EVA I got to watch I don't lose my camera. It's - come loose.

CDR-EVA See, now you can look where we're going to come up on the white mantle. It's dusted with that light - light - look at it.

LMP-EVA Yes.

CDR-EVA We're only 100 meters from the light mantle.

LMP-EVA Well - -

CC Okay. How about giving us the range and bearing when you get to it.

CDR-EVA Look at - look at this crater in here. We're coming right up on it now.

LMP-EVA Yes. There certainly is a change in the general albedo, particularly in the craters. The craters are much brighter in their walls than we've seen before.

CDR-EVA Yes. That's a -

LMP-EVA Although there still is a brown - a light gray dusting over the top of it in here, but it's clearly different - no question about that.

CDR-EVA You can't see the contact as you cross it but we're just - we know we're coming into something lighter - You can - obviously see it.

LMP-EVA Yes. We ought to sample the rim of one of these craters when we get our LRV sample, because that's what's distinctly lighter.

CC How about a range and bearing, guys?

05 19 24 44 CDR-EVA We're at 3.8 here, and we can sample that rim - -

CC Copy the 3.8.

05 19 24 48 CDR-EVA 0834.4, 3.8, and I've been ... - -

LMP-EVA How about right over there, Geno? Can you get on the rim of that crater?

CDR-EVA Right here?

LMP-EVA No, right to the right there. Right here - that light stuff. See the big crater here - -

CDR-EVA Yes.

LMP-EVA - - and the light material right on the rim?

CDR-EVA Yes. I can get there. But I'm going to have to not give you much of a turn because it's - -

LMP-EVA That's all right. I got the pictures. Now, if you can swing to the left a little bit and then back - whoa. Now, back right. Okay. Hope my camera stays on there.

CDR-EVA You like that?

LMP-EVA Whoa. Yes. Whoa, whoa.

05 19 25 17 CDR-EVA Okay, Bob. We're 083, 4.4, and 3.8; and I've been running about 20 to 25 amps, I think, on both.

CC Okay. Copy that.

CDR-EVA We are in the light mantle. It's not a contrasting light like you might expect, or like we're looking at on the scarp as the Sun shines on it, but I don't think there's any question.

CC Okay. Beautiful.

LMP-EVA Yes. The craters are definite - that penetrate into it are definitely different. However, the surface texture is unchanged. There may be fewer blocks.

Tape 93A/52

05 19 26 02 CDR-EVA Okay; bag 27 Echo, 27 Echo.
CC Copy that. And frame time, Jack?
CDR-EVA Hold your bag? We don't want to lose it.
LMP-EVA Stand by.
CDR-EVA Hold it up.

05 19 26 16 LMP-EVA Okay. It's in there.
CDR-EVA Is it in? Okay. Oops, that bag won't stay open.
LMP-EVA Yes. It will after we get a couple of samples in there. Okay; my locator.
CDR-EVA And my locator.
LMP-EVA I hope I don't lose my camera.
CDR-EVA I can't reach it, or I'd help you.

05 19 26 31 LMP-EVA Okay; 110.
CC Copy that, Jack.
LMP-EVA I guess I never - - I guess I didn't do what I wanted to do and that's get that thing really cinched down.

05 19 26 50 CDR-EVA Boy, Bob, one of the remarkable things is the Sun-angle difference on that light mantle when you're looking at the slopes of the Scarp versus what we're on. I hate to use a familiar term, but my impression right here is there is more of a raindrop influence than back at the LM, or in the darker mantle.

05 19 27 13 CC Okay. Copy that.
LMP-EVA Yes. Might - might by.
CDR-EVA I think so.
LMP-EVA I think the big thing is, though, that each one of these little craters is much light - much more

lightly colored. But we're still not - there's no crater in view that does - that has a blocky rim. There's fragmental rims based on, almost certainly, incident rock, but no blocky rims.

CDR-EVA You know, one of the reasons those craters look lighter is because of their Sun angle. Walls of some of these little craters - It's the same material we're driving on, I'll bet. Yes, there is incident rock right there, Jack, you're right.

LMP-EVA Yes.

CDR-EVA Oh, boy.

LMP-EVA The fragment population is certainly less than 1 percent in here.

CDR-EVA Yes.

LMP-EVA Right now. When I say fragments, I'm talking about rocks that are - are greater than a centimeter in grain size.

CDR-EVA You know, it may be me, Bob; but it - it also seems to be a little bit more difficult to drive down-Sun in this area.

LMP-EVA Yes, I think it is brighter, Geno. I was thinking that a minute ago, but it's hard to make a - I think your normal albedo is - is greater. Here's some rocks now starting ... - -

CDR-EVA And the little craters still have the central pits.

05 19 28 30 CC Okay. We're losing your comm a little bit, guys.

CDR-EVA ...

LMP-EVA Yes, there's a few.

CDR-EVA ...

LMP-EVA Yes. There're a few blocks. They still - they still look like the gabbro, though. Hard to tell.

CDR-EVA Well, a couple of them looked to me like they had some very light *** crystals in them. See that?

Tape 93A/54

LMP-EVA I'm afraid those are zap pits.

CDR-EVA They could be.

LMP-EVA I got - I think I've been fooled by that, too, and that's why I estimated the ... time.

CDR-EVA I just want to keep you out of those slopes, and I'll tell you, I get you in some to - -

LMP-EVA That's all right.

CDR-EVA - - keeping you out of them.

05 19 29 14 LMP-EVA Okay. We're getting a little more blocks in here. Of course, we're approaching the dark mantle again. Now, you can see the difference. You got to look hard for it. But, you see those craters out in there are not white anymore.

CDR-EVA I got to get around that slope.

LMP-EVA Yes. Okay. You still got Hole-in-the-Wall picked out over there, don't you?

CDR-EVA Yes, I got it. I'm just - - And, I'm trying to keep comm with them as I'm turning here.

LMP-EVA Yes.

CDR-EVA And, I've been keeping the thing on. I don't know if they're reading us, but I've been moving it.

05 19 29 46 CC Reading you loud and clear, guys.

05 19 29 50 LMP-EVA Okay. Looking up on the South Massif, we've got real good views of the block-strewn fields. There's one that - there seems to be two dominant colorations of the rock. The light-colored ones, very - very light tan and to white, and then there are the blue-gray rocks. There's one major outcrop of blue gray about a sixth of the way down the slope, the center of the field of view we have; and it looks very much like similar blue-gray rocks right at the crest, the highest point from our vantage point.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 19 33 13 CMP There's the ole Earth. It's about a half Earth now.

CMP Houston, America.

CC Go ahead, Ron.

CMP Okay, Robert. I guess the big thing I want to report from the back side on this one here is that I took another look at the - the Cloverleaf in Aitken, with the binocs, and that southern, domical crater of the Cloverleaf - it has a breach on the east - east side of it. It - I can't tell - There's - there's a flow - In other words, the domical structures, themselves, are part of a flow material that is partially filled up the breach. In other words, the breach has either flowed into that little domical structure before the domes were built, or else all of that stuff that's in the mare floor has flown out of that domical structure before the domes came in. In other words, the domical structures, themselves, are different time relationship to the floor, itself. They are - are younger than the floor, itself.

CC Roger, Ron. We copy that.

05 19 35 20 CC Ron, is there a difference in the color between the dome and the mare in Aitken, there?

CMP Yes, there - yes, there is. The dome-type material is - the colors again are very hard, you know? I'm just going to have to say that it's - it's slightly darker than the mare floor - is the way it looks to me, right at this point in time. Also, the texture is a coarser texture than the floor itself. In other words, the floor, to me, is kind of a standard mare flat-floor-type stuff. And I have to compare the texture of the domical hills to - Oh - I guess what I would imagine is some of the dacite flows that I've seen out in California. You know, the heavy viscous-type flows.

Tape 93B/2

CC Roger. We copy there, Ron.

CC That's good data on Aitken there, Ron. Those color differences any - on any of these things - that color is one of the most important things you can give us. We'll be all ears for that.

CMP Okay. I'll try to - The trouble with colors, I'm finding out, is that - it's sure a function of the Sun angle as to what color it appears to your eye.

CC Roger. We can believe that. We just - we'll - -

CMP ... passes. Yes.

05 19 37 41 CMP You know, you take a look at the central peak of Neper, and on the south and western edge of it, you get the vertical stripes in it or streaking like you get off of the massifs in the landing site area. And then, you look at the area around in the rim - around the rim of Neper, and you get the corncob - I guess - or Sculptured Hill-type of appearance.

CC Ron, it's time for PAN CAMERA T-stop time.

CMP Okay. Thank you. ***teen 24 -

05 19 38 38 CMP Now. Okay, went to STANDBY at - whatever I said now. (Laughter)

CC Roger.

CMP It's been about 30 - something.

CC That's fine. No problem.

CC Ron, if you start your Picard orbital science photos on time, I'll be glad to call you to change to f/5.6 and the change to f/4, if you want.

CMP Oh, okay.

CC Okay, Ron. You can go PAN CAMERA, OFF at this time.

CMP Okay. PAN CAMERA POWER is -

05 19 40 11 CMP OFF.

CMP That's Conder - Condorsay or Condorcet, or whatever you want to call it, there. Condorcet Hotel is the one that has got that diamond-shaped fill down in the - in the floor.

CC Roger. Understand. Condorcet Hotel.

CMP Condor - Condorcet Alfa - it's either got a landslide - I'll get a picture of that the next time with - with the other frame, but it's either got a landslide on it, or it's had a - And it doesn't look like a crater on the side of the wall, on the northwest wall of the crater.

CC Okay. We copy that. Northwest wall of Condorcet A.

CMP That's a - the area is oval or ellipse shape. Of course, the top of the ellipse is toward the top of the crater. And it looks like it's - almost gets a flow out of the bottom of the ellipse, which is about a fourth of the way up from the bottom of the crater.

CC Ron, can you give me a scale on the size of that flow, as compared to the rest of the crater?

CMP Uhhh. The - the hole or the slope or the slide, or whatever you want to call it, down through there, is maybe one-eighth of the crater diameter. And the floor area is only just a real small portion of one-eighth size. It's a ... - -

CC You seeing any lineaments in the area? Any lineaments in the area?

CMP Yes. There was some lineaments on the area - in the area; and again, they're vertical-type lineaments or lineations kind of like the - the downslope - operations of most ... craters.

CC Roger.

Tape 93B/4

05 19 45 34 CMP They're fresher ones. Okay, let's see. We're going to Picard and then on up to - Yerkes - Where's Yerkes? There it is. Okay. Let's see where we're aiming at, here. Okay. Is it about time, does it look like?

CC Roger. You can start at - you're just about 30 seconds from starting on Picard. And like you said on the map, you go up - you go up Picard, after you start up Picard X, there, and you go on up through Picard and Yerkes and that - -

CMP Okay.

CC - - that front there, up at Yerkes' area. That's the Yerkes. Right above there is where you change to f/11.

CMP Okay. Okay, here we go.

05 19 46 21 CMP Started it. Picard X.

CMP Works better when you take the slide out.

CC If you'll give me kind of a call at what you're aiming at, like Picard X and Picard, I can give you a call on those f-stops, Ron.

CMP Okay. I just passed Picard X; and then the one west of that. *** what it was. The next - about half the size of Picard X. Hey, does this go right through Picard? Or south of it?

CC No, it goes right through dead center of Picard.

CMP Okay. We'll get it.

05 19 47 43 CMP Sure hope that color difference shows up in - on Picard.

CC Roger. We hope so, too.

CMP There's black material - now - get on up here - you get on up here, the darker tannish-gray material covers essentially from the east all the way around to the south. It goes outside the rim as well as inside the rim. It drapes over the rim. That can't be a shadow effect.

CC Have you taken Picard yet, Ron?

CMP Just now. Just one more, and I'll be through with Picard. Change to what?

CC No, not yet. You don't change it until you get on the other side of Yerkes, up there. Your path goes directly between Yerkes and ... - -

CMP Okay. Let me go to f/11.

CC No. Don't change to f/11 until you're at Yerkes.

CMP Yes, okay. Until I get to the other side of Yerkes.

CMP I can still see those dark halo craters down there. I'm going to have to look at them with the binocs sometime.

CC Roger.

CC Okay. When you're at Yerkes there, you want to switch to f/11. Just - -

CMP ...

CC - - just on the other side of Yerkes.

CMP Okay.

CC And looking west, you'll go right through Proclus.

CMP Okay.

CMP Now, what comes after Proclus?

CC Okay. You just keep pressing on up through - through - up in towards Maraldi. You go up through Proclus, and then Proclus D; and at that point, you'll change to f/5.6 and then get - get into the Maraldi N, across the maria there; and the mare of Tran - Tranquillity.

Tape 93B/6

CMP Oh, okay.

CMP It's sure easy to see why that - ray excluded zone shows up on the pictures because, to me, it's - it's a tan Sculptured Hill-type material - where - in the ray excluded zone of Proclus.

CC Okay, Ron. The - this pass continues and you change to 5.6 up there at Proclus D at the mare/highland contact at Proclus - up around Proclus and Franz.

05 19 53 13 CMP Okay. It's about now. Change to 5.6. Getting out into the mare.

CC Okay. You go right across the Mare - Maraldi M and Maraldi D, and across Vitruvius A and Vitruvius.

CMP Oh. Okay. It's a little closer in, then.

05 19 53 32 CC And, at Vitruvius again - -

CMP ...

CC - - on that contact, the mare to the highlands is where you go to f/4.

CMP At - Okay, Vitruvius? Yes, okay; f/4. You know, if you can look up on your map, it looks like there's kind of a subdued ... almost submerged crater, between - I mean just east of Vitruvius A. And that - that domical mounds that are sticking up around there are the same type of structures as Maraldi Gamma. And that's what lead me to believe that - you know - it's just some old jumbled-up-type stuff that was here before the mare.

CC Roger. We copy.

CMP That has a completely - it has a completely different - texture to it than the domical structures of Aitken.

CC Okay. We got that.

CC Okay. Have you gotten up over, vertical over Vitruvius? If you are, that's where you go to f/4.

CMP Not quite. I'm in Vitruvius A, right now.

CC Okay. Good show.

CMP And I just took a peak at it with the binocs and - Let's see, I'm 5.6 at 1/250. And that's a different type of material. It looks like it's a - it almost has to be a slump-type of operation. Somehow, it gets piled up down in the middle. But they're a smoother, more subdued type of domical structures than the ones in Aitken. Okay. Switching to f/4 - -

CC Roger; f/4 - -

CMP - - 1/250.

CC Your track goes right across the mare - the mare there between Tranquillity and Serenity - right across Dawes, and ends at just to the east and north of Plinius. On that - -

CMP Okay.

CC - - that appears to be the boundary between Tranquillity and Serenity.

CMP No, when I take a look at it from this angle, you even get a different - the - the ejecta from Plinius kind of covers up the rilles and the annulus around Serenitatis.

05 19 57 29 CMP Now, we're getting into a relatively low Sun. And Serenitatis is a lot lighter colored than the - the light tan, to me. And then you - in the low Sun, you look out into Tranquillitatis, across Plinius, and that demarcation turns out to be the same - same kind of gray-tan. You know, it's a darker -

Tape 93B/8

CC But there is a color difference between Serenity and Tranquillitatis, there?

CMP Yes. There's a definite color difference between Tra - and it almost looks like - If you could stand on color alone, the color from Tranquillitatis extends on over, and covers into - you know, kind of drapes over the edge and covers up part Serenity.

CC Okay. We got that. Well, that should be all of your photos there, on that pass, Ron.

CMP Oh, okay. (Laughter)

CC And, Ron, before we get into the visual, here, we'd like HIGH GAIN, AUTO.

05 19 58 40 CMP Okay. HIGH GAIN -

CC And, can you give me - -

CMP ... away from the window, here.

CC - - a magazine report on that two pictures?

CMP Okay. We're magazine Lima Lima. And it's 129.

CMP Yes, we're at the same Sun angle, and there's no doubt about it from Tacquet on up to Mel something or other, there's a group of small rilles in there, and those rilles have got ejected material, around and up and over the rilles. And not - not impact-type ejecta. It's got to be a volcanic ejecta of some kind up and around there. It's a dark brown - a darker brown, than the tan of Serenitatis.

CC Roger. You're referring to the Menulus [sic] rilles, there, right to the west of Tacquet, right? That's to the west of Tacquet? Still, it looks like it's in the Serenitatis - Serenitatis Basin, right on the edge of it.

05 20 01 13 CC Roger. We see them.

CMP And then they kind of st - they stop just even with Mel whatever it is. (Laughter) Malinius or something like that.

CC Not Melinius or Menelaus? Pick your pick.

CMP Yes. Okay.

05 20 01 36 CC You see a ray coming out of Menelaus going through - through Bessel? Is that one of Tycho's rays?

CMP It disappeared. I couldn't - couldn't see that one.

CC Roger.

CMP Take a look the next time around.

CC That was my question. I was just curious.

CMP Yes. I know it shows it on the map there, and I haven't really got a good - a good clear picture of a ray, yet.

CC I'm going to be more interested to see it - -

CMP I'll look for it for sure the next time.

CC - - I want to - more interested to see if you can see the alleged crater Arabia on this next pass.

CMP (Laughter) I've been looking for that every pass. And - there's a lot of depressions - and ridges and - hills around there. It's hard to - see, you don't really get a big picture view of it. You get a little piece of it at a time. And I think, in order to really con - convince yourself that you got something there, you're going to have to get - get off - away from it. And - -

CC Roger. Understand.

CMP *** D-Caldera is sure a depression. Like nothing I've ever seen before.

Tape 93B/10

CC Got you. You're going to get a chance to get some pictures of that next - next rev.

CMP Next rev? Okay, they ought to be good ones because the Sun angle is going to be pretty good. But, at this point, you get a dark tan, kind of a mare-type material - it's in mare-type materials. And then it's a light gray down in the D-Caldera itself. Sure looks like a "D" all right. But it's a light gray down in there. And then it's got bumps that stick up, and the bumps themselves are - I want to look at it again for sure. But I get the impression the bumps, themselves, are the light tan material.

05 20 04 59 CC Okay. Understand. The bumps are light tan. Right?

CMP Whereas, down - Yes, the bumps are light tan. And down between the bumps that are down in the Caldera, it looks like a rough - real rough blocky - gray material.

CMP Bob, I hope you're keeping me honest on the Flight Plan. I got my head out the window. I can't follow the Flight Plan.

CC Affirmative. All you got is, in about 4 minutes, or 3 minutes, now, you pick up orbital science visuals on Copernicus. And we'll just stay with you on those orb science visuals right through Reiner Gamma. And at 143:12, you've got a rather rapid time, you might want to quit early. You got the LOI [sic] canister change. Then you got a P52. So, your choice on that. I'll call you right at 143:12, if that's what you want.

05 20 06 13 CMP Okay, yes. Give me a call right there, because I got to get ready for this - I'll do the P52 first, so you all can see it, then I can always change that canister.

CC Yes, okay. We'll concur on that; but just don't forget it.

CMP Okay.

CC Ron, you're coming up on Copernicus; I might read you some of these questions. One of them was, "Study the floor of Copernicus, and compare its material to that on the walled terraces." The other one is, "When viewed from the opposite direction, is there an extension of the structure in the middle central peak?" I guess that we refer to that as what might be a dike in that middle central peak. And "What is the nature of that structure?"

CMP Okay. I think those things are going to be kind of hard to see. But we'll try.

CC The back room would like you to kind of concentrate on looking on that dike, if it is at all possible, Ron. Even if you have to use - -

CMP Okay. I'll - -

CC - - even if you have to use the binoculars.

CMP - - get the ole binocs, here. Okay.

05 20 08 25 CC If you want to feel for some scale on that, just a reminder: the crater is about 3 kilometers deep, and the central peak is 400 meters high, Ron.

CMP 400 meters. Okay.

CMP Is this Eratosthenes I'm passing over now? I hope.

CC Yes. You should be just about over Eratosthenes right now.

05 20 09 57 CMP I hope it's Eratosthenes because the old Sun's shining right on my rendezvous light, out here.

CC Roger.

CMP And you can't see anything out the window.

CMP Ahhhhhh, there's Copernicus.

CMP And I'll tell you what. I think we - need more daylight (laughter).

Tape 93B/12

CC Kind of tough, huh?

CMP Yes, especially the binocs cut off - they must cut off too much light or something.

CC Okay, we understand that. Might just stick with the naked eye then and do the best you can, I guess.

CMP Well, I'm trying to - to recall what Jack said on it, and what I see. I'm not sure, did he mention the - the dark part to the south - on the south side of Copernicus? In other words, you can see albedoes real well, and there's a dark area that extends maybe - oh, a half a crater diameter, three-quarters of a crater diameter to the south, and then it kind of flows down in - I don't know - I don't want to say flows, but at least it carries itself down - down the crater wall - down to the crater floor. And this is kind of in the south maybe from 6 - or let's see, from about 4:30 to 7:30. And then the rest of the crater all the way - all the rest of the way around it, you can see light albedo step all away around the crater. The first step down about a fourth of the way down in the crater wall.

05 20 13 31 CC I don't recall that, but sounds good, Ron.

CMP Okay. Unfortunately, those things really disappear fast.

CC Roger. Take - take a look at the peaks and concentrate on that mountain in the center of the peaks, if you will, Ron.

CMP Okay. Is - it's already passed now but I can recall as - as I was looking at it, the peaks - well, seems to me like there's four and they have the same light albedo texture as the - not texture, but the same light albedo - as that first - rings on the inner wall of the crater. And then interspersed between those white peaks were a darker - you could just tell it's the darker - albedo. And you couldn't tell for sure - it's not part of the crater floor, it's just a darker albedo interspersed in there. And I spent - oh, half my time

trying to acquire the thing in the binocs. And it just cuts - the binocs just cut down the light too much.

CC Okay. We'll try maybe later on with the binocs on Copernicus. I guess you're coming up in the Kepler area, aren't you - your - your right coming up on Kepler B.

CMP Yes. I think there should be Kepler B right out there now.

CMP Let's see - Yes, that's out in Oceanus Procellarum, I guess, isn't it?

05 20 15 32 CC That's affirmative.

CMP Yes, and then Aristarchus is coming up, I think, isn't it? No, that's Kepler.

CC I think Kepler is the real bright one with many bright rays from - coming out it.

CMP Yes, it's got a - got a lot of the bright rays on it. Kepler D, and must be another one down there. They, the two small Keplers, don't show any bright rays at all. Do show they're - they've bright slopes on the inner walls. The rays of Kepler really show up quite markedly in the earthshine. I bet - I bet they show up probably better in earthshine than they do - otherwise. Because I think earthshine tends to bring out the - the albedo differences - considerably.

05 20 16 55 CC Why don't you give me a hack when you're right over Kepler, Ron?

CMP Okay, will do. And then what's directly south of Kepler, there's one about the same size as Kepler?

CC Encke is about the same size and directly south of Kepler.

Tape 93B/14

CMP Yes, that's Encke. Okay, Encke.

CMP Encke has - departing from the west - Yes, no, I mean departing on its eastern side - it's either - it's a light - I don't see how in the world it can have only one ray, but that's the only one I can see. But there's a light streak - oh about an eighth of the diameter of Encke; and it goes out to the east a little ways and then curves back - it goes out to the east - oh, about three-quarters of the crater diameter, and then it essentially curves back to the northeast and continues on out for another crater diameter.

05 20 18 20 CC Roger. Good show.

CMP That might be - that might be the margin of the highlands, there. I'm not sure.

CC Okay.

CMP Let's see, Reiner Gamma is going to be out of window 3, won't it?

CC That's affirmative, Ron. Window 3 for Reiner Gamma.

CMP Yes. Okay. Just north of - sure can't remember those names - Kyber?

CC North of Kepler, there?

CMP Kepler. Yes.

05 20 19 45 CMP And I'm looking out window 3 now, and you can still see those rays. They must be coming from Kepler. They go way on up north toward - the next one is - is - -

CC Yes, did you see them going up toward Marius, there?

CMP Yes, there's ... zero phase. Yes, I can see Aristarchus. I think that must be Aristarchus. Way back over to the north.

CC Yes, that's - that's Aristarchus.

CMP Sure - -

CC That's affirm.

CMP - - yes, yes.

05 20 20 31 CC Can you see anything on that Marius Rille up there? Or is that too far up?

CMP Yes. It - I've sort of kind of looking for it. I can just see some - about three or four light spots up in there. But that's a long ways away, you know.

CC Roger.

CMP It's about halfway - it's about halfway to the horizon. Or the real light area. Let's see, and you can see Reiner Gamma. I guess Reiner is the crater there. ... Isn't there a big crater just before you get to it - -

CC That's affirm.

CMP - - I think. And then Reiner Gamma - Hey, you know, from here it almost looks like it's the - the ejecta from a crater, because (chuckle) and then continuing from the bottom of the - bottom of the Gamma is a - again a lighter albedo that comes down toward the crater Reiner about halfway between the two of them, and then it takes off and goes perpendicular to - to the line between Reiner and Reiner Gamma.

05 20 21 51 CC Roger. We copy that.

CMP And that's a lighter - lighter albedo demarcation, there.

CC Is there any topographical expression associated with brightness - with the brightness of Gamma?

Tape 93B/16

CMP Well, that's what it - is - is very hard to pick up. Maybe that's what the - what I'm describing here - is going perpendicular to the - to the two of them. I got to check and see if that's a - you know, a rise from a relatively flat area up to a kind of a - a hilly terrain.

CC Any dark deposits associated with the Gamma? Reiner Gamma?

CMP Yes, it's - the Gamma, itself, is - is dark. Now, when zero - zero - Hey, I think we're going to be lucky - zero phase is going to go right through it. But there are dark - in other words, the Gamma, itself - is about the same size as the - as the - the full extension is about the same size as the crater Reiner. And then half of a crater diameter on the inside of that - and, of course, in the Gamma-type shape is a dark type material. Zero-phase is going right through it right now. By gosh, it didn't blot out the dark at all.

05 20 23 46 CC Got any - any more thoughts about what it is?

CMP The - -

CC Do the light-colored markings to the north look the same, Ron?

CMP You know, you get - you mean off toward the Marius Hills area?

CC Yes, that's right.

CMP There's a - the only light - yes, the only light-colored stuff that you can see - I don't see anything off towards the Marius Hills on the thing. You see it right around Reiner Gamma itself. And intermixed within that is that dark - it's a dark annulus, except the annulus is on the inside of the white. And it looks like - I don't know if your eyes deceive you in this darkness or not, but it sure looks the light-colored stuff is raised up with respect to the dark. In other words, the dark almost looks like the interior of a crater - crater rim, interior of a crater wall, you know - -

05 20 24 58 CC Roger.

CMP - - with the light material around it. Now that's what it looks like in the - in the darkness. And then on the - let's see - southwestern rim of it, it almost looks like you've got a breach of the dark albedo stuff going out to the southeast corner of it in two spots. Okay, then the light stuff turns into - how do you put it - a darker swirly looking type stuff as you continue on west of Reiner Gamma. It crosses kind of a wrinkle ridge, I can see a wrinkle ridge down there, now. It crosses the wrinkle ridge with the no - no apparent change in albedo, anyhow, as it crosses the ridge.

CC Roger. Got you, and I think I've got the ridge on my map. I think we've got you.

CMP Okay.

CC Still - still think it might be a ray from one of those craters - -

05 20 26 09 CMP That's the last of the - you know, it's kind of associated with its own little thing. It doesn't look like it's a ray. It doesn't look like a ray, in other words, it doesn't thin out in different parts of it, like a ray does.

CC Okay.

CMP It looks like it was a lot thicker than - than a ray.

CMP Yes. Okay, this must be - what - Riccioli, I guess? The big crater? About -

05 20 27 03 CMP Now.

CC You're just coming up on Ricci - Grimaldi and you got to go through Hevelius, first of all, and then you get into Grimaldi and Riccioli.

CMP Okay, that's Hevelius, then, is the one I'm passing right now. Hevelius is showing up real clear. You can see the slumping of the crater walls coming

Tape 93B/18

down there. It's a fairly old-type crater because you don't see any - any rays associated with it. Although the - the slumping is not completely degraded. There's a flat floor with a central peak on it. The central peak has the same albedo - it's a lighter albedo - no, the same albedo texture as the walls - as the west wall.

05 20 28 20 CMP

We're passing over a - well, generally a hilly type of terrain, and then just before we get into Grimaldi area, it looks like we're out into a plains-type material, again, interspersed with a hummocky-type. I guess that hummocky - is - hummocky stuff is associated with Grimaldi.

CC

Roger. Looks like you're just passing a little bit to the west of Grimaldi now. You concur with that? About right over Riccioli?

CMP

It doesn't look like Grimaldi to me - I guess it is, though.

CC

Okay, Ron. You probably ought to think about - If it's getting kind of dark there for seeing or anything, you might consider getting in the P52, although you're a couple more minutes - still a couple minutes left on it. If you can see back at anything within Reiner Gamma - -

CMP

Okay.

CC

- - from this angle, it would be good; otherwise, if it's out, you ought to just consider the 52.

05 20 29 48 CMP

Ah, she's pointing in the wrong direction.

CC

Okay. That was some good stuff, Ron. Just don't hesitate to keep talking on that. We can sort it all out when we get down.

CMP

Okay. Well, the bright - I'm looking out window 1 now. Must be out to the north I guess, and there's two very bright craters, in there, just crossing some rilles that run north and south. There's a little bit of a mare material out in there. I wish I knew what that crater was. Well, I better get going on P52, I guess.

CMP (Humming - "Deck the Halls")

05 20 34 17 CMP Old heaters sure work on these optics. They're always nice and warm when you take them out.

CC Well, Roger. Understand you're changing the LOH - LiOH canister now.

CMP (Laughter) No, the optics.

CC Okay, good.

CMP Tele - yes - telescope. When you - you take the telescope out, it's got a heater on it in there and it keeps it nice and warm. Okay, CMC, FREE. Do a P52, option 3. Okay, then back to P20. Okay, this time we will not forget to go to AUTO.

CMP Okay, computer, find me a star. *** out there. Menkar. Okay, take me to Menkar. Oh!

05 20 36 03 CMP Looks like Menkar.

05 20 37 06 CMP Okay. Canopus. Canopus. Okay, take me to Canopus.

CMP And Canopus is as bright as all get out.

CC Just like the simulator, huh?

CMP *** bright that - brighter than any star we've ever had in the simulator. *** so bright it almost blanks out the crosshair. Got Saturn.

CC Yes, hope it's not Saturn, huh?

CMP (Laughter) Me, too.

CC Well, we'll know in a minute when we look at your NOUN 05.

CMP Oh, man, okay.

CC Nothing wrong with that one.

CMP That's pretty good.

Tape 93B/20

CC Yes. We'll buy that.

CMP Think that's a good one?

CC Okay, Ron, you can go ahead and torque.

CMP Okay. We'll torque at 19.

CC Good show, huh?

CMP Now my new - bet that's in there, isn't it - unit vectors of Saturn. Would that be in here, somewhere?

CC Say again, Ron?

CMP These unit vectors of Saturn, aren't they in my - planet unit vectors - yes, stars - oh, here we go.

05 20 39 57 CC Okay, we just got a beautiful picture of the Earth from the - from the Rover. Just spectacular picture of the Earth.

CMP Oh, really?

CC Yes.

CMP Great.

CC Just beautiful. Old Fendell's been hunting for all night, but he finally found it. It's just beautiful.

CMP (Laughter)

CC Ron, we're 5 minutes from LOS here. Everything's looking great. Just - you have to finish off your checklist on that TM, P20 and CMC MODE back to AUTO. And then just a reminder on that LOH [sic] canister: if you'd go back and pick that up, we'd appreciate it.

CMP Okay, we'll get that one. I'm going to try and see if I can find Saturn here.

CC Okay.

CC This VOX mode is just great. We're sitting here following what you're doing. You don't even have to talk to us. It's really great.

CMP (Laughter) I think it's great, too.

CC Your voice is so clear - - Oh, shucks. Now the fuel is - -

CC You sound like you're in the next room.

CMP Oh, really? You know, that's funny because I really can't hear myself and the - you know, on the intercom.

05 20 41 28 CC You sound - you sound - -

CMP Well, I'll have to look ... - -

CC - - louder in my earphone than in the simulator, when you're down at the Cape, or over here across the way. You're just loud and clear, even better than down there.

CMP (Laughter) That's good. Well, it's beyond the field of view. So we'll have to catch it another time.

CC Yes, that's too bad.

CC We're going to pick you up at 144:10. I'll be losing you in a minute or so. And 144:10 has a good back side.

CMP Okay.

CC And you might check your ZPN settings when you - your sensors - when you get a chance on the back side here. They're still not giving much good data.

CMP Okay. Yes, it looks like I'll have a little time this time, so I'll do it.

Tape 93B/22

CC Roger. Just don't let them tear you away from the window, though.

CMP (Laughter) Okay.

CC And we've dumped the data from the last couple of back-side revs and you sound real good, Ron.

05 20 42 50 CMP Okay, hey, real fine. You know the guys at lunar surface don't even have any ZPN, you know. They left it up here.

CC Roger. (Laughter)

CMP I didn't even - I didn't know that until they left. Okay, the old LiOH canister, let's see - 13 into A, and 13 must be in A-9 then. (Humming)

05 20 43 54 CMP Oh, there's old 13. Take 14 out, so we - put ... in the bottom.

CC Hey, Ron. We just had a discussion here and your point is well taken, and why don't you just go ahead, if you want to, and take the ZPN sensors, the yellow plug ones, off and take them off for the evening, if you like.

05 20 44 25 CMP Hey, that sounds like an excellent idea. Thank you.

05 20 45 09 CMP Okay, we're 11 - out - picked nice small ones, I guess. None of them have been stuck so far.

05 21 03 XX BEGIN LUNAR REV 29

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 19 30 34 CC Okay, give me a range and bearing, please.

CDR-EVA Bob, you want another sample of the dark mantle here? Could you use that?

CC Yes, we want - As soon as you get into the dark mantle - We're estimating it's something like 4.34, 4.5, somewhere in that vicinity.

LMP-EVA We're there.

CC Okay. We're ready for another one, then.

LMP-EVA We're there. Now, let's - If you can - Okay, right over there, and maybe I can get a rock with it. See that batch of rocks there?

CDR-EVA Right here?

LMP-EVA Whoa. Yes. Swing it. Whoa, now swing back over. Little more, little more. Whoa. Little more.

CDR-EVA Can you - can you reach it?

LMP-EVA Now, if you go forward.

CDR-EVA Can you reach it?

LMP-EVA Hold it. Right there.

CDR-EVA Okay, Bob; 082, 5.0, and 4.3.

CC Copy that.

CDR-LMP And CDR is 3.85 and about 70 percent and no flags.

CC Okay. Thank you, Geno.

LMP-EVA I got it.

CDR-EVA You got it? Okay?

Tape 94A/2

LMP-EVA I got the rock. I got the rock, and there's some dirt in there. Maybe I'd better get a little bit more dirt.

CDR-EVA Yes.

LMP-EVA You don't have any trouble getting dirt. Can you see in there? Is there - -

CDR-EVA Yes.

LMP-EVA - - Much soil?

CDR-EVA Oh, a little bit - -

LMP-EVA Okay. I'll get - I'll get this soil.

CDR-EVA Couple teaspoonsfull. Twenty-eight Echo, Bob.

CC Say again there, 17.

05 19 32 14 CDR-EVA Twenty-eight Echo.

CC Copy that.

CDR-EVA And that's primarily a rock fragment. Jack's getting a soil fragment - soil sample with it.

CC Copy.

CDR-EVA Jack, look at the wrinkles over there on the North Massif.

LMP-EVA Yes, there's no question that there is apparent lineations all over these Massifs, in a variety of directions. Hey, look at how that Scarp goes up beside there. There's a distinct change in texture.

CDR-EVA Okay.

LMP-EVA As a matter of fact, lineations are not present on the Scarp, that we can see, where it crosses the North Massif. There is no sign of those lineations on there.

CDR-EVA Oh, man; yes. I can see what you're talking about now.

LMP-EVA Look over by Hanover.

CDR-EVA It looks like the Scarp overlays the North Massif, doesn't it?

LMP-EVA Yes.

CDR-EVA Okay. This last one was 29 Echo.

CC Okay. Copy that. And that's the soil.

CDR-EVA Okay, now I need to get in that bag. That's firm.

CDR-EVA Here's another one. You're going to - don't lose those.

LMP-EVA I won't. I'll put it down.

05 19 33 28 CDR-EVA Okay, Bob, we are rolling.

CC Copy that.

LMP-EVA And pray for me, Bob, that I don't lose my camera. Okay. Hanover is very - quite a ways up the slope. I don't think we'd have gotten to it, as we planned that time. But the appearance you have of the Scarp - North Massif contact is one of the Scarp being smoother textured, less cratered, and certainly less lineated. And I wouldn't be a bit surprised if it's, as Gene says, younger.

CC Okay, Jack. Copy that.

CDR-EVA But that goes - It's not just the - it's not just this slope, it's the materials on the other side of the Scarp, on the west side.

LMP-EVA Okay, I'm going to have to really ease up on pictures. I forgot to give them a frame count.

CC Yes. We didn't get a frame count. You want to give us a frame count there, Jack?

LMP-EVA Well, Bob. The problem is I - if I - every time I take my hand off, my camera loosens up again.

Tape 94A/4

CC Okay; I copy that. And our estimate is that if you kind of go between 50 and 100 meters between frames, we'll make it.

CDR-EVA Boy, I tell you. Are those Massifs getting to look big now. Holy Smoly.

LMP-EVA That frame at the LRV sample was about 115.

CC Copy that.

LMP-EVA I'll tell you, that Scarp looks nice over there, too, doesn't it?

CDR-EVA Yes.

LMP-EVA Okay, we're back down in our old friend, the dark mantle. And I think the zero phase point is not as bright as it was. Passing a small crater, but the block population is still way down there in about - Whoops, watch that one - 1 percent.

CC And, 17, for your benefit, we're showing you with very good net mobility rates here; and things looking quite good.

LMP-EVA Thank you. Gene's doing a great job.

CDR-EVA I'll tell you, it takes all your time to drive, though. You look around, and you're in a hole.

05 19 36 12 LMP-EVA Okay here's another small crater - instant(?) rock, with the same little pits and a spattering of glass holding the pit materials together. None of these - none of the glass linings look very coherent, Bob. They mainly just seem to be a sprinkling of glass that's - some - helping or coating the instant rock.

CC Okay, I copy that, Jack.

LMP-EVA We still don't have - The craters at about 10 to 15 meters in diameter seem to have somewhat more blocky material in their rims. But they're not clearcut blocky rim craters. And here's one that's probably 50 meters across that has a - a fair number of blocks in the bottom. Looks like it might have just about gotten down to where the gabbro is - starts to be abundant again.

CC Okay; I copy on that one, Jack.

CDR-EVA ... start ... 12 o'clock - 12 o'clock; and I'm going to work my way up to Hole-in-the-Wall and from there on up, right?

LMP-EVA That's good.

CDR-EVA Take a long, easy turnout.

LMP-EVA Yes.

CDR-EVA Got Hole-in-the-Wall, Bob. It's a very long, very subtle, very gentle slope. We'll just have to get some more words when we get there.

CC Okay; we're anxiously awaiting them.

CC How about a range and bearing while you're at it?

CDR-EVA Yes. I've been taking 10 or 12 clicks most of the time.

05 19 37 58 CDR-EVA Okay, ... 5.6 and 4.9.

CC Copy 4.9 on the range.

CDR-EVA And about - 20 to 22 amps most of the time.

LMP-EVA Okay, we're losing a little bit of LOW GAIN there, Geno.

CDR-EVA Yes.

LMP-EVA I think you need to tilt it up a little. Probably undershooting the Earth. I don't know.

CDR-EVA Well, our pitch angle changes all the time. That's the problem. Bob, I have been within 10 to 20 degrees of you the whole time.

LMP-EVA Okay, Bob, we're not in light mantle, I don't think. Maybe we are.

CDR-EVA I think we are, Jack.

Tape 94A/6

LMP-EVA Yes, I guess we are.

CDR-EVA I think we are. According to my geology map ...

LMP-EVA I guess we are. Gosh, I was going to say the craters are white - whiter than they have been. So, we're back in it. And - -

CDR-EVA I think - -

LMP-EVA - - even the phase point's brighter, too.

CDR-EVA I think that place where we had those small, blocky craters was within the dark mantle. I - They're not evident here in the lighter stuff.

LMP-EVA Yes, yes.

CDR-EVA Boy, is that getting big.

LMP-EVA Whoo-ee!

CDR-EVA Hold on.

LMP-EVA Whooooee! Oh, boy, that really gives me a strange feeling (laughter).

CDR-EVA Gives me a strange feeling too. Those are not intentional.

LMP-EVA I understand.

CDR-EVA I'm not sure I've got enough guts to make them intentional. Man everything's getting to look big the closer you get. Hole-in-the-Wall looks more promising, though, Bob.

LMP-EVA Yes, I don't think that's going to be any problem until we get up and look back. Oh, man, what a trip this is going to be. Golly.

LMP-EVA That vent cooling is just about right, isn't it.

05 19 39 48 CDR-EVA No, it's just about warm for me.

LMP-EVA Yes.

CDR-EVA Bob, is my PLSS cooling working all right?

CC Roger. It looks like it's working to us.

CDR-EVA Okay.

LMP-EVA Bob, I'm not - The rock fragments look - still look like gabbro. The craters tend to have white walls and white rims, which they don't have in the dark - mantle area. The block population is way down, 1 percent or less. However, the bigger craters do have more blocks; but nowhere does that population seem get above about 5 percent. And that's on the walls and the rims of the craters, say bigger than 15 meters. There's one probably 20 meters in diameter that has some blocks on it.

CDR-EVA Have you seen Nemo? I think Nemo is right over there, if I'm not mistaken. It's - I don't know.

LMP-EVA Nemo will be hard to see. But, yes, it's probably that one right in there. Or back here. There's one back here.

CDR-EVA Well, it's pretty - -

LMP-EVA Yes, well - Yes, that's closer to Scarp. You're probably - it's probably right off your wing there.

CDR-EVA Okay, I'm going straight ahead and then I'm going to make a left turn.

05 19 41 10 LMP-EVA Okay. We're looking at Lara - Now, Lara - I can see blocks in the northwest rim of Lara. At least, it's rugged terrain; and it looks like blocky terrain. One spot - is all I see. It looks like it may be a couple hundred meters in average diameter. On - It starts about - maybe three-quarters of the way up the wall and goes right up to the rim.

CDR-EVA Hey, Bob, Hole-in-the-Wall seems to be a - -

LMP-EVA Hey, look at that. Look at that crater!!

CDR-EVA Right there? Yes.

LMP-EVA That pit - that central pit goes down about half the depth of the crater, and the crater is a fresh

Tape 94A/8

3-meter crater. That's - It almost was a cylindrical pit. Hey, Bob, Hole-in-the-Wall is a - is just a step - headed down to the south or southeast on the Scarp. It's a - Scarp is just about what I think we all expected it to be. It's very rolling and relatively smooth. I don't really see any outcrops exposed anywhere out here to the - to the south.

LMP-EVA No. You see, now there's station 3 area right up there.

CDR-EVA Yes.

LMP-EVA Looks like maybe that - set of - see that bright bigger crater over there to the right of Lara? That's probably a good place for station 3.

CDR-EVA Yes, way over there. Yes. Okay, we're going to find out something very shortly.

LMP-EVA It doesn't look very rocky, Gene.

CDR-EVA No.

LMP-EVA ...

CC How about bearing and range, guys?

CDR-EVA Bob, I'll give it to you just as soon as I make my turn. It's not too far - 100 meters -

LMP-EVA Are - are you - are you going to turn over that or go on closer - -

CDR-EVA No, I'm going right up straight ahead and then go on to the inside of that place.

LMP-EVA Yes. That's more than 100 meters.

05 19 43 08 CDR-EVA Yes. I'll - 081 and 5.6.

CC Copy that.

LMP-EVA There's the - Now the craters are getting very, very light colored - in the rims and walls.

CDR-EVA You notice when we're in the light mantle looking at the scarp, at this angle, it loses some of its high albedo?

LMP-EVA Yes. Yes. I think we're getting - -

CDR-EVA We've got a long depression to go around.

LMP-EVA Your eyes get used to it.

CDR-EVA Okay, Jack, we got to watch it because I got to go around a long depressions. That's a crater over there.

LMP-EVA On the right, yes.

CDR-EVA I don't know how - can get over there to -

LMP-EVA I think - -

CDR-EVA I may have to go up over there. I can't go down that hole. That one's not going to make it.

LMP-EVA What's your pitch?

CDR-EVA Let's go back here. We can't get there. I'm going to go over here.

LMP-EVA What was your pitch then, Geno?

CDR-EVA Oh, ... primarily. I can't go there.

LMP-EVA Yes, I think you're right.

CDR-EVA We'll go up this gentle slope. See what's on top.

CDR-EVA Okay. Let me get my ...

05 19 44 17 LMP-EVA We made a turn to the south a little bit at 081 and 5.7. Are you going to try to drive up there?

CDR-EVA I don't think we're going to have any choice.

LMP-EVA Okay. Looks to me like right on the - just to the left of that - -

Tape 94A/10

CDR-EVA Yes.

LMP-EVA - - white crater is a - or even right like you're headed now and then veer off to the right.

CDR-EVA Yes.

CDR-EVA Find out how this climbs in a minute.

LMP-EVA Oh, I think you're all right. That - -

05 19 44 47 CDR-EVA And, Bob, I'm starting up the scarp at 081, 6.6, and 5.7.

CC Okay. Copy that, Geno.

LMP-EVA This is the first tongue(?) of the scarp.

CDR-EVA I don't even think the Rover knows it's going uphill. I've got about 3 - 7 or 8 amps. See what's on top here.

LMP-EVA You're making about 8 - 8 clicks.

CDR-EVA And I'm full bore.

LMP-EVA (Laughter)

CDR-EVA Well, I'll tell you, this Rover doesn't know it's going up the hill.

LMP-EVA Looks to me like you may be able to head just like you're going.

CDR-EVA Yes. Hey, Bob, we'll make it.

LMP-EVA And get down - -

05 19 45 25 CDR-EVA Yes. We will make it. ... Get my antenna adjusted.

LMP-EVA Okay. Whatever makes up the light mantle is - in - at least, the incident rock that it forms is much lighter than anything we see. Those fragments probably - are 30 percent lighter than any fragments we see on the dark mantle. And that's around the fresh craters. But it is not blocky. Bob, are you still reading?

- CC Roger. Read you loud and clear.
- LMP-EVA Okay, I just wanted to make sure my antenna's working
- CC Roger.
- 05 19 46 25 CDR-EVA We're doing a little zig-zag navigation. I'm - literally came up a slope at about a heading of 240. We couldn't get through the actual turn to the south because there is a big crater right at the foot of it. So we're just making our way through some relatively local undulating slopes that get pretty steep, but it seems to be no problem.
- LMP-EVA Yes, I think we're in good shape. Bob, I can't - there are not any blocks big enough to really make a statement about what the rock is. But it - it really doesn't look like gabbro anymore.
- CC Okay. Copy that.
- LMP-EVA It doesn't have that - -
- CC And a reminder that eventually you're going to have to turn to the south a little bit to pick up - the final thing at the - station 2.
- LMP-EVA We're not on top of that scarp, yet. We're still in the Hole-in-the-Wall rim.
- CC Okay. Copy that.
- LMP-EVA Bob, as far as lineations in the soil or on the surface that are observable at this range, I don't - I don't see any. I think there may be a finer raindrop pattern on the light mantle than maybe there was out on the dark. But that's an awfully hard judgment to make.
- CC Okay. Copy that.
- LMP-EVA How you doing, Geno?

Tape 94A/12

CDR-EVA Doing fine, Bob. We've slowed down between about 5 to 8 - maybe 5 to 10 clicks most of the time. I'm going to head right up there, I think. Get around this crater.

LMP-EVA Pretty healthy roll you're going to have here.

CDR-EVA Yes, I'm going to head more straight up the hill. Once I get up on top, I'll be all right. I'm going to head down in this hole and then up that way.

LMP-EVA Yes, I think - -

CDR-EVA I don't mind pitch, but I sure don't like roll.

LMP-EVA I don't either.

CDR-EVA Now I'm going to head straight up - I'm going to head straight up that slope right there. Okay.

05 19 48 49 LMP-EVA Bob, I still - It looks like maybe the large fragments in here are still crystalline. They have white zap pits on them. But they do not yet really resemble the gabbro.

CC Okay, Jack. Copy that. Give us a hack when you get up on top of the scarp there.

LMP-EVA Okay.

CMP-EVA Let me tell you, Bob, I've got to go cross-slope some of the time because the Rover is really working to go uphill now.

CC All right.

CDR-EVA But we're almost there.

LMP-EVA As I look up the scarp to the west, there are some big blocks scattered around on our horizon; but, again, I would guess that we're not dealing with more than - 2 or 3 percent total coverage of blocks in here, at that.

CDR-EVA Well, I think, for the most part - for the most part, we're on top... - -

LMP-EVA Yes, we're - we're on top.

05 19 49 53 CDR-EVA Bob, we're at 7.8 - correction 078, 7.2, and 6.2.

CC Copy that.

CDR-EVA Jack, where was Nansen with respect to those tracks up there?

LMP-EVA Well, they never really had any good tracks pinned down, I don't think, on that - You'll be able to see Nansen, I think soon as you get over this hill.

CDR-EVA Boy, I tell you, when we look back, that's going to be quite a sight if we can see into that Sun. We have been coming uphill. Well, I'd say this is the - this is the last straw to the top. And is she working! Come on, baby.

LMP-EVA Okay. I think you bear -

CDR-EVA I'm going to try to get over along the base of the massif now.

LMP-EVA Yes. Head towards that track area there, anyway. There are a lot of boulder tracks coming down from the blue-gray rocks, Bob. We'll see whether or not we're going to get to those tracks at Nansen, or we might want to move over to the track and see if we can find the boulder that made them.

CC Okay; if they're in the vicinity, it might be a nice idea - -

LMP-EVA But there's no question where those tracks come from.

CC And we gather you're slowing down to about 5 clicks now, coming up this last rise.

CDR-EVA Yes, I'm back up to about 7 to 10 now, Bob. That's the slowdown - is because that's about all it will take.

Tape 94A/14

LMP-EVA Bob, I have the impression that there is a dipping zone of blue-gray outcrops or block concentrations up there on the Massif that trends from the high point just beneath the Earth - cross-slope - and probably is - at least the apparent depth is - oh, I don't know, 10 or 15 degrees to the east. It looks like those outcrops may match up along that trend.

CC Okay.

CDR-EVA Jack, I'm going to head right along this ridge because I think that's the depression we were talking about.

LMP-EVA Yes, That's Nansen down there.

CDR-EVA Right - Where are you looking?

LMP-EVA I think, right below -

CDR-EVA I think you're right. I think that's it. Let me get over here, and then I'll head a little bit to the south.

LMP-EVA Yes, we're a little more west, I think, than we intended to be.

CDR-EVA Yes, I think you're right.

05 19 52 18 LMP-EVA Bob, 7 - Wait a minute - 7.8 and 6.5.

LMP-EVA Bob, I've had an impression, and I can't prove it yet, that we're dealing with more heterogeneous rock. Possibly there are breccias in here. But it's - it's - awfully hard to tell right now. They're very light-colored rocks - I think even lighter colored than the gabbros.

CC Okay. We'll soon find out.

LMP-EVA I'm afraid those - I think we can follow those tracks - the pictures, maybe, or -

CDR-EVA Yes, I think we can see some of those coming down.

LMP-EVA I think the ones from the big outcrop of blue-gray rock, though, are the ones going into Nansen.

05 19 53 29 CDR-EVA Bob, my best guess - let's see - 077, 7.7, 6.6 - is that we're coming up on the northern side of Nansen.

CC Okay. We copy that, Geneo.

CDR-EVA And, let me tell you, this is quite a Rover ride.

CC It sure sounds like it.

CDR-EVA That is quite a machine, I tell you. I think it would do a lot more than we'd let it.

LMP-EVA (Laughter) That's right. I think that big crater up there on the side is the one that you can see in the photographs, just above station 2.

CDR-EVA Yes. I think if I come up here, do a hard left turn; you unbuckle your belt, you'll roll right down into the bottom of Nansen.

LMP-EVA I'm afraid you're right. ...

CC Okay. And remember we're going to about 068 and about 7.4 will be station 2. At least that's our estimate.

LMP-EVA Bob - -

CDR-EVA Okay, there's Nansen over there, huh?

LMP-EVA Well, I think so.

CDR-EVA Yes.

LMP-EVA I think you're right. It's got to be it. Got to be it. Yes, Bob, I think we're into a breccia population now. I think the blocks in the light mantle are largely breccias. They're mottled in their characteristics. Their white zaps do not seem to be nearly as burned. They tend to be chalky when they get hit. At least, in the large craters, the walls are chalky looking. Oh, yes. We've got boulders in station 2.

Tape 94A/16

CDR-EVA Yes, they're there. Yes, sir.

LMP-EVA Boy, I tell you, if I hand on to this camera until you stop and can tighten it up, it'll be a miracle.

CDR-EVA Bob, how long have we been driving?

CC Stand by. We estimate you've got about a kilometer and a half to go - a little over a kilometer, anyway. Stand by, we'll check on the time. You're doing great.

CDR-EVA How long in - -

LMP-EVA Man, this has been a trip.

CDR-EVA Man, I tell you. You know, we're really up on top of this thing. Whoo!

CC You guys have been driving 64 minutes, and that counts the time to stop and deploy the charge and pick up the Rover samples.

LMP-EVA Hey, Bob. We're very clearly going downhill now, into the trough area that - that surrounds the Massif where - or between the mantle and the massif. But the trough is much greater in extent than just Nansen scale. It's probably a kilometer wide. I never realized that it was so - so much of a depression in here.

CC Okay. How about a range and bearing readout.

LMP-EVA I'm not sure we're going to be able to see the LM.

05 19 56 35 CDR-EVA 074, 8.2, 6.9.

CC Copy that.

CDR-EVA We won't be able to see the LM from down here. We'll be too low to see it. Fact is, I don't think I can see that far.

- LMP-EVA The surface patterns are still the same, Bob. The main difference being that we're getting probably a gradual increase in block population, and the blocks seem to be of a different character. They - they may be breccias.
- CC Okay. Copy that.
- LMP-EVA And around the crater here that's maybe 75 meters in diameter, the - there's probably 5 percent blocks - fragments, I should say - greater than a centimeter.
- CDR-EVA Boy, look at all the dust around that fender. I hate to think of what it would have been like with that fender gone.
- LMP-EVA Yes. There's a good-sized block, sort of blue-gray.
- CDR-EVA Looking up there, Jack, I ought to get some 500s looking right up that hill, but - -
- LMP-EVA Well, you may want to do that way out a way, a ways.
- CDR-EVA It's - some of that stuff is mantled - or buried in the massif material. Some of it just seems to be laying on it, of course.
- LMP-EVA Yes. Well, I think it has to do with how long it's been there. You'll tend to get the downslope movements forming uphill fillets, and that's what a lot of it looks like.
- CDR-EVA Most of it is uphill fillets. Most of it is pretty sharp. But my guess, from back at the LM, that those blocks on the massif were much more angular - I think is a good guess because that's what they look like to me here.
- LMP-EVA And looking up into our blue-gray outcrop area, I still have even more the impression that there's a - a planier (?) orientation that dips off to the southeast - maybe just fracturing, but I - pretty clear up there, I think. It may - it may be shadows.

Tape 94A/18

05 19 58 51 CDR-EVA The LM is now 50 percent away from the massif -
let's see, 50 percent of the massif height away
from the massif. How's that? I think we will
keep that on top.

LMP-EVA That is a high mountain.

CDR-EVA Gemine Christmas!

LMP-EVA Listen, if the Earth goes behind it, we're changing
station 2. (Laughter) It'll be nip and tuck,
pardon the expression. Okay. As we get closer,
actually, we're out of the very - the block area.
And that blocky region of 5 percent may have
been just associated with that crater. I still
see no lineations although - -

CDR-EVA Look at these wrinkles, though, Jack - -

LMP-EVA Yes. I mean on - I was talking about the mantle.

CDR-EVA Oh.

LMP-EVA But you're right about on the massif.

CDR-EVA The same wrinkled lineations we saw trending -
sloping uphill to the west on the eastern half of
the massif are still very evident at this Sun angle.

CC Okay, 17; And we're estimating that you should be
there within - -

LMP-EVA ...

CC - - about 5 minutes to meet the walkback constraints.

CDR-EVA Well, we're - Bob, we're almost ready to park.

CC Okay. Beautiful.

LMP-EVA Well, I wouldn't have gone so far as to have said
that.

CDR-EVA Well - -

LMP-EVA We're getting close.

CDR-EVA I'll give them their 5 minutes. We'll make it by then.

LMP-EVA Bob, the boulder tracks are really just chains of small craters, for the most part.

CC Okay; copy that. That's interesting.

CDR-EVA I don't think we can tilt that television - I don't think they can tilt the television camera high enough to see the top of the massif. Jack, we're on the edge here, but I don't know - Is that that - Well, let me go up here.

LMP-EVA No, you're doing great.

05 20 01 08 CDR-EVA Brazil 71, 8.9, and 7.4.

LMP-EVA See, there's Nansen off to my right now.

CDR-EVA Yes, I just want to make sure that I'm not driving down a hole here, which I am, but - I don't want to drive down Nansen.

LMP-EVA No, I - you won't. The saddle - the end of Nansen is over there near those blocks. Right over there.

LMP-EVA Look at those blocks. Unfortunately, the boulder tracks - good boulder tracks are over into Nansen.

CDR-EVA Going out of here very slowly.

LMP-EVA I think station - just about anywhere near the big blocks - -

CDR-EVA Yes - -

LMP-EVA - - would be a good station 2.

CDR-EVA - - that's where I'm going to put it. We could try to -

LMP-EVA Let's see.

CDR-EVA Yes, that's where we're going to make station 2; right up there.

Tape 94A/20

LMP-EVA What? Straight ahead?

CDR-EVA Yes.

LMP-EVA Yes. Okay.

CDR-EVA Boy, you're looking right into Nansen.

LMP-EVA Yes. We're right where we wanted to be for station 2. It looks like a great place. Big blocks. It looks like quite a bit of variety from here. Different colors, anyway. Grays and lighter colored tans.

CDR-EVA Hey, Jack, I'm going to do a 180 and park the Rover at 045.

LMP-EVA Those are two good - there's a blue-gray rock and a lighter colored tan rock.

CDR-EVA See where they can look in here.

LMP-EVA How about - Are you going to park it?

CDR-EVA Right on the other side of this little crater. ... heading ...

CC ... heading.

CDR-EVA ... 45

CDR-EVA Hey, Bob ... 045 ... 9.1, 7.6. Are you reading, by the way?

CC Roger. Reading you loud and clear.

CDR-EVA Okay. Let me get undone here. Amp hours are 98, 98. Batteries are 90 and 112, and the motor forward left is OFFSCALE LOW, and right is 340. Forward rear is OFFSCALE LOW, and right is 240. I expect we've got a bad meter.

CC Okay. Copy that on the 340. And you want to give me the bearing one more time there, Gene. All I got was the distance at 9.1 and the heading - and the range.

CDR-EVA Yes, sir. 0.1, 9.1, 7.6. We are right at station 2.

LMP-EVA Look at Nansen.

CC Okay. We copy that. When you're at the station, here's a couple of things - -

CDR-EVA Five minutes - -

CC - - we'll like for you guys to look at in the overhead. In addition to them. We'd like the TV lens to be dusted, in addition to the regular dusting. That'll take the lens brush, remember.

LMP-EVA Can you try to tighten that?

CC You might check the low gain antella - antenna elevation to make sure it's at 45 degrees. We'd like - we think you commented on that, and I think you're right now looking at tightening Jack's camera handle.

LMP-EVA I'll work on that, Gene. You go ahead with the other - -

05 20 05 00 CDR-EVA Okay. Yes, we are at 45 degrees, Bob. Let me check it. I'll lose the comm on you a second. I've got to turn it towards me.

CDR-EVA ... at 045.

CC And, 17. Jack, we'd like you to check the SEP for us. I suspect we'll have to turn it off and open the mirrors and dust them.

LMP-EVA Boy, when you get this picture -

05 20 05 48 CDR-EVA You got HIGH GAIN.

CC Roger. Thank you. We have TV.

CC Geno, we do not get a good bearing from you guys.

CDR-EVA Oh, Manischewitz!

CC We might also check the LMP's camera.

Tape 94A/22

CDR-EVA Okay. I'll give it to you again.

LMP-EVA That's fixed. Oh, you mean for pictures?

CC Roger. ... - -

LMP-EVA Okay, LMP -

CDR-EVA 071, 071 is the bearing.

CC Okay. Copy that.

LMP-EVA 142 on LM - 142 on the LMP's camera. The temperature is 105.

CC Roger. Let's turn off the power and the recorder, open the blankets, and dust it.

05 20 06 55 LMP-EVA Power's off, blankets are open; and, Gene, you'll have to dust it.

CDR-EVA I'll get it. I've got a lot of dusting to do here, Jack.

LMP-EVA Okay. Let's see what we've got to do.

CC And, Jack, I presume when I told you, you turned off the receiver, didn't you? Not just the DSEA?

LMP-EVA That's affirm. I turned off both switches.

CC That's what I thought. Thank you.

LMP-EVA Oh, my scoop. My scoop just came off. That's interesting. I'd better check the rake. Vibrated loose, I guess.

CDR-EVA I'll get the battery covers.

CC Okay; and Jack, and we'd like to get an EMU check on you.

LMP-EVA Stand by.

CC And, Jack, we'd like to go to India on the magazine for you. Okay. magazine India. My goodness, we'll never get started.

CDR-EVA Man, we are down in a - Look at where we came down, Jack. And that was just one of the hills. Got to go back up and then down some. Hey, thank you for that fix on the fender, by the way, because I'd hate to see what it would look like without it.

CC Okay. And John suggests that we might just check it momentarily while you're here to make sure it's still holding on good and tight. Both the clamps and the tape.

CDR-EVA Yes, that's on my list. If it stayed on through that ride it may never come off. Okay. Have you got a lint brush in there, Jack?

LMP-EVA Yes.

CDR-EVA Well, hold it a minute. I've got to get this SEP. Do you want me to brush the SEP, is that what you said?

LMP-EVA Yes.

CDR-EVA Do you want the covers open?

LMP-EVA They should be open and dusted.

05 20 09 54 CDR-EVA Okay. The SEP is open. It's about 100 degrees.

LMP-EVA 105 ...

CDR-EVA 105? Okay. And it's dusted.

LMP-EVA Here's your lint brush; if you need it.

CDR-EVA Okay, thank you. That camera look all right to you? Let me get yours; lean over here, and I'll get yours. Okay. I'll get mine, too.

CC And, Jack, we're suggesting that you're getting a little warm - maybe intermediate might help.

LMP-EVA Bob, I feel the same way, but I want to get this camera fixed.

CC Okay.

Tape 94A/24

LMP-EVA I mean the film changed.

CC Okay.

CDR-EVA Can I change ...?

CC Oh, thank you, Geno. It looks much better.

CDR-EVA How about Any other service I can be?

LMP-EVA Okay. Okay, Houston, the number of blocks plotted on the map are not nearly enough. In the greater than 1-meter range, there are many hundred blocks on the flank - on the massif flank of Nansen and up around station 2, where we are. There are only one or two blocks on the light mantle side of Nansen. It looks as if the material in the bottom of Nansen is overriding the light mantle materials of the north wall. That's just an impression. There's slightly lighter albedo than the north wall of Nansen.

CC Okay. Copy that, Jack. Looks fantastic up there.

LMP-EVA And I suggest that we - I suggest that we do our raking - That's right. I just told you everything you can see - fairly close to the Rover to get the front of the general population of talus material coming off the massif.

CDR-EVA Bob, on my mark - I've got everything - hammer, gnomon, film. Okay.

05 20 12 51 CDR-EVA MARK, if you have a gravimeter measurement going.

CC Roger. Copy the mark.

LMP-EVA Okay, Bob. The blue-gray rocks are breccias. They're multilithic, gray matrix - matrix breccias, I guess. There are fragments in them, but it doesn't look like more than about 10 or 15 percent fragments. Some of the light - the light-colored fragments seem to have fine-grained - very fine-grained dark halos around them. The zap pits do not have white halos, so I suspect they are not crystalline. They might be glass - they might be the vitric or glassy breccias. At least, the one big rock we have here.

CC Copy that.

LMP-EVA There's a rough, very rough, foliation in them - that - that and I'm not sure - it's shown by the elongate knobs on the surface. It looks like a fracture foliation of some kind.

CDR-EVA Jack, that rock has almost got to have come down, don't you think?

LMP-EVA Oh, no question about it. I'll bet you - I'll bet you it's the same as the blue-gray rocks we see up higher. Here's some more blue-gray ones over here.

CDR-EVA Let's - let's start taking - Oh, yes. Look at the size of some of these light fragments in here.

LMP-EVA Yes, but it still - I don't - It looks like they're dominantly matrix breccias. There - there are light-colored fragments, and they may be crystalline.

CDR-EVA - Okay - -

LMP-EVA They are. They're very light colored; they look like the shattered anorthosites. They have white halos - I think that's what those fragments are.

CDR-EVA Jack, let's get a piece of this one right here.

LMP-EVA Okay.

CDR-EVA Biggest one here.

LMP-EVA Get her up. This is the blue-gray variety, Houston.

CC Okay. Copy on that.

CDR-EVA I'm going to take that little knob off up there.

LMP-EVA Okay; well, you can sample - you can work that block over - -

CDR-EVA Yes.

LMP-EVA We can get several examples. We ought to sample across that layering, actually - that foliation.

Tape 94A/26

05 20 15 21 CDR-EVA One comment. When you look down into the bottom of Nansen, it looks like - like, I guess - which sounds obvious - that some of the debris that has rolled off of the South Massif covers up the original material there that covers the north wall of Nansen. There is a distinct difference. You've got that very wrinkled texture in the north slopes of Nansen, and you've got the South Massif - debris in the south slopes of Nansen. And the debris, of course, overlays the - the north slope. And all the rock fragments, all the boulders that have come down are all on the west side of the - of the - correction, on the south side of the slope of Nansen.

CC Okay; got that.

LMP-EVA Okay, Houston. I take back what I said about no halos. There are light - not very sharply light - but light halos around zap pits in the matrix. The matrix glass is dark, and it seems to have a greenish cast; but it's very dark.

CDR-EVA Oh, look at that blue.

LMP-EVA Oh.

CDR-EVA Look at the white fragments in there.

LMP-EVA Let me come and help you there.

CDR-EVA Man, there's some boulder rolling rocks here, Jack.

LMP-EVA (Laughter) Okay, don't wreck the fillets. There's an overhang we've got to get into.

05 20 16 53 LMP-EVA Okay. 514 is the - Okay, I'll take it back. On the fresh surface, these look like fragment breccias although the fragment size is fairly small. There are dark gray fragments and the light fragments we talked about. The gray ones are very fine grained and dense, although I see flashes that indicate they may be crystalline. The light-colored fragments are as I described them earlier, I think.

CC Copy that.

LMP-EVA 514. ... - -

CC Okay; Jack. If you could tear yourself away in the middle of that sometime to give us an EMU read-out, we'd appreciate it. We haven't gotten that from you yet on the EVA.

LMP-EVA Okay. I'm - Stand by. Gene's got a rock to go. That's from up higher?

CDR-EVA That's a little higher. See that shelf up there?

LMP-EVA Okay. The first rock was from about a - 514 was from a meter above the base of the rocks; 515 is from about a meter and a half.

CDR-EVA Here, can I get this in your -

05 20 18 05 LMP-EVA Can you get some on either side of those two now?

CDR-EVA Yes.

LMP-EVA Okay. You're open. I'll leave you open for a minute.

CDR-EVA Well, okay. Just so they don't fall out. Am I in?

LMP-EVA No. Let me get this other one.

CDR-EVA Okay.

LMP-EVA Okay, go ahead.

CDR-EVA Let me try from back here.

LMP-EVA Of course, that's a north/south overhang.

CDR-EVA Yes. That one?

LMP-EVA Yes, you're facing right into the east.

CDR-EVA Yes, yes. I don't know if I can get a piece back here or not.

LMP-EVA How about right where you ... yes.

CDR-EVA Right here? I can get that.

LMP-EVA Yes, that's good.

Tape 94A/28

CDR-EVA Oh, beautiful. Hit the gnomon.

CDR-EVA Well, I'll re - -

LMP-EVA It didn't move. It just tilted it. This it?

CDR-EVA Yes, that's it right there.

LMP-EVA Let me set my working tool down here.

CDR-EVA Got a bag?

LMP-EVA Coming right up. Boy, that dust. Once you get it on there, you might as well forget it.

LMP-EVA 494. 494 is from a half a meter above the base of the rock.

CC Understand, 0.5 meters up.

LMP-EVA And these are samples from across the layering - or the - - These are samples from - across the - foliation. I missed that, Bob.

CC Okay. Copy that now.

LMP-EVA What do you think? Can you get that - can you get that one up there?

CDR-EVA Yes. I might either get that or this other piece up here.

LMP-EVA Well, don't take any chances.

CDR-EVA Yes, I'm not going to. How about this one? Here's a whole big piece.

LMP-EVA Okay. That's a good - good representative fragment. Can you get it?

CDR-EVA I can't reach you without my camera hitting.

LMP-EVA That's a football-size fragment. Okay, this next sample - Can you get a bag out, and we'll try to put it around it. Around the end. Bob, it's highly

variable. This is a light matrix breccia; whereas the other three fragments were dark-matrix or dark-fragment breccias. The big rock is a light-matrix breccia with dark fragments, and it's the one that has the halos around the - around the light fragments. And that's in 495, barely. It's not even in it. It's just - 495 is wrapped around it.

05 20 20 50 CDR-EVA It's not going to stay.

LMP-EVA It's not going to stay, is it?

CDR-EVA No. Well -

LMP-EVA It's a football-size fragmental rock. Let me - Why don't you just stuff it. See if you can stuff it in there with that - with the bag down - -

CDR-EVA Yes, it'll - We'll be able to identify it when we get - 495 when we get back. Okay, it'll stay.

LMP-EVA Is the bag on it now?

CDR-EVA Well, yes, - it's ...

LMP-EVA Great.

CC Okay; we copy that, Gene. And do you guys see any tracks coming down to these boulders? Do have any feeling that these - you can place these that way?

LMP-EVA Bob, unfortunately, no. The main tracks are out into Nansen, and we - I don't think we can get over there.

CC Okay; that's those biggies that we see on the left, huh?

LMP-EVA But the visual resi - Yes. Coming up, I was looking; and there are no obvious tracks coming down here.

CDR-EVA Watch your shadow, Jack.

Tape 94A/30

LMP-EVA Here, I'll get it. Wait a minute; that gnomon is probably not - Well, that's right; you got stereo earlier.

CDR-EVA Yes, I reset it.

LMP-EVA The gnomon was moved a little between the samples.

CC Okay. We copy that.

LMP-EVA Do you need to take a vertical pan?

CDR-EVA Yes, I've gotten it all. I'm getting it all.

LMP-EVA You getting the flight line? I'll get a flight line this way. Postsample, flight line.

CDR-EVA Okay, Bob. I'm on frame count 42.

CC Copy, 42.

05 20 22 19 CDR-EVA Did you get a locator from here, Jack?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA Okay. I got flight line on the north/south trend; Gene got east/west.

CDR-EVA You going to get that sample under there?

LMP-EVA Yes, we got to get the soil.

CDR-EVA There may be an overhang. And look at that frag - that rack - rock is fragmented; let's see, but it's east - it's southeast/northwest. There's a split.

LMP-EVA Yes, that one right over there is okay. You want to get - hey, did you want to get this?

CDR-EVA Yes, I'll get that.

LMP-EVA This fillet?

CDR-EVA You got it?

CC And, 17 - -

LMP-EVA This is a fillet from underneath the rock.

CC Roger. And an update on the rake samples when you get around to it. We'd like to get one up on the massif slope as much as you can, if you can get over to it. And then the second one down near the Rover.

CDR-EVA Okay.

LMP-EVA Okay, Bob. This fillet is up underneath an overhang. I got it from about -

CDR-EVA I got to get uphill from you.

LMP-EVA It's about - -

CDR-EVA That's good.

LMP-EVA - - oh, a third of a meter under an overhand. And it's the upper 3 centimeters of soil.

CDR-EVA And it's bag 496.

LMP-EVA Now let me get one out away from the overhand a little bit.

CDR-EVA - Okay.

CC Okay. You think that's permanent shadow?

LMP-EVA And a one away from - - No.

CDR-EVA No. It's facing east.

CC Okay.

LMP-EVA Okay. And a sample down to a depth of about 5 centimeters, about two-thirds of a meter from the - boulder - the south side - is in 497.

CC Copy that.

Tape 94A/32

LMP-EVA Now let me - let me get a skim sample, Geno.

CDR-EVA Okay. I got to take a set of pictures after that, by the way. Show where they are.

LMP-EVA I can piece them into my flight line stereo.

CDR-EVA Okay. They were in both of the before pictures on those rocks.

LMP-EVA Okay; about a centimeter deep - skim.

CDR-EVA Careful. You're in a hole. Can you - you better come out.

LMP-EVA Yes.

CDR-EVA Yes. Boy, that's hard on the hand even in 1/6 g.

LMP-EVA Okay.

CDR-EVA And that was - -

LMP-EVA Okay.

CDR-EVA And I didn't park that Rover in a very good spot for them to watch what's going on, I guess; but that was the heading.

LMP-EVA Oh, shoot. They're missing all of it.

CDR-EVA We didn't work in the right spot; that's all.

CC Every now and then we get a peek at you guys. But only every now and then.

CDR-EVA Sorry, Bob.

LMP-EVA Oh, - oh wait a minute.

CDR-EVA You know, that's the way it happens

CC Give sample bag number, please.

CDR-EVA Okay. It's back on.

LMP-EVA Okay, Bob. I missed that. I didn't give it to you; but I think - well the next bag I take out, you can check the num - Well, wait a minute, I'll do it for you.

CC No. That's okay. I suspect it's 498.

LMP-EVA I'm almost positive it was 498.

CC Okay. We'll put that down.

LMP-EVA Yes, I did, too.

05 20 26 13 LMP-EVA Okay, Bob, the - looking at the blocks directly down-Sun, there are - the light gray, or the gray-matrix breccias seem to be fragments, or ... anyway, within the white-matrix breccias.

CC Okay. I copy that.

LMP-EVA And I got a couple pictures down-Sun to show that texture.

CC Okay. And one thing we'd like to do would be to sample a variety of blocks, in terms of looking at differences in the blocks - from block to block.

LMP-EVA Roger. We're going to do that. We're going after a gray - I mean a lighter-colored block, now. Are you going up there?

CDR-EVA Yes.

CC Okay; and if you're going up the massif, why don't we try and get the rake sample up there now. when you finish these rocks.

CDR-EVA Hey, Jack - Jack, don't come up here unless you bring the rake. It's a long trip. No sense coming up here twice. I can go get this sample. I'd get the rake, if I were you. Don't walk back up twice.

LMP-EVA Well, I don't - I'm not sure they're going to gain anything by coming up to the top.

CDR-EVA Okay.

Tape 94A/34

LMP-EVA You're not going to gain a thing, Bob.

CC Stand by.

LMP-EVA You're still on the talus. You guys - Oh, well. The rims of the small craters in the talus are - are softer than the - normal terrain. My foot goes in maybe 10 centimeters where normally it only goes in a centimeter.

CC Okay. As long as it's above the break of the slope, Jack, we don't have to get very far up the slope.

LMP-EVA That's right.

CC And, Jack, if you're back at the Rover, how about giving us a grav reading when you - before you leave.

LMP-EVA Because I'm late sampling, that's why. But I'll do it, anyway.

CC Roger.

05 20 28 20 LMP-EVA Okay, 670 155 201; 670 155 201.

CC Okay. Copy that, Jack. Press on.

CDR-EVA Okay, Bob, I'm at another boulder up the slope here. It's - looks quite similar to the one we just sampled, except there is a lot of flake fractures on it. Non-uniform, nondirectional, - but quite - quite different, at least from that other rock, in terms of the fracture pattern. The texture looks to be quite similar. Boy, I'm glad I don't have to walk to the top of this thing.

LMP-EVA Hey, look, Gene, on these rake samples, there is just no point in carrying a rake all the way up here - -

CC Negative, Jack, as long as you're above the break - -

LMP-EVA - - because all we needed was a break in the slope.

CC As long as you're above the break in the slope; that's right.

LMP-EVA Well, that's all right. It's being done; but let's watch those kind of calls please.

CDR-EVA They can't appreciate the - toughness of going up this slope, though. We can; we've got to tell them that.

LMP-EVA Well, we did.

CC Yes, that's what we were saying. Don't go above - just at the base of the break in the slope, Jack. Don't climb all the way up there with it.

LMP-EVA Oh, relax.

CDR-EVA Okay, we're all set, Bob. No problem ...

LMP-EVA We want to get away from that big rock because it's probably shedding. Hey, that's a different rock, Gene.

CDR-EVA Yes. Well, it looks like the same texture, but it's got that flaky fracture pattern all over it. I'm going to get a stereo while I'm at it.

LMP-EVA Yes.

CDR-EVA This ought to cover any samples I take off of that thing.

LMP-EVA I'm going to get myself a zap of cold water.

CDR-EVA Man, we've got to be a million miles away from the LM.

LMP-EVA Okay, this is a crystalline rock, Houston. It's got nice white halos around the zap pits. The zap is - the zaps are not - dense black glass, but a dark greenish - very dark greenish-gray.

Tape 94A/36

CDR-EVA Are those halos or fragments?

LMP-EVA No, they're halos. Well, they are fragments, I think, also. But, right now, it's fairly crystalline, but it is heterogeneous. Matter of fact (laughter) there's a big fragment of a porphyry caught up in this thing, I think.

CDR-EVA Did you get a locator, by any chance?

LMP-EVA I haven't done a thing.

CDR-EVA Okay. Well, I want to start taking some - -

LMP-EVA Yes, we got to get some of that.

05 20 31 19 CDR-EVA That's what I want. That's where I'm going right now.

LMP-EVA And there's a chunk there we can get. That's a big fragment within this crystalline rock - -

CDR-EVA Take a picture of that - -

LMP-EVA - - inclusion.

CDR-EVA Take a picture of that and then - and then - your locator, I'll get it.

LMP-EVA Go ahead. I've got it.

LMP-EVA Got it?

CDR-EVA Yes, I've got it.

LMP-EVA Beautiful. Looks like a porphyry.

CDR-EVA Boy, it does look like a crystalline rock.

LMP-EVA Looks like an anorthosite porphyry is what it looks like.

CDR-EVA The ... has got the very large crystals in there. They're very - they're very reflective, elongated crystals.

LMP-EVA It's a relatively angular inclusion about - it's about a half a meter in size, and it's a square cross section. Well, it's irregular; but generally square cross section. It's in bag 516, and it looks like a - well it's a high feldspar rock. It may be an anorthositic gabbro, but it is - it does look like a porphyry.

CDR-EVA There's a big chunk where I've got - I can't get it out, though; it's buried in a rock - a very - oh, half an inch elongated - I can't see whether they are colorless or not, but they are certainly reflective crystals. See that up here? See right there?

LMP-EVA Yes.

CDR-EVA And then in the big rock, you've got massive things like this big - this big fragment here - that's 5 inches across.

LMP-EVA Well, it - that may be a spall point, Gene, that's a lighter color, in general, because of a zap or something.

CDR-EVA Let's get the - let me get some more samples of it.

LMP-EVA Yes, we need to get some of the host rock here.

CDR-EVA Okay. We'll get a piece here.

LMP-EVA Okay now, you're still sampling the one we just got. So we'll get another one.

05 20 33 42 LMP-EVA Okay. The same kind - or the contact of that rock looks very much - looks like it might be finer grained - but it's about the same - in 517. That's the contact in the - the inclusion side of the contact. Keep going after the other one, Gene, I'll get this in you - your bag.

CDR-EVA Bob, you could probably see this rock if you look over this way. We're high enough.

Tape 94A/38

CC Yes, we saw it, Geno. Quite a sight - quite a goodie.

CDR-EVA Okay. Let me see if I can't get this one here. There it is.

LMP-EVA Okay. The host rock for the inclusion, which appears to be also crystalline but may be a recrystallized rock of some kind - -

CDR-EVA Can't see it too well.

LMP-EVA - - metamorphic - also looks like a high plagioclase - high feldspar, anyway. That's in bag 518 - and that was a loose frag - fairly loose but in place fragment along the fracture zone.

CC Okay. - -

CDR-EVA Will you hold this a minute? I'm going to try to get the rest of it up there.

CC Okay, 17. And for your thinking in the next few minutes, you might also factor in the question the backroom raises about taking 10 minutes out station 4 and adding it into this station, given the wealth of interest that seems to be occurring here. You might think about that. You never - haven't been to station 4, so it's a little hard to judge. But if you think 10 minutes can be very profitably spent, you might as well do that.

LMP-EVA Okay, Bob, we'll think about it. This is a medium-green anorthositic gabbro, and it looks like it has some pastel-green allophane (?) crystals in it. Did you get it?

CC We copy that.

CDR-EVA I can't get any more of it, Jack, up there. I can't reach any more.

LMP-EVA Okay, and that small chip of that is in 519. It's the same host - rock, much like the previous sample.

CDR-EVA There's a good sample for you.

LMP-EVA Okay. And another chunk of the host -

CDR-EVA Oops, be careful.

LMP-EVA Yes.

CDR-EVA It's still there.

LMP-EVA Yes, I've got it. I need to get rid of this - -

CDR-EVA Okay?

LMP-EVA It's in there. I haven't closed your bag yet. And we've got to get a - get one soil sample up the hill here. Oh, we didn't get the rake -

CDR-EVA We ought to get a soil sample, though, up here, so - -

LMP-EVA We'll get the rake sample right over here on this slope.

CDR-EVA Where did that thing go, Jack?

LMP-EVA Right here.

CC Okay. Was that last sample in 518, as well?

CDR-EVA There it is. That's it right there.

05 20 36 31 LMP-EVA No. We haven't put it in yet.

CC Okay.

CDR-EVA Bob, that will go in 499.

CC Copy that.

Tape 94A/40

CDR-EVA You get it?

LMP-EVA Okay. Bob, this is a fairly uniform-looking rock. It does have some - widely spaced fractures across it. It's - clearly crystalline and has crystal-line inclusions in it.

CDR-EVA Hey, Jack - -

CC Copy that.

CDR-EVA Might get the soil from around that thing.

LMP-EVA Both rocks look like they might be in the anorthositic class - -

CDR-EVA Your bag is still open part way, too.

LMP-EVA - - of rocks. It's just that it - one is - has the appearance of being a por - finer grain matrix. Looks like a porphyry in - in the boulder.

CC Okay. And a reminder, as you photograph it, to remember that the photograph in the southwest quadrant there will be the best ones. Around the corner on two sides there will be the best ones to show the structure through the whole rock.

LMP-EVA Yes, sir. On the southwest?

CDR-EVA South and west.

CC Roger.

LMP-EVA South and west. Yes.

CC Roger.

LMP-EVA No, the west's in shade. No, no. You mean the -

CC Southwest -

LMP-EVA South and east.

CC Roger. The southwest face - or it faces not quite south.

05 20 37 59 CDR-EVA Okay. I've got a stereo - I'll just continue my stereo around here. Hey, Jack, you can get way under there, and I know you could get soil. I don't know how long it's been shadowed, but it's been shadowed as long as this rock's been here.

LMP-EVA Okay. I'll do that.

CDR-EVA Way out under there.

LMP-EVA I've got to stereo this one.

CDR-EVA I've already got it.

LMP-EVA Well, I'm getting it from this way, and they like that. Did we kick any dirt in under there?

CDR-EVA No. I don't - no, I don't think so. Go way down in there. Let me get a couple of after pictures. Yes, we want to get two sides of these rocks, and you can see their structure.

LMP-EVA I've got that, Gene.

CDR-EVA Okay.

LMP-EVA I took those. I took that stereo.

CC Okay, and if I could remind you guys to get a pan from up there before you leave the high uphill area there. There's no point in climbing up there twice. Remember?

CDR-EVA Yes, sir, Bob. How much time we got here now?

CC Stand by.

LMP-EVA Okay. You got your bag?

Tape 94A/42

CC Okay. We got 12 or 13 minutes left at this station; unless you take that extra 10 minutes that we were offering you.

CDR-EVA Let's take it, Bob.

LMP-EVA We got to get the rake.

CDR-EVA Let's take it; we'll need it.

LMP-EVA Okay. Let me try again.

CDR-EVA Okay.

LMP-EVA I don't know whether I can or not.

CDR-EVA Do you know how far under you're getting, by any chance?

LMP-EVA Yes. I got in a - I got under an east-west overhang about - 20 centimeters - way back - By the way, ... it goes even farther, but that's about as far as I can reach back there now.

CDR-EVA That's enough, Jack let me -

CC Okay. I copy that.

LMP-EVA That's in bag 500.

CC And, 17, if you want to take a minute, you might look up in the sky and notice that our camera is taking a beautiful picture of Mother Earth.

05 20 40 10 CDR-EVA Isn't that pretty over - Can you see the Massif, too?

CC Now we're coming down to look at the massif. Isn't that a beautiful picture of the Pacific there? Ed finally found it. Now we see the massif.

LMP-EVA Okay.

CDR-EVA And, Bob, I took an after picture of - of where Jack just got that soil sample under the rock from; and I'm on 60.

CC Copy that.

LMP-EVA Are you through with the gnomon?

CDR-EVA Yes.

LMP-EVA I'll set it up for the rake.

CDR-EVA Okay. I'll go up there and get a pan, Jack.

LMP-EVA Okay. You get that pan - -

CC I - didn't get that soil bag number, Gene - Jack.

CDR-EVA We've been here - -

LMP-EVA 500.

CC Copy that.

LMP-EVA We're on a pretty good slope, Geno.

CDR-EVA You bet you. And do I know it. Hey - Bob, how long have we been at this station?

CC Stand by. You've been here about 40 minutes right now. Can you believe it?

CDR-EVA No, I - Is that - all ready? Jack - -

CC And we're going to give you that extra 10 minutes there.

CDR-EVA I can't believe we've been here.

CC That leaves you about 20 minutes; then you'll have to be moving.

CDR-EVA Boy, this pan may be looking - Okay. This pan may be looking right smack in the sides of the Massifs. Only way you can get it is to lean back - and I can't lean downhill.

CC Hey. Watch out for that crater behind you there, Geno.

CDR-EVA I'm standing in the crater so I can get level.

Tape 94A/44

CC Yes, we see that.

CDR-EVA Well, I have some good pictures of Nansen, anyway, and -

05 20 42 28 CDR-EVA You know, I look out there, I'm not sure I really believe it all.

LMP-EVA Bob, my down-Sun pictures on the rake were taken at f/8. I'm sorry.

CC Okay, copy that ... We'll take it into account.

CDR-EVA This isn't an easy -

LMP-EVA Okay, I got to get out of my shadow or I can't see what I'm doing.

CDR-EVA I'll be right down there to bag that rake for you.

LMP-EVA I got to get it first.

CDR-EVA (Laughter) Man, I tell you; can you come downhill in a hurry. Going uphill is a nice job. Bob, I'd say we can meet our walkback constraints, if anyone's interested.

CC Okay. I expect it's all downhill from here.

CDR-EVA Well, no, sir. Not exactly.

CC Can you guys see the LM or are you down too far to see the LM?

CDR-EVA ... our walkback constraints. Oh, no. The LM is over about three rises in the Scarp before we can even see it.

CC Okay, I thought that might have happened.

CDR-EVA You're looking - I'm not even at a lev - I'm not even at a level of the last - the last hill we came over.

CC Okay.

CDR-EVA I don't know if you've looked up that way.

CC Roger. We had a feeling for that. I was just checking.

CDR-EVA We can meet them, but I wouldn't stretch them.

CC Okay.

LMP-EVA Not many small walnut-sized fragments in here, Bob. Gotten about seven or eight.

CC Okay. I copy that.

LMP-EVA Gene, you got a bag?

CDR-EVA Yes, sir. Right here. How you doing?

LMP-EVA My hands are getting tired.

CDR-EVA Yes. Bag 501.

CDR-EVA No, there aren't a lot; but that'll fill up a bag.

LMP-EVA This kilogram of sample site 2?

CDR-EVA I'll have to look; I think so. I think they all are, aren't they? Practically.

CC And this is the one that we would like to get the kilogram of soil from, Jack.

LMP-EVA Okay. I'll use my scoop for that.

05 20 45 27 CDR-EVA Bag 501.

CC Copy that, Gene.

LMP-EVA Okay, what do we have left here?

CDR-EVA We want to get a - I got the high pan.

CDR-EVA Okay, let me look. They want it - -

LMP-EVA I don't know how we used up all the time, but we did.

CDR-EVA Okay, my pan, by the way - I got extensive vertical coverage down into Nansen, Bob.

Tape 94A/46

CC Okay. Copy that, Gene. Thank you.

LMP-EVA ... getting to my ...

CDR-EVA I don't know where the hour went that it took to drive here.

LMP-EVA Maybe time's different in space. Adventures in space and time.

CDR-EVA We changed 2 hours and 40 minutes. I don't know whether that makes us older or not, but - -

LMP-EVA Ooops -

CDR-EVA Awrrrrrrr -

LMP-EVA Try again. I got half of it. I got three-quarters of it.

CDR-EVA 502, Bob, will be the kilogram.

CC Copy that.

LMP-EVA And that's sample down to about 5 - about 4 centimeters - Don't get too close to the camera. Okay.

CDR-EVA Oh, that's a big bag full. Want to put it in mine?

LMP-EVA It's all right. I can't feel it. You might as well -

CDR-EVA How's your cooling, okay?

05 20 46 55 LMP-EVA Cooling's fine. My hands are tired.

CDR-EVA Yes, that's natural.

LMP-EVA Okay, ...

CC Okay. And guys - do you see any more different blocks up there that are worth sampling before you go on down on to the flats and sample the light mantle?

LMP-EVA We haven't had a chance to look around any more than you've heard.

CC Okay.

CDR-EVA You want a rake and a light mantle here?

CC We want a rake and a light mantle. You might as well get that down by the Rover - later on and -

LMP-EVA Get an after - get an after, Gene. Gene, get an after.

CDR-EVA Yes. Got it, got it, got it, got it.

CC Then you might look around - -

LMP-EVA I'm sorry, Bob. Go ahead.

CC - - ... documented samples there - up on the slope of the massif, before you move down the flatter light mantle areas by the Rover. Just do the other sampling.

LMP-EVA We - we will.

CDR-EVA Okay, Bob. Jack got the before on the rake and I got the after.

CC Okay; we have that.

CDR-EVA Okay, Bob, here are two rocks side by side, a meter or two in diameter. And one is the anorthositic gabbro, if I can use the term; and the other is the - is that two-cycle breccia.

CDR-EVA Man, that's the way to come downhill.

LMP-EVA Just don't stub your toe.

CDR-EVA Yes, that's the way to come downhill.

LMP-EVA Hey, Gene.

CDR-EVA Yes.

Tape 94A/48

LMP-EVA Set up right there. Let's get that - let's get that big clast.

CDR-EVA There's a fram - a fracture right in there I want to get near. Oh, the clast. Yes.

LMP-EVA Yes, sir.

CDR-EVA Good eye, good eye.

LMP-EVA Big white clast - in the two-cy - in the gray-matrix breccia.

CDR-EVA Good eye. Man, that's a prize. Let me get this over here so I can ...

LMP-EVA I think you can even get it.

CDR-EVA I can get both sides. I want to get this big - Yes, I think I can get that. I'm going to try. Oh. I can't believe the trouble I have with f-stops.

LMP-EVA Okay.

CDR-EVA I'm going to try to take this piece off first.

LMP-EVA Pretty hard, isn't it? That boulder's going to roll.

CDR-EVA Man, that is hard. There's the same clast over there.

LMP-EVA Well, we get - -

CDR-EVA That clast is soft.

LMP-EVA Can you use your - your blade end?

CDR-EVA Yes. Yes, let me get that little piece, anyway, to start with. Got it. There's two more pieces.

LMP-EVA Okay. Before we cover them up, let's get them.

CDR-EVA I got to get a sample of that mother rock.

LMP-EVA Okay, there you go.

CDR-EVA The other one's right there.

LMP-EVA Okay.

CDR-EVA Now, I'm going to see if I can't get a sample -

LMP-EVA Want to try to hit that one more time. I think we've got another one coming there. There's another little one.

LMP-EVA That looks almost like a rhyolite from here. I don't believe it, though.

CDR-EVA No, that's not - -

05 20 50 16 LMP-EVA I think that's it. Got a bag? Okay, this is a fine-grained - but crystalline white clast - in the gray breccia; and it's mixed with soil. We had to pick up a little soil. 503.

CDR-EVA I guess they're all there, aren't they?

LMP-EVA I think they are. There are three clasts, anyway - or three fragments that we got off.

CDR-EVA Chips. Let me get a piece of the rock it's in. And I'm going to take a closeup stereo of that.

LMP-EVA Okay, don't get it - Okay.

CDR-EVA See it?

LMP-EVA Yes. See it? You hit me with it.

CDR-EVA Well - -

LMP-EVA I tried to catch it.

CDR-EVA Bob, you still there?

CC Roger. Still there. Listening with great delight.

CDR-EVA I believe ... the piece that came off there, though, Jack.

LMP-EVA I got another piece of it up here.

Tape 94A/50

CDR-EVA And I'd roll that downhill - -

LMP-EVA Okay, the - the host rock for that - that inclusion of white material will be in bag - What is it?

CDR-EVA 504.

LMP-EVA 504. Two chips with soil. Okay.

CDR-EVA Getting heavy?

LMP-EVA What? The bag?

CDR-EVA Yes.

LMP-EVA No. Just the scoop.

CDR-EVA Just make sure they're closed so they don't - -

LMP-EVA I wore my hand out holding that camera together coming out here.

CDR-EVA We're getting some samples this time. I want to get a far - an after, and I want to get a closeup stereo of that. And I'm going to get some pictures around this block, too.

LMP-EVA Okay.

CDR-EVA There's an after and now I'm going to get - sort of a closeup stereo around it. That ought to do it.

05 20 52 18 LMP-EVA Hey, Bob, while he's doing that, there's a real good example of pit-bottom crater up here even on this talus slope. I'll try to take a stereo of it.

CC Okay, Jack, that sounds great. I guess there's always a problem of getting the in-place, glass, if you think that's appropriate at this point. Word along those lines, though, is we'd like your Rover moving in 11 minutes; so it's probably not appropriate at this time on that.

LMP-EVA Okay, there isn't any glass in this - this crater - you can see it with your TV.

CC Okay; copy that.

LMP-EVA It's just bigger - it's bigger than the average crater. And it still has that pit, the pit being about a third of the diameter of the - the inner diameter of the crater - third of the - make it a fourth of the rim diameter, that's easier.

CC Copy that.

CDR-EVA Jack, can I look - can I look at that closely?

LMP-EVA Look at what?

CDR-EVA Hold the rake a second. We got to be moving in how many minutes, Bob?

CC We'd like to have you moving in 10 minutes, which means - allow about, you know, the - the usual 3 or 4 or 5 minutes for closeout - before that time.

CDR-EVA Okay, we'll get hustling.

LMP-EVA Okay, Bob. That white-colored inclusion we sampled looks like a strange -

CDR-EVA Look out, Jack.

CC It's the old boulder-rolling trick.

CDR-EVA How about getting a soil sample under there?

CC Don't hit the Rover.

CDR-EVA Get that - get that sample under there, Jack. Under that rock.

LMP-EVA Okay. Got a bag?

CDR-EVA Got a bag.

Tape 94A/52

05 20 54 12 LMP-EVA The soil from right underneath the rock - down to about 4 centimeters - in 505. And I'll try to skim it here a little, too. Get the upper - centimeter.

CDR-EVA Bob, this big white clast - I'm not sure there aren't - some smaller ones in some of those other big boulders. That's just an intuitive guess.

LMP-EVA Oh, there are.

CDR-EVA But we never saw any as obviously big, as gross as this one. Such as this particular boulder I photographed, I had three of them other than the one we sampled. And that's 505 - and 506, in that order.

CC Okay; we copy that.

CDR-EVA On the - -

CC And by now, probably the best thing for you guys - -

LMP-EVA Bob, that rock - -

CC - - to do is to go back to the Rover and pick up the rake samples. Go ahead, Jack.

LMP-EVA That - -

CDR-EVA I'll get it.

LMP-EVA Okay. That rock - that clast - white clast - I looked at it, and it has a light, pastel-green - fairly rounded crystals in a fine-grained white to light pinkish-tan matrix. And you can figure that one out. Looks like olivine and something.

CC Roger on that. Sounds like a rainbow.

LMP-EVA It might be a - No, it's not those - the colors aren't that distinct, Bob. I was just giving you shades.

CC Okay; Roger.

CDR-EVA Hey, Bob, have you panned - down into Nansen and seen this rock that's - oh, 30 or 40 meters from us? To give you an idea of the kind of upslope filleting you have on some of those boulders.

CC Okay, we'll - -

CDR-EVA It's down to your right.

CC Okay. We'll send Ed over there to look at it.

LMP-EVA Yes, I'll help him.

CDR-EVA I don't think you got enough time.

CC Okay, we'd like you guys to get going on the rake sample. We'd like a handle on the rake there.

LMP-EVA Okay, I'm going to have to move out here a ways, Geno.

CDR-EVA Okay.

LMP-EVA Coming right there.

CDR-EVA Right there is what I'm looking at.

CC Okay. We're going to check it out; thank you.

CDR-EVA And there's no sense trying to get 500's up. Well - Let's see what happens.

CC Okay. Also, we're running out of - there's no time to get 500's either, unfortunately. We're planning on station 4, which will be a better perspective distance anyway.

LMP-EVA Yes, I was going to say there's no sense in trying to get them up the massif; I don't think you'll see anything up there.

CC Okay.

Tape 94A/54

05 20 57 22 LMP-EVA Gene. You getting your pan?
CDR-EVA Yes. I said where do you want it?
LMP-EVA Well, right over there where there's some fragments. And you get the -
CDR-EVA I'll get the before and the locator.
LMP-EVA Okay, and then I'll get the down.
LMP-EVA Okay. (Laughter) ... to take pictures.
CDR-EVA Yes. Let me tell you, you just got to think an order of magnitude bigger than what you're normally are accustomed to thinking.
LMP-EVA Okay, pan's complete.
CDR-EVA Let's get the rake sample so we can move on. Bob, I couldn't get those 500's anyway. It would require me to pitch up too far, and there's no way I could do it.
CC Okay. No, we're definitely not in favor of that, Gene, at this area.
CDR-EVA I know, I'm just mulling it over, but there really isn't any way I could get them.
CC Okay.
LMP-EVA Boy, I tell you -
05 20 58 53 CDR-EVA How are your hands? Let me rake that a little bit.
LMP-EVA Well, it's all right; there just aren't any rocks. Should have brought the scoop and used the old shovel trick.
CDR-EVA There's a couple, keep going. There sure aren't, are there?

CC Okay, do you have any feeling - do you have that hard layer underneath there like you did yesterday, when you raked at station 1, Jack?

CDR-EVA There's one under the gnomon you can get.

LMP-EVA Several I thought were rocks turned out to be clods.

CDR-EVA Yes, that's what most of them are is clods. How do you get clods if it's never been wet? You're not getting any. You've had three in there ever since the last four scoops.

LMP-EVA There just aren't many.

CDR-EVA 507.

CC Okay, copy 507, very few.

CDR-EVA Three rocks. Yes, you got about four rocks - about 2 inches and smaller.

LMP-EVA And let me get the down-Sun which - -

CC Okay, let's just get the soil and press on. We'd like to move in 3 minutes, 3 minutes.

CDR-EVA Okay, you got it?

LMP-EVA Yes.

CDR-EVA Okay. Let me put this in your bag and ... we'll forget the soil.

LMP-EVA Forget the soil?

CDR-EVA He wants us moving in 3 minutes. So let's go.

LMP-EVA Well -

CC No, get the soil, guys. Get the soil. Don't forget the soil; get the soil.

LMP-EVA Yes, we want it.

CDR-EVA I'm sorry, I thought you said to skip it.

Tape 94A/56

CDR-EVA Got your bag?

LMP-EVA Yes. May be a little messy.

CDR-EVA That's all right.

LMP-EVA One-scoop-Schmitt, they call me.

CDR-EVA That's good. That's bag 508.

CC Copy that.

05 21 00 50 CDR-EVA You'll have to start putting some of these samples in my bag. You're getting a full bag for Christmas here.

LMP-EVA Is it so full we ought to change it?

CDR-EVA Yes. Let's do that after we get to the next station, though.

LMP-EVA Well - okay.

CDR-EVA We ought to start moving out of here.

LMP-EVA Yes, let's go.

CDR-EVA Let me get one after of the area that we messed up.

CC Beautiful station, guys; just simply beautiful. Almost deserves a Falcon code.

LMP-EVA Man, I'll tell you. (Laughter) Falcon 109. I couldn't help that, Bob; it's just too beautiful.

CDR-EVA Hey, Jack, will you look where we kicked up this stuff. There's some light - the light - well, I can't see it now, I'm looking in - -

LMP-EVA I can see. There's a light-colored fragment I think we break into.

CDR-EVA Yes, we kick it up.

LMP-EVA They are light-colored clods.

CDR-EVA And when I was walking uphill, I really wasn't sinking in probably more than an inch or two.

LMP-EVA Why don't you - can you - want to take this bag off of me?

CDR-EVA Yes, sir.

LMP-EVA I'll get one out. We can use this one.

CDR-EVA Yes. Because we want to get rolling.

CC Okay, 17, there's a couple of things here, while your getting undone there. There's our house-keeping to close out. Change those bags. We'd also like to get the SEP turned on, and you might read us the temperature when you turn it on. And other than that, stowing the TV and low gain antenna and you're on your way. We've taken care of the gravimeter already.

CDR-EVA What did it - did our reading change much, Bob?

CC Which one?

LMP-EVA Make sure that's locked on there.

CDR-EVA Yes, it is locked; make sure the cap's locked. Okay, bag 8 is on the gate, and Jack's getting bag 4.

CC Okay; copy that. Copy that.

05 21 03 00 CDR-EVA Boy, I know my camera's going to be - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 21 30 12 CMP Houston, it's coming in. Rooster Tail ... - Yes, dark striations, vertical - ***tion up and down the a - area rim. And it looks like there's a black - but they all look green. You know, it looks kind of a green-gray in this type of light, back on this side. And a green-gray material down in the center of the Rooster Tail, on the floor of the Rooster Tail. And the floor is about one-fourth of the diameter. Turn this thing off - 60 - minus Peirce, scale 250, 8-second intervalometer, and I lost my intervalometer. Count 8 seconds, I guess. Stuck it around here and it disappeared. Nothing.

CC Ron, this is your friendly inter - intervalometer speaking, can I help you?

CMP (Laughter) Okay. Let's see, we're about 159 - I'm going to take two more pictures on this frame, and finish it up on Lima Lima, huh? Off to the north. Maybe it's got 160, I'll keep it.

05 21 34 12 CMP Okay, Lima Lima is on 161. I don't know how many's left. It says 160 on it, still going, but -

05 21 34 24 CMP Mike Mike is starting with number 1.

CC Mike Mike, number 1. Roger.

CC Ron, just for your information, we're not going to give you a TEI-49 pad or a state vector this pass. We're going to give it to you at the beginning of the next pass. We want to refine our data a little bit.

CMP Oh, okay. Hey, I found the intervalometer, stuck under the seat - between the web and the - the metal part. ... that.

05 21 35 54 CMP 250 lens on there.

Tape 94B/2

CMP Okay. (Singing) Okeytedokeyte. Let's see now. ... 8, ... 50, ... 88 frames - take lots of pictures. Here's frame 160 on Lima Lima. And now configure camera. Okay, Peirce ... that ... and then mag QQ's standing by (whistling).

05 21 38 48 CC How'd the photos go, going right across Arabia there, on this last - little bit of go, Ron?

CMP Okay. Yes, those were good. You can - you can kind of see the topographic rise in the Saenger area especially, it's a little bit higher to the west of Saenger than to the east. But you can still see a general rise in that area.

CC Roger.

CMP You get a kind of a hint of the - the second ring of Arabia.

CC Real good, Ron. We need to get the battery A - terminate the charge on battery A.

05 21 39 39 CMP Okay, BATT CHARGER, OFF. And A looks about 37 volts. RELAY BUS is going CLOSED.

CMP ... of a time to lose my map.

CMP (Singing) There it is.

CMP Okay. This is on the pan camera photos. When you want to start looking at something, look for a small - Okay, just to the east of Abul Wafa, there's a small crater. About - oh, he must be about 2 to 400 meters in diameter. And he's got a black strip right on the western wall - going down - going down the western wall of the crater. It doesn't look like the strip extends beyond the rim at all; just down inside the crater wall. Also next to a - Now I forgot where I was.

CC What was that name of that crater with the black wall there; where - where was it near again?

CMP Well, it's right near Abul Wafa on the first ring of Arabia.

- CC Okay.
- CMP And I think that ought to be up in - should show up in the pan camera.
- CC Okay, good. Good show. You notice the swirls right near Abul Wafa?
- 05 21 41 58 CMP Yes, I really saw them that time. And where the swirls, they really show up, are about a crater diameter from Firshov - crater diameter to the west. And I talked about it on the tape. But, basically they're kind of concentric swirls in that area with light and dark. And the contrast between the light and dark is - is something tremendous. The dark is not a mare dark - tan, but it comes real close to it.
- CC Real good. Ron, you're coming up within a minute of this or a couple minutes of this orbital science photo of Peirce starting at - in the Sea of Cr - Crisium and going through Peirce in that area.
- CMP Okay. Let's see that ought to be out window 3. We are going to stay f/8 all the way across with this one, huh?
- CC No, it says f/8 at start. And then according to the Flight Plan, you change to f/5.6 and you'll change that at about Macrobius A. And then you'll go to 1/125 right at the Littrow area.
- 05 21 43 31 CMP Okay. ... do I want to jump to f/11 going across those highlands, huh? At - on the western edge of Crisium?
- CC Well, see, f/8 - 1 shows f/8 on the map all the way across Crisium, starting at f/8 and using f/8 all the way across Crisium.
- CMP Okay. Let's see there's Picard X, so we should start in here somewhere.
- CC Yes, it's those rilles or whatever you call - rilles, I guess, to the north of the Picard X is where you start.

Tape 94B/4

CMP Okay, me get a shot of those - oh, come on ... longer. Okay, we started it, ... then about 10 [?] time.

05 21 44 54 CMP Okay. There is absolutely no color variation on these flow fronts or scarps, or - By golly, flow fronts, looks to me like. Just looking north, right from the Picard X.

CC Roger. You'd call them flow fronts and -

CMP Well, flow front, or - or I've hardly even, it's - let me see they're bright on the high side, as you're looking north. You know, they're - they're bright on the high side. I would presume they kind of run east and west.

CC Roger. According to the map, they're just exactly east and west.

CMP - - ... inside of them. Yes.

CC Your photo path goes directly between Peirce and Pease - Peirce Bravo. And then leads up toward Peirce Charlie just a little bit north of Peirce Charlie.

CMP Okay.

05 21 46 21 CMP Well, Peirce Charlie has really got some black lines going down, vertical down them.

CC You talking about inside the crater, black vertical lines inside the crater?

CMP Yes, inside the crater. And it also looks like it carries on across. As I get a little bit closer, I'll see if it carries on across or not. This can't be shadow. You can still see the darker annulus around - Peirce. Peirce Bravo's also got a dark annulus around it. In Peirce Bravo has only - goes out to about a half a crater diameter, though.

CC Roger.

CMP Well, you know Peirce Charlie looks like - the sides of the South Massif, almost. Look down in that. In other words, it is kind of highly eroded, elongate crater.

CMP ... are all vertical; you know, I don't - I don't - vertical is the only way I know how to describe them. They point toward the - you know, radial - they point radial, but they all point toward the middle of the crater.

CC Roger.

CMP Does that make sense? (Laughter)

CC We will try to salve them out. Yes, that makes sense, Ron.

CMP Okay.

CMP Peirce Charlie was right in the middle of a little framelet there. South of Microbius, huh?

CC Yes, just a little bit south of Mic - Macrobius there. Lay it on the edge of it actually, and on the nor - southern edge of Macrobius.

CMP Okay.

CC As you get up ahead, between the contact line between the mare and the highlands at Macrobius Alfa, is where you'll change to 5.6.

CMP Okay.

05 21 49 54 CMP Hey, do we go north of Macrobius Alfa?

CC Boy, it looks like you just, yes, you're north of Macrobius Alfa. That's affirm. You're even just a little bit north of Macrobius Bravo.

CMP Yes, that's ... what I mean ... Macrobius Bravo. Boy, it's a beautiful - between Macrobius Bravo and Macrobius there is a beautiful - ray excluded - what you call it - butterfly! Little butterfly - about a 1000-meter crater.

Tape 94B/6

CC Roger.

CMP Got him (laughter). 5.6.

CMP You know this - -

CC Okay, you ought to be changing 5.6.

CMP Okay. Let's see about 5 - Now here again is where Sun angle may make a little bit of difference on the thing. But this kind of a hummocky, well, close to sculptured-hill-type of material that we are flying over between Proclus and Macrobius A and B, doesn't look at all like the Sculptured Hills in the landing site area, next to - In other words, all along the edge of Crisium, or the edge of Serenitatis you have the sculptured-hills effect that have the vertical, dark lineations in it. These vertical, radial or whatever you want to - lineations, striations, I guess, dark striations are not apparent under the western edge of Crisium at all. Where does this come out by the landing site? North of the landing site?

05 21 52 16 CC Roger. You're quite a bit north of the site. You are over Li - Littrow. In fact, you're north of Littrow.

CMP Over Littrow?

CC You're north of Littrow.

CMP Okay, we're to get the Littrow ...

CC Okay, when you cross into the mare on Serenity there, after Littrow, you want to change to 1/25.

CMP ... 25; okay. So that'll be -

05 21 54 26 CC And, Ron, this is camera path ends at Bessel A - Bessel Alfa in the Sea of - in Serenity - Serenitatis.

CMP Okay. Okay, let's see, that's beyond the rilles out there. Let's see, it's quite a - in the middle isn't it - way out there. Okay.

CC Yes, you cross those east-west - east-west running rilles there in Serenitatis and then get right up to the Bessel.

CMP Okay.

CMP Well, I don't think that scarp could be a flow front across there, but it sure does look like it. The thing that changes your mind about it being a flow front is that it goes up to North Massif. I couldn't see any real continuation. It looks like there's two possible continuations on a south side and the South Massif. I'll have to take another look at that the next time around.

CC Okay, HIGH GAIN to AUTO when you get a chance there, Ron. And you got to switch over for this terminator photo P29 Charlie on Sulpicius Gallus.

CMP Okay.

05 21 57 18 CMP Okay. Serenitatis Sulpicius Gallus, huh?

CC Roger. You get - -

CMP Two of 500.

CC And then f/11 on the mountains right behind, right to the west of Sulpicius Gallus. That's using a 250-millimeter.

CMP Okay. These are 250 m - 250, f/22. Okay, and it's mag Quebec Quebec, starting at 79.

CC Got it, starting at 79. Roger.

CMP Got six and one - yes, which window was the -

CC I don't have my friendly helper here or I could give it to you.

CMP There's the ones that's going to be ... (laughter).

CC CM-5 is what we think.

CMP ... seeing it out of window 3.

Tape 94B/8

CC Try CM-5, Ron.

CMP And - Yes, that CM-5 is ... Okay, about six of them around Sulpicius Gallus there. There's 22 to 500.

CC Okay. Get those Haemus Mountains right to the west of Sulpicius Gallus.

CMP Yes.

CC Then, you get D-Caldera.

CMP Okay. Hope I can find it this time again (laughter). Wouldn't that be a heck of a note?

CC You better believe it.

05 21 59 32 CMP Try to take a picture of it and couldn't find it (laughter). Okay. Let's see, 1, 2, 3, 4, 5. Okay, next one is 11.

CC Okay. On D-Caldera, you want to go, f/8 at 1/250.

CMP Okay. Let me get some of these mare. Still got to get the Haemus Mountains there.

CC Okay. ...

CMP And got to get some of the - Okay, D-Caldera. 250th, huh?

CC Yes, 1/250 f/8, f/8, 1/250 on D-Caldera.

05 22 01 31 CMP Okay. I found it.

CMP Okay. What's the next one?

CC Okay. I don't even know what the name of it is. It's just immediately up that hill and riile there, just immediately to the west of D-Caldera.

CMP Okay.

CC Looks like it would be right at the terminator.

CMP ... 125th. Yes, it is, as a matter of fact.

CC Ron, when - soon as you're done with the photos, you might check the laser altimeter. We - it went belly up during this photo pass - just absolutely quit like you had shut it off with your toe or something.

CMP Thank you. Okay. It is off, as a matter of fact. Shall I turn it on now?

CC Why don't you turn it on so we'll get a check here, and then it'll be coming off in a second. Think you got it with a toe or something?

05 22 03 32 CMP Okay. It's ON. I must have.

CC Okay. It's working good, too.

CMP I wonder if I ever turned - I wonder if I ever turned it on?

CC No, it was - it was on and running, Ron. And then all of a sudden, about 5 minutes ago, we got just a complete belly up; no power to it at all.

CMP Oh. Well, I'll tell you, I've (chuckle) worn the toes through in my underwear here, so you do a lot of rolling around (chuckle). Let's see - let's recapitulate here. In mag QQ, we're on frame 104.

CMP I'm not sure where it was when we started on that one.

CC I think you gave me a call at 79, didn't you?

CMP I didn't write it down (chuckle).

CC That's all right. You - We've gotten all your calls. I think Tommy can pick that one up.

CMP Oh, okay.

CC Tommy's shaking his head that he's got it all squared away. So, if the bookkeeper's right, we're right.

CMP Oh, okay (laughter).

Tape 94B/10

CC And you can go ahead and start down that line now. We've seen the laser altimeter enough, I think.

05 22 05 32 CMP Okay. I have the camera OFF. Yes, it's dark down there. I'm not getting any more pictures. Okay.

05 22 05 46 CMP MAPPING CAMERA to OFF. Wait 30 seconds, it says. Okay. Rolling them up.

CC Okay. You've got MAPPING CAMERA to STANDBY and IMAGE MOTION, OFF.

05 22 06 39 CMP Okay. MAPPING CAMERA to STANDBY. OFF, barberpole, gray. LASER ALTIMETER, OFF. Okay. We've already in CMC FREE, and we're rolling left.

CC Roger. Ron, INCO just asked me to remind you that those high gain angles that you see in this block here are strictly if we lose lock here during the maneuver. That's the reacquire angle.

CMP Okay. That's after we get the attitude. Okay.

CC Watching your buddies on the screen down here right now, and they've, believe me, they've got more black showing than they do white right now - of those suits. They've really been down among them.

CMP They out to the Scarp yet?

CC Yes, they're - Let me ask Bob here.

CMP At the edge of the mountain? Have they - -

CC They've gone up and down the Scarp. Wh -

CMP Okay. They've gone all the way past station 2 and then they're going to station 4, huh?

CC Roger. Let's see, they're - they're at station 3 right now, matter of fact. That's where they were showing them on TV. They've been up the Massif and up to station 2, and now they're back down to station 3.

05 22 08 42 CMP Okay, Mike Mike is at 95. I don't know if I ever told you that or not. I think I always get more pictures than I'm supposed to.

CC We decided that what you're doing is trying to use up all the crew options before Jack gets up there.

CMP (Laughter) You guessed it!

CMP Hey, yes, which reminds me, if - you know, you get to a point where we've got one of these mags that doesn't have enough for a complete set, you know we could make those options on the end of a - a reel and use Papa Papa, there.

CC Roger. That's - that's affirmative.

CC Ron, I got to ask this - During the last eat period, did you leave the Hasselblad running without a mag in it, just to pull our chain?

CMP (Laughter) No, honest I didn't; I really didn't. You heard something clicking all the time, huh?

CC Roger. It's very periodic, just like it was on the intervalometer and it sounded just like - just like the Hasselblad sounded this last time. Just exactly like it.

CC Tommy was just pulling his hair out over there.

CMP Did - have I used up any more film on some of these than I should have?

05 22 11 08 CC No, we haven't caught any, anomalies in the film usage.

CMP (Humming: "Who's afraid of the Big Bad Wolf")

CMP ... 32; roll attitude.

05 22 14 39 CMP You know, I just noticed something that I didn't know before.

CC What's that?

Tape 94B/12

CMP That is that the - when you maneuver, you know, in a simulator, it's just like the eye-view ball. You know, it's nice, smooth transition, you know. You look at the GDC ball and it goes, it kind of takes a jump in pitch and then a jump in yaw; a jump in pitch and then a jump in yaw. You put it on ball 2 ... ball 1 and it all does the same thing.

CC Roger.

CMP Yes, it does the same thing. That's just the way the GDC operates I guess.

CMP Yes, not the - not the ball, it's just the GDC.

CC Roger. The G&C is - just said that's a nominal.

CMP Well, I'm sure it is, but, you know, I just didn't even know it. Because I hadn't noticed it before, I guess, either.

05 22 18 55 CC Ron, while you're sitting there watching this maneuver to completion, I've got some read-up from the orbital science report for the CMP if you would like to hear it?

CMP Yes, I sure would. Go ahead.

CC Okay. Let's talk about the UV. The far UV spectrometer data has been excellent throughout the mission. Indications are that the hydrogen atmosphere of the Moon is much less than expected. The Aerobee launched from White Sands on Monday failed to get solar UV calibration because an instrument viewing port failed to open. A second Aerobee flight is scheduled for tomorrow. The IR scanning radiometer is performing beautifully. Indications are that the subsolar point surface temperatures are higher than Earth-based observations predicted. Many thermal anomalies are being seen in the Ocean Procellarum area west of Copernicus. A few unusual cold spots have also been detected indicating areas of fine soil with few and no blocks. The lunar sounder data is excellent and the specular power monitor signals correlate with surface features; HF data indicates that layers are being detected in the mare areas. Over.

05 22 20 14 CMP Hey, beautiful. Man oh man. That sounds like all that stuff's working good. Outstanding. That's good - good to hear.

CC Roger. And don't worry about that short period of time the laser altimeter was off; it shouldn't affect anything.

CMP Okay.

CC And anytime you can reach over there, Ron, it's H₂ tank 2 FANs to ON for the night.

05 22 20 18 CMP Okay, tank 2 FANs are going ON.

05 22 25 41 CMP Hear it rattling. It must be pretty close to attitude. Yes.

05 22 25 43 CC Roger. You've got a 50 18 on the DSKY.

CMP Okay. You know, it doesn't shake, rattle, and roll as much since we got rid of that tin can. But it still does a little bit, you know, you get a - it is a little more dynamic than I had thought it would be.

CC We'd like ACCEPT, we've got a jet-on monitor load for you, Ron.

CMP Okay.

05 22 26 30 CMP There you got ACCEPT.

CC You're trying to say you've got a - you're prejudiced and you think you've got a better flying vehicle than somebody else.

05 22 26 44 CMP (Laughter) I just said it doesn't shake, rattle, and roll as much as it did when - when the other guys were on there.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 21 03 00 LMP-EVA ... my camera's going be - -

CC You copy on the SEP receiver turn on and temperature?

LMP-EVA Right. You want that closed?

CDR-EVA Yes.

LMP-EVA Mag.

CDR-EVA We got that, Bob.

LMP-EVA It's closed.

CDR-EVA Okay.

LMP-EVA Okay.

CC Okay. 17, take all that back, we've just had a change of heart back here. And we're not going to turn the SEP on, just cover it up. And you might give us a temperature reading as you go by; that'll help us think what to do with it.

05 21 03 30 CDR-EVA It's about 98.

CC Copy 98, then leave them both off.

CDR-EVA Okay.

CC 17, John and Charlie are kind of advising you to put that SC - that full SCB underneath the seat to keep - make sure the top doesn't bounce open and lose some of those rocks.

CDR-EVA Well, you can't take better advice than from those who have been here.

CC Roger on that.

CDR-EVA Their advice has been pretty good so far.

CC I won't pass that on to them, I think they -

Tape 95A/2

CDR-EVA These locks are clamming up, Jack. I can't unlock that one now.

LMP-EVA Can you lock that one?

CDR-EVA They all get sticky.

LMP-EVA That one just didn't want to work any more.

CDR-EVA Let me see. It isn't moving either way. This one - this one was sticky, too. Let me see.

LMP-EVA OUT's open, right?

CDR-EVA Huh?

LMP-EVA OUT is open - -

CDR-EVA OUT is OPEN, yes. Let me try once more if I have to - Here I got it.

LMP-EVA Okay, those are really getting dusty. I'll hit those with a dust brush next time around.

05 21 05 11 CDR-EVA Charge that time up to John and Charlie!

LMP-EVA Okay. What haven't we done?

CDR-EVA Okay. I got to get the camera. Okay, Bob, I'm taking your camera.

CC Okay, looks like it's in the right place, as long as it's turned around. Good coordination.

CDR-EVA Yes, sir. Okay. We read the TGE, I'm going MODE 1.

CC Roger on that. Okay; we lost the picture.

CC And give me a call when you guys get rolling.

LMP-EVA Okay.

CC And we'd like frames when it's convenient on you guys.

LMP-EVA Okay, Bob.

05 21 06 16 LMP-EVA Okay. LMP is at 46.

CC Copy that.

CDR-EVA And CDR, is at, if I stop long enough, 113.

CC Copy. 113.

LMP-EVA Oh, look at that. Boy, I tell you. Okay, Geno, why don't I follow our tracks back; well, until we get over the big hump and then we can start picking our way to 3.

CDR-EVA I've got 3 pretty well spotted.

LMP-EVA Okay. Okay; low gain is set, and heading about 035 - oh, let me set this thing out of the way again. This has been giving me more trouble.

CDR-EVA What's that? The hammer?

LMP-EVA Yes, the handle.

CDR-EVA Oh, getting caught in there?

05 21 07 25 LMP-EVA Okay, Bob. We're ready, we're rolling. You need any readings?

CC No, no readings called out. And when you get going, I'll give you a little advice on what we're going to do on the way to station 3.

LMP-EVA Well, let me tell you a few things first, Bob.

CC Okay, start telling me.

LMP-EVA I think those two - -

05 21 07 47 CDR-EVA We're rolling!

LMP-EVA All right. Those two major kinds of blocks that we sampled there - it was about the two varieties we saw in the area, it's a long extrapolation I realize, but they do resemble in color, and I believe in texture, the blue-gray rocks and the light tan rocks up on the Massif. So I feel confident that - fairly confident that we sampled at least the two major units visible from a distance in the South Massif.

Tape 95A/4

CC Excellent, excellent.

LMP-EVA I think that there is some - a lot of postmission work to be done on correlating the angularity and possibly even the albedoes of the rocks we sampled with those on the Massif. We should have good - good pictures of them - of both from a distance and up close.

CC Okay. I'm reminding you - -

LMP-EVA So we may be able ... - -

CC - - That extrapolation is the nature of our art.

LMP-EVA Ha-ha-ha-ha-ha-ha. And, Bob, I'm not going to - How am I on the film?

CDR-EVA Oh, my golly! Look at that valley!

05 21 09 10 CC Stand by. I'll get that for you, Jack - -

CDR-EVA I think there's a - -

CC I'm picking you up fairly well, now. And before you guys get too far, a couple of comments we want to do on the way. If - there is a Rover sample stop in your checklist, it used to be at the 073 and 6.3; it's the first thing there, halfway out to Hole-in-the-Wall. And we're now going to have that Rover sample stop at 078 and 7.0. That should be along your tracks going home. So, about 078 and 7.0, we'll have the Rover sample stop. And the gravimeter people have won today, and we're going to stop and get off the Rover and get a gravimeter reading at that location. We're taking out another stop, I'm not sure quite where. And right now, Jack, you're right on on the film says a little note in front of me.

LMP-EVA Okay. I'll take pictures, then.

CDR-EVA Bcb, we're on the top, coming off the highest lobe of the scarp looking back into the valley. And it's quite a scene back there, but we still cannot see the LM. That may be it - I don't know.

LMP-EVA Hey, turn a partial pan, I know it's into the Sun. Wait a minute. Wait a minute.

CDR-EVA Okay. Let's take one from right here. I want - I want the whole thing.

CDR-EVA You ready to start?

05 21 10 28 LMP-EVA Yes, I got it.

CDR-EVA Start taking. Well, that's -

CDR-EVA Take the whole thing.

LMP-EVA Go ahead.

CDR-EVA Get around this crater.

LMP-EVA I got a pan down in the valley. This is just going to be right into the -

CDR-EVA Yes. Don't take that one. Get it up as we come around. You get it? There we go.

LMP-EVA Okay.

CDR-EVA That's the one we want. And you got the valley?

LMP-EVA Yes. Keep going. Okay. Keep turning around over there, and I'll get that scarp.

CDR-EVA That's beautiful.

LMP-EVA Isn't that something? Man, you talk about a mysterious looking place. They can cut some frames - some parts of those pictures out and make a nice photograph. (Laughter) TV cameras, maps -

05 21 11 10 LMP-EVA Okay, looking at the north man - the light mantle. No more comments except that by that rake sample and just looking, there's certainly - are fewer fragments than we saw at station 2. The main thing that we can tell about the light mantle and when we're on it, of course, is the light-colored craters. The fresher craters all appear to be light colored. As they get older, they seem to - the albedo goes down and potentially have been

Tape 95A/6

dusted with material from the dark mantle or from other sites. Either that or it's just the lunar patination that we're all familiar with.

CDR-EVA You know, it's a shame. They could have had TV coming down here because my heading isn't going to change much at all. The high gain could have been on the whole time.

LMP-EVA Bob, none of the craters out here in the light mantle appear to show - they've got new bedrock. Almost all of them are instant rock craters.

CDR-EVA Say, Bob. Give me that bearing and range again for the - -

LMP-EVA 70 right here.

CC 07 and 7.0.

05 21 12 32 CDR-EVA - - up on the hill. How about 071 and 7.0? Will that do?

CC Yes. I think that that will be enough to hack it.

CDR-EVA Well, if not, we can go down there.

CC No, no, no. Stay on the road - stay on the road you're on.

CDR-EVA Well, I'm not on any road, but I'm stopping here.

CC I thought you guys were making a road -

CDR-EVA 071.

CC Roger.

CDR-EVA Let me turn it off.

CC Yes, also - -

LMP-EVA ... 98 and 70.

CC Okay. And the Rover ... should be fairly flat for the ole gravimeter.

CDR-EVA Oh, oh.

CDR-EVA Well - That means we have to change here.

LMP-EVA Hey, right over here to my right - -

CDR-EVA Okay.

LMP-EVA Maybe it's the best we can do, but it's still going to be on a slope.

CDR-EVA Well, I'll level it off on a local - -

LMP-EVA On it?

CDR-EVA Yes.

LMP-EVA Go ahead.

CDR-EVA I'm on. Do you see -

LMP-EVA Yes, I see it. Right there.

CDR-EVA On the rim of that crater that's builded up a little bit? Right up here. What's your - can you tell your roll? Okay, now that's about zero right there. What's your roll?

LMP-EVA Let me turn this off.

CDR-EVA What's your roll indicator ...

LMP-EVA Oh; zero.

CDR-EVA Zero?

LMP-EVA Yes.

CDR-EVA I'll punch it.

LMP-EVA You'll change it as soon as you get off.

Tape 95A/8

CDR-EVA Oh, it's zero.

LMP-EVA Oh, you got to get off anyway?

CDR-EVA Do I have to get off for this?

CC Roger. Both of you get off.

LMP-EVA Gravimeter reading.

CDR-EVA Why should I have to get off?

CC So you don't move the ole gravimeter.

LMP-EVA Think you can hold still?

CDR-EVA Yes. I'll hold still.

05 21 14 06 CC No. Negative on that, Gene.

CDR-EVA Okay, Bob. Give me your sampler cause that's the other thing I have to do.

CC Yes. We'll get bag samples here - Rover samples, at least.

CDR-EVA But you need me off to sample?

CC Roger. We want Jack - Gene and Jack both off.

CDR-EVA Well, if you need me off; Jack, just punch it.

LMP-EVA Okay. Hold still. They don't know anything about your PLSS noise.

CDR-EVA We'll get off.

CC Gene, we'd like both of you off.

LMP-EVA 07 - 071, 9.8, and 7.0, Bob.

CC Got that.

CDR-EVA Don't push it yet - did you?

LMP-EVA No.

05 21 14 59 CDR-EVA Okay. Go ahead. Push it.
LMP-EVA Let me wait until it settles down here.
CDR-EVA This thing is off tape START, isn't it?
LMP-EVA Oh - if this thing doesn't change.
CDR-EVA Oh, that should be good - -
LMP-EVA Yes, it does change - vibrate a couple of times.
CDR-EVA Huh?
LMP-EVA Vibrate a couple of times.
CDR-EVA No, the settings.
LMP-EVA Oh, I don't know - yes, they'll change.
CDR-EVA Okay. Quiet Rover. Gravity.

05 21 15 30 LMP-EVA MARK it.
CC Copy that.
LMP-EVA Say, Bob, I need a quick f-stop for the 500.
CC F-stop.
LMP-EVA It's the same - it's the same film.
CC Stand by.
LMP-EVA Hey, Bob, can I punch it again?
CC Oh yes. Go to STANDBY and then punch it again.
CDR-EVA ... time out, do you? Go to STANDBY.
LMP-EVA Stand by.
CDR-EVA Stand by, Jack.
CDR-EVA Okay.

Tape 95A/10

05 21 15 56 LMP-EVA MARK it.

CC Copy that.

CC Okay. And, Geno, f-stop for the 500 millimeter should be the same as - for the 70.

CDR-EVA Okay.

CC And, Jack, I presume you're getting some Rover samples here off the Rover.

LMP-EVA Bag 30 Easy.

CC Copy. 30 Easy. Are you guys finding much in the way of rocks here?

CDR-EVA I'm looking. I can get you some instant rock out of a small pit crater - pit bottom crater.

05 21 17 25 LMP-EVA Bob, up to frame count 36 is the outcrop or boulders at the top of the South Massif.

CC Okay.

LMP-EVA Bag 31 Easy. Instant rock out of a 2-meter pit bottom crater - off the inner wall.

CC Copy that.

LMP-EVA Well, let's make it 30 centimeters down from the rim.

CC Okay.

CC Okay, 17. We've got about 30 seconds left for that gravimeter reading. You want to be finishing up the task and getting back toward the Rover.

CDR-EVA Okay.

LMP-EVA Okay, Bob. And through frame count 57 are the North Massif and - from part of the western portions to part of the eastern portions.

CC Okay, now; and what was that frame count?

CC Okay. Copy the 57, then.

CDR-EVA Here's something different - here's a little - -

CC Hey, guys, we're ready for the gravimeter reading. And we'd like a frame count from you, Jack. I guess if you'd prefer - -

LMP-EVA A chunk of yellow-brown rock that apparently has several spots behind it, probably indicating direction from which it came - Oh, no - What is that? That's a reflection (laughter). That really fooled me. A reflection off the Mylar (laughter). Crazy. Well, what the heck, I'll sample it anyway.

CDR-EVA Okay. Let me get my antenna set so - it's not quite - -

LMP-EVA Is it through reading?

CDR-EVA Yes, it's through reading. I'll - Probably read it better by now, Bob. I've got Family Mountain and some of the hills way up to the right of Family Mountain. I'm at 67 on the - on the - 500 and I'll give you the reading on the gravimeter.

CC Okay. Copy. 67 on Family Mountain.

CDR-EVA Did you get the other words on the 500?

CC Roger. Copied them all.

CDR-EVA Well, you were reading at probably a 90-degree low-gain angle.

CC Roger. We've been reading them on the LM also.

LMP-EVA Thirty-two Easy is another - just small - another small fragment.

CC You know what I need?

Tape 95A/12

05 21 20 56 CDR-EVA Okay, 670, 123, 501 - 670, 123 501.

CC Okay. Copy that, Geno. And we're ready for you guys to go on at your earliest convenience.

CDR-EVA Do you want me to load the LRV sampler?

LMP-EVA Go ahead. Yes.

CC And, Jack, is that your last LRV sample bag?

LMP-EVA I only had one left, but it's loaded now.

CC Okay.

CDR-EVA You did get the reading, right, Bob?

CC Roger. Got the reading.

05 21 21 54 CDR-EVA Okay. We're buttoning up.

CC Okay. And if you've got something - if you don't have one left for that sample at Hole-in-the-Wall, Jack, we'd like you to get a new set of sample bags.

LMP-EVA We've got it.

CC Okay. Got it. Still understand that 32 Echo was your last sample.

LMP-EVA Thirty-two Echo. Got three here.

CC Okay.

CDR-EVA Oh, oh.

LMP-EVA Okay?

CDR-EVA Yes.

LMP-EVA Need some help?

CDR-EVA No. I've got the Rover.

LMP-EVA Was that me?

CDR-EVA No.

CDR-EVA That was interesting. Bob, about 2 inches below the surface here, you ran into that very - that blue-gray material down there and it just - it's in little clods, and it breaks apart in your hands.

LMP-EVA Yes, that's right.

CDR-EVA Did you get some of that in your Rover sample?

LMP-EVA No, but I got it out of that instant rock crater.

CDR-EVA Let's grab a quick Rover sample and we'll take off.

LMP-EVA That's why that was a pretty interesting (laughter) episode.

05 21 23 06 CDR-EVA Yes. Well, you know, we haven't been trenching like we should or we would have - -

LMP-EVA But, really those trenches - those craters are giving us the same information. That there's a light-colored material underneath.

CC Okay. 17, we're ready for you guys to move on and we'd like to eliminate the Rover sample at Hole-in-the-Wall.

CDR-EVA Okay, Bob. We're getting on now.

CC Copy that.

CDR-EVA We got on a minute ago (laughter)

CC And, do I understand that these Rover samples, Jack, are in your pockets?

LMP-EVA No. They're in the bag on the Rover.

CC Okay.

LMP-EVA Forty Yankee.

CC Copy that.

Tape 95A/14

LMP-EVA That's light-colored soil from a depth of about - it's mixed with a little of the upper surface, but mostly light-colored soil from a depth of about 15 centimeters.

CDR-EVA Wonder what would I do for an encore?

LMP-EVA It looks like the light mantle in here is covered with dark to a depth of about 5 or 10 centimeters.

CDR-EVA You might want to go MIN, Jack, on your diverter.

LMP-EVA Right now, I'm sort of warm.

CDR-EVA Okay. When we start driving, you might want to go.

LMP-EVA I'm going to zap myself with a cold. I can do it on here.

CDR-EVA Did you take any pictures at all while you were there?

LMP-EVA Oh, yes. I didn't take a pan. Why don't you turn right to a ...?

CDR-EVA Okay, Bob. If you read, we're rolling.

05 21 25 08 CC Okay. Mark that.

CDR-EVA Making a right-hand turn for a pan.

LMP-EVA Left. Let me see where we're going. I guess ... again. You know, a little more and that hole would have been in the way. We left some of our litter.

CDR-EVA Not a complete pan but it will show the location.

LMP-EVA Okay. LMP frame count 80.

CC Copy that; 80.

LMP-EVA Okay. Geno, you're heading for a spot that's about 080/5.5, approximately.

LMP-EVA Okay?

CC Yes, you guys following ... form or not?

LMP-EVA Do you have an update?

CDR-EVA No.

CC Okay; and - Roger. The Hole-in-the-Wall should be at about 080 or maybe 5.7. And we're not going to stop and get a Rover sample at Hole-in-the-Wall.

CDR-EVA What about station 3?

CDR-EVA Okay, that sounds reasonable because it's just nothing but lots of rolling terrain.

05 21 26 25 LMP-EVA Okay. Bob, I - I think we have a good sample of only partially contaminated light mantle in that last Rover sample that Gene accidentally discovered was right under our feet. It's almost certainly the light-colored material that's the crater - we've been talking about in the walls of the crater. And, as a matter of fact, that instant rock sample I took was light-colored and probably represents the same stuff, indurated slightly.

CDR-EVA Light-colored mantle has that bluish tint that you saw in those rocks.

LMP-EVA Yes.

LMP-EVA I still don't think there's anything. We ought to - we ought to get a core in this light mantle sometime; and probably station 3 is going to be the place. I hope that's still in the agenda.

CC Roger. It's still in the agenda.

CDR-EVA Say, Bob, can you update the mileage on station 3?

CC Okay, you want mileage to it or do you want the range and bearing at it?

Tape 95A/16

CDR-EVA Well, range and bearing at it.

CC Okay. Stand by.

CDR-EVA The Hole-in-the-Wall is fairly nebulous.

CC Okay, we're going to say about 089 and 6.1 for station 3.

CDR-EVA Okay.

CC Do you want to hear another range and bearing right now?

CDR-EVA Do you get the feeling that we're the only ones out here, Jack? Looking around - 073, 10.3, 6.6.

CC Copy that.

LMP-EVA Bob, I have a feeling that whatever darkens the - Ooh, there's a beautiful little glass-lined crater, pit bottom crater - whatever darkens the light mantle is not a - a one-time-only mantling of darker material. It's something that happens over a period of time, continually, because craters of all sizes and apparent degradation are dark - darkened and there are lighter craters that are light to varying degrees, there seems to be a continuing - continuum of albedo change.

05 21 29 08 CDR-EVA You know that little crater on the side of the North Massif that we're thinking about going to doesn't look nearly as light-colored or haloed as it does in pictures, does it?

LMP-EVA You mean - Yes - no.

CDR-EVA Now, let's see where we are, I don't want to run into that big crater at the foot of the - -

LMP-EVA I think you're almost to the rim.

CDR-EVA Yes, I want to go down here if I can. My tracks are over there to the left, I haven't crossed them yet.

05 21 29 45 LMP-EVA 073, 6.3.

CC Copy that.

LMP-EVA LMP frame count is 86.

CC Copy 86.

LMP-EVA Boy, that's a sight, isn't it?

CDR-EVA That's spectacular.

LMP-EVA I don't know why something that's all approximately the same hue should -

CDR-EVA The lack of color has got to contribute to the inability to judge distance.

LMP-EVA See the lobes coming out - looks like lobes out from the Scarp. The Scarp rather being a line in there on the, on the plain, appear to be lobes. I got a couple of shots of that. Whereas when it gets up on the Massif, it's a fairly continuous curve; although it does appear to be younger, at least - at least there's less relief on it for the first few kilometers of that bend there.

CDR-EVA We're going to have to go down like the way we came because there's that big crater down at the bottom, I'm afraid.

CC Yes, I think we agree with that suggestion, too.

LMP-EVA Bob, the Scarp, so called Scarp, impresses me as less of a scarp than a series of - of lobes which roughly have a north-south trend. And we've been driving over various hummocks within those lobes.

CC Okay, copy that.

CDR-EVA I think we made a gross mistake in not trying to let them get TV, my heading hasn't changed much at all here. Then we would have a spectacular view. Look at it out in that valley, Jack.

Tape 95A/18

LMP-EVA Yes.

CDR-EVA Good gosh. I still don't know where the LM is - I see it, I think. The shadow or blob - that's the only sharp shadow out there right in the - because you sure can't make out the craters from here, can you? Okay, hold on. Over the hill and down the vale. Man, I tell you, this machine is fantastic.

LMP-EVA Yes; Roger. (Laughter)

CDR-EVA Quite a machine.

LMP-EVA Likes to spin when you turn going down hill.

CDR-EVA Quite a machine.

LMP-EVA But - I think you've got something right ahead of you. Here -

CDR-EVA I got it.

LMP-EVA See the instant rock.

CDR-EVA I got it. You know, the crater doesn't look nearly as bad from here, but it sure is deep when you get up there. We'll just - I'll meander around it over next to this next little lobe then I'll head down the next one - the first lobe we came up - and then along it.

05 21 33 08 LMP-EVA Okay, there's Lara, and I think we can see station - Watch it, watch it, watch it.

CDR-EVA Okay, I'm going through it slow.

LMP-EVA Beautiful. I figured we'd buckle the LCRU with that one.

CDR-EVA I bet they can watch this road. My heart rate just dictates the kind of terrain we're going over.

LMP-EVA Okay - Houston, we're navigating and not talking. Sorry. But the light mantle is a fair - is a uniform surface and I think you've heard just about everything we've had to say so far.

CC Roger. Your comm's great and you guys are doing good work.

LMP-EVA The fragment population is not - the fragment population hasn't changed, nor has the crater population, as near as I can tell. I hope the LRV photos will give you more detail than that. Okay, Gene, do you have the target over there, that set of - -

CDR-EVA Yes, I got to get over to this next knoll and I'm going to be off the Scarp. We're about three-quarters of the way down.

CDR-EVA Isn't that sharp shadow out there the LM? See it way out there? Almost under the Sun. It's got to be. It's the only sharp shadow out there. Right under the Sun, straight down there.

LMP-EVA Probably.

CDR-EVA Okay, I'm going to try to make it down there. Hold on.

LMP-EVA This is what?

CDR-EVA This is the one we climbed up.

LMP-EVA Oh, there's Nemo over there to my right.

CDR-EVA Yes, sir, this is the one we climbed up. Would you believe that?

LMP-EVA Well, I don't know.

CDR-EVA Yes, I would.

LMP-EVA The problem is if there is any crater on the side - -

CDR-EVA I don't want to give it the roll, are you - -

LMP-EVA I think you're all right.

CDR-EVA We're all right. I don't know, that's got - -

Tape 95A/20

LMP-EVA Keep your speed down because if you have to turn, it doesn't like it on a downhill slope.

CDR-EVA And that's got to be a pitch-angle ... and I don't know what that means. Okay. Right on time - -

LMP-EVA ... scarp.

05 21 35 45 CC You guys cut each other out but I take it that means you're at the edge of the Scarp.

CDR-EVA We're off, we're off, we came down.

CC Roger. You're down the Scarp.

CDR-EVA Hey, will you look at the hill we came down same way we went up?

LMP-EVA I'd rather not.

CDR-EVA Oh, I don't know, I'm impressed.

CDR-EVA Okay, now where we got to go. 345 roughly. And we want to go to 087/6.1 - -

LMP-EVA Okay. you're - I think you're headed right - right for where we want.

CDR-EVA Yes.

LMP-EVA It's that bright - see that bright crater? You can just start to see station 3 over there now.

CDR-EVA Okay, navigation says I've got more than 9 degrees - I should be increasing range. Bob, we're at 079, 11.5, and 5.7.

CC Okay, beautiful, guys. Really going smooth.

CDR-EVA And I'm headed northwest.

CC Roger. In fact, we understand it's been going so smooth down here that they haven't even spilled any coffee in the SPAN room yet this mission.

CDR-EVA Morrison must not be on duty. I'm glad we don't have any sitting on the LCRU.

LMP-EVA Right over there is station 3, I think.

CDR-EVA Oh, actually, I guess - they would want it - is there - I can just start to see two craters - -

LMP-EVA You know what the problem is?

CDR-EVA - - and they're closer to Lara.

LMP-EVA I got a full planar view of the high gain and I can't see a thing out there.

CDR-EVA That's right.

LMP-EVA Full planar view. All I can do is see underneath it.

CDR-EVA Well I - going to take it broadside. See, I can't see a lot of craters now that I'm out in front. Oh, I guess I can see them both.

LMP-EVA Here's a nice sharp little hole; look at that. Bob, the texture of the light mantle - surface texture - is really no different on the Scarp, on its flank, or out here to the east of the Scarp. Fragment population, crater population, everything looking about the same. If there is such a thing as a light mantle, it seems to be uniform across the Scarp.

05 21 37 59 CC Okay, I copy that, Jack.

LMP-EVA Here are your tracks - Hey! We crossed somebody's tracks - we sure did ... we made a loop.

CC Hope they look like yours.

05 21 38 14 CDR-EVA That was at 081/5.7.

CC Okay, copy 081/5.7. Do they look like your tracks?

LMP-EVA Well, here's another set.

Tape 95A/22

CDR-EVA Yes, this is where we went to the big crater and I came southeast in order to get around it, remember? We saw that hole?

LMP-EVA Yes.

CDR-EVA Look at that big turn I made, ha ha! That was a quick change of mind when we came over that ridge.

LMP-EVA Yes, sir.

CDR-EVA Okay, we're still headed northwest, Bob.

LMP-EVA Here - I -

CDR-EVA Okay, Bob, I guess one thing we don't have a handle on yet is what are the - I think we sampled them - once in a Rover sample, but what are the fragments out here mixed with the light mantle?

CC Okay, I copy that.

LMP-EVA I think I got one at our last - our last gravimeter stop, a small one, and I guess there's one other Rover sample, but - station 3, we probably ought to make sure we get a representative suite of those fragments.

CC Roger. Agree to that.

CDR-EVA Hey, Bob, how long have we been out?

CC Say there again, Gene? How long have you been out?

CDR-EVA How long have we been out?

CC 3 plus 45.

CDR-EVA Thank you.

LMP-EVA We're at 083/5.7. Well, it certainly doesn't look like the geology of Norway, but it certainly is interesting.

CDR-EVA That must be Lara right there, huh?

LMP-EVA Yes.

CDR-EVA On the left. You can see the blocks on the other side of her.

LMP-EVA That's right. I told them about those earlier. That's the only no - I think, Gene, you want to bear a little bit - Hold on - a little bit to the left. See those two craters, two bright craters, that are just this side of Lara?

CDR-EVA Now - well - I'm not -

LMP-EVA You're pointed right - almost right at them, now.

CDR-EVA Okay, I can barely see them now through that high gain.

LMP-EVA Okay.

CDR-EVA But I can see - I know where we're going now.

05 21 40 25 LMP-EVA Those are the two I think they wanted us to be at, and I think that's a good choice if we can get up there.

CDR-EVA Bob, I want to get some 500s the way that scarp flows up on top - well, it looks like it flows up on top of the North Massif. Now it may look like the North Massif may drape material down upon it. Look at that.

LMP-EVA Yes.

CDR-EVA Not really. The texture is so different. It just doesn't look like as old a surface, but definitely different.

LMP-EVA Yes.

LMP-EVA Wish they had never said anything about pictures, because I've tended to not take enough - to do better.

Tape 95A/24

CC Okay, but, Jack, you're doing quite well in the picture department - you're not getting too far behind or ahead. Copy that, Gene?

LMP-EVA No, but I mean I'm not getting the coverage I've - I'm not sure I'm getting the coverage I should.

CC Okay. We'll look at the frame count when you get to station 3.

LMP-EVA Oops, oops! Oh, there's another big crater with a pit in it.

CDR-EVA What was it, 17-1/2 or 18 clicks we hit coming down the Scarp, Jack?

LMP-EVA I don't know (laughter).

05 21 41 46 CDR-EVA I'm in MIN cooling now.

CDR-EVA Oh, look at that - wait until you get over and look at that South Massif. Is that -

LMP-EVA Yes. I don't know where we're going to get a good - Well, let's see. You know, that big block up there might be worth going to.

CDR-EVA 087 at 5.9. I think that's the best station we've got right here.

LMP-EVA Well - -

CDR-EVA Let's see what's over on your right. Let's see if we can get at that scarp over there.

LMP-EVA I've sort of lost track - -

CDR-EVA We're about there.

CC I think we expected you guys to be a little bit farther north. We were getting a heading of 080 for the bearing which really kind of says you said you were going a bit farther north than this.

CDR-EVA Well, there's that first crater, there, Jack.

05 21 42 41 LMP-EVA 080?
CC Roger. 080 is where we think -
LMP-EVA All of a sudden I've lost track.
CC Stand by.
LMP-EVA There's nothing wrong with that except that -
LMP-EVA I think we ought to go back to that big block.
CDR-EVA Heading 080 is - heading north is not going to - -
CC Roger. I just realized that, Geno.
05 21 42 58 CDR-EVA I'm 087 now.
CC Yes, I realize that, Gene; my mistake. Somebody's
got a wrong thing down here.
LMP-EVA Gene, I think - -
CC That's the Hole-in-the-Wall. My mistake.
LMP-EVA I think we need to go - go back there a little
bit.
CDR-EVA Yes, we're at 087/6.0. I think that's probably
about right. Why don't we stop here?
CC Okay, 17, that's a great stop. That was my mis-
take, I was reading the Hole-in-the-Wall coordinate.
05 21 43 25 CDR-EVA All right, Bob, we've got the boulders over here
that are in the light mantle.
CC Okay, now, let me brief you on station 3. It's
going to be a very brief station to make up for
the - -
CDR-EVA We can see a little bit down into Lara, too.

Tape 95A/26

CC Okay, it will be a brief station to make up for the time we added on at the - first of all, remember we want to get the nav update. Let me go into a heading of 270 more or less and give us the nav read-out so we can start that here.

CDR-EVA Can you get where you want from here?

LMP-EVA No, this is no good. I wanted to get a high spot.

CDR-EVA Yes, let's - let me park down here, Jack.

LMP-EVA Why? You should have stayed up there. This is good right here.

CDR-EVA It's not going to be very level for the gravimeter.

CC Gene, remember, we want to - head for the west so we can get the nav update.

CDR-EVA We'll park right out here and we can work those blocks right up behind us. Okay, you want a nav update here?

CC Roger. That's affirm. You need to get your antenna.

CDR-EVA Why don't you get off, Jack? Oh, I was looking at the wrong - oh, no, I'm not. Okay. I'll get a nav update. Get off and look around. I'll give them a nav update, Jack, and we'll press on.

CDR-EVA Yes, sir, you're right, Bob. Hey, get your -

LMP-EVA I will.

CDR-EVA Okay.

LMP-EVA Go ahead.

CDR-EVA What do you need? Take your scoop or whatever you need.

LMP-EVA Oh, you're going to move?

CDR-EVA Yes. I want to give them a nav update real quick.

LMP-EVA Oh, I'm sorry, I - -

CC Okay. And, Jack, ... for you. We're going to want you to do some document sampling on your own. I'll get with you guys on the rest of the station plan shortly. Go ahead, Gene, we're ready.

CDR-EVA Okay, I ought to get the gnomon, I guess. Okay, let me find a level spot; I'll come back towards you.

LMP-EVA I'll get it. There is none.

CDR-EVA Well, okay, if you got any -

LMP-EVA No, go ahead, make your park.

CDR-EVA Yes, I'm looking for a level spot, but my gosh, there sure aren't very many.

LMP-EVA That's probably pretty good.

CDR-EVA It will be in a minute.

CC It doesn't have to be all that level, Jack - Gene.

05 21 46 27 CDR-EVA Okay, 087 and 12.6, 6.0.

LMP-EVA I got your gnomon.

CDR-EVA Sun shadow is zero. Pitch - if I can get it over to read it. Pitch is - pitch is zero. Roll is zero. About 1 left, Bob?

CC Okay, copy. And how about that - -

CDR-EVA About 1 left.

CC And how about heading?

CDR-EVA Heading is 282.

CC Okay, go ahead and park. We'll give you an update when you get done.

Tape 95A/28

CDR-EVA What else do you need?

CC That's all we need. Go ahead and park on your 045. We'll give you an update when you are done.

CDR-EVA Jack, is one coming right there?

LMP-EVA Looks like a pretty good location to sample the rim materials of this crater.

CDR-EVA Bob, I'm at the south, let's say the east-southeast rim of a - oh, 30-meter crater in the light mantle, of course; up on the Scarp and maybe 300 - 200 meters from the rim of Lara in a northeast direction.

CC Okay, I copy that.

CDR-EVA It's body shows up as a bright crater - a bright crater on your map. There's only about a half a centimeter of gray cover over very white material that forms the rim.

CC Okay. And, Gene, give me a call when you get parked and I'll give you an update on what we want to do.

05 21 48 38 CDR-EVA Okay, I am parked.

CC Okay, good. We'll take the Rover read-out first.

05 21 48 45 CDR-EVA Okay. 087, 12.7, 6.0; 105 and 100. On the battery temps 100, 120. The rear motors are off scale low and the forward motors are 0 and 240.

CC Okay, we copy that. Understand that 240 now instead of a 340. And what was your heading, 045?

CDR-EVA Heading is 043.

CC Okay. We copy that.

CDR-EVA If I ever gave you a motor temperature of 340, that figure was erroneous.

CC Okay; Roger. And what we'd like you to do, Gene, is we'd like you to get the CSVC samples yourself, that will essentially be your sole task at this station, Jack can do the solo sampling and we'd like to get one pan and the gravimeter, and then we'll leave this station. We're going to absorb some of the time we spent with the extra gravimeter reading and some of the time we absorbed at station 2 in the longer stay time in sampling at station 3. That's our plan. So it will be CDR for the CSVC for the long cans, excuse me, and LMP for solo sampling and then a pan by Jack, I presume, and then the gravimeter and then leave. And, Jack, you might check your film. We aren't quite sure where you are right now, before you get too far from the Rover.

05 21 50 17 CDR-EVA Okay, Bob.

CDR-EVA Bob, you got any - Bob, you got any preference up in this area where you want that long can?

CC Negative. That's something that was sort of near the scarp, but you're parked so near the scarp and that something, remember we do it in solo, we only did it with the Rover, so you'd have to stay right there beside the Rover and do it. No expectations of doing it otherwise.

CDR-EVA Yes. That's what I figured.

LMP-EVA Gene.

CDR-EVA Yes, I think you're in good shape. Yes, I don't have any other choice. Matter of fact, if there is a scarp, and if it is a fault, I'm right - right on it because the projection of it would be uphill a little bit.

CDR-EVA Yes, I'll be right on the side of it. I'm parked on the side of it if it exists.

CC Okay, and, Jack, what's your frame count?

05 21 51 35 LMP-EVA Well, 1 - 122.

Tape 95A/30

CC Okay, copy that ... Go ahead, Gene.

LMP-EVA What do you need, Gene?

CDR-EVA Oh, yes. Bob, I dug a trench in the side of this crater. I've got down-Sun pictures of it. There is quite a marbling of light and dark soil or fine grain material. It looks as if there's a uniform, about 3-centimeter layer of light material over that marbled light and dark. On the very top surface, there's a half centimeter of light gray, and when I say dark, I mean a medium gray.

CC Okay, copy that. Sounds like a great sample site.

CDR-EVA Okay, I'm going to start sampling the soils, and then I'll get you the fragments.

CC Okay, I presume that we'll at least have the single upper core which we can use to sample of that stuff in the soil, and we -

CDR-EVA Oh, there's no guarantee that this is a crater rim.

CC Okay. And, Gene, are you still near the Rover?

CDR-EVA Yes, I am.

CC Okay, we'd like to get the SEP blankets opened, Gene, and dusted if they're dirty, so they can cool some more.

CDR-EVA Oh, boy.

CC Yes.

CDR-EVA Okay, now I can't give you the gravimeter reading while I'm working on the Rover, so I'll have to time it when I get away from it.

CC Okay. Roger on that. I think you'll be pounding on the hammer for a long while while you can take the Rover - gravimeter reading.

05 21 53 36 CDR-EVA Yes. Well, we'll see. Let me get your brush back.

LMP-EVA Okay, bag 520 has a skin sample of the upper light-gray soil. Don't know where I'm going to put these things, I've got to come down and get a bag.

LMP-EVA Have you punched the gravim - No.

CDR-EVA No, I can't punch it until I get out of here.

LMP-EVA These switches are on OFF, STANDBY, right?

CDR-EVA They should be.

LMP-EVA Okay, that's where they are and the temperature is 100, about 104 and - -

CDR-EVA No, they should be OFF. Isn't it OFF?

LMP-EVA No, it was STANDBY.

CDR-EVA No, push it OFF.

CC Okay, it doesn't matter whether it's STANDBY; it won't be heating at that temperature anyway, but put it OFF.

CDR-EVA Okay. It might have gotten hit when I changed the blanket. Now I have to go to INTERMEDIATE cooling here.

LMP-EVA Zap me with a cold. Imagine those PLSS got charged okay last night. ...

CDR-EVA Okay, back to intermediate. How's Ron doing?

CC They're both looking - Stand by, I thought he said both fine. Ron's doing great, too. He's sitting here busily - -

CDR-EVA No, no.

CC Go ahead.

CDR-EVA I mean Captain America.

Tape 95A/32

CC Yes, I'm just inquiring of Bob. I think he's doing great. He's just passed a little bit north of you a couple of minutes ago and took some pictures of you.

LMP-EVA Okay. I do my work around the LMP seat here.

CDR-EVA That's lock. That must be unlock.

05 21 56 36 LMP-EVA Okay, unlock. Brake is off. Four is coming in. Okay, Bob, the upper - the upper 5 centimeter - 3 centimeters mixed with that upper half centimeter, is the next sample.

CC Copy that.

CDR-EVA Okay, Bob, I guess I'm going to go pound away and, Jack, I'm going to hit the gravimeter.

LMP-EVA Okay.

CDR-EVA Okay -

05 21 57 30 CDR-EVA MARK it.

CC Copy that.

CDR-EVA And 521 is the sample bag.

CC Copy that.

CDR-EVA Well, the first core has gone down pretty good, Bob.

CC Okay, great.

LMP-EVA Oh, you're not going - you won't have any problem in here coring.

CDR-EVA Oh, man, I tell you, I wish I was putting a drill hole in here. Looks pretty nice.

05 21 58 29 LMP-EVA Okay, Bob. The next sample is mostly the medium gray fraction of the marbling. It's mixed, though.

05 21 59 19 LMP-EVA That's in bag 522.

CC Copy that, Jack.

LMP-EVA Okay, I think I got it. I think I got it, Bob.

CC Okay.

CC And, Jack, when you get done with this trench you might hit one - two of those blocks there, but then we'd - since we're really trying to cut this station down to a minimum, after that you'd probably get - better get to the pan.

CDR-EVA Bob, what do you think, can I read a gravimeter?

CC Yes, if it's not flashing - -

CDR-EVA The light's out.

CC Yes, it should be just done.

05 22 00 15 CDR-EVA 670, 049, 701; 670, 049, 701.

CC Okay, I copy that.

LMP-EVA Bob, the - the white marble in the - the white fraction in the marble zone in 523.

CC Copy that.

CDR-EVA Bob, I forgot to give you the core numbers, but I will.

CC Okay. And don't forget to put your little note in the long can there.

CDR-EVA Oh, I'll get the note in there. I'll get it in there. Nobody will ever know.

CDR-EVA Okay, Bob, our 524 is what I think is a blue-gray rock probably breccia. It's got a little dust cover.

CC Copy that.

CDR-EVA From just off the rim of this little crater.

Tape 95A/34

CC Okay, copy that. It's a blue-gray rock, it's not part of the trench, right? You finish with the trench?

CDR-EVA Yes. As you see, Bob, it's full. See that?

CC Roger. We see a long thing in your hand there, Gene.

LMP-EVA Well, I didn't think that was supposed to happen.

CDR-EVA And I'd know, Jack? Shoot! Thought I had them on the Rover.

LMP-EVA What?

CDR-EVA Oh, the core cap covers. I'll get them.

LMP-EVA No, you got some there in that little ca - in that little pocket - in that little pocket. Yes, and there's so many bags in here, I can't get at them. No, I mean the pocket on the Rover, on the back. Remember?

CDR-EVA No, they're not. I took them out and put them on you.

LMP-EVA Oh, okay.

CDR-EVA The rest of them are in this bag. I'll come and get them.

CDR-EVA ... This other - but I don't want to get into your seat. We got those bags pi - packed in there like gangbusters. How are you doing there by yourself?

LMP-EVA Well, it's hard.

CDR-EVA Your hook came off. If you wait a minute, I'll hook it on this bag. See. See.

LMP-EVA I never - I didn't think the sample bag could come off the camera. But they can.

CDR-EVA Yes. Doggone it.

LMP-EVA What's your problem?

CDR-EVA Just as well fix this bag now. Let me get this bag - it's going to come off at the bottom if we don't. It's going to come off again. I don't think the harness is tight enough now.

LMP-EVA Want to tighten the harness?

CDR-EVA Yes, I got to, Jack.

LMP-EVA Okay.

CDR-EVA Let me get your harness - I might just as well do it, so it's right. If it's worth doing at all, it's worth doing right. Now, let me try getting that bag back on. No, don't bend over, I can't get down there.

LMP-EVA Okay.

CDR-EVA You're plenty short enough.

LMP-EVA Thanks - thanks a lot. (Laughter)

CDR-EVA Just think, that hook - or something changes the geometry.

CC Okay, don't worry about it too much, guys; I'm sure the bag will stay on without the hook.

CDR-EVA Yes, it will; the conclusion I just came to.

LMP-EVA You through?

CDR-EVA Yes, go ahead.

05 22 05 38 LMP-EVA Okay, Bob, what I know is a blue-gray breccia is in bag 525.

CC Okay, copy that. And, Jack, you just skipping up - scooping up little rocks along the ... here - in your little xenolith mode? Go ahead, Gene.

LMP-EVA Yes, ... you read my mind. I do want to get one of these light-colored rocks, though.

Tape 95A/36

CC Go ahead, Gene.

CDR-EVA Bob, the - when I broke the cores apart, there's just a lot of dried clods and - and the bottom core's full, the top core about - oh, I got to look - it's dark down there, but about an inch - inch and a half of the core is just - just zero g to 1/6 g'd itself right out.

CC Okay, we copy that. I guess we still just cover it, and see what we got. Might just again trying compacting it after that's through; after you're done with the lower core.

CDR-EVA Yes. I'll do that.

CC And, Geno, how about - -

05 22 07 23 LMP-EVA Bag 526.

CC Copy; 526.

CDR-EVA Okay, in a long can - I'll give it to you; wait a minute. That may have been a piece of gabbro. But again, I can't be completely sure.

CC Copy that. Go ahead, Gene.

CDR-EVA It's either that or anorthositic gabbro we saw up on the front. Up on the massif.

CC Okay.

CDR-EVA And my bags aren't staying on my camera worth a darn.

05 22 07 56 CDR-EVA Forty-six, Bob, is going into the long can.

CC Copy that.

LMP-EVA Boy, another exercise in dexterity. Okay, LMI' has gone to INTERMEDIATE.

05 22 08 40 CDR-EVA And, by the way, I'm at about 49 percent and 3.85 and INTERMEDIATE cooling and no flags.

CC Okay, copy that, Geno. Have you got a number for the upper core when you done - I guess you're probably putting the other one in the long can, aren't you, right now?

CDR-EVA Yes, yes, yes; that's right.

CC And somewhere here along the line, Jack, I guess maybe when you get those, you ought to stop and take the pan.

LMP-EVA Okay, Bob.

CDR-EVA Okay, Bob, the - the long can is sealed and I guess nobody knows what's in it but me.

CC No one ever will, probably.

CDR-EVA I may not - I may not even tell. It does not - none of the material in this core, in either the top section or the bottom section, look unlike that - that stuff just beneath the surface that we sampled at that special stop back there. It's a bluish-gray, and it tends to clod and break up in your hands. And that's core 31 - the number is 31.

05 22 09 41 CC Copy. Thirty-one on the ...

CDR-EVA Oh, man. Bob, you've got better than - oh, you've got two-thirds of a core after I packed it down a little bit.

CC Okay, thank you, Geno. Copy that.

LMP-EVA Okay, that little set of 4 samples is in 527, barely.

CC Okay, we hope it was worth the effort.

LMP-EVA Oh, it's all worth the effort; it just hurts.

CC Okay. We're ready now for your pan and don't forget your scoop.

LMP-EVA I won't - You don't mind a little dirt here and there, do you, ...?

Tape 95A/38

CC No.

LMP-EVA Oh, dadgummit. Well - -

CC Hey, Gene, would you help - would you go over and help Twinkletoes, please?

LMP-EVA I tell you - you fix that camera bracket so the backs stay on and I'll be a lot better off.

CC Roger.

CDR-EVA Want some help, Jack? I'll be there.

LMP-EVA No, I don't need any help.

CDR-EVA Okay.

CC Jack, you might worry about whether your camera lens is dirty or clean, Jack. I don't know what you could do about it.

LMP-EVA I'm very worried about that.

CC I don't know what you could do about it, but you might worry about it.

LMP-EVA I don't have a thing to do - it's clean.

CDR-EVA Well, I'll be a son of a gun.

LMP-EVA What's your problem?

CDR-EVA (Chuckle) I can't get this thing locked on.

LMP-EVA What the - -

CDR-EVA The rake!

LMP-EVA The rake?

CDR-EVA Yes. That should lock. I turn that like that - there it comes.

CC Jack, have you ever started your pan, so we get an EMU check from you?

05 22 13 00 LMP-EVA Well, it's about 50 percent. About 385.

CC Okay, copy that.

LMP-EVA And no flags. ... Come on. Get back in there.

CDR-EVA Okay, that's all put away. That goes back on your back. I'll get it.

CC Why don't you go over and - over towards Jack, Gene, and then the two of you can pick up the scoop and the bag together and get back towards the Rover after that?

CDR-EVA Yes, I'm cleaning up this seat here. I'll do that. I think I can hack it.

CC And then, at that point, we're ready for you guys ... and, at that point, we're ready for you guys to leave.

CDR-EVA Whew - Okay. Jack, I've got the rammer I've got to put on you. I'll just leave it on your seat right now?

LMP-EVA Okay.

CC We're watching you, Jack.

LMP-EVA What's that?

CC I said we're watching you, but don't let that inhibit you.

LMP-EVA I don't - Bob, I don't let anything inhibit me - and I don't stay mad very long.

CC That was very good.

LMP-EVA (Laughter) Well, there's an easy way to do everything. The question is can you hang on to it once you've done it?

CDR-EVA Let me get those, Jack. Don't get down there. Let me get those.

Tape 95A/40

LMP-EVA Where are you? They don't stay on my camera anymore.

CDR-EVA Well, we'll fix it.

LMP-EVA There's no reason why they shouldn't, according to this. But there are a lot - -

CDR-EVA ... The samples from that - Oh - I need it - Wait I gotta go up there. Take an after - cross-Sun, from over to the north of the gnomon.

LMP-EVA You didn't get an after, huh?

CDR-EVA No.

LMP-EVA How come you're cleaning up the Rover?

CDR-EVA Oh, I'll get it.

CDR-EVA If you'll mount this thing.

LMP-EVA Just set it there. Just set it there. I'll take four deep breaths.

CDR-EVA Bob, what else do you want us to do here?

CC Nothing. Get on the Rover and leave. Get the heck out.

05 22 16 03 CC Don't forget the gnomon.

LMP-EVA Okay. We're going back to get that after - and we won't forget it.

CDR-EVA I think you might be able to decipher this station, Bob.

CC That's the general idea. And be advised that the switchboard here at MSC has been lit up by calls from the Houston Ballet Foundation requesting your services for next season.

CDR-EVA I should hope so. Well, we can't use that one. The right-hand gate lock is - how's that - non-functional and the left one is almost nonfunctional.

CC Okay.

LMP-EVA We - once you get it open, you can't get it locked. I'll dust them if I get a chance, but it's locked on the left side.

CC Okay, well, we'll keep those bags under your feet, anyway.

LMP-EVA Here, I'll work on it.

CC I think the samples are safer under there, anyway.

CDR-EVA We don't have any room. ... we can take bag 7 out.

CDR-EVA That one is locked - in good shape.

CDR-EVA Let's press on. We got the reading? Let me put the rammer on your back and see if we can't get this on your camera.

05 22 17 42 LMP-EVA Are we going to run the SEP this time?

CDR-EVA I don't know; he hasn't said anything. I expect he will.

CC No, we will not turn the SEP on, Jack. You might cover it with a blanket as well as you can. And how about a temperature reading before you leave, when you do that?

CDR-EVA It's 100.

CC Copy that. 100, and understand both switches are OFF and the covers are closed.

CDR-EVA Well, the covers are closed now. They weren't.

CC Okay. Roger. That's what I mean.

Tape 95A/42

CDR-EVA Okay. Turn - turn the other way, left. I think it might just put you there.

LMP-EVA Well, I don't know why it isn't staying on, but it certainly isn't.

LMP-EVA ... Move over there.

CDR-EVA Okay.

LMP-EVA Is that the same one? I may have bent it.

CDR-EVA I think you did now. Yes.

LMP-EVA I just bent that, didn't I?

CDR-EVA Yes, that's not going to stay on. Yes, you bent it (laughter) very well.

LMP-EVA ... how I did that?

CDR-EVA I don't know ... You'll lose these bags.

LMP-EVA Okay, well, we'll - -

CDR-EVA I got bags.

LMP-EVA We'll revise our procedures.

CDR-EVA I got bags.

LMP-EVA I guess I bent my camera mounting brac - point, the camera point.

CDR-EVA Turn around.

LMP-EVA We may have to - think about a fix there.

CDR-EVA We might be able to fix that in the cockpit.

LMP-EVA Yes.

CC Okay - -

LMP-EVA Okay, are we all through, have you got - -

CC - - worry about that right, when you get back in.

LMP-EVA Okay. Okay, where are we here?

CDR-EVA I'll get on.

LMP-EVA Okay. Oh, I guess I need to get another film mag, huh?

CC Okay, how about frame counts on both you guys before you start?

05 22 19 43 LMP-EVA 152 on the LMP -

CC We suggest magaline - magazine Juliett, please.

CDR-EVA (Laughter) Okay, we'll get magaline Julieing. The CDR's on 118.

CC Okay, copy that, Geno.

LMP-EVA Fire fire, two frames. You know, I'd enjoy this if it weren't so much fun.

CDR-EVA Okay, you going to change your mag.

LMP-EVA Yes.

CDR-EVA Shoot a 500 while you're doing that. (Laughter)

LMP-EVA Listen to me - -

LMP-EVA Yes.

CDR-EVA Look at my thumb.

LMP-EVA I know.

CC 17, we'd really like the - -

LMP-EVA Any time you want to do something, though.

CC - - we'd like to press on as quickly as possible.

CDR-EVA I got it.

LMP-EVA Got it.

Tape 95A/44

CDR-EVA Got it.

CC In case you didn't get.

CDR-EVA Take a portion of the scarp over there you can see.

CC 17, do you copy? Houston.

CDR-EVA What?

CC We'd like to press on - -

CDR-EVA What?

CC - - as soon as possible, please.

05 22 20 48 CDR-EVA Yes, we are, Bob, but - but he's got to change his mag.

CC Roger.

CDR-EVA I'm going to stand here and look around.

CC Okay.

LMP-EVA Okay, I'm picking up with mag - or with frame 56 and I'm going to try to get a little bit of where the scarp overlaps the North Massif. I can't see much of it. All I could get was three frames of that. Now I'm picking up the South Massif.

CDR-EVA Okay, how are you coming, Jack?

LMP-EVA Okay. Oh, I ought to put that in there so you've got room for your camera.

CC You got a final frame count there, Gene?

LMP-EVA Okay, I'm all set.

05 22 22 51 LMP-EVA Okay, Bob. When I finished with South Massif, I was on 94 and I took - now I'm on 99 - I took five more pictures back over to the northeast.

CC We copy that. And we assume you guys are ready to go by now.

CDR-EVA And, Bob, they were all with the lens - Yes, sir - they were all with the lens cap off.

CC Splendid.

LMP-EVA Okay.

CC Okay. And, Jack, what's the headings say? And we'll - -

LMP-EVA Why don't you fix that high gain so you can see?

CC We'll - we'll get the reading we need for the nav update. Do you think you can give us the heading right now?

LMP-EVA Okay, heading is 41 - I think. I'm at a little bit of an angle. Better let Gene do it for you.

CC Okay. We're waiting.

LMP-EVA I got some - Gee, I've got some parallax. I think it's 41, though.

CDR-EVA What you looking at?

LMP-EVA The headings.

CDR-EVA 43 - 043 is what I gave them earlier.

05 22 24 12 CC Yes, we were wondering if it drifted while you were there, because we're going to give you now a - -

CDR-EVA Bob, let me - -

CC - - going to give you one to update it if it has drifted at all.

CDR-EVA Okay, it did drift, 041 is a good number.

CC Okay. Stand by.

CC Okay. That's fine. No torque necessary, Geno.

LMP-EVA I'm strapped.

Tape 95A/46

CDR-EVA You liked the drift, huh?

CC Great.

CDR-EVA Okay, I'll - Dadgummit.

LMP-EVA What's wrong? Oh, the hammer?

CDR-EVA Yes. Every time. Okay, let's go.

CDR-EVA All right, sport. I'm going to head -

LMP-EVA We didn't really do all the things we wanted to do, but I think we did everything we could.

CC We did everything we wanted to ... time line ...

LMP-EVA Okay, let's get ready to roll.

CDR-EVA Flight line stereo.

CDR-EVA Okay, Bob - Oh -

LMP-EVA You got the TGE ... on and the low gain is 060.

CDR-EVA You get the gnomon in?

LMP-EVA Didn't you get it?

CDR-EVA Wait a minute.

CDR-EVA You took the after. It's not sitting out there.

LMP-EVA No, I thought I handed - didn't you stick it in?

CDR-EVA Yes, I stuck it in. I got it. Okay. We can look back (laughter).

CDR-EVA Bob.

LMP-EVA I sure thought I handed it to you, Geno.

CDR-EVA You did, and I put it in.

LMP-EVA Okay, that's good. Okay, whoo-boy, rest the old hands.

CC Okay, we've recommendations for MINIMUM for you,
Gene - Jack.

LMP-EVA ... ejecta. It's double.

CDR-EVA I think I am in MINIMUM.

CC Jack, ... - Jack.

CDR-EVA I am already.

LMP-EVA Yes, I'll go to MINIMUM. Yes, I will.

CC And give us a mark rolling, please.

05 22 26 24 CDR-EVA Yes, Bob, I gave you one. We've been rolling for
about 30 seconds.

CC Copy that.

CDR-EVA We're at 087 - 087 and 5.9 on that range.

CC Copy that.

CC And the drive to station 4 will be nominal and
we'll get a Rover sample at about 094/5.1 but it
will be the track as indicated on the map and the
cuff checklist.

LMP-EVA Okay. Going to Shorty.

CDR-EVA Okay.

LMP-EVA On our way.

LMP-EVA You got your checklist there?

CDR-EVA Yes, I got it in front of me.

LMP-EVA Okay.

CDR-EVA And, we're heading - heading is 069, around -
Well, up - I got it -

LMP-EVA Yes, that's pretty close.

Tape 95A/48

CDR-EVA I know we're next to that band but I know where we're going. My next is 094/5.1 is what I want for that sample.

LMP-EVA Yeah. Zero what?

CDR-EVA I think he said 094/5.1.

LMP-EVA He meant - 052 is what's nominal. What's the sample again, Bob?

05 22 27 39 CC 5.1; 094/5.1.

05 22 27 48 LMP-EVA Oh, okay, that's the heading.

CDR-EVA All right. You got 451.

LMP-EVA Yes, got it.

CDR-EVA Just drive by this big rock. Want to look at it. Can't see it. I can't see when that off LCRU shines into my eyes.

LMP-EVA Looks like one of the gray breccias.

CDR-EVA Big 3-meter - 3- to 4-meter block out here all by itself on the light mantle - I got some pictures. It was at 088/5.6.

CC Okay, copy that.

LMP-EVA And it looked like a gray breccia, I'm not sure though, all I could see was the surface texture, and it had the modular or elongate modular texture that those breccias had up on the South Massif.

CC Okay, copy that, Jack.

CDR-EVA Where are you, Shorty? And the battery temperatures are 100 and 130.

05 22 29 06 CC Copy that.

LMP-EVA Okay, Bob, as far as any of the things we talked about trying to see at the surface, dynamics or a variation of the light mantle, I think you've heard it all, there isn't much to say about the dynamics right now. I have a feeling that the surfaces are old enough that all those kind of detailed relationships have been obscured. ... is just about the same all over here, it varies, but there are no systematics that I've seen.

CC Okay, copy that. Do we ever see a Rover flag come up when you've got high temperatures there on the battery - have you seen the flag up yet?

CDR-EVA No, you didn't. No, you did not, you did not.

CC Okay, that may be telling us something, we hope. Press on.

LMP-EVA Okay. LMP is in MINIMUM.

CC Copy that, thank you.

LMP-EVA Okay. Ought to cut left up here a little bit.

CDR-EVA Yes, I think so. Oh.

LMP-EVA Don't - Keep her going.

CDR-EVA (Laughter)

LMP-EVA Good gosh! Was that a - ... aspect ratio of that little thing.

LMP-EVA Yes, that's what they call a pit crater. Can you swing a little bit and let me get that fragment crater - see that one on your left there?

CDR-EVA Quite a scene up here. Got your pictures? Pictures?

05 22 31 04 LMP-EVA Yes, I got them.

Tape 95A/50

CDR-EVA Okay, Bob. We're at 090/5.3 for a quick Rover sample of a very, very fragmental crater. The ejecta is about 50-percent small angular fragments, much different than we have seen before in terms of the type of patterns.

CC Okay, copy.

05 22 31 35 CDR-EVA Okay, and that's in bag 41 Yankee.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 22 32 09 CC Ron, we need REACQ and NARROW and the dials at 25 and 195 as is in the Flight Plan.

CMP Huh? Okay. Have you got it?

CC Thank you, sir. We would have lost you here shortly in AUTO.

CMP Oh. Okay.

CC Okay, Ron, the EMP is running, and you can go back to BLOCK.

CMP Okay.

CMP It's working.

CC Ron, Jaime wanted me to mention the fact that she got a couple of A's on some tests today, and she's real tickled and knew you'd be happy to hear that.

CMP Hey, you bet, by golly! That's great!

CC Ron, we are probably going to lose you a little early on this half, and we may pick you up a little late at the start of the next half, unless you were to try and acquire us manually, or something like that. If you go via the Flight Plan, which is really what we want, we will be coming in a little bit later than is shown. If you have to talk to us or anything like that, you can acquire manually, and we'll be right there.

05 22 38 21 CMP Manually, yes. Okay. I was just looking at the Earth out of window 3 here. Boy, that's beautiful! I have an earthset pretty quick.

CC Roger.

CMP Took some pictures of it the other day.

Tape 95B/2

CC Yes, we were going to steal Jack's thunder and take a - take our own weather report when we had the TV looking at the Earth here a little bit ago.

CMP (Laughter)

CC John told me to tell you to be sure and - that he's so glad you're there because he knows you worked so hard all these years to be there. He's really tickled. Jan said to send her love.

CMP Hey, tell them I appreciate it very much.

CC Roger. They're listening, and they're hanging on every word.

05 23 01 XX

BEGIN LUNAR REV 30

05 23 29 25

CC America, Houston.

CMP Okay, Houston; America. I'm with you now.

CC Roger, Ron. Good show. We need the - we need ACCEPT, so we can give you state vector.

CMP Okay. Sorry. I had my helmet off.

CC No problem. Did you unplug your EKG blue lead?

CMP No. But I didn't have the power on. See? I didn't have the suit power on.

CC Okay; the signal looks good right now. You're in good shape there.

CMP Yes. Okay.

CC Ron, we want to delete "CRYO STIR" tonight from the presleep checklist.

CMP Okay. It's deleted.

CC And I've got a TEI-49 pad any time you want it.

CMP Okay.

CC Okay. You ready to copy?

05 23 30 37 CMP Stand by.

CMP Okay. Ready to copy.

CC Okay, Ron. TEI-49, SPS/G&N; 37568; plus 0.56, plus 0.96; 185:12:47.95. NOUN 81: plus 2781.5, minus 1831.5, minus 0532.3. Roll, 182; pitch, 104; yaw, 330. Rest of the pad, not - NA. Okay. And the set stars are the same as always: Sirius and Rigel; 133, 200, 030. Four jet; 12 seconds. Okay. And - let me see. Two comments. Longitude at T_{ig} : minus 178.34. That's minus 178.34. And second comment: assume no plane change 1. No plane change burn. Over. And the computer is yours, Ron.

05 23 32 44 CMP Okay. Going to BLOCK. TEI-49, SPS/G&N; 37568; plus 0.56, plus 0.96; and T_{ig} 185: 12:47.95. DELTA V_x : plus 2781.5, minus 1831.5, minus 0532.3; 80, 104, and 330; Rigel; 133, 200. Jet; 12 seconds. Lunar longitude at T_{ig} is minus 178.34. Assume no plane change.

CC Good readback, Ron. But I didn't catch your readback on the roll. 182 is the roll, 182. Did you read that?

CMP Roger. Roll, 182.

CC Okay; I just missed the readback on that one. Good readback.

CMP Roger.

05 23 33 56 CC While you're doing your presleep checklist, you may be interested that - at Shorty, the surface crew found some very, very orange soil, a great deal of it. Indicates strong oxidation and possibly indicates water and/or volcanics in the area. And they're really - Jack's kind of like a boy at Christmas time. I'll tell you, a little kid at Christmas time on that one.

Tape 95B/4

CMP (Laughter) I bet he would be. Hey, that's a great find, by gosh!

CC Yes, that's first time we find - It's orange. Boy, you could see it in the television; it's bright orange soil. No question about it.

CMP I'll be darned.

CC And, as luck would have it, they found it all and got working, and then they got - had to pull out of Shorty due to constraints, walkback constraints in the area. You know consumable versus walkback.

CMP Yes.

05 23 35 12 CC Okay. Ron, everything is - That's everything we've got from down here. Once you finish your presleep checklist, then you'll be clear to turn the comm off and - or turn the - the DOWN VOICE, OFF, and have a good night's sleep. And - -

CMP Okay.

CC - - And if you got anything in specific you want me to check through at the homefront, be glad to take it down and give them a call later or let you know tomorrow, or even before you go to sleep if you want.

CMP Okay. Appreciate it, but can't think of anything right now. Just send my love.

CC Roger. They'll hear that.

05 23 36 01 CMP (Laughter) Okay. Panel 9 is RECEIVE, and we're in DUPLEX, and SQUELCH B is adjusted.

CMP I'll check my tone booster here.

CC Ron, we - that got garbled. Say again, please?

CMP Hear it?

CC Yes, we got you. We got you. Just working great.

CMP (Laughter) Okay.

05 23 42 20 CMP Well, we'll get down here and clean the old suit circuit return valve.

05 23 45 17 CC Hey, Ron. Did you have some noise in the cockpit just now?

CMP Yes. I was down there in - cleaning the suit circuit return valve. Could you hear it? I was banging the door.

CC Yes, that's exactly - We're getting a noise on the loop. It sounds exactly like that Hasselblad. Just exactly like the Hasselblad, and that's what we got all during that eat period. But, you know, it gives a click, and then it sounds like its transporting film, and then another click. Just exactly like the Hasselblad.

CMP Yes. (Laughter) No, that's - that's not from up here. At least I don't hear anything like that.

05 23 46 00 CC Roger. Understand.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

05 22 31 35 CC Copy that.

05 22 31 40 CDR-EVA And we're on our way.

CC Great.

CDR-EVA Get your picture, Jack?

05 22 31 51 LMP-EVA Yes. LMP frame count is 15.

CC Copy that.

05 22 31 58 CDR-EVA About a 30-second stop. Okay, 094 - I'm 090, 5.3 now, Bob. We're heading toward your stop.

CC Okay, 090, 5.3.

LMP-EVA See Shorty out there yet?

CDR-EVA Well, I -

05 22 32 17 LMP-EVA Bob, I couldn't tell whether that was just - it looked like that that might have been a crater that had got to bedrock. There may have been a high point, or let's say a thin point in the light mantle, and it got down to bedrock. But I can't - It's the most blocky-rimmed crater we've seen for a long time.

CDR-EVA Yes. All these others are nowhere near that - look at that.

LMP-EVA No. It was about 15 meters in diameter.

LMP-EVA Bob, there - there are no obvious lineations, at the scale we can observe, on the light mantle. I think the pan photography and the metric stuff may be what you'll have to use for any directional trends out in here. Depending on what we decide the origin is.

LMP-EVA Bob, are you still reading?

Tape 96A/2

CC Roger. We're still reading you, Jack.

CDR-EVA Okay. Are you reading us through the LM or through the low gain?

CC As far as I can tell, we're reading you through the low gain. It's been working just great tonight, Geno.

CDR-EVA Okay, that's great - -

LMP-EVA Tonight?

CDR-EVA - - because I just scraped bottom on the LCRU. If it's still working, I'm glad to hear that.

05 22 33 54 CDR-EVA Okay, we're 093 and 5.2. We're almost there.

LMP-EVA Going to be right on the rim of that crater.

05 22 34 08 CC Okay. And, 17, the word from the backroom is - with that last Rover sample you got, we'd like to go straight to station 4 - and we won't get the one here at 094 and 5.3 - 5.1, excuse me.

LMP-EVA Bob, I thought the purpose was to sample the light mantle?

CC I - We talked to them about that, but they - -

LMP-EVA We didn't sample light mantle at that last one.

CC - - I agree. I talked to them about that. But they are so anxious to get to station 4, I guess they don't want to do it.

LMP-EVA Well, how about it, Gene? A little real time -

CDR-EVA I think we got to, right here.

LMP-EVA I think we got to.

05 22 34 48 CDR-EVA 094, 5.1. You got your picture?

LMP-EVA Yes. Okay, that's good enough.

CDR-EVA You happy?

LMP-EVA We'll get the sample - anyway.

05 22 34 58 CDR-EVA Okay. 094, 5.1.

CC Copy that.

05 22 35 02 CDR-EVA That's good, Jack. Sample is in 42 Yankee.

CC Copy that.

05 22 35 13 CDR-EVA And we are rolling. And give me a bearing and a range to station 4.

CC Roger. It will be bearing of 100 and range of 4.6.

05 22 35 29 CDR-EVA Okay. We're now at 5.0 - 094 and 50.

05 22 35 33 LMP-EVA LMP frame count is 25.

CDR-EVA Was that 100, 4.6?

CC Roger, Gene.

LMP-EVA Houston, there aren't very many rocks that just sit on the surface. All of them seem to - to be slightly buried to moderately buried. That one looked like it might be vesicular. There's a trench - linear set of craters.

CDR-EVA Hold it, babe. We got to do a little detouring.

LMP-EVA Okay, what we're looking for is 101 - -

CDR-EVA Yes. 100, 4.6, I'll detour. I'll just get down this slope. I don't see Shorty though, do you?

LMP-EVA Wait a minute, is that it? Is that it out there straight ahead?

CDR-EVA Well, let me get down this slope.

LMP-EVA Something's dark out there. I think that's it.

CDR-EVA The - the dark - It might be right over there to the left a little bit?

Tape 96A/4

LMP-EVA Your left, yes.

CDR-EVA Yes, right over there. I think I can cut it right across there. That's going to be about the right place.

LMP-EVA Seems a little far from here - but - maybe not.

LMP-EVA Oh, I forgot to take pictures again. Trying to shade my eyes. That Scarp certainly is spectacular going up there by Hanover, isn't it?

CDR-EVA It just rolls over the side, doesn't it?

LMP-EVA Yes.

05 22 38 00 LMP-EVA I don't know what else we can say about it, though (chuckle). Okay, we're getting a good view of the North Massif, and the cross-hatched lineaments that Gene has talked about are over there, also. They seem to be a set that - that plunge about, oh, 30 degrees to the east and another set that plunge about the same to the west. Plus the boulder tracks, which we see occasionally over there. And there are areas - boulder fields up on the Massif itself, such as we saw on the South Massif. As a matter of fact, it looks like there's one just above where we may - where station 6 may be. Straight ahead of us there, Geno.

CDR-EVA Um-hum.

05 22 39 02 LMP-EVA About bearing 060 from our present position, which is 098 and 4.8.

CDR-EVA If I change that heading, that LCRU comes right in on me.

LMP-EVA I don't see any - anything like layering up there. Although the upper boundary of those boulder fields on the North Massif, and, as a matter of fact, on the South Massif - -

CDR-EVA That's Shorty straight ahead of us, I think. Yes, yes, that's got to be it.

LMP-EVA - - all tend to have a linear boundary. That's the upper portion of the field; the lower portion is strung out downslope. That looks like it might be Shorty. Yes.

05 22 40 07 CDR-EVA We're at 9 - 099, 4.7, Bob.

CC Okay, great. Sounds like you're just about there.

CDR-EVA Yes, I think we got it in front of us.

CC Okay.

LMP-EVA Bob, looking at the Sculptured Hills, I think Gene's comments the other day about Bare Mountain would apply. There's a small relief - or small amplitude hummockiness to the surface. It's formed by cross-hatch of - Let's say the slope I'm looking at is sort of west-facing slope. So on the other side of Wessex Cleft, it's formed by lineaments going - plunging about 10 degrees to the north and about 10 degrees to the south. And the combination gives some hummocks that are quite distinct.

CDR-EVA Well, you know it's hard to see a blanket here, but that's got to be Shorty right there.

LMP-EVA Okay - -

CDR-EVA It's the only large - real large -

LMP-EVA We want to park. I don't think we'll see a blanket down - -

CDR-EVA I don't either.

LMP-EVA It - Well, I think - At least we're going to see where the break in slope is for the rim. My goodness.

CDR-EVA Oh, look at the boulders sitting on that rim.

LMP-EVA It's different.

CDR-EVA It is darker.

Tape 96A/6

LMP-EVA Let's go over there.

05 22 41 42 CDR-EVA No question. We're at 101, 4.5.

CC Copy that.

CDR-EVA Okay - -

CC Let us know when you stop and where you're - -

CDR-EVA Which rim do you want to park on?

LMP-EVA Well, I think we ought to park over here near that big boulder.

CDR-EVA Yes - yes, if I can get up there. I think I can.

LMP-EVA You can swing in, you know, and just park parallel to the - Of course, that will put them looking back. What - Can you park any direction?

CDR-EVA Well, yes, but 045 gives me a good - Let me - I'll work on it.

LMP-EVA Okay.

CDR-EVA Let me get up there slowly. I'll put them on this low saddle here. 045 will give them a good heading.

LMP-EVA Shorty is a crater, the size of which you know. It's obviously darker rimmed, although the fragment population for most of the blanket does not seem too different than the light mantle. But inside - Whoo, whoo, whoo!

CDR-EVA Man, are you going to get a picture now.

LMP-EVA Oh, yes.

CC We can hardly wait.

CDR-EVA That's about as far as I want to take it!

CC Okay. And when you stop and get off, give me word and I'll read you up some revised plans for station 4.

05 22 42 57 CDR-EVA Okay, Bob, we're heading 041; bearing is 102; distance, 5.1; and 4.4 on the range. Amp-hours are 92, 90, 102. And 128 on the batteries. Off-scale low on the fronts, and off-scale low on the rears.

CC Copy that. And did I understand 4.2 on the range, Gene?

CDR-EVA Yes sir!

CC Okay. Copy that.

CDR-EVA I don't know whether you're wrong, or we are, but - -

CC Sounds like an interesting crater, in any case.

CDR-EVA - - this is an impressive one.

LMP-EVA Wait until you see the bottom of it.

CC Okay.

LMP-EVA Okay, Houston. Shorty is clearly a darker rimmed crater. The inner wall is quite blocky over - but except for the western portion of it, which is less blocky than the others. The floor is hummocky, as we thought it was in the photograph. The central peak, if you will, or central mound, is very blocky and jagged. And the impression I have of the other mounds in the bottom is that they may - they look like Scarp masses that may have come off the side.

CC Okay; copy that and - -

LMP-EVA That's just what they look like. I'm not sure that - They have a - they have a bench appearance.

CC - - Okay, and the primary priority - number 1 and 2 priorities - at this station will be samples from the crater rim and the pan from the crater rim. Over.

Tape 96A/8

LMP-EVA Okay, we've got a large boulder of very intensely fractured rock, right on the rim, right near the Rover. It looks like - it looks like a finely vesicular version of our clinopyroxene gabbro. It's obviously crystalline and has generally that same appearance. There is, in one spot here, some inclusions of a darker gray rock also intensely fractured. The fracture systems, I think, will show up well in the flight line stereo.

05 22 45 48 CDR-EVA Bob, do you have TV?

05 22 45 50 CC Roger. We have TV, and you might brush the lens for us before you run away.

CDR-EVA Yes, I'll get it. I've got to get my battery covers cleaned.

LMP-EVA Okay, I'm going to take a pan while I'm waiting for you.

CC And we're going to want the SEP opened and dusted as well here so we'll be - switches turned off.

CDR-EVA Ooo-kaay. Ooo-kaay.

05 22 46 22 LMP-EVA Oh, hey - Wait a minute - -

CDR-EVA What?

LMP-EVA - - Where are the reflections? I've been fooled once. There is orange soil!

CDR-EVA Well, don't move it until I see it.

LMP-EVA It's all over! Orange!

CDR-EVA Don't move it until I see it.

LMP-EVA I stirred it up with my feet.

CDR-EVA Hey, it is! I can see it from here!

LMP-EVA It's orange!

CDR-EVA Wait a minute, let me put my visor up. It's still orange!

LMP-EVA Sure it is! Crazy! Orange! I've got to dig a trench, Houston.

CC Copy that, I guess we'd better work fast.

CDR-EVA Hey, he's not - he's not going out of his wits. It really is.

CC Is it the same color as cheese?

05 22 47 07 CDR-EVA Temperature on the SEP is about 100 and - temperature on the SEP's about 102.

LMP-EA It's almost the same color as the LMP decal on my camera.

CC Okay. Copy that.

CDR-EVA That is orange, Jack!

CDR-EVA Boy, this brush is getting harder to get on and off too. But I sure don't want to lose it. Man, I may start putting that under my seat. Well, zap me with a little cold water. Okay, the SEP has been dusted. I think I gave you 102 or something like that.

LMP-EVA Fantastic, sports fans. It's trench time. You can see this in your color television, I'll bet you.

CDR-EVA How can there be orange soil on the Moon?

CDR-EVA Jack, that is really orange. It's been oxidized. Go around and get the lunar sounder [sic] over here.

LMP-EVA It looks just like - an oxidized desert soil, that's exactly right.

CDR-EVA Well, I'm going to clean their glasses so they don't - so they know we're - Can you wait a minute on that - on that pan you're taking?

LMP-EVA I already took it.

CDR-EVA No, I mean the television camera. I'll put you back where I had you.

Tape 96A/10

CDR-EVA Now, I'll let you put your - right where you finished your pan.

LMP-EVA You know - that orange - that orange is along a line, Geno, along the rim crest -

CDR-EVA To follow - what? Circum - circumferential?

LMP-EVA Yes. Man, if there ever was a (chuckle) - I'm not going to say it. But if there ever was something that looked like a fumarole alteration, this is it.

CDR-EVA Okay, let me give you a gravimeter - -

05 22 49 42 CDR-EVA MARK it.

CC Okay, mark the gravimeter.

CDR-EVA And she is flashing. Oh, never mind, Bob. I'm going to go to STANDBY. I've got to get my gnomon.

LMP-EVA Hey, I think we hit one of those things we've got to reconsider on, Houston.

CC Yes. The problem is we're looking at PLSS constraints right now, as luck would have it, of course.

02 55 50 15 CDR-EVA MARK it. Gravimeter.

CC Roger. Copy that.

CDR-EVA What's wrong with the TV? Aren't you watching it?

CC It seems to have died slowly there.

CDR-EVA Well, stand by. Now, I'm going to give you another STANDBY and another MARK.

CC Okay.

05 22 50 56 CDR-EVA STANDBY, ON, and -

05 22 51 00 CDR-EVA MARK it.

CC Copy that.

LMP-EVA Okay, Bob, I've trenched across the trend of the yellow - or the orange. There is light gray material on either side.

CDR-EVA Oh, man, that's incredible.

LMP-EVA Say, Gene, we're going to have to - -

CDR-EVA That's incredible.

LMP-EVA You need to get a down-Sun color - -

CDR-EVA That's incredible.

LMP-EVA - - as well as - I'll get my black-and-white.

CDR-EVA I'll get it.

LMP-EVA We also got to get that rock up there - that's - -

CDR-EVA Yes, we'll get that. Okay, let's start sampling that trench. We've got to get - that's - -

LMP-EVA Okay.

CDR-EVA - - That's phenomenal. Look at where the contact between the gray and the -

LMP-EVA Yes. Right, and it's on both sides - -

CDR-EVA Before you disturb it, let me just get a couple of closeups of that.

LMP-EVA Hey, can you get a down-Sun? I think your color will be best down-Sun.

CDR-EVA Okay.

LMP-EVA Go to f/11. Get a little closer, Geno, if you think you're minimum.

LMP-EVA Come up. There you go.

CDR-EVA Let me get one more. Hey, you want any of this bagged in a - in the can, Bob? Canned in the bag - or whatever it is?

Tape 96A/12

CC Stand by. They're debating that right now.

CDR-EVA Are they?

CC Roger. Let's get the short can for some of that
and - -

LMP-EVA Okay, the color is - -

CDR-EVA Okay let us get the - let us sample it first, then
we'll get it.

LMP-EVA It's quite - it's - it's indurated.

LMP-EVA Aah - Go back and get that one.

CDR-EVA Go get a new chunk.

LMP-EVA I'll go get a new chunk.

CDR-EVA Give me that, and get a new one. Give me that.
Get some more.

LMP-EVA I'm going to slow down here.

CDR-EVA Yes, just take it easy.

LMP-EVA I can't see into this.

CDR-EVA I can't see when your shadow is there.

LMP-EVA Can you get around on the other side?

CDR-EVA Yes.

LMP-EVA Because I can't see to sample.

LMP-EVA Oh. Well. Yes, that's it.

CDR-EVA See if you can get a sample right across that
contact too.

LMP-EVA I will. Okay, bag that one.

05 22 53 49 CDR-EVA Bag 509 has got the - the orange material from, oh,
about 2 to 3 inches down.

05 22 54 02 CC Copy that.

CC Okay, we're suggesting INTERMEDIATE for you, Jack.

LMP-EVA Okay, the light gray, which is on either side - we sample the - the - Want me to get some more?

CDR-EVA Yes, a little more.

LMP-EVA It's - all of this is getting mixed a little bit with a - about a half-centimeter thick light-gray or a medium-gray covering over the whole area.

05 22 54 57 CDR-EVA Bob, the gray material that is adjacent to the red material is in at 5 - how would I say 510.

CC Copy that.

CDR-EVA I had it, and I can't see it now.

LMP-EVA And the LMP is INTERMEDIATE.

CC Copy that.

CDR-EVA 510, Bob.

CC Copy that.

CDR-EVA And that - and that orange band is about a meter wide, I think.

LMP-EVA About a meter.

CDR-EVA You can't get to the end of it - bottom of it though, can you?

LMP-EVA I haven't been able to yet.

CC Okay.

LMP-EVA Just to be sure, why don't we sample this side of it, too?

CDR-EVA Then I'm going to go get the can.

LMP-EVA Okay - one.

Tape 96A/14

CDR-EVA If I can remember where we put it. Bob, where did we put the small can?

LMP-EVA It's in the - it's in bag 7 under my seat.

05 22 55 40 CDR-EVA Okay. That's good. 511 has the gray from the other side of the orange band. And the other side happens to be the crater side.

LMP-EVA That's right. North side.

CDR-EVA Okay. Why don't you look around a minute, and I'll get that can.

LMP-EVA Okay. I'm going to see - see if this goes on down here as a zone.

CDR-EVA It looks like it's - ellipsoidal area if my foot-prints are any indication.

CC 17, Houston. We'd like to get the double core here instead of the small can. - Double core, please, instead of the small can.

CDR-EVA Okay.

LMP-EVA Did you want it in the orange?

CC Roger. That affirm. We can put cores in gray soil all the time.

LMP-EVA Well, it's a vertical stratigraphy. Do you want to go sideways a little with it? Or you just want to get it as deep as you can, huh?

05 22 56 52 CC I expect we want to get - let's go as deep as we can in the orange, please, there, Jack. And the one problem at this station, Jack, is not that - -

LMP-EVA All right.

CC - - we can ... decide priorities between this station or any other station. It's the fact that we're running up against the walkback constraints here in just a very few minutes, about 20 minutes.

LMP-EVA Okay.

05 22 57 15 CDR-EVA Okay, Bob, and the bottom will be 44, and the top will be 35.

CC Copy that. And after the core, we'd like for you to go over and sample some of that - some of the big rocks there on the rim, if you could very quickly. That'll be the next order of priority after that.

LMP-EVA We will.

CDR-EVA Yes, sir.

CC And I'm not sure whether your pan will look down into the crater or not, Jack. But if it didn't, we'd like to get another one from there. Hey, there's the crater.

CDR-EVA It did. Yes - yes - look into it yourself and - and then, I'll also get you a stereo pan before we leave. I can do that.

CC Roger. That's some crater.

LMP-EVA Got your hammer?

CDR-EVA Yes. I've practiced too long on taking stereo pans of craters, without getting one here.

LMP-EVA I got mine from right - just right down there, Gene. So -

CDR-EVA What is that right there?

LMP-EVA What?

CDR-EVA That right there.

LMP-EVA I don't see - Oh, it's a piece of glass, probably.

CDR-EVA Boy, it sure is.

LMP-EVA Hey, how about right up here?

Tape 96A/16

LMP-EVA You know that - we were almost - we just about got (laugh) to the upper edge of this little ellipsoid zone. I think we're going to have to - we've messed up most of it. Let's try right over here.

CDR-EVA I've got a little piece of glass in my pocket.

LMP-EVA Bob, the upper portion of the core is going to be a little bit disturbed, because we've walked around the area so much.

CC Okay. Copy that.

CDR-EVA There was a little piece of black glass - -

LMP-EVA You may want to get up here - -

CDR-EVA - - solid black glass.

LMP-EVA Okay. That - did you get a - hold it, and I'll get a shot.

05 22 59 26 CDR-EVA Take your picture. That's about as far as I could shove it in.

CC Okay. And, 17, while you're doing that, was the gray mantle over the top of this, or was this showing all the way through to the surface?

LMP-EVA No, it was over the top. It was about a half a centimeter over the top.

CC Copy that.

LMP-EVA He's getting about - about 3 centimeters a whack.

CC Very good.

CDR-EVA I'll tell you, it's a lot harder going in than that double core was back there. It's pretty hard.

LMP-EVA It acts like it's inherently cohesive. It breaks up in angular fragments.

CC Copy that.

LMP-EVA An essential portion of the zone is - actually has a crimson hue, or red hue. Outside of that it's orange. And outside of that, it's gray.

CDR-EVA Pardon me, Jack.

LMP-EVA That's all right, take it easy. I'd offer to hit it, but I don't think I can, my hands are so tired.

CDR-EVA I'm going up to max here for just a minute or 2.

CC Copy that.

CDR-EVA Okay, let me hit some more. Ready?

LMP-EVA Yes, go ahead.

CDR-EVA Watch it - I'm afraid. Jack, it's stable enough. Why don't you get out of the way? I'm afraid if I leave go of this thing, you'll get it in the head.

LMP-EVA Okay. Have at it. He's still getting a centimeter a whack, poor guy. Let's see. I didn't get a locator, I better get a locator. Oh, it's in the - No, it isn't.

05 23 01 05 CDR-EVA The only thing I question is our ability to get it out. Man, that's really hit bottom.

LMP-EVA Has it?

CDR-EVA Yes.

LMP-EVA Okay, do I have core tubes on me now? I mean caps?

CDR-EVA Yes.

LMP-EVA Caps.

CDR-EVA Yes, sir.

LMP-EVA And the rammer.

CDR-EVA Yes.

LMP-EVA Okay - only -

Tape 96A/18

CDR-EVA That's all the way down. But, I really - -

LMP-EVA That's it. Thanks, Geno.

CDR-EVA - - I really wonder about getting it out.

LMP-EVA Well, we'll give it the old college try.

CDR-EVA Yes, we ought to be good at getting cores out by now.

LMP-EVA It'll come out.

CDR-EVA Wow! Okay.

LMP-EVA It wouldn't dare not come out - wait a minute - -

CDR-EVA Is there enough to hold on to?

LMP-EVA Whoops - Which side you got?

CDR-EVA I was just getting this out for you. Let me - I can get this side better.

LMP-EVA Okay.

CDR-EVA You ready?

LMP-EVA Okay.

05 23 01 57 CDR-EVA Go. Okay, pull slowly. Slowly so I can cap it all right. Let me get a cap.

LMP-EVA Okay.

CDR-EVA Okay. Hold it - hold it - let me get a cap.

LMP-EVA All right, get the cap.

CDR-EVA Okay. Now, wait a minute.

LMP-EVA Are you ready?

CDR-EVA Okay, very slow. Even the core tube is red!

LMP-EVA Look at that!

CDR-EVA Even the core is red! The bottom one's black - black and orange, and the top one's gray and orange!

LMP-EVA The fact is, the bottom of the core is very black compared to anything we've seen.

CDR-EVA Hey, we must have gone through the red soil because it's filled, but it's filled with a black material.

LMP-EVA Let me see, Gene.

CDR-EVA Dark gray, almost a very very fine grained - -

LMP-EVA That might be a magnet - magnetite.

CC Fantastic.

CDR-EVA ...

LMP-EVA I got it.

CC Fantastic.

LMP-EVA Go ahead.

CDR-EVA Okay.

CDR-EVA But it, it, it -

LMP-EVA Let me - God, it is black isn't it?

CDR-EVA Yes. I've got to get it so I can get the - Boy, it is black and is it contrasted to that orange stuff. Very black. Well, not very black. It's a good dark gray. Very dark bluish gray.

LMP-EVA Yes - contrast.

CDR-EVA Okay, turn that thing so I can push this cap a little bit. Just turn -

LMP-EVA Which way?

CDR-EVA Either way. Just turn the whole tube.

LMP-EVA Oh, okay.

Tape 96A/20

CDR-EVA It's just easier to turn the tube than my hand - -

LMP-EVA (Laughter)

05 23 03 14 CDR-EVA - - some more. I don't want this cap to come off. Okay. I'm going to INTERMEDIATE cooling. Okay. Now you don't have any caps, so let's take this back to the Rover.

LMP-EVA Where's the hole?

CDR-EVA Why don't you take a picture of the hole, while you've got a camera there?

LMP-EVA Be careful with that.

CDR-EVA Yes.

CC The caps are in SCB-7. They're under the LMP seat.

LMP-EVA Well, the hole's most - the hole's mostly in shadow.

CC And, 17 - -

CDR-EVA Yes, I got them Bob.

05 23 03 42 CC - - And, 17, so you're at a spot - we'd like - We have to be leaving here - not like - we have to be here in 14 minutes on the move because of walkback constraints. And we'd like to get a quick sample of the basalt up there on the rim, and Gene's stereo pan, and then press on. And I emphasize that the walkback constraint we're up against in 14 minutes - 13 now.

LMP-EVA Okay, Bob, I'll get a sample - I'll doc - I'll sample it by hand. But it'll be documented. And I'll get it in a bag in a minute since I don't have any.

CDR-EVA Come back this way when you do. I need that rammer again.

LMP-EVA Oh, okay. Well, I better come there first, I guess.

CDR-EVA Well, I don't need it right this second - -

LMP-EVA Okay.

CC Why don't you leave the core there Gene, and you can take the stereo pan while Jack's getting that sample. And then you can get together and ram the core home.

CDR-EVA Okay. Bob, the bottom of the upper core is also dark.

CC Copy that. Sounds a little thin.

CDR-EVA And, like you might expect, the top of the bottom core is dark, too.

CC How about that.

LMP-EVA ...

LMP-EVA It - If I ever saw a classic alteration halo around a volcanic crater, this is it. It's ellipsoidal. It appears to be zoned. There's one sample we didn't get. We didn't get the more yellowy stuff, we got the center portion -

CDR-EVA Let me get those caps, Jack. What's - That's what's holding it. Holding it from coming out.

LMP-EVA Steal a bag.

CDR-EVA Okay

05 23 06 10 LMP-EVA Okay, the - I got it. Basalt is in bag 512.

CC Copy that.

LMP-EVA I'm getting in your bag here Gene. Got it. Okay.

CDR-EVA Jack, our lock is on the outside here, so we ought to watch this gage.

LMP-EVA What happened?

Tape 96A/22

05 23 07 00 CDR-EVA Not going to worry about it. This lock is on the outside of that lever lock - out there. You'll see what I mean when you look at the lock. Okay, I'm going to go get my pan.

LMP-EVA Okay.

CDR-EVA The cores are not rammed yet. You want to ram them while you're here?

LMP-EVA What did you do with my extension handle? Oh, it's -

CDR-EVA Here. And if you want to ram them - -

LMP-EVA Okay.

CDR-EVA - - there you are. They're not rammed.

LMP-EVA I'll get them.

05 23 07 31 CDR-EVA Okay, Bob, I'm going several meters around to the east and towards the south to get this pan.

CC Copy that.

CDR-EVA And I - I'm going upslope. I'm circum - I'm - on the circum - Oh, you know, on the rim. And I'm up. Oh, that ought to be a beautiful shot, if I could see what my settings are.

05 23 07 57 LMP-EVA Okay, the lower core is chucky-jam full. I don't think I've budged that thing.

CC Okay. Copy that.

CC Okay, and, Jack, I copied - aside from three trench samples, I copied one single rock - one single bag of basalt samples. Is that correct?

05 23 08 35 LMP-EVA That's right. 512.

CC Copy that.

05 23 08 37 CDR-EVA Hey, Bob, from where I am, about 100 meters around the west side of the rim of this crater, the mantle on the inside of the rim turns from this gray material we've been sampling - sampling in here - to a very dark gray material. And there's a lot of ... stuff that goes down - radially down into the - into the pit of the crater.

CC Okay. Copy that. Outstanding.

LMP-EVA Hey, Bob, those cores didn't feel like they - the follower went down at all.

CC Okay.

LMP-EVA Shouldn't it have gone a little bit?

CC Not necessarily, if it's pretty compact stuff. You were having a hard time getting it in.

LMP-EVA Well, I thought there was a little space up there, but maybe I just didn't feel it.

CC Not very much - -

LMP-EVA I don't think there's much danger of them coming apart.

CC Okay. Great.

CDR-EVA I got to take a couple of more pictures at that contact slope over there. I know - you can't see it from where you are, Jack, but I guess we got to leave. Otherwise it would be nice to sample that dark stuff up on top.

CC We need you guys rolling in 7 minutes.

CDR-EVA We can get a spool - oh, I bet I'm out of film! Well, I got them all anyway, Bob. I'm at 162. I'm out of film. That stuff - and you're looking at me with the camera - that stuff is up toward that boulder, around that - about as far away from that boulder on the other side as we are on this side. And we want a hack at that boulder, too. Jack, let's see if we can't get that boulder, anyway.

Tape 96A/24

CDR-EVA But I don't have any film.

CC Guys, we don't have that much time.

CDR-EVA I know, Bob, I know. There's a lot of little pieces - not a lot - but enough that I've seen five or six of them. Little pieces of obsidian-like glass. I got one in my pocket. Unbagged. Undocumented. This boulder that you were looking at with the TV. I'm going to take a sample. Undocumented.

05 23 11 00 LMP-EVA I got it! I got it!

CDR-EVA Oh, you got it?

LMP-EVA Yes.

CC Yes.

LMP-EVA Let's go.

CDR-EVA I'm sorry, I didn't know you got that. Bag 461 has another sample of the - of basalt that I picked up right near where we dug the trench.

CC Copy 561 [sic].

CDR-EVA Okay, Bob, I'm going to give you something with the - I'm going to give you something with the TV. I want to show you where that dar - dark material starts.

LMP-EVA Hold still, now.

CDR-EVA As you - okay. As you look at the inner rim - as it goes down (cough) to the right - you see a lot of boulders - a lot of rocks that are protruding out. Where that rock pattern thins out, just beyond that is an orange - a visible orange radial pattern, and then beyond that is a definite change in albedo where you get the gray material, and a definite change in the number of - of rocks on the slope.

CC Gene, Roger.

05 23 12 09 CDR-EVA And that particular - -
CC Copy that.
CDR-EVA - - material can - -
CC And if - -
CDR-EVA - - and that particular material - that par - Let
me finish, Bob! That particular rim material
there continues around to the due north, and then
there's a drastic change again where you see the -
the inner rim completely terraced with this boulder
fill.
CC Okay, copy that, Gene - -
CDR-EVA And I can't bet on it, but I can see it - -
CC - - and you can talk about it when you get home.
CDR-EVA Okay. As long as you're happy, I am.
LMP-EVA Wait, Gene. Wait, wait, wait.
CDR-EVA I got to get the film changed, Jack - -
CC All right, Gene, change the film at the next - -
CDR-EVA - - ...
LMP-EVA Okay.
CC - - station. We can save time that way.
CDR-EVA All right.
CC And we would like the SEP turned on before you
leave - -
CDR-EVA We did that.
CC - - and we'd like EP number 1 taken, Jack, so you
can deploy that at Victory.
LMP-EVA Okay. Okay. I'll get - I'll get your scoop for
you. Have you been leaving it cocked like that?

Tape 96A/26

CDR-EVA Yes. Of course, we haven't been taking any SEP measurements, and I don't know what difference it makes.

LMP-EVA Okay, everything is locked on, I guess - How are you reading, Bob?

CC We've been reading you loud and - -

CDR-EVA It's 70, 012, 501; 670, 012, 501.

CC Okay, we copy that, Geno, and -

CDR-EVA Okay, got the -

CC Charge number 1 and - -

LMP-EVA We got the gnomon, we got the rake - -

CC - - we need the SEP on - -

CDR-EVA SEP on, Jack? I'll get charge number 1 for you.

LMP-EVA Okay. I'll get the SEP on.

CDR-EVA I'll just hand it to you.

CC And what's your frame count, Gene - Jack?

SC Charge number 1.

05 23 14 07 LMP-EVA Okay, power-power's on, recorder's on, the temperature is 112.

CC I copy that.

LMP-EVA Can you get it, Geno?

CDR-EVA Yes.

CDR-EVA You get in - I'll hand it to you.

LMP-EVA Okay.

CDR-EVA And then I'll offer to get the TV.

CC And, Jack, what's your frame count, please?

LMP-EVA Wait, Bob, I can give you that on the Rover.

CC Okay. I thought you were on there.

05 23 14 47 CDR-EVA Okay, camera MODE switch is 1 - MODE switch is 1; camera's going AFT - camera's going AFT. Well, I guess that's the breaks of life. Low gain on SEP when I get on, I'll give you - this when you're ready. First thing I got to do, Bob, is change film at the next station.

CC That's affirm.

LMP-EVA And, Bob, LMP is at 75.

CC Say again, there, Jack, I - I missed that.

LMP-EVA 75.

CC Copy that. Thank you.

CDR-EVA I must be getting fatter, you know it.

LMP-EVA Fatter?

CDR-EVA Well -

LMP-EVA Depends on how you get in. Where's your hammer?

CDR-EVA Okay, we got a flag on the Rover.

LMP-EVA Your hammer's caught again.

CDR-EVA That's all right. We got a flag on the Rover, and I'm reading 136 on battery number 2.

CC Say again on that one, Gene.

05 23 16 03 CDR-EVA I'm reading 136 - make that 132 on battery number 2, and we did get a flag.

CC Copy that.

CDR-EVA Okay, Jack, I'm going to make a very sharp right turn here because I do not want to go down that hill. Okay. We're moving, Houston.

Tape 96A/28

05 23 16 25 CC Roger. You're moving exactly 37 seconds early.

CDR-EVA Early? I could have got - gotten that dark mantle on the side of that crater. That's all it would have taken me.

LMP-EVA So you saw a radial orange, huh?

CDR-EVA Yes, it was radial, Jack. You could see it very - It'll be in the pictures. Oh, man, I can't drive into that heading. Let me get my - -

LMP-EVA That was on the inside of the crater?

CDR-EVA On the inside rim of the crater.

LMP-EVA Yes, that's where the surface ... keeps slumping off so it's exposed, probably.

CC Quite a station, men. We thought - -

CDR-EVA I'm going to get my ... Okay. I'm MIN.

CC - - station 2 was a good station.

CDR-EVA Okay, I'm MIN. Man, I'll tell you, that - that heading is going to put us right - Okay, Bob, give me a - Dang - wait a minute.

CC The heading you should be generally taking - -

CDR-EVA Where we at?

CC - - toward Victory is 090, Gene.

CDR-EVA Okay, can you give me a bearing and range at Victory?

CC Okay. Stand by.

LMP-EVA Did you get the TGE read?

CDR-EVA Yes, I did - I get it read. They got everything, that station - but not everything I'd like to give them.

CC Okay, it's going to be - -

CDR-EVA Houston - -

CC - - 105 and 3.1.

CDR-EVA Okay. Man, I tell you that LCRU is terrible, when it lashes into you.

LMP-EVA Well, you can always zigzag.

CDR-EVA Yes, that's what I've got to do. I've got to tack into that Sun.

LMP-EVA I got it.

CDR-EVA Okay. We got to go to Victory.

LMP-EVA Houston, I don't know what exa - I didn't have time to really think at that station but that could - I think based on having found the alte - If I hadn't seen that alteration, and all I'd seen is the - is the fractured block on the rim, I might have - which looked like the stuff in the bottom - I might have said it was just another impact. But having all the color changes and everything, I think we might have to consider that it could be a volcanic vent.

CC Roger. It surely was different, anyway.

LMP-EVA I'm not sure how we - I'm not sure how we prove it. We didn't have time to prove it.

CC We noticed. I guess that's the breaks of the game, sometime.

05 25 19 03 CDR-EVA Hey, Bob, I forgot your numbers at - I forgot your numbers at Victory. How about giving them to me, again?

CC Okay. 105, 3.1. And it'll be a heading of 090 - -

CDR-EVA Okay. Thank you.

CC - - that's the general heading in that direction.

CDR-EVA Okay. 105, 3.1.

Tape 96A/30

CC I guess we always have Station 9 to look forward to, guys. That may be the same thing - We'll probably be out of time when we get to that one, too.

CDR-EVA Nobody likes a pessimist.

05 23 20 11 CDR-EVA Hey, Bob - I note on those radiators - I have been dusting the covers at every stop, whether that's any help or not.

CC Okay; we copy that.

CDR-EVA Okay, sports fans. We're still about on the - well, I think we moved - yes, we moved - we moved out into the Tortilla Flat area, I guess. Not very flat.

CC That's affirmative.

CDR-EVA Those kind I can go through - I can see them coming. 102, 3.8. And where's Victory?

CC Dead ahead.

CDR-EVA Boy, Victory is going to be subtle, I'll tell you. Bob, how long we been out?

CC Stand by. 5 plus 26, 5 plus 26.

LMP-EVA Hey - hey, Bob, I recommend that if we ever do this again they let me get off and pick the charge off when we want to deploy it. It really adds to the fatigue of the hands.

CC I tell you - -

CDR-EVA Couldn't you just hook it onto your fingers?

CC We - we copy that, Jack. And Charlie's got a big smile on his face here.

LMP-EVA Mark my words. There's Victory over there, I bet. See that's the long edge.

CDR-EVA Yes, yes. I can't see over there, but - -

LMP-EVA Okay.

CDR-EVA - - got too much Sun in my eyes.

LMP-EVA That's the right way to go. That'll be about it, too.

CDR-EVA Man, I haven't seen - I don't think I've really seen the LM, except ... - -

LMP-EVA ... big rock in front of you.

CDR-EVA I got it.

LMP-EVA Okay. Well, you can't tell much about the countryside going into the Sun, can you?

CDR-EVA Put your upper visor down. That's what - that'll give you a whole different perspective.

LMP-EVA It doesn't vise very well. It's stuck.

CDR-EVA That's got to be Victory over there, Jack.

LMP-EVA Yes.

05 23 23 03 CDR-EVA We're at 103, 3.4.

CC Copy that.

CDR-EVA That is Victory.

LMP-EVA We're still seeing the pit-bottom glass - the glass-lined, pit-bottomed craters. How's that?

CC Otherwise known as - -

CDR-EVA That's geology-ese if I ever heard it.

CC - - the GLPBC.

LMP-EVA Took you a while, didn't it?

CC It's 11 o'clock down here, guys.

CDR-EVA It's 11 o'clock up here, too, Bob. There's a square boulder - look at that one!

Tape 96A/32

LMP-EVA Yes, it's square all right - or at least one side of it is.

CDR-EVA No, three sides of it are square. It just fractured that way - that's by accident, looking at it. So how do we get over here?

LMP-EVA Go left, probably. And along the rim.

CDR-EVA Yes, that's where I'm going to go. Hold on.

LMP-EVA I'm holding. Whew! If Charlie is smiling because my hands are tired, why did he let you give me - get the charge off? Fine backup crew we got.

CC You guys didn't really mean to say that, did you?

CDR-EVA 106, 3.2. We're approaching the rim of Victory.

LMP-EVA And the LMP frame count is somewhere around 7 - well, 8.5, maybe.

CDR-EVA That's Victory; look at it go to the left and look at it go to the right. That's Victory; we're right on the ridge.

LMP-EVA Yes. Yes.

CC Okay; and we're picking - -

CDR-EVA We're at 106, 3. - -

CC - - on a Rover ..., you guys - Copy that.

CDR-EVA 1 - 106, 3.2.

LMP-EVA Okay, let's see.

CDR-EVA Tell me where you want that thing and we'll get a pan around it.

LMP-EVA Okay, let's - I tell you what - you see right ahead of you -

CDR-EVA Yes.

LMP-EVA There's - it's - looks like a place you could spin [?] a profile on.

CDR-EVA Yes, I could do it - right up in here.

LMP-EVA And deploy the charge. Tell me where you're going.

CDR-EVA I'm going, right here; you could put it in that hole. No, you don't want to do that.

LMP-EVA That's all right.

CDR-EVA Just pick a spot and take your photos.

LMP-EVA Okay, I've got them. Now, go just beyond there. Little bit more. That's good.

05 23 25 54 CDR-EVA Okay. Okay, Bob, we're at 106, 3.2.

CC Copy that.

05 23 26 04 LMP-EVA Okay, pull - pin 1 is pulled and safe. Pin 2 is pulled and safe, and - Boy, these are stiff this time around. Push it in - try again.

CDR-EVA That's a - that's a big black box. Don't pull it too hard.

LMP-EVA Stand by on pin 3, gang.

CC Copying that. Remember to push it all the way back in, Jack, and start from scratch.

LMP-EVA I did - I did - I did. I remembered - I remembered.

CC Good, good, good.

LMP-CDR But now I can't get to the -

CDR-EVA Your hands are tired. Let me try it once.

LMP-EVA No, it's - it's not that. It's just - it's coming. Got it.

05 23 27 00 LMP-EVA Pin 3 is out and safe.

CC Copy that.

LMP-EVA And look at the orange flag. Zowie!

CC That's what you guys were sampling at station 4, I bet.

Tape 96A/34

CDR-EVA Huh? Yes - it's about that orange, only a little - not quite as bright. Same - same shade. Okay. Okay, let me turn my switch on. Hey, Bob - -

LMP-EVA Wait a minute, wait a minute. Let me get that out a little more.

CDR-EVA Bob, there's no question but what that we're at Victory.

CC Say again there, 17.

CDR-EVA It's the first crater that looked like I thought it would.

CC Okay.

CDR-EVA Okay. You ready?

LMP-EVA Let me change my setting here.

CDR-EVA Okay. Okay.

LMP-EVA Good.

CDR-EVA Okay, let's get a nice Rover pan here.

LMP-EVA Okay, turn the other way first.

CDR-EVA Yes.

LMP-EVA ... slow.

CC And we'll get a Rover sample here before you guys leave, too, after the circular pan.

LMP-EVA We will.

CDR-EVA Low enough?

LMP-EVA Yes.

LMP-EVA Look at the light mantle over there.

CDR-EVA You can sure see it now, can't you now?

LMP-EVA Yes.

CDR-EVA Getting your - your setting changed fast enough?

LMP-EVA I got it; yes.

CDR-EVA Okay. Okay, let's get our Rover sample.

LMP-EVA Okay.

05 23 29 01 CDR-EVA And the Rover sample will be from the same locality. Boy, it's just a couple of meters from the charge, isn't it?

LMP-EVA Yes. I hope I didn't put too much soil in there for you. Wait a minute.

CDR-EVA Okay.

LMP-EVA Rover sample works just as advertised.

CC Copy that.

LMP-EVA Not bad. That - bag 43 Yankee.

CC Copy; 43 Yankee. And how about a frame count after - right now, Gene - Jack.

LMP-EVA I will. Stand by. You're jumping the gun occasionally but not very often. 106.

CC Copy - -

CDR-EVA ..., Jack. Okay?

CC - - 106.

05 23 29 57 LMP-EVA Okay. I guess we're ready to leave here, huh?

CDR-EVA Well, if they don't want us to stop here, I guess we leave.

CC Roger. We're ready for you guys to leave there - -

LMP-EVA No, there's nothing else here now.

CC - - and we're pressing on toward station 5.

CDR-EVA Okay -

Tape 96A/36

LMP-EVA Gene?

CDR-EVA Okay, and I want to go about 120.

LMP-EVA Gene.

CDR-EVA Yes?

LMP-EVA Gene, when you - can you swing out there and give me one look down east - or north into Victory?

CDR-EVA Yes, I can do that, we can - I've got to go by that way anyway.

LMP-EVA North. Well, you know, just swing it - point north so I can look in there.

CDR-EVA Yes.

LMP-EVA I never got a good look at it. Well, it's a - it's a series of three craters. There's some boulders on the - on the Talus slope of the easternmost - eastern slope of the west - eastern slope of the southernmost crater, the one we're closest to.

CDR-EVA Now how does that look to you?

LMP-EVA Well, it looks like - and see, there's the other - I don't know what it looks like. The northwest end of the V has a white block - white blocks on it - boulders - on the inner wall and right at the rim. And the northeast end of the V looks like it has somewhat darker rocks.

CDR-EVA Yes.

LMP-EVA Part of that is shadowed, but I think they are darker. And they look like about the same as down here near the tip of the V on this - -

CDR-EVA Got to be careful on that one, because there's one sloping away and one sloping towards us.

LMP-EVA Yes, I know. I've qualified it.

05 23 31 28 CDR-EVA Okay; we are rolling, by the way. And we're at 106 and - Well, we're still 3.1.

CC Yes. Copy that. Thank you.

LMP-EVA In the rim itself though, Victory is - is not blocky. There a little - there is an - some increase in fragment size, but that seems to be the result of some craters in the rim that have gotten below the debris that's covering it. I'd say that Victory's somewhat like Horatio in that it has blocky inner walls but essentially a normal block population on the rim.

CC Okay. And we've got a Rover sample going toward station 5 at about 103 and 2.5.

LMP-EVA Okay. 103 and 2.5.

CC Roger. And that'll be just a grid sample.

LMP-EVA They're - none of them just grid samples, Bob (laughter).

CDR-EVA You see, you can't tell how deep they are until you get up to them.

LMP-EVA Yes.

CDR-EVA That one I could have gone through.

LMP-EVA Yes. Okay; Station 5 is Camelot. Good old Camelot. (Humming)

CDR-EVA Look at the size of that one. That's another one of those -

LMP-EVA Yes.

CDR-EVA ... - there's another one on the right. Lookit.

LMP-EVA Some of them have -

CDR-EVA Well, that one doesn't have any fragments in the bottom of it.

LMP-EVA No.

CDR-EVA Looks like someone walked across it.

Tape 96A/38

LMP-EVA Yes.

CDR-EVA I think that there's quite a variability in the thickness of the dark mantle in here. Did you - I for - I didn't notice us crossing the - that one tongue of light mantle.

CDR-EVA No, I didn't either.

LMP-EVA I - we obviously did - -

CDR-EVA I think we did.

LMP-EA Right at Victory, but it didn't show up.

CDR-EVA Looking into the Sun, you can't tell any difference anyway. However, I tell you, I certainly get the impression there is a mantle. I would say that -

LMP-EVA Oh, I think so. I don't know what it is, but the dark mantle exists. They're just - the craters - these craters are just too big not to have thrown up blocks. And they're either subdued by the mantle or they haven't penetrated it.

CDR-EVA And a lot of - and these blocks - -

LMP-EVA And I think you probably have both. Excuse me, Gene.

CDR-EVA And I - I'd say they've been subdued by the mantle. That - that really imposes an impression on me.

LMP-EVA Yes. There are those that appear that way, like Horatio, for example, or the big ones. But others, I think, are too young. They just don't penetrate. Particularly those that are big and have bright halos.

CDR-EVA Well, now - yes, but the only ones that look fresh and not enough to penetrate are these little ones with the glass in them.

LMP-EVA Well, there's been some big - big fresh ones. We'll - we'll look for one.

CDR-EVA Now there's one with glass in it, probably.

LMP-EVA Yes. I think that one - that's one - -

CDR-EVA And without any blocks on it. That - that may not have penetrated.

LMP-EVA Yes. Yes, that just has the - mostly the shock-indurated rock - ... rock.

05 23 35 13 CDR-EVA We're coming up to 103 at 2.6 now, so we need a sample up here.

LMP-EVA Okay.

CDR-EVA Okay. 103, 2.5, anywhere.

CC Roger. That's affirm.

CDR-EA Okay, let me - good. Let me slowly go to the right here.

LMP-EVA Okay. Right out in that little inner-crater area, right out in there is good. If you let me guide you a little, I might get a rock sample. Whoa, whoa, whoa. That's it.

CDR-EVA Yes.

LMP-EVA That wasn't quite enough.

CDR-EVA Okay. Pick a point.

LMP-EVA Move - move ahead about - yes, right. Just - no, that's good. Straight ahead. Straight ahead. Good, good, good, good, good, good, whoa! Now we'll give it a try.

05 23 35 55 CDR-EVA Okay, 103, 2.5.

CC Copy that.

CDR-EVA And that battery is still at about 132.

CC Okay. Copy that. We're allowed to go to 140, tonight.

CDR-EVA I don't expect we'll make it. I think we'll get done before that. Save that for tomorrow. I'll

Tape 96A/40

tell you those batteries deserve any temperature they want today, after going - going up that - -

LMP-EVA That's - that's the soil.

CDR-EVA - - that Scarp.

05 23 36 27 LMP-EVA Okay. The soil is in 44 Yankee.

CC Copy; 44 Yankee.

LMP-EVA That block's too big. I can't get it. Too big. Okay.

CDR-EVA Get your picture?

LMP-EVA No. Okay, got mine.

CDR-EVA Okay. What's the - well, we'll find Camelot.

05 23 37 04 LMP-EVA And the - 125's the LMP frame.

CC Copy that. And just press on the same heading you've been carrying there, Gene, and that will get you to Camelot.

CDR-EVA We want the southwestern edge, huh?

LMP-EVA Do you want to go where Station 5 is, Bob?

CC That's my understanding, Jack. So press on towards there unless I tell you otherwise.

LMP-EVA Well, but you were talking about changing Station 5. I think Station 5 is a pretty good spot.

CC Roger. And I think that's where we want to go - I'm just trying to verify that. You can go in that direction, though. I'll get with you if it's not.

LMP-EVA Okay. It's probably the most concentrated boulder field on Camelot.

CC Okay. You know where it is, and we think it's about 092 and 1.6.

CDR-EVA 092 and 1.6. You know this country - -

CC Roger. But you know where it is, so you'll find it when you get there.

CDR-EVA - - is rug - is undu - It's different.

LMP-EVA Wonder where Horatio is?

CDR-EVA Well, we're going to run into something in a minute if it's - it's probably right over that rim on the right, Jack. Right off your right hand at 2 o'clock.

LMP-EVA Right. I guess so.

CDR-EVA You know, it doesn't have boulders on it. It should be over there. That should be it right over that rim. You know, I see why Al and Ed had trouble walking up Cone Crater. You - you could stand right on the edge of the rim of a crater and not know it was there.

LMP-EVA Yes.

CDR-EVA Man, that was spectacular. It's color on the Moon!

LMP-EVA Whooo!

CDR-EVA It was really orange! Can you see that color on the television?

LMP-EVA No answer.

CDR-EVA I'll bet they couldn't.

CC No, we couldn't see it, Gene. ... guys - -

CDR-EVA Look at the - look at the Sculptured Hills. Okay. I'm sure glad I went up to take that second pan to see that stuff go radially down into the center of the crater at that contact.

LMP-EVA Yes, that's good.

CDR-EVA Hope it comes out.

LMP-EVA Doesn't make any difference, it's there - comes out or not. Okay. Sculptured - -

Tape 96A/42

CDR-EVA Okay. Look at - look at up - up the cleft over there. You can see definite change in albedo now between the North Massif and the Sculptured Hills. Lookit, right at - right up the - the valley. Well, you can't see it - let me -

LMP-EVA (Laughing) You're right.

CDR-EVA You got - you got to see this. See that?

LMP-EVA Yes. There - but, again, that may be your photometrous effects.

CDR-EVA Yes, one's an upslope and one's a downslope.

LMP-EVA Yes. Yes. Just about right, but it's supposed to be darker in the - in the cleft you know.

LMP-EVA Well, I guess ... I've been on - LMP's back to MINIMUM.

CC Roger. Thank you.

05 23 40 18 CDR-EVA Oh, whoop, whoop, whoop! I wish I had a movie picture of us driving.

LMP-EVA You're doing it - you're doing the driving.

CDR-EVA Who's going to - -

LMP-EVA Who you plan on taking it?

CDR-EVA - - ... century. You're doing - Well, there must be somebody out there.

05 23 40 40 LMP-EVA Bob, the fragment population - We're at 099, 2.0 - is still about the 1-percent category of - And it's hard to tell, going into the Sun, what kind of blocks you're dealing with. But - my - my guess is most - well, more than a guess - most of them look like they're slightly vesicular. And, in that regard, resemble the gabbros.

CC Okay, copy that.

- LMP-EVA Many - there are - now there is something - there's a class of boulders that is flat topped and fairly well rounded that is just about completely buried. Only the - the - oh, not more than 5 centimeters of it projects above the surface. We've seen those off and on, both days. Remember, Geno?
- CDR-EVA Yes.
- LMP-EVA And they seem to be quite distinct. At least you notice them. Now, whether it's just a continuation of the mantling, I don't know. But - the - most other boulders - the big ones seem to be - project above the surface more than just that 5 or 10 centimeters.
- CDR-EVA I tell you, the Sculptured Hills just have that wrinkled old-face feeling.
- LMP-EVA Yes. There are blocks over there though, aren't there?
- CDR-EVA There's blocks, but I don't see any concentrated outcrops - -
- LMP-EVA No.
- CDR-EVA - - or concentrated masses of blocks up on the slope anywhere - -
- LMP-EVA Possibly - -
- CDR-EVA - - like you did on the Massif.
- LMP-EVA Possibly due - -
- CDR-EVA Oh. Do you think that's Camelot or not?
- LMP-EVA I think that might be Camelot.
- CDR-EVA Look at that.
- LMP-EVA Nice shot.
- CDR-EVA Look at that. Right on the southeastern - -
- LMP-EVA Now, wait a minute.

Tape 96A/44

CDR-EVA - - southwestern rim.

LMP-EVA Yes, yes.

CDR-EVA Yes, because Horatio's got to be on our right.
Well, wait a minute, doggone it.

LMP-EVA It's not Horatio, is it?

05 23 42 43 CDR-EVA Well, we're at 094, 1.7.

CC Stand by.

LMP-EVA No, I think that's Camelot. Horatio didn't - -

CDR-EVA That's too - that's too - -

LMP-EVA - - have blocks that far up the rim.

CDR-EVA - - let me - yes, let me look - look at the bottom.
I'll tell you. I remember.

LMP-EVA Yes. That kind of stuff's like Camelot dust.
These blocks -

CDR-EVA Yes, I remember. Yes, that's it, Bob. We're
coming right up at station 5. Right at it.

CC Okay.

LMP-EVA Only way to fly. Okay. You want to park up on
the rim so they can have a good panorama?

CDR-EVA Sure. I'd like to get a little on the other side
of those blocks, if I can.

LMP-EVA Yes, you better. Then they can look with the Sun
on them.

CDR-EVA Yes.

LMP-EVA Because, otherwise, they can't see that other rim
over there.

CDR-EVA Same heading. So, I'll be all right, there. Yes. I'll get to the other side. Then they can look at these blocks and those across the way. I got to go around this block field, though.

LMP-EVA I should hope so. ... seeing Druid.

CDR-EVA Then you really - There's Horatio back there. I can see Horatio now. Okay?

LMP-EVA Looks just like it did before.

CDR-EVA So, we came right where we were supposed to.

LMP-EVA All the blocks look very much the same in the wall of Horatio.

CDR-EVA There's a path through -

LMP-EVA Watch it. Watch it.

CDR-EVA Okay. Well, that's a test.

LMP-EVA That was a good one.

CDR-EVA That was a good test. Didn't let any air out of that tire, did it?

LMP-EVA No, I don't think so.

CDR-EVA Talk about a block field!

LMP-EVA I think my guess of 30 percent was reasonably good before. I - Where are you going to park. Right over there?

CDR-EVA I'll park right over here, so that they can look in it.

LMP-EVA Okay.

CDR-EVA Okay. Yes. I got to head 045, so I head right into those blocks.

LMP-EVA Oh, you still got to turn, remember?

CDR-EVA Yes, that's why I want to leave myself a little room over there.

Tape 96A/46

LMP-EVA Oh.

05 23 45 15 CDR-EVA Okay, Bob. We're stopped. 086 and 1.4.

CC Okay.

LMP-EVA Not very level for the gravimeter. What's their limit?

CDR-EVA I don't know, but it's taken a couple better than this.

LMP-EVA Hey, I got to change film.

CDR-EVA Let me get things going here.

LMP-EVA I think I can get by this station without it.

CDR-EVA How's our time, Bob?

CC Stand by. We're talking about that now. You've got - Stand by. You've got 25 minutes at this station, guys. We've given you somewhat of an extension here. You're using up some of it back at the LM, but we've given you - I've given you somewhat of an extension. You've got 25 minutes at this station. The primary priority will be subfloor documented samples, and then subfloor rake soil. As you can imagine.

LMP-EVA Okay.

CC As you get off, we'd also like to open the SEP and again get back to COOL.

CDR-EVA Okay. You wanted to turn it OFF.

CC That's affirm - -

CDR-EVA Turn it off.

CC - - Turn it OFF, open, dust - -

CDR-EVA You want it off?

CC - - the same thing we've been doing to it all aft - all evening.

LMP-EVA Well, it's midday here, Bob.

CDR-EVA Leave it open and I'll dust it, Jack.

LMP-EVA Okay. Oh, the temperature - they'd like to know.

05 23 47 01 CDR-EVA Temperature is still about 112.

CC Copy that.

CDR-EVA You know, the thing I - you know the thing I dread most? About closeout?

LMP-EVA What's that?

CDR-EVA Is dusting you.

LMP-EVA Yes, I'm not going to be able to do much today, I don't think.

CDR-EVA Well, you know, we don't have nearly as much dust on - because yesterday we were wallowing around in it. Today, we're -

LMP-EVA Who? Me!

CC Okay, and, Gene, if you're not off the Rover, how about the rest of the Rover readouts?

CDR-EVA Okay, Bob, I'm off, but I'll get them for you. I'm sorry. I look at them, and they all look good to me. And it - you know. I keep forgetting to give them to you.

LMP-EVA Bob, I have 135 frames. I think I can finish the station, don't you?

CC Yes, probably.

05 23 48 08 CDR-EVA You know that SEP isn't get much - well, it's getting a little on it, but those mirrors don't clean off as nice as the - as the LCRU mirrors.

Tape 96A/48

LMP-EVA Okay, Bob. This looks just like our old friend, the pyroxene gabbro with the shiny ilmenite platelets in the vugs and partially recrystallized vesicles. The textural variations are planar, and they're primarily - subplanar in the concentrations of vesicles.

CDR-EVA Jack, I'm going to put this brush under my - my seat. It's just getting too hard to get off that place up there.

LMP-EVA Okay.

CDR-EVA Bob, what magazine?

CC Magazine Delta.

LMP-EVA Wa - watch yourself through here, Geno.

CDR-EVA Yes. Delta, huh?

CC That's affirm.

LMP-EVA Okay. Delta - Bravo. There's Delta. Boy, this is certainly a uni - subfloor, as we mapped it. It's certainly a uniform - uniform rock type. I'll tell you. The only variation - are those gray zones which are - just seem to be either finer or the absence of vesicles. Boy, I'm nose to nose with a piece of it right now.

CDR-EVA Say, Bob, where can I get a new set of bags?

CC Okay, you want - The new bags, they'll be under Jack's seat.

LMP-EVA There's some under - Under my seat, there's some, Geno.

CDR-EVA Okay. Just loose?

LMP-EVA Yes.

05 23 50 37 LMP-EVA Here I am, folks, in the middle of a boulder field. Just minding my own business. There - I don't know whether I mentioned it. The texture - mineral texture - is - appears to be subophitic to - sort

of like - like a good diabase, although a little coarser. But it's unquestionably organized with that variation in vesicle concentration.

CDR-EVA Starting on frame 4, Bob.

CC Copy that, Gene.

CDR-EVA Jack, I've got to get new bags. I've only got one left, and you don't have any, I don't believe.

LMP-EVA I don't have any.

LMP-EVA Bob, there - I have the impression that these blocks are buried up here. That the mantle does exist, even on Camelot. There are a few blocks that are lying out on the - looks like they're lying more less on the surface, but you might - you can attribute those to - to craters that have disrupted the block field.

CC Okay; good observation, Jack.

LMP-EVA The big ones seem to be projecting out of the - the big ones seem to be projecting out of the mantle.

CC Okay. Do you see any such mantle on - -

LMP-EVA Although I can't see how the mantle in here could -

CC - - on top of them.

LMP-EVA It's not as - No, I don't. What's there seems to be what could have been knocked up there.

CC Okay. Understand.

LMP-EVA I see a place where - I see a place where I think we can skim some off the top of a rock, which I think we probably ought to do.

CC Okay.

Tape 96A/50

LMP-EVA But it - I don't have the impression of draping, so much as I have just of burial. And I have a feeling that the zap-pitting process just has cleaned these boulders off - of anything that may have been on top of them, in excess of what's around them, right now.

CC Okay, you're talking about - -

LMP-EVA Also, like Horatio, the - Go ahead.

CC You're talking about mantle - blocks - then mantle - and then cleaned off by zap pits, in other words.

05 23 53 38 LMP-EVA That's right. Most of the rocks seem - that seems to be what has happened all over the Moon that we've looked at. But the rocks are always cleaner than the - than the surface, of course. The - the far rim of Camelot - you can see - fact is everywhere but where we are and on the rim near the LM - the - there seems - the rim seems to be completely covered or, at least, the blocks don't show through. They show up in the wall but not at the rim. That's much like Horatio, but not to the extreme that we saw at Horatio. I'd say, at Camelot, the mantle is - oh, maybe - at the most - the rim thickness, if that's mantle, is on the order of a half of what we saw at Horatio.

CC Okay. Copy that.

LMP-EVA The pan should let you measure that - Well, we didn't get a pan at Horatio, but we got some Rover shots of it. But you may be able to come - quantify that a little bit.

CC Okay.

LMP-EVA How coming, Geno?

CDR-EVA Oh, I've got new bags. I've got new mags. I've got everything cleaned up and -

05 23 55 00 CDR-EVA MARK, gravimeter.

CC Copy. Mark that.

LMP-EVA Here's a - here's a nicely structured rock that we probably ought to work on here. Structured again in the vesicle concentration. And then I think we ought to try to get - right over there, we can get mantle.

CDR-EVA Hey, I'll tell you what impresses me about some of these rocks. There's a lot of - they may be zap pits - I guess you looked at them closer than I did, but there sure is a lot of - lot of lineation in some of that white - white material, Jack.

LMP-EVA But at what scale?

CDR-EVA Well, on a - on a - on a - on a visual-obvious scale.

LMP-EVA Well, I mean the - Okay.

CDR-EVA I'll show you. If you don't - Let me see if it's up here.

LMP-EVA The crystal grains are - seem to be linear, but they are more or less random. Is that what you mean?

CDR-EVA No, they're linear, though. I can't - -

LMP-EVA Yes.

CDR-EVA - - can't be really linear and random. There's some rocks here that are - -

LMP-EVA No, I mean - -

CDR-EVA - - that are highly vesicular and there's others that are not.

LMP-EVA That's right.

CC Okay, and a reminder, 17 - -

LMP-EVA Gene, if this is what you mean, it's - -

CC - - you guys, that the primary priority is the blocks and then a rake soil of the - of the white subfloor soil there. And you've only got 15 minutes before we want you driving back to the LM. Over.

Tape 96A/52

LMP-EVA Okay. We'll get to work.

CDR-EVA Okay - -

LMP-EVA Let's sample this.

CDR-EVA Okay.

LMP-EVA Let me get these two first and then we'll go get that one, because there's two different kinds here - at least apparent kinds. One's a relatively new fracture.

CDR-EVA Yes.

LMP-EVA Boy, I tell you, watch when you back up. ... you already - -

CDR-EVA ... told you.

LMP-EVA - - learned that.

CDR-EVA I've already cycled film.

LMP-EVA We need to sample the structures, though, in this thing. We haven't really done that.

CDR-EVA We'll try and get a around-the-corner - -

LMP-EVA And we've got to get - -

CDR-EVA - - picture.

LMP-EVA We need to get that stuff on the mantle, too. I mean on the blocks.

CDR-EVA Yes. Okay, we want to get an around-the-corner picture of one of those big ones, too. See if we can get the structure of it. Okay, you get your picture?

LMP-EVA Yes.

05 23 57 19 CDR-EVA Here's a piece right here.

LMP-EVA Okay, can you hand me a bag, or I'll pick it up with a scoop, whichever you prefer.

Tape 96A/53

CDR-EVA Get the bag? Let's see if we can fix your bag thing tonight.

LMP-EVA Okay, I got it. Okay, that looks like our - our old friend, the gabbro, all right.

CDR-EVA That for a piece.

LMP-EVA 462 is Gene's fairly freshly fractured rock. Okay, you can put it in the bag.

LMP-EVA Okay.

CDR-EVA Okay, here's another one right here. That one.

LMP-EVA Yes.

CDR-EVA I can't squeeze these things anymore. Here you go. Got a bag?

LMP-EVA Not yet.

CDR-EVA Okay. You in there?

05 23 58 53 LMP-EVA Okay, 463. Is another of the same variety. Wish we'd started on that structured rock because we're going to run out of time. Let's go over there and get at least one off of it.

CDR-EVA Yes, we'll get it.

LMP-EVA Get the after. Whoops - Got it?

CDR-EVA Got it.

LMP-EVA Okay, why don't we -

CDR-EVA What did you have picked out?

LMP-EVA This - this - this in here with the layering in it.

CC Okay, guys - -

LMP-EVA I'll get a - -

CC - - looks like you'll be going in about 10 minutes.

LMP-EVA - - a flight line photo. Yes.

Tape 96A/54

LMP-EVA Why don't you get a flight line -

CDR-EVA I'm going to get that from here.

LMP-EVA Sort of northeast. How you going to go?

CDR-EVA I'll come around from this end and go around to that side.

LMP-EVA Okay, I'll go perpendicular to you more or less.

LMP-EVA Boy, that one right behind you is just vesicular, by comparison, to a high degree - like three times as much.

CDR-EVA Oh, I hope those bags weren't in the way of every one of those pictures. Okay. Boy, I tell you there ought to be a lot of permanent shaded samples in here, Jack.

06 00 01 17 LMP-EVA Okay, I got the down-Sun. Man! That's a hard Moon.

CDR-EVA Just a little piece but that's - see -

LMP-EVA How about this chunk down there, Gene?

CDR-EVA Where you looking?

LMP-EVA That'd -

CDR-EVA I don't think that'll - that plate - piece?

LMP-EVA Yes.

CDR-EVA I don't think that'll come off very easy.

LMP-EVA Let's see here.

CDR-EVA I'll try - here try it - you're over there. You know I've worn the RTV off that hammer already.

LMP-EVA Yes, I saw that.

CC Roger, 17. Copy that.

CDR-EVA There you go; beautiful call. Beautiful call. Beautiful call.

Tape 96A/55

LMP-EVA That's why - -

CDR-EVA I wore the RTV - -

LMP-EVA That comes from 15 years as a trained - trained
hammer bearer.

06 00 02 18 CDR-EVA By golly, your geology training did come in handy.
You learned where to hit rocks.

END OF TAPE

Tapes 96B-100B/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 01 00 XX	BEGIN LUNAR REV 31
06 02 59 XX	BEGIN LUNAR REV 32
06 04 57 XX	BEGIN LUNAR REV 33
06 06 56 XX	BEGIN LUNAR REV 34

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 00 02 36 CDR-EVA Bob, 3 - well, 464. Won't all go in there but - -
LMP-EVA That's all right, you can wrap it around it.
CDR-EVA I get it - no, I get it, babe. It's in there.
LMP-EVA Okay.
CC Okay - -
CDR-EVA Okay, let's - -
CC - - Jack, and now - -
CDR-EVA What do you - can we - -
CC - - if you could get that rake soil and maybe
also get the soil off the top of one of those
boulders that you thought you saw.
LMP-EVA Yes. Whew. I've got to have Gene with me since
my - can't carry sample bag, you know.
CC Roger.
LMP-EVA I probably can if I'm careful; but I keep dropping
them.
CDR-EVA These rocks here have an awful lot - a much greater
density of the white - white minerals in them, or
crystals, than I've ever seen before, Jack. Where
did we see these kind before?
LMP-EVA Well, when I looked at them right at first, that's
what I thought - but I think that the zap pits are
making the white stand out more. They're fooling
you a little bit.
CDR-EVA They might.

Tape 97A/2

LMP-EVA Because when I looked it with the hand lens, it looked like a fairly normal gabbro - like some of those that have crystallized with the mare basalt.

CDR-EVA Where are you? You ready to take them back - -

LMP-EVA I'm back over here. What I want is a sample of this soil off one of these rocks.

CDR-EVA Okay, let's get that now and then let's get the rake sample.

LMP-EVA But it looks to me like it's soil that's been thrown up there rather than - This rock is about 3 meters in diameter and it - but it's one of the flat surfaced rocks. It only stands about - at the most - one-third of a meter high.

CC Copy that.

LMP-EVA But we can get up about a meter from the - the soil/rocks interface and get soil off the rock, I think.

CDR-EVA Okay. See what you can do.

LMP-EVA Whoops, oh, yes; I got some soil.

CDR-EVA Don't kick up anything new.

LMP-EVA No, that's all right.

06 00 04 56 CDR-EVA 455 is that bag number, Bob.

CC Copy that.

LMP-EVA Okay, this is soil from a half a meter in. It's about a centimeter deep and a half a meter in.

CDR-EVA Let's take that chip there that's lying on top with the next scoop.

LMP-EVA No, I'm going to - -

CDR-EVA Let's take the soil on that. No. I was taking - No. Okay, take that one then. Well, that's another bag. Put this - before you pick that one up, pick that little chip up -

Tape 97A/3

LMP-EVA Well - I don't - I don't want to get the chips. I want the soil. Either that or a coherent rock.

CDR-EVA Okay, there you go.

LMP-EVA I think we better leave it at that.

06 00 05 43 CDR-EVA Okay, 465. Pick that other one up and I'll bag it real quick.

CC Copy that.

CDR-EVA That's the soil from on top the rock. And we're taking a piece of the rock itself, which looks pretty much like the other one, Bob. It might be a little bit more vesicular.

CC Okay, and that'll be in 466, right?

06 00 06 06 CDR-EVA You're right again. Here we are and I'll be able to grab it with my hand. Put this away.

LMP-EVA Okay.

LMP-EVA Okay, the soil came from a half a meter in from the soil boundary. We need to get a - let me get over here and try to get a - one bag of soil that's away from the boulder. I'm going to get my after while I'm here.

CC Okay, 17 - -

LMP-EVA Could you - could you - -

CC Roger. And the present time, we drop the rake soil, we'd just like to get the kilogram of soil somewhere between the boulders - as open as you can.

CDR-EVA My scoop in that?

LMP-EVA It will be. ... Okay, it is now.

CDR-EVA Oh, you want a kilogram?

CC Roger.

Tape 97A/4

CDR-EVA From between the boulders?

CC Roger. That'll replace the rake soil sample we were going to get. And we'd like you moving in 3 minutes.

CDR-EVA Okay.

LMP-EVA Let's do it right here.

CDR-EVA Yes, right there. Let me -

LMP-EVA Oh, okay.

CDR-EVA This'll go - this will be a matched pair with our soil sample, too.

CC Roger.

06 00 07 32 CDR-EVA Okay, bag 467 is where your kilogram is coming from.

CC Roger.

CDR-EVA Another scoopful.

LMP-EVA Yes.

CDR-EVA That's - I'm sampling down to about 5 centimeters.

CC Copy.

LMP-EVA Get your hand down, please. I'm coming down to you.

CDR-EVA Oh, okay.

LMP-EVA Okay.

06 00 08 15 CDR-EVA That's full. That's 467.

LMP-EVA Pinch her down tighter or that will leak out.

CDR-EVA Now let me get your big bag tight. Okay, let me try to get a - Jack, you got a shot of where my scoop was, didn't you?

LMP-EVA Yes. Let me get an after of it, though.

CDR-EVA Okay.

LMP-EVA Okay, Houston, we sampled about 3 meters southwest of the gnomon that was set up for the top of boulder soil sample. So it's a match pair, really, in that regard.

CDR-EVA Don't forget your gnomon.

LMP-EVA I'm not.

LMP-EVA Now I need to get a pan - are you in a pan?

CDR-EVA I'm - I've already started it.

LMP-EVA Okay, I'll go over near the Rover and get one.

LMP-EVA Okay, I got the gnomon.

CDR-EVA When do you want us to leave, Bob?

CDR-EVA Jack, do you read me?

LMP-EVA Yes.

CDR-EVA Hello, Houston.

CC Hello, 17. Loud and clear. We'd like you to leave immediately, if not sooner.

CDR-EVA Hippity-hoppity, hippity-hoppity, hippity-hopping over hill and dale. (Singing) Hippity-hopping along. Okay, my golly, this time goes fast.

CC That's affirm. Okay, and when you leave here - -

CDR-EVA Where did it go?

CC - - 17, remember that we want to pick up - -

CDR-EVA I'm giving you readings.

CC - - EP number 8. Roger. We're ready.

LMP-EVA Go.

Tape 97A/6

06 00 11 23 CDR-EVA 06 - 070, 031, and 401. 670, 031, and, 401.

CC Copy that. And when we leave we want to take EP number 8 with us, guys. We'd like the SEP turned back ON and the blankets closed. Okay, Jack, I guess that's your option, you may - -

LMP-EVA Let me ...

CC - - stop and take the charge off when you get to the distance or, if it's only a short one, you might like carrying it in your lap.

CDR-EVA Jack, I can hold it in my left arm on the seat.

LMP-EVA No, I'll get it. I'll get it.

CDR-EVA Okay, you want the SEP ON?

CC That's affirm.

LMP-EVA Okay, both DSEA and the other switch.

CDR-EVA You want the blankets open?

CC No, closed.

CDR-EVA Closed. Well, closed is - What happened to the Velcro on that other side? I thought they mounted that thing, so that - -

LMP-EVA It came off, Gene. It stuck to the Velcro.

CDR-EVA That thing they ... it. Okay, you got the TG. We'll get EP-8. The camera's going.

LMP-EVA We made a mistake earlier and it's too late to rectify it in carrying these charges.

CDR-EVA Oh, I don't know - -

CC Negative, Jack.

LMP-EVA We did. I wouldn't want - -

CC If you don't have it off, we could stop and get off and get it, if you want to? But this is a short distance. You might want to carry this one.

LMP-EVA That's right, that's right. I say the mistake was made earlier. There's no problem now.

CDR-EVA Okay, traverse to LM, low gain 100.

LMP-EVA Did you turn this on?

CDR-EVA It's all on, all squared away.

LMP-EVA Okay.

CDR-EVA Push that thing down and it'll stay. . . . Well, sometimes it will. Okay.

CC And how about a frame callout before you get back on, guys.

CDR-EVA Got it.

LMP-EVA Yes, I need some new - Do you want me to get it here?

CDR-EVA CDR's at 50.

CC Copy that.

LMP-EVA 170.

CC Copy 170.

LMP-EVA LMP's 170.

CC And, Jack, it'd be my opinion, since you're just going back over the same path, that you came up this morning, it's probably not necessary.

LMP-EVA Okay, I'll use it until it runs out.

CC Okay.

CDR-EVA I am out of film anyway.

LMP-EVA But when you leave me at - Okay.

CC Yes, we'll let - we'll let Gene take some of the photos near the bomb, on near charge, . . .

Tape 97A/8

CDR-EVA Just jump up again and get your bomb. Yes, there you go. You got to come this way quite a bit.

LMP-EVA Yes. Up this slope.

CDR-EVA This seat is rising with you, for some reason. There it is, I guess. You're all right.

CDR-EVA Up closer to you.

LMP-EVA Okay.

CDR-EVA Okay.

LMP-EVA Let's go.

06 00 15 16 CDR-EVA Okay, the switch is coming ON.

CDR-EVA Okay, traverse to LM: 12 minutes, 085/1.4. That's - Man, that says 086/1.4 to the LM, and my checklist 085/1.4. We must have landed where they wanted us to.

LMP-EVA Just about.

CDR-EVA Hey, Bob.

CC Roger.

CDR-EVA You know where we landed yet?

CC Well, we think so. We've been transsecting ... positions tonight.

CDR-EVA It must be - -

LMP-EVA It must be pretty close.

06 00 15 59 CDR-EVA You bet your life. I'm reading 085/1.4, and that's what my checklist said.

CC Roger.

LMP-EVA Okay, Bob, I guess my impression and it's purely pure interpretation right at this stage - that Camelot is mantled by whatever has formed the dark mantle.

CC Copy that.

LMP-EVA It does not seem to be mantled to the degree that Horatio is.

CC Okay, copy that, too.

CC And give us a mark when you're going.

CDR-EVA Oh, I'm sorry, Bob - -

CC And we don't have - -

06 00 16 58 CDR-EVA And we've been going about - a minute.

CC Okay, copy that. And we don't have battery temperatures there, if you could quickly give them to us.

CDR-EVA Okay, I never did give you that. It's 110 and 136.

CC Copy that, good enough. Thank you.

CDR-EVA Never did get that for you.

CC That's okay.

LMP-EVA But I tell you, the inner wall of Camelot is - the inner wall of Camelot to the east is certainly blocky.

CC Well, there were a few blocks where you guys were, too.

CDR-EVA ... mantle, too, Jack. Yes, well, I don't know, you could see the outer wall, too. It's - Hey, here's some Rover tracks.

LMP-EVA Hey, somebody's been here before.

CC Okay, and, 17, what we're looking for is deploying charge number 082 and 0.4 on the range.

LMP-EVA Okay.

Tape 97A/10

06 00 18 08 CDR-EVA Okay, we're at 083 and 1.1. We're just about
abeam the eastern rim of Camelot. And there's
Challenger.

LMP-EVA Hey, hello, Challenger. You can even see the
ALSEP.

CDR-EVA I think I'll go this way. (Laughter)

LMP-EVA Gee, it seems like a short day. (Laughter)

CDR-EVA Well, I'll tell you, the time went fast.

LMP-EVA Okay, you've heard about this country. Hey,
looking over there, though, there's no - we're
about - oh, 50 meters from boulders at - in
Camelot. And their appearance from this distance
is the same as what we sampled from 5. I think
we've pretty well identified the subfloor, Bob.

CC Okay, sounds like we have and sounds like from the
very deepest - even from the bottom of Camelot -
it looks like it's about the same.

LMP-EVA It sure does. I can't say I understand it. But
that's the way it appears right now.

CC You can't say what, Jack? Okay, understand that.

LMP-EVA I can't say that I understand.

CC Copy.

LMP-EVA Whatever filled this valley - it certainly was
different than the Massif. I think we've proved
that. And it, presumably, at least everything I
see indicates that it was an igneous extrusion of
some kind. Either that, or we're - the whole
valley's been tilted and we're looking at a - some
strange cross section, planar more or less -
relative to the other mountains, of a crystalline
body that was formed at depth. But I don't think
that's likely.

CC Okay.

06 00 20 29 CDR-EVA Man, we've covered 19.3 kilometers, Jack.

LMP-EVA Is that what we planned to cover?

CC That's outstanding.

CDR-EVA I don't know. What did we plan to cover, Bob?

CC Stand by. But we've been everywhere we've planned to go, so, we must have gone just about as far as we've planned to go.

LMP-EVA Yes, but it's a straight line. I don't know what the wander factor was, but I'm sure it was pretty high.

CC 17.6, they're telling me. So we went a little bit out of our way.

CDR-EVA Well, it's all mileage.

LMP-EVA 0.7 and what was the bearing? 08 - 083?

CDR-EVA 082, I think, but we want 1.4.

CC 0.4 - 0.4, guys - you - -

CDR-EVA Oh, 0.4.

LMP-EVA Yes, that's the range.

CDR-EVA Yes, that's what I said, 0.4.

LMP-EVA But you want - you want to bear north, don't you, a - little?

CDR-EVA Yes, I want - what'd you say, 082, didn't you, Bob?

CC That's affirm. That'll be close enough. It's probably be right on your track, there.

CDR-EVA Okay. Well, I don't make a habit of following myself. I like to cover new ground.

CC Okay, copy that.

Tape 97A/12

LMP-EVA Watch out for that new ground there looks like in the - look at the Italian flag.

CDR-EVA Hey, there is one there. I saw the box before I saw the flag. No, I didn't, I saw the flag first, I've got to admit it.

LMP-EVA Come on now.

CDR-EVA I got to admit it, I saw the flag first.

LMP-EVA The boss said you saw the flag first.

CDR-EVA I'm 082 and I'm 0.5. I'll just head right in towards the LM. Man, I want to stay away from ALSEP, I see the big boulders, so I'll - -

LMP-EVA Okay.

CDR-EVA I'm going to go around - -

LMP-EVA 0.5. Okay, you'll have to swing right after we deploy, probably.

CDR-EVA Yes. Whoo.

CDR-EVA Did we ever get any glass out of the bottom of those craters?

LMP-EVA No, we haven't, we've got to try to do that before we leave. There haven't been any good - -

CC Sometime you'll have time to do that, I guess, guys. I'm not sure when - -

06 00 22 40 LMP-EVA Four.

LMP-EVA Okay.

06 00 22 47 CDR-EVA Okay, 08, well, she just went to 1. Okay, 081/0.4.

LMP-EVA Okay, let's put it in that little depression there. See right ahead of us to the right.

CDR-EVA Okay.

LMP-EVA Can you - -

CDR-EVA Got your pictures?

LMP-EVA I'm getting them.

CDR-EVA Okay.

LMP-EVA Now just swing into that depression and I'll put it there. Beautiful. Okay. Oh, whoo.

06 00 23 12 LMP-EVA Okay, charge number 8.

CDR-EVA You didn't get a picture to the LM then, did you?

LMP-EVA Yes, I did. I got several of them.

CDR-EVA Well, we don't have to take any more, do we?

LMP-EVA No.

06 00 23 21 LMP-EVA Okay, antenna is deployed. Pin 1 is pulled and SAFE. And, let me check that. It's dusty. Yes, it's SAFE. Pin 2 is pulled and SAFE. Pin 3, pulled and SAFE.

CC Copy that.

LMP-EVA I guess as long as it didn't go off, it's safe.

CDR-EVA Ooh, don't bang it. (Laughter) I don't care what they say, that's a charge.

CDR-EVA You're having great luck with those.

LMP-EVA You're right.

CDR-EVA Okay, the LM was in the - approach shot, I believe, let me - -

LMP-EVA Go ahead and turn around - -

CDR-EVA Yes, I got to go around anyway.

LMP-EVA This was I can get a running shot of ... - right in the middle of it - let me get you - get them both in it.

Tape 97A/14

LMP-EVA Okay, I ran out of film, too.

CDR-EVA Oh, boy.

LMP-EVA Now that's pretty well located.

CDR-EVA Where is it?

LMP-EVA When you come around, take a picture of the LM on your camera.

CDR-EVA I will. I'll take it right out the front looking right at the thing.

LMP-EVA Yes, and give them a frame count. At about a 56 -

CDR-EVA Fifty-six.

LMP-EVA Bob, I've got the locator of the charge and the LM all in the same order here, and I'm one more than what I just gave you. I can't look at it now.

CC Okay, one more than what you gave me at station 5, understand.

06 00 25 00 LMP-EVA ..., Bob. You want me to go to the gravimeter now.

CC Roger. And if you guys will start out, we'll drive you by the ALSEP, Gene - Jack, and if you'll get out at the ALSEP, we'll have you take a look at the surface gravimeter and Gene can press on home to the LM.

LMP-EVA Okay.

CDR-EVA Jack, I'm going to drive you in this way, and then I'll drive all the way back around that one geophone.

LMP-EVA Okay. Shall I - -

CC While you're to the north, you could drive in toward the heat flow, towards that big rock, if you can see that.

CDR-EVA Yes, well, okay; that's as good as anything.

CDR-EVA Bob, you want me to get some ALSEP pictures?

CC Negative.

CC Okay, and Jack, you can stand by - -

06 00 25 49 LMP-EVA I got a flag.

CC - - for a feedwater dump very shortly. Okay, FEEDWATER, go to AUX, please.

LMP-EVA I just got it.

06 00 26 00 CDR-EVA Man, look at that mess of cable. I hope that thing's working, Bob.

CC Every - Well, a lot of it's working, we've just got to try and see if we can't level this thing tonight. When you get off there, Jack, I'll talk to you a bit about procedures for that. And in the meanwhile, it's my understanding - -

LMP-EVA Okay; that's good, Gene - -

CC - - that the second UHT is not in the immediate vicinity, where it's accessible, is that right?

CDR-EVA No, it is, I can get it.

CC Okay; if you can - -

CDR-EVA Okay, and watch my heat flow over there, don't trip over them.

06 00 26 38 LMP-EVA Okay, I'm going to take a pair of tongs - -

CDR-EVA Do you have any film at all?

LMP-EVA No, I want your camera.

CDR-EVA You want my camera?

CC Okay, Jack, you won't need - we aren't planning on taking the ALSEP photos right now.

Tape 97A/16

LMP-EVA Okay.

CC Okay. And, Jack, we're not sure you went to AUX on your water yet.

CDR-EVA ...

LMP-EVA I thought I did.

CC Okay, it's coming up, now, we see it coming, Jack, don't worry.

LMP-EVA Gene, can you - Okay.

CDR-EVA You got what you want?

LMP-EVA Let me take the set of tongs in case I drop something.

CDR-EVA Can you reach them?

LMP-EVA Yes.

CDR-EVA You got everything you need?

LMP-EVA Yes.

06 00 27 42 CDR-EVA Okay, Jack's got my camera and tongs, and I'm on my way.

CC Okay, copy that.

06 00 27 50 LMP-EVA Okay, I got a tone again, Bob. I got a tone again.

CC Okay, what's it say? Probably just your water - ... been building up - -

LMP-EVA I can't - I can't read my gages. Want me to take - -

06 00 28 15 CDR-EVA Well, we better take a look. Okay, I'm coming over there.

CDR-EVA I just - I think I just got my water tone, Bob.

CC Okay, that's right, also.

Tape 97A/17

LMP-EVA Okay, AUX water's ON. We got our tones - our tones yesterday. Can you see anything?

CDR-EVA Well, not unless - Let me see, let me brush your - Bend over. You don't have a brush to brush off. Okay, no flags.

LMP-EVA Hey, wait a minute.

CDR-EVA Okay. You got no -

LMP-EVA Huh?

CDR-EVA You got no flags.

LMP-EVA Okay.

CC You look good to us, Jack.

CDR-EVA Once more - a good look.

06 00 28 44 CC Jack, you look good to us.

CDR-EVA No flags. All right, no flags, Jack.

CC Okay, and, Gene, I think you need to GO AUX - -

CDR-EVA Okay.

CC - - if you didn't.

06 00 28 53 CDR-EVA Yes, I just did, Bob, and my water flag cleared.

CC Okay, copy that - -

CDR-EVA No, it didn't - not yet.

CC Yes, it's probably still coming up.

CDR-EVA Okay, Jack, just be careful of the cables.

LMP-EVA Okay, you want me to get a UHT, huh?

CDR-EVA It's right over there by the - -

LMP-EVA Yes, I know where it is - -

Tape 97A/18

CC If it's quite close, but if it's not, don't bother, I think we can probably try this by hand.

CDR-EVA No, it's there, Bob; he'll get it.

CC Okay.

CDR-EVA You got a heading for me at the Rover, is 017 good?

CC 018 - 018.

CDR-EVA Okay.

LMP-EVA You don't want me to kick the LEAM yet, huh?

CC Negative.

06 00 29 54 LMP-EVA Okay, Bob, I've got a UHT.

CC Okay, when you go back to the LSG, Jack, we first of all would like a reading of where the bubble is in the circle, whether it's in the center. And what we're going to have to have, unfortunately, is to have the bubble centered in the inner circle because the - this is, apparently, a requirement, even though we didn't train to it, apparently it's something that came up, and it's going to have to be within the inner circle of the bubble. The first thing we need to do is, when you go up there, is to see whether the bubble is in the center of the circle.

06 00 30 39 LMP-EVA Okay, Bob. That bubble is centered.

CC Okay. Okay, the next thing we want you to do is put the UHT in the socket there, and move the - -

LMP-EVA Hey, Bob.

CC - - LSG from side to side - -

LMP-EVA Bob - -

CC - - do not pick it up. Okay, go ahead, Jack.

LMP-EVA I did not have to touch it, it is centered.

CC Okay, but now they're worried that it's stuck like your gimbal thing was last night and, also, the thing is that maybe - we maybe - something's hung up inside, and by moving it we can jostle it free. They do not want it picked up, but they'd like to have UHT put in there and sort of have the instrument rocked from side to side to again see the bubble move. And once that is done, to then press it down into the ground and again realign it and put the bubble within the inner circle. Over. They would also like to see if the gimbal is free.

LMP-EVA How much do you want me to - how much do you want me to rock it? How far should I let the bubble travel?

CC Basically, we just want to see it move. You - you go up to the outer circle, that's - that's plenty. And again, you ...

LMP-EVA There's only one circle. Okay.

CC Oh, I mean the outer rim, the - the rim of it.

06 00 32 05 LMP-EVA Okay, I did that. It's still centered and gimbal is swinging.

CC Okay, we copy the gimbal is swinging and we copy you moved the bubble out to the edge of the bubble level and come back into the inner circle.

LMP-EVA That's right.

06 00 32 24 CDR-EVA Okay, Bob, I'm reading 089, 20.1, 002, 92, 88. Volts are 65 and 66. Batteries are 1 - 14 and 138. Rear motors are off scale low. Forward left is off scale low and right is 210 degrees.

CC Copy that. What's the first battery temperature there, Gene?

CDR-EVA First battery temperature is 114.

Tape 97A/20

CC Okay, Jack. They apparently don't believe you when you said you aligned it last night and they're concerned the shade is not on 20 degrees. Copy 114 on that battery temperature, Gene.

CDR-EVA It is on - It's on 20, Bob.

CC Okay. In that case, I guess you're free to come home.

06 00 33 28 LMP-EVA Well, what is basically the problem with it?

CC They haven't been able to level it for some reason, and they were afraid that the thing wasn't level. They were hoping also maybe by moving it that you might jostle it a bit and it would come to level, but I think we'll just have to think about it some more. The first presumption - the easiest solution was to have it unlevelled, which case we could fix it this way. But I guess that's not the case. We'll have to see what happens overnight. Give us a chance to follow the tradition of coming back to the ALSEP tomorrow.

LMP-EVA Well, do you want me to change it's posi - it's level a little bit - put it off level a little and see if you can work it.

CC I don't think so, Jack. That doesn't sound very good to me - -

LMP-EVA Well, it might be air in the level bubble or something.

CC Why don't you just leave it there if it's centered with the level bubble within the inner - within the inner circle there. That's the requirements as far as we can tell, and we'll just have to leave it overnight again. And why don't you come on back to the LM.

CC Okay, Gene, are you at the Rover?

CDR-EVA Okay. Yes, sir. I'm parked.

CC Okay - -

CDR-EVA Gave you my readings.

CC Okay. You gave me my - your readings and when you get done, let me know, because the first thing we want to do is work on the SEP a little bit.

06 00 35 00 CDR-EVA Okay. Stand by. Get TV. Okay. What do you want to do to the SEP?

CC Okay, Geno. When you go back to the SEP now, and let's do this first and get it out of the way, it'll - you can probably do this anyway while Jack's coming home. When you opened the blankets, remember that at the back of the SEP there was a piece of Velcro on the case and a piece of Velcro just above the - just inside the rear hinge on the covers, and this is what you sort of peel back when you go to remove the back end there so you can get the DSEA out. You remember that piece of tape there?

CDR-EVA Yes. That came off.

CC Okay.

CDR-EVA That came off.

CC Okay. This is on the side away from you as you stand facing it. Right?

LMP-EVA Oh, no. That's the side - Go ahead, Gene, I'm sorry.

CDR-EVA Okay, go ahead.

CC Gene, I'm - if you stand facing it, in the back away from you is this - there's a strip of Velcro on the case and there's another strip of Velcro on the blanket itself and this is the Velcro you have to tear off or to unhook, as it were, when you come to tear the blankets down to get the DSEA off. Remember that piece?

Tape 97A/22

CDR-EVA Yes, but that's on the - yes, that's on the side away from me. I'm on the LMPs side and that's on the other side.

CC Right. That's on the other side of the top. And what we're interested in, number 1, is that piece of Velcro still mated or when you open the blankets to cool it, does that Velcro come open? Over.

CDR-EVA Well, that's the Velcro that's so full of dust it comes open, Bob.

CC Okay, and so what happens - -

CDR-EVA Trying to stay - it's hooked - it'll stay.

CC Okay. Well, the feeling - -

CDR-EVA I don't know if you can see that but it's - Well, you can't depend -

CC Okay, well, feeling is that - -

CDR-EVA Bob, I swung the covers and - they will stay open about 150 degrees.

CC I - Stand by a minute. What you're saying is that the cover actually stands up a little bit in space.

CDR-EVA Now, if you want the cover open, I can open it and normally it should swing 180 degrees parallel with the top of the SEP.

CC Okay, but does that Velcro in back stay mated? - -

CDR-EVA Well, the Velcro holds - the way that we've been opening it - it holds. Yes, it's being mated but it - but it and probably it holds the covers open 150 degrees.

CC No. That's okay. What we're - talk - what the concern originally was was that when this - -

CDR-EVA The Velcro - -

CC - - happened, the front light was getting down in the back there and warming up the back of the SEP. That's apparently not the case. Over.

CDR-EVA No, that's not the case. The Velcro that came off is the Velcro that helps the - keeps the covers closed.

CC Okay. We were concerned about both pieces of Velcro since the one had come off.

CDR-EVA No. The other one is still on and it still holds in the back part of the SEP where the DSEA is in the shade.

06 00 38 22 CC Okay. I copy that. Okay. While we're talking about this and I'll get back with you, turn the DSEA and the receiver both to OFF, please. And read me a temperature, please.

CDR-EVA 112 degrees.

CC Copy that. And I mark them both off, right?

CDR-EVA Yes.

CDR-EVA Bob, I just dusted it as clean as it'll get.

CC Okay. Thank you.

06 00 39 46 LMP-EVA Hey, Bob.

CC Go ahead.

LMP-EVA I cheated on you.

CC I was sure you would. What did you do?

LMP-EVA I just sampled the glass in the bottom of a crater. I documented it by shooting the LM across the crater at infinity and then shooting the crater with stereop at 11 feet and in that cross-Sun pair at 7; and then I sampled it.

CC Okay.

Tape 97A/24

LMP-EVA Then I took a cross-Sun pair at 7 after.

CC I guess - I guess now gnomon is a LM.

LMP-EVA It's very fragile. That's right. It's very fragile, and I double bagged it. I don't know whether we can keep it or not.

CC Okay. We'll hope.

CDR-EVA You may think about how to preserve it.

CC Okay.

LMP-EVA While you're thinking, I'll put it on my floor pan, I guess. Okay. What do I have to do here?

CDR-EVA Get this bag off me to start.

LMP-EVA Get that bag off you to start with.

CDR-EVA Be careful of that sample there.

CDR-EVA Those are the cleanest battery covers in existence on a Rover right now, I tell you. Oh, you don't believe me - look at that.

LMP-EVA What?

CDR-EVA They don't believe me.

LMP-EVA Excuse me. Move forward just a little. And I'll get your bag. Here you go.

CDR-EVA Now you're stuck down there, aren't you? No you're not. Seems like you ... I may be going nuts talking to that moving machine over there.

LMP-EVA Boy, I - we don't need any hooks; I'll tell you.

CDR-EVA I know it.

LMP-EVA Can you stoop just a little bit.

CDR-EVA Yes, all that stuff is getting - There, it's fixed.

LMP-EVA Get your hook back.

CDR-EVA Okay. I hooked my harness back up so I don't forget that.

06 00 41 50 LMP-EVA Velcro's closed. Okay. You know as you look at those little sparkles in the soil we're walking on and they change colors on you - -

CDR-EVA Yes.

LMP-EVA - - Greens and purples, iridescent. Iridescent sparkles.

CDR-EVA Okay. I'll come over, and I'll unload your stuff.

LMP-EVA Okay. Now, we got more samples than we've got sense - I think. Let's see here - you got - you're taking care of the SEP.

CDR-EVA Yes, don't - that's all right. Okay. Hey Bob, the battery covers - or the covers are open on the SEP, rather.

CC Roger. Copy that.

CDR-EVA Oh, why did I do that?

LMP-EVA Hey, Bob, you think that glass sample would be better off in the SRC?

CC We're still talking about that.

06 00 42 46 CDR-EVA Wait a minute. Your core cap assembly empty. Up and away it goes. And that's all closed. Check your bag. Okay. Now, Bob, you've got to tell us which one of these you want in the SCB and which one you want just taken in because we got our numbers all confused.

CC Okay. Go ahead. What we would like to do here - -

CDR-EVA Got it.

Tape 97A/26

CC - - the closeouts, guys. Let me read this to you first of all. In the SRC, we'd like the following stuff along with - let's see - Stand by.

CDR-EVA Is this 9 or 6?

CC Okay, guys. We're going to follow an Apollo 16 mode and put stuff in loose, because they'd like to segregate stuff in the following way. Like to put the long can and four core tubes in the SRC. I guess it's going to take a long - going to take a while just carrying stuff back and forth. But they'd probably like to get this in, because it's a volatile stuff. They'd like to get the long can and three core tubes in the SRC number 1. And then we'd like to get all the SCB-4 samples in the same SRC. Over.

LMP-EVA Oh, wait a minute. Wait a minute.

CDR-EVA Yes. You want - -

LMP-EVA Okay.

CDR-EVA - - Three - three - three plus the long can; that's four cores all together.

CC Right. Put those in the SRC - -

CDR-EVA All samples from 4.

CC All the samples from SCB-4.

CDR-EVA Okay.

LMP-EVA These are 4. You want to get the core tubes in first, though.

06 00 44 40 CDR-EVA Yes. I want to put these in. If you'd give me the - Yes, I only got two hands. I'll come back by the time you pick them out.

CC Okay, and then, 17, do you guys remember where the trench samples - the three trench soil samples - which bag those were put in - from station 4? Over.

CDR-EVA Yes, let's see. I'm the only one who had bags, so I bagged them and put them in whatever bag Jack had. I think.

LMP-EVA Yes.

CC Okay, then that'll be SCB-4, so we'd like those in SCB-4. And that - those are the ones that will go in the rock box and that's in agreement with what we want to do.

CDR-EVA Okay, give me those other two cores, if you've got them, Jack.

LMP-EVA Okay.

CDR-EVA Long can.

LMP-EVA The long can. Here's a - oh. Got it? It's slippery.

CDR-EVA Yes, and we need one more core.

LMP-EVA One more core.

CDR-EVA Okay. That right now? Three core tubes and a long can?

CDR-EVA Yes, got them all.

CC And then - Roger that. And then SCB-4 - all the samples in SCB-4. We won't bother to try and sort them out, and then beyond that we'll fill them up with samples from SCB-5. Over.

CDR-EVA Which one's that? That's 5. Let me get 4, first.

LMP-EVA Here, hold this. I'll get it.

CDR-EVA Well, it's on the gate right there, just hanging. I just put it there.

Tape 97A/28

CDR-EVA Four is the one I had on there at Shorty? Or you had on at Shorty? Yes. You had it on. I don't know, but they should have that logged. That's - I don't remember who had it on.

LMP-EVA Well, now wait a minute. I - I took the trench. You held the bags, and I put them in you.

CDR-EVA You put them on me. Did I have 4 on at Shorty?

CC Yes.

LMP-EVA That's what they said.

CC That's affirm. That's why we want SCB-4 put in the - or dumped into the thing. But it's a dirty bag, so we just want to dump the samples in.

CDR-EVA Okay.

LMP-EVA Okay. And you want 5 to fill it up. Okay, Bob -

06 00 47 27 CC Okay. And, Jack, it probably would protect the glass a bit better if you put it in the SRC gently with the other rocks there. But particularly if you don't fill the SRC too full. But, again, we'll be putting SCB samples in there to more or less flesh it out if there's not too many SCB-4 samples.

LMP-EVA Leave a space for a sample, I guess, Gene.

CDR-EVA Yes, you'd better give it to me. There's not much space, it's going fast. You really - -

LMP-EVA Well, can you leave one -

CDR-EVA Where is the sample?

LMP-EVA Well, it's over here.

CDR-EVA I'll get it.

LMP-EVA No, I'll bring it to you. I just - There's some way to -

CDR-EVA Just set it in there. ... I'll be delicate with it. Take this bag back. Okay. It's in the right-hand back corner of the SRC.

CC Okay. Copy that.

LMP-EVA You're just about full - you - you got some left in there?

CDR-EVA I got some small ones and some big ones, too.

LMP-EVA Don't fill it too full.

CDR-EVA No. Hey, we got some big rock samples.

06 00 48 58 CDR-EVA Okay, Bob. SCB-6 and SC - wait a minute - what's in 6?

CC Six - probably nothing. But tell us - -

CDR-EVA No, there's samples in 6.

CC Okay. You should also have SCB-8 under your seat with samples in it.

CDR-EVA This is what I sampled at - -

CC At station 3, maybe.

CDR-EVA Six has the samples from - from - Yes.

CC Okay. Let's take up SCB-8 - -

CDR-EVA We have more samples today than Carter - -

CC And let's take up SCB-6 with a ... and why don't you dump out the Rover samples into SCB-6?

LMP-EVA Well, one reason not to take 6 is I don't know if I can get it off.

CC Okay. And let's save SCB-4 because I think you may need that tomorrow.

CDR-EVA Four is on the rack, empty.

Tape 97A/30

CC Okay. How about SCB-5? Is that only partially emptied, or is it totally emptied?

CDR-EVA Oh, it's about half full, Bob.

CC Okay. We'll take that up with us.

06 00 50 08 CDR-EVA Bob - Bob, I've already - Let me tell you what I've done. I've got SCB-8 full.

CC Okay. Copy that.

CDR-EVA Let's take it up.

CC Roger. On that.

CDR-EVA It's got Rover samples in it.

CC Okay.

CDR-EVA But I can't get them all. They won't all be in there.

CC Okay, 8.

CDR-EVA Okay. Bob, the seal was clean. It was clear, and I got - I got your four cores - three cores, plus a long can. I got Jack's glass. I got SCB-4 and a couple of samples out of SCB-5.

CC Copy that. Sounds great.

CDR-EVA Okay. Now where was I? You got me all out of whack, here.

CC That's affirm.

CDR-EVA Core cap dispenser - Okay, you're clean cosmic ray is done. SCB-5, yes, okay. Now, Jack, we've got SCB-5 that's half full. What have you got over there?

LMP-EVA Bring it over here, and I'll put it into 6. Six is half - is a little more than half full.

CDR-EVA Well, this is a little less than half full. Okay.

LMP-EVA That ought to make one full bag. Hey, these are big rocks so they'll come out easy. Where's that big, big rock we got? That's in one of those bags, too. Picked up a big rock - here let me see if I can't dump it. How's that for a lunar dump, huh? Perfect.

CDR-EVA I want to see if I can't dust - did you lock this one over here? - No.

LMP-EVA Hey, don't lock those - -

CDR-EVA No, I'm going to see if I can dust them and make them work easier.

LMP-EVA Boy, I'll tell you - I really had to pull. I pulled harder than I like to in a pressure suit.

CDR-EVA See if I can -

06 00 52 15 CDR-EVA Okay, Bob. SCB-8 and 6 are going up.

CC Okay, and I understand 5 will be - -

CDR-EVA ... go up.

CC - - on the gate.

CDR-EVA Yes, sir, Bob. It'll be there.

LMP-EVA And 7 under the LMPs seat.

CDR-EVA 4 and 5 will be on the gate. You know, here's a problem for you tonight. You got any way of freeing up these gate hinges that lock the bags on? They're - I'm dusting them, but they're not going to lock - any of them. They're frozen tight, just about.

CC Okay. Copy that. We'll talk about it.

CDR-EVA If you do get them locked - if you do - if you do get them locked, you may never get them off.

CC Okay. We'll give them something to work on overnight.

Tape 97A/32

CDR-EVA Okay, I'm - I'm dusting them right now. But it -
I still can't free them up.

LMP-EVA Man those are heavy bags.

CC Jack, have you got the top of the bag closed?

LMP-EVA Yes, what do you need?

06 00 53 19 CC Okay. No. John thought maybe you were still open.
We were worried.

LMP-EVA Oh, no, I latched them. I'll check them again
before I go up.

CC Okay, and we got no FSRs underneath the seat. We
understand. Roger.

LMP-EVA No, if - I just checked and it's - it's all - they're
all in the bags. And the Rover sample bag is
empty.

CC Copy that.

LMP-EVA Not nothing left.

CDR-EVA Bob, Bob, neither one of these bag lachers are
going to latch on the back. I dusted them, but - -

CC Okay. - -

CDR-EVA - - They're not going to work. I can't free them
up - -

CC We'll talk about it tonight - -

LMP-EVA We'll use the seat.

CC - - Don't worry about it now.

CDR-EVA Yes, we can probably - we can probably use the seat.
We've got a little more room than we had. Okay.
Let me get something else done.

LMP-EVA I wonder if I ought to take a sample bag holder up
there to see if I can fix that, to see if it fixes.

CC Roger, Jack. I'd suggest that.

LMP-EVA Probably ought to, huh?

06 00 54 28 CDR-EVA Okay. Receiver's been dusted and blankets are open; power is OFF and OFF. Okay. I'm going to take the TGE off now, or dust it and then take it off, and then just leave it there. Hey, congratulate Jose on that fender will you, because I think he just saved us an awful lot of problems. He and whoever else worked on it.

CC He mumbled something very humbly about a thousand guys.

CDR-EVA Well, tell him - tell him that's going to be my bring home present to him - a picture of his fender.

LMP-EVA Okay, Bob. Unused gear, which you have an inventory on is in the - under the LMPs seat.

LMP-EVA Okay. Where am I?

CDR-EVA I'm bringing the TGE over here, but I'm not pushing it yet.

CC Okay. Copy that.

06 00 55 42 LMP-EVA Cosmic ray's deployed. Man, I got the sorest hands in the world, right now.

CC How about on the Moon?

CDR-EVA (Singing) Nothing's in the big bag, is it?

LMP-EVA I just can't compete with you astronomers.

CC Just keep trying.

CDR-EVA Nothing's in the bag, is it? Big bag?

LMP-EVA Nothing's in the big bag.

CDR-EVA Okay.

Tape 97A/34

LMP-EVA Unless there's one rock that disappeared yesterday.
I don't know what happened to it.

LMP-EVA Hey, we forgot the polarizing filter work.

CDR-EVA Yes, I saw it on the checklist, and I mentioned it
to Bob, and he didn't come back with anything.
And there was -

CDR-EVA Okay. I guess I'm going to go ahead and - -

LMP-EVA Put those in the - under that seat, please.

CDR-EVA Yes, there's only one left.

LMP-EVA One? No, there's three or four - -

CDR-EA There's three left.

LMP-EVA Just put them under there. Who knows, we may need
them at the rate we're going.

CC Okay. And, Jack, while you're unloading there - -

CDR-EVA Dust TV before I pull those breakers.

CC - - on the 500 millimeter, you might squeeze off
a few shots of the North and South Massif there,
if there's any lineations visible.

LMP-EVA Okay. I'm - I'll give it a try. Why, are we
ahead of time?

CC No, we're working right on time.

LMP-EVA Okay.

CDR-EVA Why don't you give it to me while you're packing
the ETB, Jack; I'll do it.

LMP-EVA Am I - am I behind you, now?

06 00 57 18 CDR-EVA Yes, I - I just - I'm going to start inventorying
the Rover and pulling the breakers so - Man, we
are so far off nominal on what bags. (Laughter)
I sort of didn't think - The checklist is going to
have to be updated, I guess.

CC Totally.

06 00 57 52 LMP-EVA Oh, I should call - mag Charlie.

CC Copy that.

LMP-EVA Mag Kilo.

CC Copy.

LMP-EVA Mag Bravo.

LMP-EVA Mag Golf.

LMP-EVA Mag India.

CC Copy all those. And tell Gene that we can confirm that his lens cover's off.

LMP-EVA Okay. Confirm that your lens cover's off. The scissors are in.

CC Copy that.

LMP-EVA Lens brushes.

CDR-EVA I hope that's at the right setting. It is (laughter).

LMP-EVA Hey, try f/5.6 directly down-Sun or up-Sun at that Sculptured Hills there in the - in the distance. See where I mean?

CDR-EVA Yes I get it.

LMP-EVA Okay, Bob. What else do I need Here? Let's see. 500, mag R, need mag R - as soon as you're through.

CC Yes. I think we've got enough of those now, Gene. You got the maps?

LMP-EVA Yes, got them.

CDR-EVA Some of these won't overlap, Bob, because I'm hurrying.

LMP-EVA Don't - Don't smear them.

Tape 97A/36

CC Don't - Don't hurry and smear them.

CDR-EVA They're not smeared, but I just didn't overlap some of them.

CDR-EVA Okay. Everyone agrees to that. Don't hurry and smear them (laughter). I'll get those others, Jack, tomorrow.

CC Okay. You got the maps in there, too, Jack?

CDR-EVA Frame count, Bob, is -

LMP-EVA Yes.

CDR-EVA Frame count is 152 on the 500.

CC Copy that.

CDR-EVA (Laughter)

LMP-EVA Let go of it. There.

CDR-EVA Okay.

LMP-EVA Dynamic. Did you cycle it twice?

CDR-EVA No, I'll cycle it twice.

CC Do you have the maps there, Jack?

CDR-EVA Okay. I guess I'll go in and pull some Rover breakers.

CC Okay. And - Roger. Copy that.

CDR-EVA Oh, boy - Oh, boy. Pulling - pulling breakers is not going to be much fun.

LMP-EVA You want me to - you want the scissors or something?

06 01 00 51 CDR-EVA No. Oh, boy. Oh, boy.

LMP-EVA Mag Romeo.

CC Copy that. You got the maps, Jack?

LMP-EVA No. (Laughter) You ask me that one more time partner, and I'm going to get mad at you.

CDR-EVA Oh, I got - What have you got over there - you got the scissors?

LMP-EVA Yes, you want them?

CDR-EVA I got three or four breakers. Let me try this other one one more time. Okay. I got it - with the old fingers.

06 01 01 36 CC Okay. Copy that. All four of them out, Gene.

CDR-EVA Okay; Alfa, Bravo. Yes, sir. Alfa, Bravo, Charlie, Delta are OPEN. I'll get the LCRU power.

CC Okay. And, Gene, when you leave the camera, a reminder to face it away from the Sun and tilt it down.

CDR-EVA Okay.

CC Hey, Gene. That's not quite away from the Sun. Really it ought to be, you know, down-Sun.

CDR-EVA I'll *** I'll get it, Bob.

06 01 02 29 CDR-EVA Bob, are you reading?

CC Roger. Loud and clear.

LMP-EVA I read you, Gene.

CDR-EVA Yes. See, I just turned LCRU power off; they got to go through the LM. I got to go through the LM.

CC That's right.

CDR-EVA Bob, do you read?

CC Loud and clear.

LMP-EVA Is this gravimeter working?

CDR-EVA No, it's not. I didn't push it yet. Hello, Houston, come on - In other words, I'll turn this power back on.

Tape 97A/38

CC Read you loud and clear, Gene. Do you read Houston?

CDR-EVA Well, let me turn it on and talk to them.

CC We read you loud and clear, Gene.

06 01 03 13 CDR-EVA Well, I just turned the LCRU back on. Are you reading us through the LM, now?

CC Yes, we came through the LM that time.

CDR-EVA Okay. I'm turning it off and the - and the camera is pointed down and it's pointed effectively to the west - down-Sun.

CC Okay. Copy that. Very good. Thank you.

06 01 03 27 CDR-EVA LCRU POWER's going OFF. Okay, LCRU POWER is OFF. Battery covers - open battery covers. They're all dusted already.

CC Roger that. Roger. They're reading us. 17, you read Houston?

CDR-EVA Uh-oh, I got to - got to work on one battery.

CC 17, you read Houston?

CC 17, you read Houston? Over.

CDR-EVA Hey, Bob - -

CC Roger, 17. Do you read?

CDR-EVA Still there? Well, they're supposed to be going through the LM ...

CC 17, do you read Houston?

LMP-EVA Got something fouled up. Maybe we got the switches wrong, or something, up there. ... think so, though.

CDR-EVA No.

LMP-EVA They talked to us first.

CDR-EVA Let me give them a call.

CC 17, do you read Houston? Over.

06 01 05 09 CDR-EVA Bob, you want to try again. We're on the LCRU. Yes, we read you, but I'm on the LCRU again. We're not reading you through the LM.

CC Yes, I don't understand that. Stand by. Press on with the rest of the closeout.

CDR-EVA Well, I'll leave you on the LCRU, here. And we're pressing on. Okay. For the first time, I've got to dust the center battery cover. All the others are good.

CC Okay. Roger, 17. Do you read Houston now?

CDR-EVA Well, yes, but I'm on the LCRU. I don't know.

CC No, now they say we're going back to the LM again. Press on with the closeout.

06 01 05 46 CDR-EVA Okay, Bob. I'm going to go turn the LCRU POWER, OFF. And for the first time, I've got to dust the center radiator on the batteries.

CC Okay. Copy that.

CDR-EVA ... until this time, they've all been real clean.

CC Copy that.

CDR-EVA Okay. Give me a short count. And in the interim I'm going to turn the LCRU POWER, OFF.

CC Okay. Roger. 1-2-3, 3-2-1. Okay, Houston, or 17, do you read Houston? Over.

06 01 06 15 CDR-EVA Okay. We've got you.

CC Okay; very good.

CDR-EVA Yes. We got you, Bob.

CC Okay. We've got about 20 minutes before we have to be inside the LM there, fellows. Let's hustle on.

Tape 97A/40

CDR-EVA Oh, I think we'll just sort of take it easy, Bob. Okay. The MESA's tidied.

CC Thank you.

LMP-EVA I've got the canisters; pins are green.

CC Copy that.

LMP-EVA The LM canister's in the pocket.

CC Very good.

LMP-EVA And, let's see. I think I'm ready to dust. Could I help you?

CDR-EVA No, I'm leaving here right now.

CC Okay. And, Gene, as you go by, how about giving us the SEP temperature readings.

CDR-EVA ... I got to take these bags up. Oh, me. I will.

CC 17, Houston. It's awfully quiet.

06 01 07 55 CDR-EVA Okay, Bob. Here's your reading. About 100 and - about 108 to 10 degrees.

CC Okay. Copy that. Okay. We'll leave it there, as is, overnight. Thank you.

CDR-EVA And I'll give it one good little smack with the brush. And it's as clean as it'll ever come.

CC Okay. Thank you.

CDR-EVA Jack, you might just as well go cold water. There's no more use for it now, if you're warm.

LMP-EVA No, I'm not warm I'm just - want to hand me that other SCB there.

CDR-EVA Oh, man! (Laughter). Oh, the - The cover's open on this one.

LMP-EVA You wonder why it's hard to get up the ladder.

CDR-EVA Don't hold it by the cover.

LMP-EVA What do I want these tongs on for?

CDR-EVA Give them to me. I'll take them out.

LMP-EVA Just noticed them.

CDR-EVA Don't want them.

LMP-EVA Okay. Thank you.

CDR-EVA Don't take it by the cover. The cover's going to come open. Take it by this.

LMP-EVA Wait a minute.

CDR-EVA Got it?

LMP-EVA I got it.

CDR-EVA Okay.

CDR-EVA Probably got tongs on for the same reason I've got them on.

06 01 09 49 CC And, 17, we're ready for a grav measurement.

CDR-EVA Yes, sir, Bob. Just cleaning up the Rover. Getting our tongs out of the way.

CC Okay.

CDR-EVA And for your information - for your information, at this heading, the - the western-most battery cover, like I talked about yesterday, is just starting to cover the - just started to cover the radiators.

CC Okay; cover that - copy that.

CDR-EVA (Humming) You know, I think another good day's work.

LMP-EVA Yes. Okay. I dusted all that. I just knocked as hard as I could, on my feet, several - several times.

Tape 97A/42

CDR-EVA What you're going to say is you want me to brush you, huh? Well, let me keep this out of the way so it doesn't get dusty.

LMP-EVA Okay.

CDR-EVA Wonder if our bouncing around that gravimeter is going to disturb it like this.

LMP-EVA Shouldn't.

CDR-EVA Got to do - well - -

LMP-EVA ... Want me down.

CDR-EVA You got to do me first.

LMP-EVA Yes. Plink.

CDR-EVA You're not nearly as dusty as you were yesterday; you're just dirty, that's all.

LMP-EVA Well.

CDR-EVA I think I can get everything off my shoes by banging, if you'll just get my arms. I didn't really fall in much today, except maybe my left arm. But - -

LMP-EVA I tell you, we saw some of the things I think we saw today. We both fell in (laughter).

CDR-EVA Don't. Oh!

LMP-EVA What? I hurt you?

CDR-EVA Yes, you're hitting.

LMP-EVA Well, you're right. Sorry. I don't have much control (laughter).

CDR-EVA (Laughter) I know it. That's the way mine feels. That's dirty. There.

LMP-EVA I'm glad they can't see this.

CDR-EVA Oh, I stand out here and I look at that flag, and I look at the Rover, and I look at those massifs. It's still hard to believe.

LMP-EVA What did we deserve to do - do to deserve being out here, huh?

CDR-EVA Okay. That's not very good. Let me get your - some - your PLSS, here. Keep - go forward just a little. ... There you go.

LMP-EVA Think your sharp turns are - Hey, that fender is - is really a classic. One might say it's a Young fender; just put it on.

CDR-EVA Do we need, do we really need those clamps? ... clamps?

LMP-EVA No. No.

06 01 12 53 CDR-EVA I can't think of anything we need them for. That - that light - but you can tie that light somewhere - -

LMP-EVA We don't - well -

CDR-EVA I might bring one back.

LMP-EVA Yes. We ought to leave one in tribute - Dr. Young.

CDR-EVA Oh, that orange soil was something.

LMP-EVA Huh?

CDR-EVA And the way it went radially down that - down that crater. Let me turn, and then take another look, and then I'll - then you get up there.

LMP-EVA You got quite a bit around your hoses here.

CDR-EVA My hoses?

LMP-EVA Okay, and I don't know what I can do about it, Geno.

CDR-EVA Oh, just give it a swap ...

Tape 97A/44

LMP-EVA Well, I got it the best I could. Let me get the top of your LCRU there.

CDR-EVA Mine's pretty good.

LMP-EVA ... RCU.

CDR-EVA Yes, mine's good. Okay. Let me get to your front.

LMP-EVA No, I didn't get your other arm here.

CDR-EVA Okay.

LMP-EVA I don't know that I can.

CDR-EVA It's the inside arm. I don't have anything on it.

LMP-EVA No, that's right. You don't. It isn't - it's about the same.

CDR-EVA When you fall out - you fall out on your other arm.

LMP-EVA I've got - there is some on that leg there.

CDR-EVA Okay.

LMP-EVA Don't know what I'm going to do about it. I think we're just going to have to make do.

CDR-EVA Let me see what I can do with you. Just look at me.

06 01 14 22 LMP-EVA What is this rock, right here, by the pad.

CDR-EVA I don't know - I. Did I just turn your comm? Do you still hear me?

LMP-EVA Yes. I've just been intending to mention that several times. Anybody that lands on a rock ought to have their head examined.

CDR-EVA Put their ladder - Boy, where have you been again today?

LMP-EVA Oh, I played some games there around station 3. I'm sorry.

CDR-EVA Boy, oh, boy!

LMP-EVA Wasn't intentional.

CDR-EVA Whoo - But I - lot of your turns - -

CDR-EVA Hold your arm up. Hold your arm up.

LMP-EVA Lot of your turns threw dust - -

CDR-EVA Yes, I noticed that (chuckle).

LMP-EVA - - on me.

CDR-EVA Gosh dang that rock! If I was strong enough, I'd move it. Hey, I am strong enough. That's one we ought to bring home.

LMP-EVA Well, if we can't fill up the LM with everything else.

CDR-EVA That's about the size of the S - SRC. Stand up on the pad. Oh, shoot! First time that's happened.

LMP-EVA Here, hold on to me.

CDR-EVA You know, by rights, that should of happened more. I want to get around back and then I want you to get up on the ladder some. Oh, man, let me get the back of your PLSS. What did you bump against? I guess that's from the Rover seat.

LMP-EVA I think it is.

CDR-EVA No, I mean you got a couple abrasions right on through the - -

LMP-EVA So do you. I wasn't going to mention them.

CDR-EVA Well, these are only a pin-hole thick, but - -

LMP-EVA All I can say is it's better than walking.

CDR-EVA Oh, man, I'll tell you, we covered over 20 kilometers today, babe. You like to walk up and down those hills and ditches at 20 kilometers? Okay. Can you - turn towards me? I want to get the front of your legs one time (laughter). Come back.

Tape 97A/46

06 01 16 41 CC Okay. And, 17, Houston - how's the dusting coming?

LMP-EVA Man, you've had your day of dusting, haven't you?

CDR-EVA Well, we're almost there. I'm going to send the LMP in in about a minute.

CC Okay. We're getting to a point where we need - -

CDR-EVA Oh, I tell you, I've ... more hours ... dustbrush - -

CC - - where we need to be inside in less than 10 minutes, with the thing closed up.

CDR-EVA Yes, sir. We're on our way, Bob. That takes care of it. Knock your feet off, Jack. Knock your feet off on the ladder.

LMP-EVA Okay.

CC And don't forget the antennas, guys.

LMP-EVA Okay. I need the pallet.

CDR-EVA Oh, Bob, you're a beauty. How did you think of that?

CC John suggested it.

CDR-EVA John who? (Laughter) He strikes again. You'd broke yours off sure, because I wouldn't have seen it as you went up unless I took inventory with my book, which I'll do here in a minute. Open battery covers, taken care of; dusted LCRU; blankets open 100 percent. They've been open 100 percent all day.

CC Okay.

LMP-EVA If I can just get up here. Oh, shoot. I forgot a snap up there.

CDR-EVA Now, let's make sure we got all of those. I don't want to get hung up on anything.

LMP-EVA Here. I mean I forgot to put the antenna under the snap - under the other thing.

CDR-EVA ... get the snap.

CDR-EVA Okay. Get it.

LMP-EVA Okay. You're set.

CDR-EVA Okay. Go on up, Jack, and I'm going to read the gravimeter.

06 01 19 00 LMP-EVA I need that pallet before I go.

CDR-EVA Okay.

CC Okay, and, Gene, we don't think you've punched the grav reading yet.

CDR-EVA Yes - Yes, I did, Bob. I'm going to read it for you in a minute.

CC Okay.

LMP-EVA Okay.

06 01 19 24 CDR-EVA The reading is 670, 023, 501; that's 670, 023, 501.

CC Okay. We got that. Go to STANDBY. Open the cover and dust the radiator if it needs it. Or dust the radiator, period.

06 01 19 47 CDR-EVA It's dusted already - it's dusted already, I took care of that. And I'm in STANDBY.

CC Okay. Copy that.

CDR-EVA Okay. Final check - LRV. Blankets open 100; battery covers, open; samples off. We checked under both seats. Equipment stowed. Okay. You're all clean to go in. Okay. Dust SEP, blankets open; verify POWER, OFF; RECORDER, OFF; TGE, that's read, that's where I dusted. Tidy the MESA blankets - they're okay. Okay, and I've got this box to bring up when I go. Okay, let's see - Oh, man, that's bright - no PLSS antenna, brush the ladder hook, EVA pallet to LMP - you got it - the pins are green and reading, STANDBY, open TGE thermal cover lid and dust - that's done. Final check: we got the pallet, ETB is on the hook, you inventoried the S-IVBs [sic], Mr. Parker, and I guess you're happy we got them all.

Tape 97A/48

CC Roger.

CDR-EVA SRC-2 is in my hand. The big bag is not required.

CC Roger that. And we're ready to call you all in as you go through the hatch.

05 01 21 05 CDR-EVA Okay. Jack's going in with the -

CDR-EVA Okay, Jack's halfway through it now, and I'm going on up the ladder.

CC Okay. Copy that.

CDR-EVA Oh, my; oh me. How you coming?

LMP-EVA Just about there.

CDR-EVA Oh, that's a nice one-handed first step. Godspeed the crew of Apollo 17. I'm going to keep reading that. I like that message. How's Captain America, speaking of Apollo 17.

CC Captain America is sound asleep - just about to come around to AOS. We think he's sound asleep.

CDR-EVA Hey, how does that always happen? That happened yesterday.

CC He got up before noon this morning, too.

CDR-EVA Oh, okay. Just take it easy, Jack, it'll - here you go - -

LMP-EVA Pip pin didn't work.

CDR-EVA Lot of things don't work when your hands get tired; that's the problem. Wasn't a bad day. How long we been out, Bob. Of course, we're still out.

06 01 22 37 CC 7 plus 27, so far.

CDR-EVA 7 plus 27?

CC How does that grab you?

CC Well, we're getting anxious to get you in and get the hatch closed.

LMP-EVA Well, we understand that.

06 01 22 57 CDR-EVA Jack's unloading the pallet and as soon as it comes out, I'll shove this stuff in, and we'll be gone.

LMP-LM Just takes a certain amount of time.

CC Okay, Gene. Are the three SCBs inside the hatch already?

CDR-EVA No - Bob, I don't think any of them are inside. Let's see I've got - -

LMP-LM No.

CDR-EVA - - I've got 8 here and 6 here and - and we emptied the contents of 4 into the - -

CC Roger.

CDR-EVA - - SRC, and we emptied the contents of 5 into one of these other two bags. So we've only got two of them here, plus the SRC.

CC Roger that.

CDR-EVA Five went into 6.

CC Roger that.

CDR-EVA And we've got two of them hanging on the tail of the Rover. And I don't know what it is under Jack's seat right now.

LMP-LM Seven is under my seat.

CC We copy that. Don't worry about it.

06 01 24 03 LMP-LM One more battery, Geno, and it's yours.

CDR-EVA Okay.

LMP-LM You always used to stand and watch me do this, anyway.

CDR-EVA Yes, but we had some long EVAs at the Cape, but -

Tape 97A/50

LMP-LM There you go.

CDR-EVA Okay. Just be careful of the - let me get up there a little farther. Careful of that hatch. Getting to look like a regular garbage dump down there.

LMP-LM Okay. Ready?

CDR-EVA Sorry, babe.

LMP-LM It's all right.

CDR-LM Now, this one's going to come open if we're not careful. Let me see if I've got one more step to go up. No I think that's the last one. I'll just hold it here until you get it. I could shove that in if I push it with the SRC. Jack, the cap'll come open. Be careful.

LMP-LM Okay. We got big silver box.

CDR-EVA Can you push on that a little bit?

LMP-LM Yes.

CDR-EVA Okay.

06 01 26 13 CDR-EVA Okay, Bob, you've got the two SR - two SCBs -

LMP-LM I'll push it in.

CDR-EVA - - SRC, and there goes the ETB.

CC Copy that. Now how about a CDR?

CDR-EVA There's only one thing left - that's right, that's the only thing left out here.

LMP-LM Are you on a checklist?

CDR-EVA No, I'm not even on my checklist, but I guess - Yes, I am, it says INGRESS. Let me knock some more dust off.

LMP-LM Okay. Let me get behind the door.

CDR-EVA Well, I'm going to take what dust I got in with me. Oh!

06 01 27 08 LMP-LM Push. There you go. Keep ... close. You're good. Beautiful. Just float in. Hanging up a little on the purse, but that's all right. There you go.

CDR-LM Oh!

LMP-LM That's my arm I'm getting in the way, there - Let me get out of the way -

CDR-LM Let me just check that seal before we close that. Okay. Can you get your arm off?

LMP-LM Okay.

CDR-LM There's no big rocks in it, that I can see. Lots of dust on the floor.

06 01 28 11 LMP-LM Yes, I think it's okay. Okay, the hatch is partially closed - -

CDR-LM Let me get it. I think it says to lock it, doesn't it?

LMP-LM Well, we're supposed to close our water first.

CDR-LM Okay, FORWARD HATCH, CLOSE and LOCK; dump valves both AUTO, okay; confirm our water CLOSED. Let me see if I can't get my ... here.

LMP-LM Here, why don't I get yours and you get mine.

CDR-LM Okay. I just got mine. And if you'll turn, I'll get yours. You'll have to - your PLSS - your right arm high; pick it up high.

LMP-LM Oh, wait a minute.

CDR-LM No, I can't reach you, Jack, unless you turn -

LMP-LM Don't move yet; don't turn around.

CDR-LM Okay.

LMP-LM Move over to the corner.

CDR-LM Okay. ... sure I got the right ones. Far right, far left, secure oxygen. Okay. Your water's OFF.

Tape 97A/52

LMP-LM Okay. Water's OFF.

CDR-LM Now, stay there and I'll lock the hatch.

LMP-LM I've got to get into position to do the other good things. You go ahead.

CDR-LM Am I - Do you have enough room or do I need to turn? No, let me get down there. Now, why can't - -

LMP-LM Okay. Let me turn back; get out of your way. Got it?

06 01 29 44 CDR-LM Okay. Hatch is closed and locked.

CC Okay. And remember, I think it's the overhead valve that you have to position to OPEN.

LMP-LM That's right.

CDR-LM Yes, you'll have to move over, Jack, so I can reach it.

CC And you ought to verify both, I guess.

CDR-LM You're going to have to wait, then.

LMP-LM Can you reach it now?

CDR-LM- Okay. No, you got to - got to swing left - -

LMP-LM Well, I'll have to -

CDR-EVA - - Right.

LMP-LM I'll have to turn around, then. How's that? Any better?

CDR-LM No, you've got to - Okay.

LMP-LM Gene, for some reason I can't put my PLSS toward you.

CDR-LM No, you can't. Just face front, if you can, and move as far forward as you can.

LMP-LM Well, if I get my - I'm going to have to go all the way around, I guess.

CDR-LM Well, just -

LMP-LM Look, I've got to get the PLSS against the circuit breaker -

CDR-LM Wait. I've got you just where I want you. Now stay right there, and shift your weight as far to the right as you can.

06 01 30 48 CDR-LM Okay, it's AUTO - -

LMP-LM Okay.

06 01 30 50 CDR-LM - - and it's - and it's locked. Okay?

LMP-LM All right.

CDR-LM Now, CABIN REPRESS - AUTO. Can't get it. I'll have to turn left, here.

LMP-LM Huh?

CDR-LM Okay. Let me turn left.

LMP-LM No, I can get it.

CDR-LM Okay. CABIN REPRESS, AUTO.

06 01 31 12 LMP-LM AUTO.

CDR-LM And at 16, CABIN REPRESS breaker, CLOSED.

06 01 31 16 LMP-LM CLOSED.

06 01 31 18 CDR-LM MASTER ALARM and CABIN warning lights. Cabin's coming up, Bob, 0.5.

CC Copy that.

LMP-LM I've still got 15 percent oxygen.

CDR-LM Okay. Cabin pressure's increasing - go PRESSURE REGs A and B, CABIN.

06 01 31 44 LMP-LM A CABIN.

Tape 97A/54

CDR-LM Okay. And you PLSS O₂ OFF at cabin greater 2.5.
It's there now. And you're probably getting
talked to.

06 01 32 05 CDR-LM Mine's OFF.

06 01 32 06 LMP-LM Mine's OFF.

06 01 32 08 CDR-LM Okay, cabin's up to 3.5, cabin's up to 4.0.

CDR-LM Okay. Next thing, Jack, you can start verifying
your white dots are out.

LMP-LM Okay.

CDR-LM And you can use your PURGE valve to depress, if
you have to.

LMP-LM Well, I don't think I have to. Okay; white dots.

CDR-LM Wait a minute. White dot's plus for you, EVA decals.

LMP-LM Okay, I'm good here, here, here.

06 01 32 54 CC And, 17, congratulations. That was two EVAs
and a half.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 01 33 03 CDR-LM Thank you, Robert, but until I get my helmet and gloves off, I won't say anything. Okay, Jack. On 16, ECS SUIT FAN 2, CLOSED.

06 01 33 10 LMP-LM CLOSED.
CDR-LM SUIT FAN DELTA-P, CLOSED.

06 01 33 13 LMP-LM CLOSED.

06 01 33 14 CDR-LM Okay. MASTER ALARM just came on. Okay. And the HEATERS, MESA, OPEN. You can OPEN your MESA HEATERS. We're getting a MASTER ALARM, Houston. I don't know why.
LMP-LM I think that's the - -
CDR-LM You did get SUIT FAN number 2?

06 01 33 33 LMP-LM - - got the SUIT - SUIT FAN DELTA-P ...
CDR-LM Okay. You've got SUIT FAN number 2 and me - and DELTA-P. Okay. - -

06 01 33 39 LMP-LM MESA is OPEN.
CDR-LM Okay. ECS cau - That's why it came on. ECS CAUTION WATER SEP light - component light should go out after that fan comes up. You can doff your glove.
CC Roger. We think that's what happened.
CDR-LM Okay.
CDR-LM Well, I never thought I'd wear my EV cover gloves through two EVAs.
LMP-LM Oh, I forgot all about them.

CDR-LM No, I didn't. I thought about taking them off until I started chipping those boulders. And I'm glad I wore them.

LMP-LM Yes, I think it's a good idea.

CDR-LM As hard as it is on your hands, mine - these cover gloves are just ripped to a nub. Glad it's not my gloves.

LMP-LM I might consider taking them off tomorrow.

CC Roger, 17. You talking about your cover gloves?

CDR-LM Yes. We're still wearing them, Bob. And, I swore I'd take them off after the drill, but I used a bit of real-time common sense.

CC Okay.

LMP-LM Okay. Gloves are off. LMP's gloves are off. Need some help?

CDR-LM ... Yes. I think you just about - -

LMP-LM No, you went the other way.

CDR-LM Did I go the wrong way? Yes, I did.

LMP-LM What's wrong with that one?

CDR-LM I don't know.

LMP-LM Shouldn't have done that.

CDR-LM Hey - you - Let me get this.

CDR-LM My hand!

LMP-LM Yes, I'm sorry.

CDR-LM Well, you get that one, and I'll get these two. Get that one.

CDR-LM Ought to get this one.

LMP-LM I'll take that off. (Laughter) Hold this thing. Okay. Let me try that one, now.

CDR-LM It wants to go.

LMP-LM Let me try that. Yes, that one ... off. Got it?

CDR-LM Yes.

LMP-LM It's usually easier when you do it yourself. The angle's wrong.

CDR-LM Oh, boy. It's starting to get a little stiff. Oh, they came off. Now, they came off. Oh, ho, ho, ho. Okay. Doff helmets, with visors. Here I'll get yours for you. Turn my way, if you can.

LMP-LM Yes. Do the - I know how you feel.

CDR-LM I don't know how they're so wet. I don't know whether it's - they're just soaking wet.

CDR-LM Everything is just twice as hard.

LMP-LM Now comes the old hay fever, again. That went up and that went down.

CDR-LM Stow in BRA. Let's get mine off though.

LMP-LM ... now that these things are off.

CDR-LM Oh, man. Does that smell, doesn't it? You sure can pick that up.

LMP-LM Okay. You got yours?

CDR-LM I've got mine.

06 01 38 34 CDR-LM Okay, Bob. Now (laughter) helmets and gloves are off.

Tape 98A/4

LMP-LM Pressure looks good, still.

06 01 39 02 CDR-LM Hello, Houston. Do you read?

CC Roger, 17. Read you loud and clear, Challenger.

CDR-LM Very good, Robert. The helmets and gloves are off.

CC Absolutely outstanding crew, there.

CDR-LM Why don't you go home and get some sleep, Bob?

CC Absolutely outstanding. I can't say more than that. And I mean it from the bottom of my heart or the bottom of my soul or something, my conscience.

LMP-LM Thank you, Bob. Well, it's all ours.

CDR-LM Bob, it's all your good training and help - -

06 01 39 34 CC 777 plus 37, from 3.5 to 3.5.

LMP-LM As mission scientists, you're totally responsible.

CC And the backup crew says that you are even better than outstanding.

LMP-LM Remember, it's in your contract (laughter). Well, thank you. We enjoyed it.

CC Hey, I'll turn you over to Little Joe, here, while I go talk to some people.

LMP-LM Thanks again, Bob. We - -

CC We've got a 9 and 1/2 hour EVA scheduled for you tomorrow. We're planning to spend 2 and 1/2 hours extra over there at station 4.

CDR-LM (Laughter) I hope those gloves that you've got packed in the back have got something in them. (Laughter) Oh, let's read the checklist. See if we can go to bed on time tonight.

LMP-LM Oh, man.

CC Okay. That might be a change.

LMP-LM I feel better than I did last night, as a matter of fact.

CDR-LM Do you?

CC I'm turning you over - I'm going to turn you over to Joe.

LMP-LM That didn't do very much good.

CC See you guys tomorrow.

CDR-LM Okay. Verify safety on dump valve. Yes.

LMP-LM Okay, Bob. Get some sleep, huh?

CDR-LM Yes, I verified them both.

LMP-LM Sorry to be touchy, occasionally.

CDR-LM DESCENT WATER valve, OPEN.

06 01 40 51 LMP-LM Okay. WATER valve's OPEN.

CDR-LM Okay. Then you can take your purge valve off.

CDR-LM There's a little dust in that tonight. Little stiffer. ... again. Remove purge valves, stow in purse. Disconnect OPS hoses.

LMP-LM Oh, man. That is dusty.

CDR-LM Yes, let's - let me disconnect yours; you disconnect mine. It's easier with the - the -

LMP-LM I think I can get - What did you say?

CDR-LM - - OPS hoses.

Tape 98A/6

LMP-LM Oh, yes. Or whatever it said.

CDR-LM Yes.

LMP-LM Disconnect - disconnect OPS hose. Is that what it said?

CDR-LM Yes.

CDR-LM Man - maneuver my fingers in here a little bit better.

LMP-LM They are all showing a little bit ... stickiness. Mine were in this in pairs.

CDR-LM (Laughter) Well, just everything's, you know, harder to fit.

06 01 42 01 LMP-LM Okay. There, you're disconnected.

CDR-LM PGA diverter valve, horizontal.

06 01 42 05 LMP-LM Okay. Horizontal.

CDR-LM And SUIT ISOL, both to SUIT FLOW.

LMP-LM All right - -

CDR-LM We don't have the LM hoses on. So don't - Put mine to SUIT FLOW to get some air in here.

LMP-LM Yes. ... in the dust.

06 01 42 27 CDR-LM PLSS pump, off, and fan, off.

LMP-LM Okay.

CDR-LM Man, that's hot. Feel that.

LMP-LM Out in the Sun.

CDR-LM Yes.

06 01 42 40 LMP-LM Pump's off. Fan's off.

CDR-LM Okay. Oh - Disconnect PLSS H₂O from PGA. Okay.

LMP-LM And connect IM water. That's what we want.

LMP-LM ... the ... and ... flags.

CDR-LM Yes, and IM water - water hose, here.

LMP-LM I'm sorry that's so complex, there.

CDR-LM Oh, that's perfectly fine.

LMP-LM But it was easier to start.

CDR-LM It had to be. Smells like someone's been firing a carbine in here.

CDR-LM I'm just standing here pushing that -

LMP-LM ...

CDR-LM Hot breaker - When you get it.

06 01 43 26 CDR-LM Hey, little Joe? Are you there?

CC 17, this is Houston. And - -

CDR-LM Little Joe, are you there?

CC Roger. How do you read Houston? Over.

06 01 43 43 CDR-LM Joe, we're reading you loud and clear. We're - the left-hand column and we're both going PLSS mode to 0 and we'll be off the air for a skosh.

CC Roger, Geno. I've been following you real close, and you two are mighty smooth. Boy, was that nice today.

LMP-LM ... feel how hot that is.

CDR-LM Yes, the whole thing.

06 01 47 42 LMP-LM Okay, Joe. LMP's PLSS is getting O₂.

CC Thank you.

Tape 98A/8

06 01 51 45 LMP-IM Joe, O₂ is off.
CC Roger.

06 01 52 57 CDR-IM Hey, Joe. This is Gene.
CC Go ahead.
CDR-IM Hey, Challenger has been holding at about 5.5 ever since we got in here. Are you all happy with that?
CC Looks good to us, Geno. We have been watching it and everyone is happy down here.
CDR-IM Okay. Well, this morning, when we were getting ready, we saw it at 5.5 and part of that has been at 5.0 all of the time. Just so we are not venting anything, that's all.
CC Geno, we hear you on that and we'll - we'll be watching it.

06 01 54 16 CDR-IM Joe, we're about 2 minutes into the CDR's O₂ charge.
CC Thank you.

06 01 55 48 LMP-IM Joe, LMP has 96 percent on his gage.
CC Thank you, Jack. We copy that.

06 01 56 52 CC Geno, with regard to your observation made to us a few moments ago, I guess we will ask for the CABIN RETURN to the AUTO position and your SUIT DIVERTER valve to CABIN, please. We are about 0.2 of a psi from CABIN RELIEF. Over.
CDR-IM Okay, we're getting that now.

06 01 57 57 CDR-IM Joe, CDR is reading 94 percent on the O₂ charge.
CC Thank you.

06 02 04 47 LMP-IM Okay, Joe. LMP's OPS pressure is 6300.

CC Thank you.

06 02 07 57 CDR-LM Commander's OPS pressure is 6100.

CC Copy, 6100.

06 02 09 02 LMP-LM Say, Joe, our cabin pressure is rising even higher, now. About 5.7.

CC We copy that.

LMP-LM Joe, Joe, we had the commander's hoses stowed, but in SUIT FLOW. That might have done it. Is that right?

CC Sounds very plausible, Jack. We'll look at it a little more here.

06 02 13 14 CC Challenger, this is Houston. Requesting you move demand REGs A and B to EGRESS, please.

06 02 13 28 LMP-LM They're EGRESS.

CC Okay.

CC 17, Houston. We noted down here that your SUIT DIVERTERS went to EGRESS and we want the demand REGs to the EGRESS position, please.

LMP-LM That's right, but the SUIT GAS DIVERTER extends when you go to EGRESS.

CC You're right, again.

06 02 17 04 LMP-LM Houston, do you figure we're relieving?

CC Jack, we don't think so. It looks like you're pretty steady at between 5.5 and 5.6. We're watching it very closely, however.

LMP-LM Okay, you know when we had that problem this morning, I hope I didn't - the backflow did not hurt something when I had the LMP's hoses stowed in the ISOL valve and SUIT FLOW.

Tape 98A/10

CC Jack, just for your information, we saw about the same thing last night. The only difference was the pressure didn't climb quite so high. So, we think whatever it is, it really doesn't involve the problem - small problem you had this morning.

IIMP-IM Okay, Joe.

06 02 19 35 CDR-IM Okay, Joe. We got the commander's PLSS back in the recharge station. We got a new battery in it, odd numbers and a new - and a new canister in it and we are working on the LM - on Jack's right now.

CC Okay, Gene. Sounds good.

06 02 22 44 CC 17, Houston.

IIMP-IM Go ahead, Joe.

CC We are still watching your cabin pressure down here. Could you check for us, please, if the PLSS fill valve is securely closed?

IIMP-IM Yes, it was closed.

CC Okay.

IIMP-IM Joe, do you want me to check out the regulator?

CC Stand by.

06 02 23 49 IIMP-IM Houston, Challenger. Do you want me to check the - Okay. ED BATs are 37.2.

CC Copy that.

06 02 24 00 IIMP-IM PCM's going HIGH.

IIMP-IM Let me know when you're ready for the battery management.

CC Roger.

06 02 25 31 CC 17, Houston. Stand by on the battery management for a few minutes, please. And, in the meantime, could you check the low pressure PLSS fill valve, closed, please? Over.

LMP-LM Joe, I checked that. It's closed.

CC Thank you.

CDR-LM Houston, Challenger.

CC Go ahead.

CDR-LM Yes, your - does you telemetry and our gage come off the same telemetry on that? Same transducer?

CC That's affirm. It does. And, Challenger, we've got a communications problem at one of the sites and are going to ask you to go to panel 12 and turn the POWER AMPLIFIER to PRIMARY, please.

06 02 28 27 LMP-LM Okay, it's PRIMARY.

CC And, Challenger, we're ready for battery management, at your convenience.

LMP-LM Okay, stand by.

06 02 32 03 CDR-LM Hey, Joe.

CC Go ahead.

CDR-LM Okay, this is Geno. I just dug a rock out of my pocket. You - no one back there probably remembers, but when we were at Shorty, fumbling around, trying to get everything done, I said there was a piece of very shiny black glasslike-looking material that reminded me of - of obsidian. Well, it's not. It looks like a very fine-grained gray rock. But, it's a fractured piece and it looks like it - I've picked up fractures of about three or four vesicle faces on it. The vesicle faces are very shiny and that's what reflected and caught my eye. I think the unique part about it is - Jack may want to tell you something else

about it - the unique part about it is - I picked it up Shorty. Undocumented, halfway between the Rover and where we were sampling that orange stuff. And it will be in bag 12 Echo.

CC Okay, Geno. Copy, 12 Echo. And, I was assured by the folks here when I came in - -

CDR-LM That'll go in it.

CC - - that - that you did indeed have shiny sample of some kind in your pocket and would probably find it later on. So, we called that one. Could you turn OFF the POWER AMPLIFIER - -

CDR-LM Okay, we'll put in it in SCB-8.

CC Okay, go ahead.

06 02 33 34 CDR-LM Okay, it's off and we will put that rock in that sample bag and put in SCB-8.

LMP-LM Joe, this - rock looks very much like 12008, 12008. It's a fine-grained, coarsely - very coarsely vesicular gray rock - probably basaltic.

CC Okay, Jack. Real fine. We'll - want LOW BIT RATE, POWER AMPLIFIER, OFF, and LOW BIT RATE and we can maybe label that one 17008. How does that sound?

CDR-LM No, you got to label Gene-rock. I was going to tell you those other things, but I thought I'd let Jack.

CC Okay, thank you.

LMP-LM The vesicles, if I may project the size of them, probably were up to 4 or 5 centimeters in diameter. They're irregular in shape, but they're clearly vesicles and it looks like they are lined with either glass or very fine-grained crystals. They're very shiny.

CC Roger.

CDR-LM And for our next act -

06 02 35 48 CC Jack, we're going to ask for your next act that you check for us both PLSS valves OFF and both OPS valves OFF. Over.

06 02 36 51 LMP-LM Joe, they're both verified OFF.

CC Okay, Jack. We understand that all four valves are verified OFF.

LMP-LM That's affirm, Joe.

CC Okay, thank you. I'm sure that you realize that we're still showing that pressure increasing very, very slowly and are pretty well convinced that nothing is leaking in from the outside. So, we are looking around on the inside here.

CDR-LM Joe, is our oxygen consumption abnormal at this point?

CC No, not at all, Geno. Everything looks pretty normal, except this - this slow creep in the cabin pressure.

LMP-LM Well, the - I guess the possibility is a creeping REG or a transducer, is that right?

CC Yes, either that or it may be we're just watching some of the effects of the thermal shock that your tanks took when - from the repress itself. We're not worried about it at all, but we are still watching it.

LMP-LM Joe, you might make a note that my two SEP area samples went into bag 8 also.

CC Roger, Jack. That's noted.

CDR-LM Joe, got some numbers, if you'd like them?

CC Go ahead.

CDR-LM SRC is 41.5. Bag 6 is 24, bag 8 is 35.

Tape 98A/14

CC Copy, 41.5 and 24 in bag 6; 35 for bag 8.

CDR-IM That's it.

CDR-IM Joe, how many samples did we get today?

CC Stand by.

CDR-IM Don't start a big investigation. I was just curious.

CC Let me ask around, Gene. We will see in a minute.

CC 17, we think you have 54 samples from this EVA, plus some cores.

CDR-IM Thank you, Joe. Just curious.

CC That's not half bad.

06 02 41 56 CDR-IM And, Joe, we're on 5-5 and I am going to start doffing.

CC Okay, Geno. Copy 5-5, and before you get started there, would you put both demand REGs to CLOSED, please? As we continue to watch this pressure.

06 02 42 19 CDR-IM Okay, Joe. Demand REG A, going CLOSED. Demand REG B going CLOSED.

CC Thank you. And we verify them both CLOSED.

06 02 47 54 CC 17, this is Houston. We'd like SUIT DIVERTER back to CABIN, please?

06 02 48 04 CDR-IM CABIN.

CC Okay.

06 02 51 46 CC Gene and Jack, you'll be interested to hear that the cabin PRES is dropping down, very slowly now. So, we think we have a tiny leak in one of the cabin regulators, one of the demand regulators, and we'll run a check after you get squared away there a little better.

CDR-IM Okay, Joe. We'll be at your beck and call.

06 02 52 26 CC I'll only smile at that.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 03 07 51 CDR-LM Houston, Challenger.
CC Go ahead.

06 03 08 00 CDR-LM Joe, we're going to air out the suits. We're going to go to SUIT FLOW on the Commander's ISOL valve now.
CC All righty.
CDR-LM Say again.
CC That sounds good.

06 03 17 02 LMP-LM Joe, I guess you guys are tired of looking at my heart beat. So, I'm gonna turn the BIOMED off as I get out of my suit.
CC Okay, Jack.

06 03 17 49 CDR-LM Hey, Joe. This is Geno. How do you read me?
CC Geno, you're 5 by.
CDR-LM Okay, we're going to get Jack out of his suit. I'll be - I'll be monitor.
CC Roger. From the way the two of you worked today, I'd think you could just about turn him upside down and pour him out.
CDR-LM Yes, if he'd fit through that little hole in the end of his wrist.
LMP-LM Joe, the day they can pour me out of anything, they'll call me slim. Talk to you later.
CC Okay. Among other things.
CDR-LM Remember those nice white suits?
CC The Clean Room will never be the same again.

Tape 99A/2

CDR-LM You'd never believe it.

06 03 38 34 CC Challenger, this is Houston.

CDR-LM Go ahead, Houston. Challenger here.

CC Geno, we're going to start to investigate which of your demand regulators is leaking and we're going to ask you to put DEMAND REG Alfa to CABIN now. And, as we watch it, please do not make any urine dumps. Over.

06 03 39 03 CDR-LM Okay, we will not make any urine dumps and we'll go to CABIN now. Okay, Alfa's in CABIN. And we'll be ready for your debriefing here in about 5 minutes.

CC Okay, Geno. And, it's going to be a short one.

06 03 47 17 LMP-LM Okay, Houston. We're going DOWNVOICE BACKUP.

CC Stand by on that.

LMP-LM And okay, we are ready for your EVA-2 debriefing.

CC Okay, 17. To begin with, we want you to delete that step going to DOWNVOICE BACKUP. And I've got a surface block data to read up to you. A few minor changes in your Lunar Surface Checklist. And a couple of very quick questions for the debriefing when you're ready. Over.

LMP-LM Go ahead, in the stated order.

CC Roger. Moving right along now to the surface block data. Lift-off time, T-33, 152 plus 30 plus 01; T-34, 154 plus 28 plus 33; T-35, 156 plus 27 plus 05; T-36, 158 plus 25 plus 37; T-37, 160 plus 24 plus 09. Over.

LMP-LM Okay, Joe. Starting with 33. 152:30:01, 154:28:33, 156:27:05, 158:25:37, 160:24:09. And what's our present rev?

CC Rev 32, Jack.

CDR-LM Hey, Joe, for pantry purposes, what day is this?

CC We've checked around the room here and the consensus is that it's Wednesday morning. Over.

CDR-LM Oh, okay. I really wanted to know whether it was irradiated [sic] ham or frankfurter morning, and I guess we can work that out.

CC Roger, Gene. Apparently, the Surgeon is happy with either of those days. And we want you to turn to - right now, to 5-7 in the checklist and perform that - one particular step at 150 hours, which will prevent the computer clock from overflowing. And that's the "PROCEED, VERB 37 ENTER, 06 ENTER, PROCEED" step. We'll stand by for that. Give us a mark as you start it. Over.

06 03 51 34 CDR-LM Okay, we're starting.

06 03 51 36 CDR-LM PRO. PROCEED, VERB 37 ENTER - VERB 30 -

06 03 52 00 CDR-LM Okay, Joe. You don't want me to go on the VERB 90 - You're not going to give us an update, huh?

06 03 52 07 CC No update required. That was just to prevent an overflow. And then I'm ready for the quick changes in the Lunar Surface Checklist when you are.

06 03 52 45 LMP-LM Okay, Joe, go ahead.

CC Okay. Begin by putting the demand REG Bravo to CABIN position and leave the demand REG Alfa in the - in the CABIN position where it now is. And I'll continue on with the changes in the checklist here. Page 5-6, left-hand side, where it reads "Configure ETB." The - the fourth line down that starts out "Four B&W mags," they should read, "Hotel, India, Juliet, and Romeo in LCG compartment." Then going up to the right-hand side under "Stow in ETB," change the line "One B&W mag Romeo" to read "One B&W mag Kilo." Over.

LMP-LM Okay, Joe. I changed the mags in the "Empty" from Kilo to Romeo and the mag in "Stow" from Romeo to Kilo.

Tape 99A/4

- CC Okay, that sounds like the thing to do. And a note on your demand regulators. We're showing that the demand regulator Alfa is - has good integrity and we're now in the process of checking the demand regulator Bravo. I've got a couple of fairly quick questions here when you're ready for those.
- CDR-LM Okay, Joe. Go ahead with your questions, and integrity is certainly what we need around here, right?
- CC Okay. Jack, a question for you to begin with. Is your gold visor sticking halfway down? Apparently, that's based on a discussion earlier. Over.
- CDR-LM Yes. Apparently his visor is sticking.
- CDR-LM Which one? The gold visor? No, he said his sunshade is sticking halfway down, but his gold visor's not.
- CC Okay, that answers the question. We couldn't tell from the TV whether it was the visor or the sunshade. That's fine. We also heard some discussion about possible wear in the seats of the suits when you were dusting each other off. We want to know if you could see the - any hint of the aluminum layers showing through in the suits. Over.
- CDR-LM No, Joe. Not to worry. It's just a few scars on the PLSS thermal blanket in back where you probably rub the seat when you get in. Nothing on the suits.
- CC Okay, Geno. Now two real quick geology questions that will help us do the planning for your EVA tomorrow. The first one has to do with station 4. And you called out some material on the rim there - the crater at station 4 - which looked like bedded spatter. And we're wondering if that resembled things that - that you'd seen in Hawaii? Over.
- 06 03 57 03 LMP-LM Hey, Joe, I think they misheard. I think I may have said shattered and you might of said - thought

spattered. No, I didn't - neither one of us intended to leave that impression. The rock - the big rock we sampled was - looked like shattered - intensely shattered gabbro, such as we've had around the LM. The rocks, probably more significantly, that Gene - one of which Gene picked up with the fine-grained vesicular basalt - completely vesicular basalts. And we didn't have any time to really examine the interrelationships of those rock types there, but those were the two fragment types we saw.

CC Okay, Jack. That's quite clear to us now. Also a question about station 4 - -

LMP-LM Joe - Joe.

CC Okay, go ahead.

06 03 58 04 LMP-LM The bottom of that crater, now, had material that was extremely disorganized in its aspect and, really, we didn't have time to examine it in detail in order to decide why it was disorganized. It did not necessarily look like the boulder that we sampled at the rim.

CC Okay, Jack. Understand that. A question about the boulder you sampled at the rim. Would you compare the basalt in this boulder to - which I - you may have called a gabbro, I'm not sure - in any case the basalt - to samples which you collected at Camelot and at ALSEP. Over.

LMP-LM Well, my impression was that they were the same rock types.

CC Okay, that's our impression, too. Thank you. That's - that's it for us on the questions. And for information, we're showing your cabin pressure is holding fairly steady even with both those demand regs on.

Tape 99A/6

CDR-LM Okay. Keep watching it for us, would you, and let us know. I expect one of them is probably leaking pretty slow.

CC You have no - no worry about that, Gene. We're looking at it real close.

CDR-LM How's - how's America looking to you?

CC It is just as clean as a whistle.

CDR-LM It may not be when we get back there, judging from the looks - looks of us. That's good to hear, though. It's a good bird. So is this one.

LMP-LM Joe, is there any - You got any more debriefing questions?

CC Negative, Jack. And we're interested that you move right along so we can get you - get you turned in there and get some rest.

LMP-LM We're moving. We're eating now, and we're - we're - we feel the same way, I think.

CC Troops, enjoy your meal there. And at your convenience, you can go ahead with the feedwater recharge. We want you to hold off on the oxygen recharge until we watch these regs for about another 10 minutes. And give us a mark if you do start the water recharge, please. Over.

06 04 01 36 CDR-LM Okay.

CC And if there are any ways we can cut corners on the time here, it'll be helping us, because we're still looking at - at being down a couple of hours nearly.

CDR-LM Okay, Joe. We're working at it as fast as we can. Best place in the world to make it up is tomorrow night.

CC Right, Geno, and we - actually, we're going to pick up a good one shortly, because we're coming

up to a pad in the time line. So, as long as we don't waste too much time, we're doing pretty well.

CDR-LM Okay; be assured we're not. There's just a certain amount of housekeeping we have to do. But, very seriously, day after tomorrow is a very short day, and I think we ought to look at making up any time. I'm a hold-faster on sleep periods but tomorrow is the one that I think is flexible.

CC Roger. We hear you.

06 04 06 12 LMP-LM Hey, Joe. This is Jack. We're eating here. Won't be too long at it, but if you've got any significant news or anything, why don't you give it to us?

CC Jack, I don't know if it's significant news, but at least I know you will be interested. Both your demand regs look good now. We show no evidence of a leak there and it may have been that just recycling them reseated them and solved whatever problem we had. You can go ahead with the O₂ recharge on the PLSS and the water recharge at your convenience. And let me poll the room here for other news items. Over.

06 04 08 21 CDR-LM Okay, Joe, we're starting an O₂ charge of the CDR's PLSS, 10 minutes.

CC Okay.

06 04 13 29 CC Challenger, this is Houston.

LMP-LM Go ahead, Joe.

CC Roger. This is a news report to eat by. I'll combine an orbital science report with a sports report, an unusual combination here. I'll start out with a sports report on Monday night football, which you may not have heard yet. Joe Namath tried mightily to lead the New York Jets into the

Tape 99A/8

American Football League playoffs, but the Oakland Raiders grounded the Jets in a fourth quarter 24 to 16 blitz. Namath passed for more than 400 yards but, in spite of it, New York scored only one touchdown. Moving along to the successes of Captain America, I'll run down different items in the SIM bay here, beginning with the UV spectrometer. In general, the data has been excellent. We're getting indications that the hydrogen atmosphere of the Moon is much less than expected. In fact, I don't think we're detecting any, but rather setting a limit on the amount of hydrogen around the Moon. There was an Aerobee launch - an attempt at an Aerobee launch - from White Sands on Monday to calibrate solar UV radiation, but this launch failed because an instrument viewing port in the rocket failed to open. A second launch - let's see - was scheduled, I think, for today, and I don't know whether that was successful or not. I guess it'll be launched later today. The infrared scanning radiometer is performing beautifully. Indications are that subsolar-point surface temperatures are higher than we've detected from our Earth-based observations before. We're seeing many thermal anomalies, particularly in Procellarum and in the Procellarum area west of Copernicus. And we're seeing also a few unusual cold spots, which apparently are indicating areas of very fine soil with a few or no blocks in and on the soil. The lunar sounder data is beautiful, and the power monitor signals we find correlate with the surface features. And the HF data indicates to us that we are detecting a variety of layers in the mare areas.

06 04 16 52 LMP-LM Joe, this is Jack. Do you know where specifically they're seeing the hot spots west of Copernicus?

CC Jack, I don't have it on the page in front of me here. We're going to check into it and I'll get back to you in a second.

CC Jack, this is Houston. With regard to your questions on the hot spots, apparently they've not yet

indexed the - these warmer sources that they're detecting to the CSM ephemeris, and - and so they don't know exactly what they correspond to as far as the surface features themselves go. So I can't help you on that right now.

LMP-LM Okay, Joe. Just curious.

06 04 21 04 CC And, Jack, TELMU handed me some numbers which I think you will be interested in. From the EVA-2 EMU summary, the elapsed EVA time was 7 hours plus 37 minutes plus 22 seconds for a new outdoor record under international rules. The rest of the sheet looks free from problems in a comforting way. Let's see, average metabolic rates - for you, Geno, 855; and, Jack, you're running at around 920. And that, relative to premission averages of around 850. And you have a grand total EVA time now of 14 hours 49 minutes and 35 seconds.

06 04 22 19 LMP-LM Very interesting numbers, Joe. Do you have any idea how the metabolic rate compared to yesterday?

CC Good question. Let me ask on that one. Yesterday you were running at 1045 and 1090. So you're down considerably from your work rates of yesterday, which is good news. Maybe you're learning how to do it more easily or something like that.

CDR-LM Yes, but we spent a lot of time riding today and a lot of time working yesterday.

CC That's true. But I guess that's not taken into consideration of the average here. It's certainly true. We can ask for the metabolic rate of the Rover. I bet that is pretty impressive for today.

CDR-LM Well, don't - don't get me wrong. Driving that Rover is ... But I'll tell you, it keeps your attention.

CC I'm sure it does.

LMP-LM It keeps the passenger's attention, too.

Tape 99A/10

CC I'm sure it does. We noted some comments when you were rolling along today - and reading between the lines from time to time.

06 04 23 59 CDR-LM Actually, Joe, for good long spans on the run up to station 2, except when we had to pick our way up the Hole-in-the-Wall, I was running full bore at anywheres from, I guess, what'd I say, 10 to 12 to 15 clicks. I didn't hit 15 going up very much. Coming down I did, but it's - it's really a "stand by for turn and watch where you're going" type of run. Because the small craters, - of course, are the ones that can really jolt you. But the trouble is, you can't - you can never see what's just over the next ridge, and the next ridge may be 20 meters away, and you just can't see it until you're there, and you don't know whether its a dish crater or pit crater.

CC Roger, Gene. We copy that.

LMP-LM Joe, that des -

CC Go ahead.

LMP-LM That description - that description fits the geology up in there, because we weren't seeing blocky rimmed craters and otherwise you would have been able to tell more easily about the old versus new craters, which would be the ones you could either go through or not go through, respectively.

CC Roger.

CDR-LM That's a super machine to drive though, Joe, I'll tell you. If you had enough time you could really learn to - to take it all the way. But you don't really do that, just the second time around.

CC Geno, was it spraying dirt at you today? Could you - did you notice that you still missed the real fender and that the patch fender wasn't quite doing what - what maybe it could?

CDR-IM No, sir, I don't think we missed it at all.

LMP-IM Fact is, we're recommending a design change, Joe.

CC That'll be for next year's model.

06 04 26 32 CDR-IM That's right.

06 04 30 20 LMP-IM Hey, Joe. Is it all right to use the waste management system?

CC Roger. We're happy with those demand regs now. And you can proceed on with that and including all the - the - the PLSS recharges that you'll need to do as well.

06 04 33 23 LMP-IM Joe, we're filling my PLSS with water now. You might check on the water quantity.

06 04 33 29 CC Roger. Thank you.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 04 43 11 CDR-LM Joe, that should take care of my PLSS for tonight.

CC Okay, Gene. Thank you. Out of curiosity, have you packed, or are you packing the ETB now?

CDR-LM Yes. Jack's doing it right now.

CC Okay; we've got a last minute change. We show that you - your mag Bravo is about 77 frames, and we'd like for you to leave it in the ETB - It is already in the ETB - and take it out with you tomorrow. We can shoot up the remaining frames if we run out of film, otherwise.

CDR-LM Okay; fine. That goes along with our thinking.

CC You know, apparently you made some comment earlier in the day about being bothered by comm noise during your egress from Challenger. Did that go away right away, or did it just cease to bother you, or what - what was the story on that?

CDR-LM I don't remember; so, it must have gone away, because the comm was great.

CC Okay; that's what we kind of assumed.

CDR-LM Okay; we're charging Jack's PLSS with oxygen.

CC Sounds good.

06 04 59 44 CDR-LM Houston, Challenger. The O₂ is complete on - O₂ FILL is complete on the LMPs PLSS, and we're working on the water.

CC Roger.

06 05 02 19 CC Challenger, for your information, we're coming up on comm handover in about a minute and a half.

CDR-LM Okay.

Tape 100A/2

06 05 07 33 CDR-LM Hello, Houston; Challenger. The LMPs PLSS is charged.

CC We copy it.

CDR-LM Joe, how's the weather got down there? Any better?

CC Geno, the weather is better. We were really socked in yesterday. That front's moved on through the Houston area, and it is cold and clear tonight, I suspect. It's been a while since we've been out, but they are calling for it to go down right near freezing.

CDR-LM Okay. Thank you.

06 05 36 12 LMP-LM Hey, Joe; Challenger.

CC Go ahead.

LMP-LM They succeeded in leveling the gravimeter, yet?

CC Jack, we'll check it, update our information on that. My understanding at the moment is that they've not, but - but they're thinking that the unit's just too cold and they're in the process of warming it up by dumping heat into it by running some of the equipment around it and in it, and they've by no means given up - given up hope for that unit.

LMP-LM I figure that means that my fooling around with it didn't help them.

CC Apparently, it - it didn't do too much for them, but what it did do was convince them that it's probably somehow locked up because its temperature's not right yet. And they're not worrying about whether it's level or not level now. They're - they're confident that it's been set up okay, and now they're just biding their time to bring that temperature up. We'll get some more words to you sometime tomorrow on it as you make your traditional visit to the site again - ALSEP site again, probably. How are you coming along with your sleep prep?

CDR-LM We're just about there, Joe. We picked up some time somewhere in here. Couldn't be much more than 1 hour behind.

CC No, that's just about right. You're looking pretty good on that.

LMP-LM If you get to sleep in the next 5 minutes, you're 1 hour behind.

CDR-LM Yes, sir; we're - I'm putting my hammock up now, as a matter of fact.

LMP-LM What are you doing up so late?

CC Well, somebody's got to sit up and keep you guys honest. I think we're getting more sleep down here than you are.

CDR-LM Ah me.

CC I might add that not only do we have to stay up late; we have to get up mighty early to keep you honest, too.

LMP-LM Okay; you going to let us sleep 8 hours or what?

CC That's affirm, Jack. We're - we're looking good on the time, and we're - Not only will you get, we hope, 8 hours of good sleep, but you'll have a full EVA tomorrow. So, it's not costing us anything there.

LMP-LM Sounds great, Joe. I - I fully expect it won't be much longer now.

CC And, Gene, just for rough planning purposes, we'll start to figure your sleep period starting around 152:30. And we'll be looking at your getting up around 8 hours from that time.

CDR-LM Okay, Joe; I'll buy that.

CC Might add, also, that there are a lot of us looking forward to that third EVA tomorrow. It's going

Tape 100A/4

to be the last one on the lunar surface for some time.

CDR-LM I tell you, if it's anywhere near what the first two were like, we're looking forward to it, also.

CC Gene and Jack, we're still marveling at the beautiful television pictures that we're getting from your TV camera there. It's fun, in fact, to watch the - the tracks that you're leaving behind in - in the - the lunar soil, both footprints and Rover tracks. And some of us are down here now reflecting on what sort of mark or track will someday disturb the tracks that you leave behind there tomorrow.

CDR-LM That's an interesting thought, Joe, but I think we all know that somewhere, someday, someone will be here to disturb those tracks.

CC No doubt about it, Geno.

LMP-LM Don't be too pessimistic, Joe. I think it's going to happen.

CC Oh, there's no doubt about that. But it's fun to think about what sort of - of device will ultimately disturb your tracks.

LMP-LM Well that device may look something like your little boy.

CC Boy, he'd make short work of them.

LMP-LM Joe, I'll tell you it's also a pretty philosophical thought to think that you're riding around out here on what is really undisturbed - undisturbed everything, you know. If there was someone here, way back when sometime, they didn't leave much - much sign of their whereabouts, but that's an interesting thought, too, as you drive around and all of a sudden cross your own Rover tracks and figure out those are the only ones that have maybe have ever been here.

CC Very true.

LMP-LM And with that, I'm rolling out my hammock.

LMP-LM Okay, Joe. I'm waving goodnight to you. I'm rolling up my overhead window cover.

CC Okay, Gene and Jack. We'll say good night to you from down here, unless there's some other way we can help you.

LMP-LM No, sir. If there is, we'll give you a call, though.

CC Just want to end by saying what a terrific job you did today, and really looking forward to tomorrow. Have a good 8-hours rest.

LMP-LM Thank you, Joe. Tomorrow we answer all the unanswered questions. Right?

06 05 45 22 CC If not more.

06 05 46 16 LMP-LM ...

END OF TAPE

Tapes 101A-105A/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 08 00 22 CC Good morning, America. How are you?

06 08 01 17 CMP Hey, Houston. This is the command module pilot of the United States spaceship America, and we're ready to participate in another day's activity.

CC Glad to hear it, Ron. Good morning.

CMP Good morning.

CMP I slept with my lightweight headset on last night so didn't have to have that cap on. Is the fidelity of this thing any good at all?

CC Pretty good, Ron. Pretty good. And as you start your morning's activities, you can be aware that we were watching the spacecraft through the night, and as Flight puts it, everything is swinging.

06 08 02 21 CMP Outstanding. That's what we like.

06 08 06 26 CMP Hey, it's still dark outside.

CC We start work early around here.

CMP Well, I guess.

06 08 12 34 CMP Hey, Houston; America.

CC Go ahead.

CMP You know, I'd just be kind of curious how the old heart rate compares to those sleep tests that we did - preflight? Is it about the same when I'm soundly asleep or is it lower or what, you know?

CC Stand by, Ron, and I'll ask the men on my left.

Tape 101B/2

CMP Okay. You know, maybe they'll have that information.

CC Roger. They think maybe 5 minutes. And we'll be back to you.

06 08 13 30 CMP Okay. No problem. Curiosity more than anything.

06 08 14 08 CMP I didn't get quite as much sleep last night. I took a bath and changed my underwear, and all those good ... things, you know. Probably only got - oh, maybe 7 hours at the most. Probably closer to 6-1/2 of good sleep

CC Roger.

CMP I'll give you the rest of that in just a jiffy when I get it squared away.

06 08 14 38 CC Okay.

06 08 18 21 CC America, this is Houston.

CMP Go ahead.

CC Roger, Ron. Apparently in your preflight data base they show you with a rate of in the low 60's or high 50's, that's a sleeping rate. And we're showing you now, during your sleep periods, of heart rates of about 10 beats lower per minute. And with heart rates that show less variation than the preflight data shows.

CMP Ah ha, okay. Well, thank you much. The heart does slow down a little bit up here, then.

CC Apparently so - they assured me however, that it would not be approaching zero. So you can relax there.

CMP (Laughter) Okay.

CC And, Ron, in the meantime, Gordo's arrived here and - I'll turn the console over to him. Be talking to you later perhaps.

CMP Okay, Joe. Hey, we thank you much. Appreciate it.

CC Enjoyed it. Have a good day; and we'll all be watching you close.

CMP Okay.

06 08 21 17 CMP Okay, Houston; America. Here's my medical log.

CC Okay, Ron. Good morning and go ahead.

CMP I just got something a day off (laughter). Okay, Gordo. Glad to have you aboard with us. Okay. PRD, 15041; and the sleep, I mentioned, probably about 6-1/2 or 7 good hours. I took a Seconal last night, and I had four cans of fluid.

CC Okay.

CMP Okay, here's the old chow for day 6.

CC Okay.

CMP Scrambled eggs, bacon squares, peaches, cinnamon toasted bread cubes, orange juice, cocoa with potassium and a vitamin pill. Okay. Lobster bisque, all the peanut butter, all the jelly, three pieces of bread, citrus beverage, a tea, a chocolate bar, and a package of pecans. And I had a beef steak, butterscotch pudding, and an orange drink.

CC Okay, got that.

CMP I think that was it. Hey, today I get sausage, grits, fruit cocktail, orange beverage, and coffee.

Tape 101B/4

06 08 23 44 CC Roger.

06 08 24 10 CMP And, Gordo, if you have one of these preflight, not preflight - but, what do you call it - geology summarys of EVA-2, like you had yesterday. I thought that was great.

CC Okay, Ron. I just picked it up. Let me read it over and then I'll give you a summary.

06 08 24 33 CMP Oh, okay. Sure; no problem.

06 08 28 40 CC Hello, Ron. I'll give you a little summary here of the EVA. It's going to be a little rambling, because I haven't had time to organize it, but it was a very interesting night last night on that second EVA.

CMP Sure that's ... Go ahead.

CC Traverse lay over terrain of extraordinary geologic diversity and yielded a far greater variety of information than ever obtained on any other lunar traverse. Systematic descriptions and samples of four of the six main units of the area, massif, subfloor, the light mantle, and the dark mantle were obtained. In addition, detailed descriptions were given of a variety of craters, including exciting discoveries that the crater Shorty, and descriptions of the Lee-Lincoln Scarp and lineaments in the hilly terrain. The South Massif is composed of two main varieties of breccia; blue-gray and tan-gray blocks of both varieties were abundant at station 2 up on Nansen. I won't go into the geologic details on those breccias. But - they then found samples of the subfloor unit exposed as blocks in the ejecta around larger craters that had been partly buried by the dark mantle. Stand by.

Tape 101B/5

CC Okay. They are going to take the antenna
away from us, Ron. I'll have to finish this
next time around. Spacecraft's looking good,
we'll see you in about 45 minutes or so.

06 08 30 32 CMP Okay. Mighty fine Gordo. Thank you.

06 08 55 XX BEGIN LUNAR REV 35

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 09 23 12 CMP Houston, this is America. See you tried to come in there.

CC Yes, Ron. You're loud and clear.

CMP Okay. I'm just finishing up my fruit cocktail.

CC Okay. While you're munching there, let me give you a few status reports here. First of all, your RCS is hooking right along there 4 percent above the Flight Plan line; however, we have some plans for that 4 percent, which I'll go over with you later. On the oxygen, you've gained a little on it, since I was last on anyway. O₂ tank 1 is a little low, but it's balanced by tank 3 being a - a little high, and tank 2 is right on the redline, so I think they all balance out to be about on the redline on the Flight Plan line. And they all three balance out to be right on the Flight Plan line, as close as I can tell. On hydrogen, you're probably up about 4 percent in tank 1, and the other two are right on the line, so you are in good shape there, still.

CMP Very good.

CC Okay, while you're - I've got some words on your - on your orbit here, which won't require anything - writing down anything - but for some reason you're missing the mascons or something, and your orbit's not degrading like we expected it to. It's not degrading down into a circular orbit. It's - I think it's staying just about the way it was, and so we're looking ahead to a plane change, and we're - we're thinking about an extra maneuver prior to plane change - about 1 hour prior to plane change on the back side. There was some discussion here about what to call that maneuver. Somebody wanted to call it a HAM, height adjustment maneuver, and someone else said, well that one's already used in the rendezvous sequence. Maybe we ought to make it "bacon." And even "lox" was suggested, considering the FDOs objected to "bacon" because of his religion. So the "lox" was eliminated because we already used that for the S-IVB.

Tape 102B/2

CMP How about "mascon adjust?"

CC Anyway, what the maneuver's going to be - whatever we call it - is about 11 foot per second RCS burn, 1 hour prior to plane change so that'll be on the back side. And, that'll just about use up your RCS coverage and put you back on the Flight Plan line. That will adjust the height when you get around to the plane change, and then the plane change will be a little bigger than originally planned, showing about 365 feet per second, SPS, of course. And, looking at the consumables, that will put you down right - right on the rescue red-line on SPS, so we're still in good shape - consumablewise. Further tracking will refine this, of course, so we'll have updates on the plan. Any questions on that? Over.

06 09 27 16 CMP

No, it sounds like you all thought it out. I appreciate your letting me know about that. I think - Is the time line worked out good enough in there to work in a P41? I guess it does - an hour before, huh?

CC Yes, well - we'll make it. I haven't looked at it myself, but we are - FAO has - and I haven't heard exactly what needs to be changed, if anything. Okay, on the SIM bay. Basically there's nothing new to report. And all the people down here appreciate your timely operation of the SIM bay, and it's responsible for really maximizing the data return. In general, we're pretty happy. The problems that we're have - having with it are ones that have already been mentioned to you. On the - on the HF antenna retract problem that we have, if we have it, here's the plan. We're - Well, first of all, the consensus on that is that we really think the antennas are retracting okay. That it's a malfunction in the limit switch that drives the talkback that's really the problem. So we have devised an alternate method, utilizing timing and stall current, and actually the signature of the motor stall current down here in the data, to determine proper retraction. And just prior to 168 hours in the Flight Plan, you're supposed to retract those antennas, and we're going to check the data at that time, and say

"yes" or "no"; they are retracting or they aren't. If they don't, then the alternate plan we'll swing into at that time is to reschedule the HF targets that are now scheduled on rev 55. Reschedule them and do them on rev 42. After which, we'll try one more time to retract the antennas, and if it still looks like they indeed are not retracting - I guess it's just the one that's in question - then we'll go ahead and jettison them at that time. And we'll still have gotten most of the - of the least - priority HF targets with that alternate plan. Over.

06 09 29 45 CMP

Yes, that sounds like - sounds like a good plan to me.

CC

Okay, we got one request from EECOM here. Can you turn the H₂ tank 2 FANs, OFF, please?

06 09 30 04 CMP

H₂ tank 2 FANs are OFF now.

CC

Okay. And when you get between courses on breakfast there, I have some pencil work for you in the way of Flight Plan updates. Not too much, really.

CMP

Okay. Contrary to the way I eat breakfast on the ground, I always end up leaving my orange juice to last. I guess that's because you like to eat the hot things first.

CC

Roger.

CMP

What I'm saying is the only thing I've got left to eat is orange juice, and I'm ready to copy.

CC

Okay, 156:22 - which is coming up here - like to, at that time, verify all command module VHF off. You are now 11 after - You have to terminate the jet-on monitor and then get the sounder operating. I can break this off at any time if you think we're pressing that. Just interrupt me. At 156:50, lunar sounder pad. T-start is 156:51:05, and T-spot is 156:56:09. Over.

CMP

Okay. T-start, 156:51:05, 156:56:09.

CC

That's good. Flip the page - flip two pages and copy the next sounder pad, which is for 158:40. T-start is 158:49:35 and stop time is 158 - -

Tape 102B/4

CMP Wait a minute; wait a minute. I'm not with you.

CC Okay.

CMP Okay. I got it (chuckle).

CC Okay. T-start - -

CMP Go ahead, now, very sorry.

CC - - 158:49:35, and stop is 158:54:38.

CMP Okay. Start 158:49:35, 158:54:38.

CC Okay, that's correct. Now at - that same page - 158:13, after "PAN CAMERA - ON," add a line that says, "V/H OVERRIDE - HIGH ALTITUDE."

CMP Okay, at 158:13, "V/H OVERRIDE to HIGH ALTITUDE."

CC Okay, and at 158 - -

CMP I think it's still in HIGH ALTITUDE from yesterday. Yes, it is.

CC Okay. 158:21 is another, "Verify all command module VHF, OFF."

CMP Okay, 158:21, "Verify all VHF, OFF," and I know what that means.

CC Okay, and the next two are easy. Next page, at 159:01. Just draw a line through "MAPPING CAMERA, RETRACT," and at 159:05 - -

CMP Okay, I got it.

CC - - draw a line through "MAPPING CAMERA LASER ALTIM - LASER ALTIMETER COVER, CLOSED."

CMP Okay, got it.

CC Okay, I think we're caught up. We're ready for HIGH GAIN, AUTO.

06 09 34 28 CMP Okay, I'll go back and see where we are in the old Flight Plan. Okay, you have AUTO.

CC Okay.

CMP Okay. I don't think this lightweight headset is quite as good as the - the other one, and I'm going to change as soon as I get a chance here.

CC Okay.

06 09 35 06 CMP Okay, VHF A is OFF, B is OFF, RECEIVE ONLY, B DATA is OFF, BEACON is OFF, RANGING is OFF. That's all (chuckle).

CC Okay.

CMP I was looking at - Aitken when they came that side. Aitken is almost right in the terminator, right now. So when they come up on terminator photos there - The only thing is that, even though it was down in the shadow, down in the bottom of the crater, I could still see the bottom of the craters on - when they come around there for the near-terminator photography. I'm going to open the camera up and take a picture down in the shadow itself and see if that works.

CC Okeydoke.

CMP And there was quite a bit of backlight - quite a bit of backlight reflection from the northeastern side of it and also the eastern side of it, I guess. Funny, down in the eastern rim - -

CC Ron, if you give us ACCEPT, we'll give you a vector while you got it.

06 09 36 29 CMP - - the only way I can describe it - Okay. You have ACCEPT.

CC Roger.

CMP And the DSKY is clear. With the shadow effect on the eastern - I guess the east and southeastern interior rim of the crater, it reminds me a lot of some eroded hills. Like if you've got a valley

Tape 102B/6

that maybe has a 20-foot - it's bigger than that - but say you got a 20-foot drop on the thing where it's been - just rain erosion down the side and it kind of washes little - little valleys down it here and there. And it leaves mounds and humps in between that haven't eroded away yet. And that's the way the side of that crater works. And then the other side of it, the northeastern rim of it and the interior rim, looks just like a - a - one of the massif units. That is, it's a very fine texture, no real erosional processes, just a smooth, gentle - gentle slope.

CC Roger.

CC Okay, Ron; it's your computer. Go back to BLOCK.

06 09 38 17 CMP Okay, we're in BLOCK.

CMP You know that Skylab drink bag has really been a pretty good deal because you can use the nipple that's on the end of that thing and use it for all of the beverage packages. And that way, you don't have to cup open the end of it and let it drip out all over the place.

CC Hey, I'll pass that along to the Skylab - -

CMP - - you can use the nipple.

CMP I'm not sure if they have any of our beverage packs or not. I think they are all packaged in these expandable little things we're using for water - water cans.

CC I see.

CMP Hey, Gordo, what day is it?

CC Out of sync there myself. It's Wednesday. It's about 9:15 in the morning, Wednesday.

CMP Ah ha! Thank you. I guess I could have figured it up, but -

CC That's why we're here. Answer important questions.

CMP (Laughter) That's right.

06 09 42 54 CMP Hey, getting ready for LUNAR SOUNDER to STANDBY. That's a "verify."

CC Roger.

06 09 43 14 CMP And RECORDER is - RADAR is ON. RECORDER is OFF, not heaters. I see the old MODE is still in VHF. Ah ha! I get to control the spacecraft again. ... Takes about five minimum impulse blips to get - a tenth of a degree per second.

CC Roger.

06 09 48 17 CMP The dark annulus around Serenitatis - As you look north - the dark variation there, and I'm kind of looking back - looking a little bit backwards now - but that dark has no continuity with the ridge at all. Goes right down the middle of the ridges. As you look directly east of Littrow - east - I mean directly west of Littrow, the wrinkle ridge is there, and then there's - it comes out, and you have the light tan, tannish, tannish -. There's a dark, I guess you call it - a dark tannish-gray. And then you get out to the light tan of the Mare Serenitatis, itself.

CC Okay, Ron.

06 09 53 09 CMP You know, I'm looking almost directly into the Sun and you can still see a topographic expression - topographic high around the rilles in the Tacquet area, and also the grayness has disappeared out of that - out of the dark material, and it's just - looking into the Sun now - it looks more of a tan - a darker tan than the Serenitatis area. And you can all see - also see the topographic rise to it now - I'm looking quite a ways away from it and looking down on it.

CC Roger.

06 09 54 23 CMP You know, that's kind of funny now, looking back at Sulpicius Gallus and just to the north of that,

Tape 102B/8

there's a crater that's about - well, it's right at the end of those rilles that go north from Sulpicius Gallus. And you can really see the ejecta blanket. The ejecta blanket looks very dark, around it now in this Sun. Now you look out across the Mare Serenitatis now and you're getting toward the sunset, looking back into the Sun, and the color is disappearing all except in that one spot. Now that must be a - either a fresh ejecta - and you look the brightness of it or something - or either that or it's dark. It's sure a dark - it's a dark ejecta blanket around it. The blanket itself goes out maybe two or three crater diameters, and it looks like it has kind of a ray-type pattern to it. I'll mark that crater. I don't even know if it has got a name or not, but I'll mark it on my map.

CC Okay.

CMP I got a ding. Let's see. It must be time to do something.

CC Yes, it's time to turn the recorder on.

06 09 55 43 CMP RECORDER, ON. RECORDER'S ON.

CC Okay.

06 09 57 04 CMP Just - I don't know where I am right now, I'll be honest. I just looked out window 3, and I'm right on the terminator. And, let's see, I'm going west, so we've got some arcuate - There's kind of a mare area down there. Okay, I think it is. And you can see lava tongues sticking out through there. And lava flow fronts with the high side on the east side because you got a shadow all the way along the front. And they're about - in the one area - you might consider a scalloped area - an ejecta scallop. Coming out of that one area you can see a crazy lava flow coming out from it.

CC Roger on that.

CMP At least the flow -

CMP Hey, those are Apennines I'm just going over, aren't they?

CC That's right. That's what they ought to be. We need the IR, OFF.

CMP You look back out across Seren - Okay.

CC We need the IR COVER, CLOSED, please.

CMP Say again, Gordo.

CC We want the IR COVER, CLOSED. Right away.

06 09 59 34 CMP Okay, it's going CLOSED. Okay, it's CLOSED. How about the UV?

CMP IR COVER is CLOSED.

CMP I was just going to say, looking back across Serenitatis into the Sun now, there must be Bessel that has ejecta pattern out there. When you look at the ejecta patterns into the Sun, they all look black with respect to the mare. I think it must be a shadow effect or something that you get off of the - the raised ejecta that comes up across it.

CC Roger.

06 10 02 41 CC Hey, Ron, that frantic call there was because the Sun had started to get in the IR and hadn't really thought that would happen, but started to see it get in there. But you caught it in time; the cover saved it.

CMP Okay. Real good. I figured that's probably what it was.

CC And you can go ahead with the rest of the steps in there with the UV off after sunset.

06 10 03 21 CMP Okay. MAPPING CAMERA is going OFF. COVER's CLOSED on the IR so then we'll turn it off. PAN CAMERA, SELF TEST, OFF. And let's see, I don't see the Sun shining up a light out there. It must be sunset. Couldn't be yet, though. Yes, sure enough is, though. Okay, UV's going OFF. You want the IR COVERS back OPEN just to keep things straight here?

Tape 102B/10

CC Stand by on that.

CMP They're just - I - next time we use the IR, let's just remember to open the cover.

CC Okay. Just open it up the next time we use it, which is in about 15 minutes. We'll we'll remind you on that if you forget.

CMP Oh, okay. That's right. Okay. That's right, these are just short sounder passes now, aren't they?

CC That's right.

CC Ron, I can finish up my description of the last night's EVA if you like since nothing to look at now. I'm watching the clock on the sounder start for you.

CMP Okay; hey, appreciate it.

06 10 06 01 CC Okay, think I left off, or was cut off there without mentioning two varieties of breccia in the South Massif. They found blue-gray and tan-gray and, without going into the geological details, those are the two types they found up there at Nansen. The subfloor unit was exposed as blocks and ejecta around larger craters had been partly buried by dark mantle. And craters apparently had penetrated thin parts of the light mantle. Especially good samples were obtained from the rim of Camelot where the same textural characteristics which are banding caused by variations in vesicle concentration, coarse-grain size, and mineralogic features, as reported in EVA-1, were found. So apparently this unit is quite uniform over the distances that they have covered so far in the traverses. The prominent east-facing scarp, crossing the valley floor from north to south about 5 kilometers west of the LM, was traversed twice near the crater Lara, near Hole-in-the-Wall, although Hole-in-the-Wall appeared to be pretty subtle. No change in the surface characteristics or lithology of the mantle was discernible where the astronauts traversed the Scarp. Outcrops of

boulders were observed farther to the north where the northward extension of the Scarp crosses the face of the North Massif, it forms a notably smooth and relatively young-appearing surface. Elsewhere, the surface of the North Massif is prominently furrowed and textured, and the crew described it as a cross-hatched pattern on the surface that they could see with one set of lineaments dipping eastward and the other westward at about 30 degrees. Some of the most interesting observations made during the EVA were related to craters. Many small craters within the dark mantle have glass-coated central pits. Jack called them dimples. Some of the pits are nearly cylindrical and maybe half again as deep as the crater itself. Other small craters occurring in both the dark and light mantle have bright halos, but these halos appear to be noticeably brighter on the light-colored material. This bright material is not blocky or fragmental ejecta derived from a subfloor layer, but rather appears to consist of "instant rock" or soil breccia which has been partly consolidated by the impact shock itself. The most interesting eureka during the EVA was at station 4, Shorty Crater, where Jack found some bright red or orange, he described it, orange dirt within the gray to dark-gray rim material. The colored banding is circumferential to the crater and resembled alteration halos, which occur around many terrestrial volcanic vents. So you can see why the geologists are excited on that one. The morphology of Shorty, however, is similar in some respects - -

06 10 09 20 CMP

You bet you.

CC

- - impact craters have definitive interpretation of its origin may depend on sample analysis. And I got about a minute and a half to start the sounder. It might be close to 02:30 there, if you aren't. They took a total of about 850 pictures. They've taken a total of 1270, would you believe, pictures ... on the lunar surface. Including about 150 with the 500-millimeter camera mostly of the North, South, East Massifs, and Family Mountain. They got 56 samples, two double cores, probably about 36 kilograms worth, and they traveled a total distance of 20 kilometers. Over.

Tape 102B/12

CMP Hey, sounds like a good summary. They're finding all kinds of things up there. Which is the reason you explor, I guess, to find - to see what you can find.

CC Yes, they - they were really in their element last night. About 30 seconds to T-start time. I'll let you call it yourself, though.

CMP Okay. I'll get it.

06 10 11 04 CMP DATA SYSTEMS are OFF. OPERATE, 05.

CC Okay.

CMP Hope this thing's in Reiner Gamma. Then you can find some sort of a topographic expression, to that light-colored material around there. It looks to me like there is - right around the Reiner Gamma itself anyhow.

CC Roger.

CMP Maybe the lunar sounder will collaborate my moonlight investigations here - or earthlight investigations, I'm sorry.

CC (Laughter)

CMP While we're waiting here - I decided to sleep last night without being tied down or anything. So I slept in the old - What do you call them in the Navy? -

CC Hammocks, I think.

CMP Well, anyhow, sleeper strings, we call them up here. Yes, sleeping bags - or some kind of sack. And the last 2 or 3 nights, what I'd do is put the lap belt on loosely. And you know, it just kind of keeps you from rolling all over the cockpit. Then last night, I didn't put it on at all and stayed in the sack. And I really didn't go too far anyhow. One time I woke up and I was crossways in the couch up here. And then when I woke up this

morning my feet were up in the tunnel, and my head was kind of still in the center couch, more or less. So you really don't roam around too much that way anyhow, even if you aren't tied down. And you can get the "huggy pillow" effect by being inside that sack and laying your head on the outside of the sack. It just about fits me, except that if I stretch my feet out - then I get a little bit of a pull. Little bit of a pull - on it and it feels like a huggy pillow that way.

CC Kind of a security blanket effect, huh?

CMP (Laughter) Yes, right. That was the biggest problem the first 2 or 3 days here - what do you do with your head when you go to sleep. I'm used to sleeping with a pillow. And I'm used to sleeping on my side. And it's amazing the psychological effect that you can get from - for me it's hard to go to sleep just laying on my back. So you can - turn on your side and you go right to sleep (laughter). What's your side and what's your back - I don't know, but anyhow, it works.

CC That's got to be psychological.

06 10 16 57 CMP (Laughter) It sure is.

CMP 5, 6, 7, 8 -

06 10 16 12 CMP MARK it. LUNAR SOUNDER to STANDBY.

CC Okay.

06 10 17 14 CMP Okay. RECORDER is going OFF. ... the heaters.

CC Roger.

06 10 17 24 CMP DATA SYSTEMs coming ON.

06 10 17 41 CMP Okay. SM/AC POWER is ON.

06 10 18 40 CMP I guess we need to open the old door. IR, OFF, barberpole, gray bar. I get to mess with the old optics again.

Tape 102B/14

- CC We're getting some of that, Ron. Sounds like the mike might have slipped away from your mouth, though.
- CMP Okay. That's a good point - let me change my headsets here. Anyway, I went right through the Flight Plan with all that stuff.
- CC Okay, and - -
- CMP ... left the IR COVER, OPEN.
- CC Okay. Great memory there.
- CC Ron, if you like while you're getting ready for the 52, I can summarize the news real rapidly. There wasn't a whole lot.
- CMP Okay. Sure, go ahead, I've got a different headset now. Is that okay?
- CC Yes, you're loud and clear. Former President Truman is still hanging in there. His heartbeat and breathing became unstable yesterday, but then improved again. Of course, the big headlines were about the discovery of the orange dirt at Shorty Crater. And there was a picture of Jan, John, and Jaime in the paper, watching the EVA on TV. The only thing new on the peace talks is that Kissinger will probably be coming back to the United States today and there's a rumor, the French press said that the compromise is in the work on the withdrawal of the North Vietnamese troops from the south. The Rockets lost - the Aeros, the hockey team, won last night. They beat the Alberta Oilers. The Rockets lost to Buffalo. And the weather finally cleared out. The cold front cleared out the wet stuff and last night I think was the first time since you guys launched that we've had a look at the Moon, so we had a direct look at you last night. It's just nice and sunny here, this morning when I came to work. Over.
- CMP Hey, thanks for the news and I guess those three guys that went up to the Moon - you know, they probably cleared that weather up there in Houston.

CC It sure took you awhile though.

CMP (Laughter) Right.

06 10 24 31 CMP Okay, 14 is Canopus again, the same ones I had last night I think. That's Canopus. Canopus looks about as bright as Sirius, but not quite.

CC Roger.

CMP My sextant - is good and everything like that, but you just can't quite get the reticle in focus.

CC Roger.

CMP It's kind of the way they said it was going to be.

CC Okay, Ron. We copy those. Clear to torque them.

06 10 26 14 CMP Okay, let's see; we'll torque at - oh, make it 06:30.

CC All righty.

CC Ron, we've still got about 5 or 6 minutes until LOS, but in case we drop off on your maneuvering there - just want to tell you that everything's looking good. In fact, the IR is pumping out good data, so with that fantastic teamwork, we saved it back there, and we'll see you next time around.

06 10 27 24 CMP Hey, okay. Sounds good, there's little old Aldebaran in there. Saturn still must be out of the - There it goes into the -

06 10 28 58 CMP (Humming) got to align the old GDC here.

06 10 53 XX

BEGIN LUNAR REV 36

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 11 20 18 CMP Aha! We have acquired on OMNI D.
CC Hello there, America. We hear your scratchy-sounding omni.
CMP (Laughter) Probably so.
CC You're readable but noisy.
CMP You're cutting in and out on the omni. I thought I couldn't get you.
CC Roger.
CMP Looks like we get the high gain here pretty quick.
...
06 11 22 52 CC Roger.
06 11 27 29 CMP Launch a little heavy [?].
CMP Okay, Houston; America. We probably have pretty good comm now, huh?
CC Yes, Ron. We're getting you now, and you sound good.
CMP Okay. I don't have any observations to report from the back side. About time for blue bag number 4. Somebody has got to develop a better mouse trap.
06 11 29 23 CC Roger on that.
06 11 32 07 CMP Okay, the old PAN CAMERA's in STANDBY.
CC Roger, Ron.
CMP Power's coming - power's coming on and V/H is the HIGH ALTITUDE.
CC Okay.
CC Okay, Ron, we're ready for SELF TEST.

Tape 103B/2

CMP Okay, going to SELF TEST -

06 11 32 49 CMP Now. Barber pole.

CC Roger.

CMP Okay, by the way, mag Lima Lima is empty. 165 frames showing there. Started mag Mike Mike with frame number 95. Finished the orbital science at 142. Took the crazy camera at f/5.6 at 1/125. When I got ready to change to f/5.6 at 1/250, I looked at the crazy thing and it was setting at f/11. Maybe those first frames in there, maybe they can develop them a little different or something and still bring - get them to come out.

06 11 37 01 CC Okay, Ron. We got that.

CMP I think what happens is I must have been holding the thing by the lens or something or I bumped the - the f-stop thing somehow.

CC Ron, we're ready for PAN CAMERA POWER to OFF. And did you go to HEATERS after you set the SELF TEST switch to SELF TEST, when we started this?

CMP No, I just went back to to OFF. Was I supposed to go to HEATERS?

CC Okay, we'd like it in HEATERS, now.

06 11 37 59 CMP Okay, it's going to HEATERS. Now it's spring-loaded to OFF, and I just left it there. Okay, going to HEATERS, and now it's going to - power if OFF.

CC Okay.

CMP Okay, let's see. Are we ready for Lunar Sounder? Need a clock down here by panel 230 (laugh). Not really. I can look back and see the LEB one. Okay, it's about time. Okay. LUNAR SOUNDER's verified in STANDBY. The RECORDER is going ON. RADAR is going ON. And the RECORDER is OFF, not the heaters. If antenna 1, verify they're out, eh? EXTEND. No barber pole. Back to OFF. Number 2 EXTEND. No barber pole. Back to OFF.

Okay, MODE is going to HF and let me take a look at - Alfa is OFF; Bravo is OFF. B DATA is OFF, BEACON is OFF; RANGING is OFF. Okay, let's see. Two, two. 250 lens. Okay.

06 11 40 27 CMP 5.6 *** fifth and infinity. Mag QQ.

CMP Mike goes in the temporary stowage bag; QQ goes on with 10⁴ frames.

CMP That's going to be window 3.

CMP Somebody had - had his nose up against window 3, here. Got to wipe it off. Boy, these windows have really been great though. They haven't - you know - don't have any coatings or anything like that on them.

06 11 42 18 CC Roger, on that.

CMP I'll be darned. I'll bet that's a little micro-meteorite pit in window 3. Right in the middle of it. It looks like two of them out there. It's about - much smaller than a 1/32 - 1/64 - 1/64 in diameter probably.

CC Gotcha.

CMP It's a little, round - Doesn't seem to have any - It's just a pit, you know.

CC Ron, you said that was window 3?

CMP Window 3, yes.

CC Okay.

06 11 45 54 CMP Oh, it scared me for a minute there. I was configuring for terminator photos, and I looked on the near-side terminator, and I didn't see any. It's on the far side.

CC Yes, Stu and I were looking at the same thing. We're just about a - 30 seconds ahead of you.

CMP (Laughter) Okay. One's of Aitkin on the far side. Okay. Aitken and Ibn Hyan [sic], I think, or something like that. Debber [?], Ibn Hyan [sic].

Tape 103B/4

- CMP Yes. You know, going to come across - come across the Tacquet area again, and there doesn't seem to be any - it - there's a bright crater - a recent crater in the annulus - in that dark annulus, in the southern part of Serenitatis, it shows up again as that kind of a blue-gray brightness, as opposed - as opposed to the tannish - tannish brightness of the - of the bright craters in Serenitatis. There's still is no apparent wrinkle ridge - there's no color tone or differentiation in the wrinkle-ridge area, in this part of it. The only differentiation, and - It looks like south of Tacquet you get the same color tone variation occurs on over into Tranquillitatis. When you get to the Tacquet area, from Tacquet up to Miller or something - I wish I could remember the name of that crazy crater.
- CC How about Menelaus.
- 06 11 49 31 CMP Menelaus. That's it. Yes. From Tacquet up to Menelaus now, the - that's got to be a buildup of material and it's more on the tan side than it is on the - more of a dark tan than it is to the tannish-gray. So it's a different type of material than - than on the annulus down below the crater, Tacquet.
- CC Okay, Ron. You're saying this is sort of a annular plateau, then, that stretches across between Tacquet and Menelaus?
- CMP Yes, it is. It's an annular plateau in there, and the plateau is got to have been coming from those rilles down - that are down in there.
- CC Okay, do those - Maybe you've already said this - do those wrinkle ridges cross the color boundaries?
- CMP No, I can't find the wrinkle ridge that crosses the color boundary. The wrinkle ridges are out in Serenitatis itself, and there is no color boundary on the western edge of Serenitatis. It's all the same.
- CC Okay. Those sound like supergood observations, Ron.

CMP Passing over - Sulpic - and - I'm just passing over Sulpicius Gallus, now. And just beyond Sulpicius Gallus - Sulpicius Gallus is out in the Mare Tranquillitatis, itself, and it looks like you could - it's either a talus slope - you know, you got a gentle slope of the - of the massif coming down and then it changes slope a little bit, and the - it looks like you have finer-grained material. And that might be what we have at one time or another called the high-water mark, but I kind of believe that's just a talus change in the slope. As you go on down there in the fine-grained material, somehow developing down there in the bottom. But as soon as you cross that area - we're going west now from Sulpicius Gallus - again we've got kind of the same tannish - a dark tan material that essentially covers the highland - this highland-type of an area here. It's a hummocky-type material. There are a few rilles just north of Sulpicius Gallus; those rilles, again, have - have the dark tan material on it. About the same as the tan - same color tones that you pick up from Tacquet to Mele - Meleneis [sic].

06 11 51 54 CC Okay sounds great. Keep talking, we'll cue you as the Flight Plan events come up.

CMP Okay. D - D-Caldera is sure fascinating. I'll try and take a quick look with the binocs on that one. *** binoc and I can't find it there. There it is.

CMP I hope the pictures will kind of confirm a little bit of a - of a topographic rise around the D-Caldera, just a slight one, and it's about half the width of the - if you - As you look at the "D," it's a half a width of the "D," not the height, but the width. And it seems to be a raised, kind of a raised, flat rim around it. The color of the raised bumps down in the D-Caldera are the same as the surrounding material, around there. The de - the bumps that are raised up are smooth looking and the depression for it has to be a caldera, I guess, or at least, the part of the depression, anyhow, is a light bluish gray; I'll call it that way, very light bluish gray.

Tape 103B/6

06 11 54 14 CC Hey, Ron I'm not suggesting you do, because it's probably trouble to find. Have you tried the color wheel, comparing it on any of this stuff?

CMP (Laughter) No, I haven't. Let me try. That's a good idea, though. I'll try that and see what I can come up with on that thing.

CC Well, don't don't go to a lot of trouble. I never got around to it, but you might - you might peg down some of these colors a little better. Particularly when you were talking last night about - on the back side - -

CMP That's a good point.

CC On one of those passes about the green.

CMP Yes.

CC Okay, you're about 7 seconds away from where we're wanting the recorder on, Ron. Any time here's fine.

CMP Okay, RECORDER - let's see -

06 11 55 09 CMP Is ON. Verify RADAR is ON, remove HF, okay.

CMP You know, to me, the Moon's got a lot more color than I'd been led to believe. I kind of had the impression that everything was the same color. That's far from being true.

CC Okay.

CC I guess, maybe we could say, perhaps, color is in the eye of the beholder.

CMP I think there is a considerable amount of truth to that.

CMP (Whistling)

CC Okay, Ron. We'll take the MAPPING CAMERA, OFF, now.

06 11 59 00 CMP Okay, the old MAPPER is going OFF.

CC Ron, you're clear to go to STANDBY on the MAPPING CAMERA.

06 11 59 51 CMP Okay, MAPPER's going to STANDBY. MOTION is up, barberpole. CAMERA is OFF. PAN CAMERA SELF TEST, OFF. Okay, turn the old SM/AC POWER, OFF, again. SERVICE MODULE AC POWER is OFF.

CMP (Humming)

CMP (Whistling)

CMP Okay, must be sunset. IR is coming -

06 12 04 59 CMP OFF. *** ... OFF. Okay, I'm going to go to plus-X. Plus 52.25. There is an UP-LINK. VERB 58 ENTER. Ah, 141. That's pretty close. 228.

06 12 05 05 CMP Ah - plus 66641. ENTER, there at 48 07. *** at 4935. That's about right.

06 12 08 09 CC We're about a minute and a half to T-start, now.

CMP Okay. Cue release, [?] ENTER.

CMP OMNI Bravo.

CMP Power OFF. Okay, data systems - -

06 12 09 05 CC Okay, 30 seconds to T-start.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 12 09 05 CMP - - ... five. Okay, at 40 minutes - Okay. I got the HIGH GAIN, OFF. Got my finger on the DATA SYSTEMS. Okay. DATA SYSTEMS are going OFF; OPERATE at 49:35. OPERATE. 54:38. Give me a call on that, Gordo. I'm going to look out the window here for a bit.

CC Sure will, Ron.

CMP A minute before that or so.

CMP I had the lights up. I may not be light adapted.

CMP Sure is ...

CMP I was trying to think if there was anything I could add to the Reiner Gamma observation there. I'm right over that - the light albedo of that type of material that goes perpendicular between Reiner and Reiner Gamma. It's kind of a crooked type - Well, you know, it goes for a little ways, and then it breaks off into a dark-albedo-type stuff; and then breaks off in another direction a little bit. So, it doesn't look like a straight ray at all.

06 12 12 26 CC Roger.

CMP You know - you can see crater holes, and this type of thing. You look right down on Reiner now, you've sure got that dark annulus - the lighter-albedo-type stuff is essentially in the middle of it. And the annulus is - let's see, maybe 30 kilometers wide by twice as long - that's a relative size, anyhow - by twice as long, and that's the dark area. And then around that, the light albedo stuff is about half of the width, and it's lighter on the outside than it is on the inside. The inside is not quite as light as the - I'd call it the rim, I guess. It's very hard to see any - -

CC Okay.

Tape 104B/2

CMP - - great, great, great topographic expression to it, though. The reason I say that is because it kind of blends in with everything, whereas if you look at a crater out here in the middle of the mare or a hill, you get a brighter - part of it's brighter than the surrounding territory. You can actually see the demarcation. So that's the way you get your depth perception out of it.

CC Okay, about 30 seconds now until T-stop.

CMP Okay. T-stop is 54:38 and we'll go to STANDBY at that time. Tape switch. 3, 4, 5, 6, 7; STANDBY.

CC Okay. I'll give you a call in a minute.

CMP Okay.

CC Okay, Ron. It's been a minute.

06 12 15 47 CMP Okay. RECORDER is OFF - not HEATERS. RADAR is OFF. DATA SYSTEM goes back ON. HIGH GAIN ANTENNA POWER to ON. And we're about minus 44, I guess. And select the old HIGH GAIN. There we go. REACQ *** AUTO. *** in NARROW. INCO's going to do some commanding. *** goes. Tape motion is going. Continue on here to the SM/AC POWER. Okay. SM/AC POWER is ON.

06 12 17 04 CMP MAPPING CAMERA is STANDBY. IR *** CAMERA SELF TEST ***. *** is ON. H₂ PURGE LINE HEATER. Do a hydrogen purge, here, shortly, I guess.

06 12 17 42 CMP Well - Leave that cover open there, and let the Mendall Mendall [?] get some data for a while; on Dr. Low, or whoever happens to be there. And I'll step ahead and sample the old BUSS.

CC Okay.

CMP Do-do-do-do-dadoot-doot.

CMP Houston, America. You might tell the medics not to pay any attention to those sample numbers on those busses. Pay attention to the GET time,

because when you take them out of the buss storage bag, the right one never comes out. So I don't think it makes any difference, just pay attention to the GET time.

06 12 20 24 CC Okay, Ron. I'll pass that along.

CMP Dun-dun-du-dun-dun-dun-dun-dun.

CMP Where are the guys on the Challenger? Are they going to go out the regular time, or are they getting a little extra sleep period here or something?

CC I think we're letting them sleep in again today. They're getting up 1 hour later than the Flight Plan shows; however, there's enough pad downstream that we're planning on ascent at the scheduled time.

06 12 22 14 CMP Okay.

CMP (Humming and whistling)

CMP (Humming)

06 12 26 19 CMP I think I'll - The STOWAGE VENT, ON, just for a little bit.

CMP (Whistling)

CC America, Houston. We've got a couple of - couple of items of general information, as you come up on AOS here - LOS. The - we want to remind you to CLOSE the IR - -

CMP Okay.

CC - - and UV COVERS, before you do any dump. After LOS, you'll have to - -

CMP Okay. Will do.

CC - - reconfigure the comm.

Tape 104B/4

CMP Okay.

CC And suggest you wait on the dumps, as per the Flight Plan, until after the photos. And, we estimate the waste water dump will take 10 minutes. Over.

06 12 28 19 CMP About 10 minutes on the waste water. Okay.

CMP Okay. Let's see - must be *** LOW BIT RATE, huh? Okay, LOW BIT RATE, with DATA SYSTEMS, so no DSE voice. I'll write everything down.

06 12 30 27 CMP ...

06 12 31 27 CMP Okay. I'll get up all the hoses and stuff I put down here.

CC Just about LOS, Ron. See you later.

06 12 33 13 CMP Okay, Gordo. Thank you much.

06 12 52 XX BEGIN LUNAR REV 37

06 13 19 14 CMP (Humming)

06 13 19 22 CMP Well, I've got AOS with you. Okay. ... HEATERS OFF. (Singing) ...

CC Hello, America. Are you there?

CMP Okay. We got REACQ and NARROW now.

CC Okay. You're loud and clear.

CC Ron, when it's convenient - -

CMP Okay. I just finished mag - -

CC - - I have a couple of updates to the Flight Plan - -

CMP Okay. Go ahead.

Tape 104B/5

CC Okay. On your present page, there - the UV solar atmosphere pad, at 160:38.

CMP Ah-ha. I have it.

06 13 20 56 CC Okay. It's T-start of 160:41:22; T-stop is 161:26:47. And the remark that goes with that - you don't need to write this down - but the T-start time is biased 10 seconds prior to when we really think sunset will occur. If you see, visually - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 13 21 13 CC And the remark that goes with that, you don't need to write this down, but the T-start time is biased 10 seconds prior to when we really think sunset will occur. If you see visually - Okay, my mistake that's - the time is 10 seconds after sunset, but if you see sunset visually, you can go ahead and proceed with the UV COVER, OPEN, as soon as you see it. But we'd like you to close the UV cover exactly on the T-stop time as written. Over.

CMP Okay. Let's see. I'm with you. We'll make sure it gets closed at 61:26:47, but we can open it as soon as sunset comes, okay? Even though we haven't started pitching yet.

CC That's correct, and do you want to read back the start time?

CMP My start time is 160:41:22. Is that correct?

CC That's correct; 41:22.

CMP Okay.

CC Okay. Go to 161:34.

CMP 161:34, okay.

CC Okay, and the old standard "MAP CAMERA/LASER ALTIMETER COVER, OPEN:" cross that out. A couple lines below, at 36, cross out "MAPPING CAMERA, EXTEND," and then turn the page - -

CMP I got them.

CC In fact, turn two pages to 163:31.

CMP 31, okay.

Tape 105B/2

CC At 163:31, write in "verify all command module VHF, OFF."

CMP 63:31, verify all VHF, OFF, okay?

CC Okay. That completes it.

06 13 24 06 CMP Goody, I've got a zodiacal light coming up there sometime; blue filter, no less. Oh, I started to say, when I was coming across Aitken - Of course Aitken itself was down in the shadow, and the Sun was really shining on window 3. I took the first one at f/5.6 and a 1/15, the second one 56, 5.6, I mean, at a - at a 1/30, and a third one at a 1/60, and then a fourth one at a 1/25, and the fifth and sixth ones I took off to the north - looking off to the north - out of window 4.

CC Okay.

CMP And they were 5.6 at 1/125. I kind of doubt if - It might work, but there's sure a lot of glare on the window. If it can get through that glare, well then we've got it made.

CC Roger.

06 13 27 10 CMP Oh, the other thing I was going to tell you was that magazine Quebec Quebec - I finished that one on 114.

CC Okay.

CMP On that pass there.

CMP I don't know who took my water jug, but it's gone.

CMP Okay. Overboard drain is purged enough. I guess we can turn that off.

CMP That big filter on here - here. I always leave the hose and everything disconnected and stick it back

behind this rock bag. I'm afraid I'll kick it, break it off. You know - you know those rock bags. I unzip those and blow the air out of them every night, wake up the next morning, and they're full of air again; just like two big balloons down there.

06 13 29 08 CC How about that.

CMP (Laughter) I don't know ...

CC You can use one for the pillow you've been missing.

CMP (Laughter) Yes, that's an idea. I could use that.

CMP And, Houston; America. If FAO's got his finger on the next magazine - next Hasselblad mag, I'm going to use - save me looking it up, here.

CC Okay. I'll ask him.

CC Ron, I - You're scheduled to use Mike Mike next.

CMP ... water - Go ahead. Mike Mike. Okay. Thank you.

CMP Did you hear me sucking all the bubbles out of the - out of my teeth?

CC No, we've missed that pleasure.

CMP Good. Didn't want this VOX to be too good.

CMP Okay. We go to P00 in about 2 minutes.

CMP Zero phase is going to go right over Proclus, I mean Picard this time. Just as that darkness disappears there, if I can still see the change in the color on it.

CC Okay, Ron. You can put the HIGH GAIN to AUTO next chance you get and FAO advises there's no more

Tape 105B/4

optional film left on Mike Mike. Everything that's left on Mike Mike is scheduled up. Over.

04 13 34 44 CMP

Okay. I'll buy that. You know you could even - as zero phase went right across Picard there, you could still see the - the darkness on the west - let's see east - on the east from 9 o'clock around to 6 o'clock, if north is zero.

CC Roger.

CMP

And if north is zero as you look at the crater, then over about 1 o'clock there's some kind of a fault area in the side of the rim, and that's another spot where the dark material drapes down into the rim and also out on the outer - outside - outside of the rim. And then you have that same type of impression at about 11 o'clock. You've got a black streak going down inside the rim, and then it widens out going out toward a little crater out there on the outside of the rim.

06 13 36 03 CC

Okay, - -

LMP

Now, let's see - -

CC

- - you're scheduled to get a VERB 49 going now.

CMP

Thank you. Okay. Pitch is plus 120.55 ENTER, plus 341.00 ENTER, and a plus ENTER for 0 yaw 622. Press on. 50 18. CMC caged. Proceed.

CMP

Okay; let's see. We're in AUTO, so we can ***teen. 26 on the dial

CMP

Okay, we'll change 07 to 8 plus 9 - 1 -

CMP

*** VENTS OPEN. ... waste water dump. Must have been some stuff that's just frozen on the - the dump or something and then when the - when the jets fired too - that kicked it loose.

06 13 39 31 CC Roger.

CMP Maybe that's the particles of combustion - burning.

CMP Minus 0.05 - degrees per half a degree dead band.

CMP Five up - Got zero, zero. Stay there ...

06 13 43 14 CC Ron, this is Houston. Check NOWN 79 again. We think you might have loaded R1 and R2 negative. That's the way it looked down here, anyway.

CMP Okay, I'll check that.

CMP You know, I'm looking from this position back toward le Monnier - le - le Monnier or whatever. Le - le Monnier, and you can see the - well, it's hard viewing it - to see it here, but your - you can see the annulus around Serenitatis. The demarcation is about the diameter of le Monnier toward - westward from there and the demarcation of the color - the color from this observation, again, is a light tan. Darn. I forgot to get that color wheel out, but it's a darker tan than the tan of Serenitatis.

CC Roger, Ron.

CMP The color boundary is not associated with any rille or anything that I can see. Doesn't look like there's any topographic expression to it.

CMP There it is.

06 13 48 16 CC Thought you might be interested, Ron. We just woke up the Challenger, and they're all doing fine.

CMP Oh, hey, good, good. Sounds like Robert. You back on?

Tape 105B/6

CC Yes, they pressed me into service because they have - We woke up the Challenger and they needed someone on that one, so I'm over here. Still cold and cloudy.

CMP (Laughter)

CC But we've got one blessing. It's not raining outside.

CMP Well, that's good anyhow. You know, even from here now I can still see that annulus around le Monnier or le Monnier or whatever it is.

CC I'll buy that.

CMP Pronounce those things for me, you know (laughter).

CC Are you saying that annulus extends out into Serenitatis, and you see some, kind of like, rings of le Monnier out there in Serenitatis like that?

CMP No, they aren't rings there - they're just a - it's a diameter that extends into Serenitatis about the diameter of le Monnier.

06 13 49 36 CC Okay. We copy that.

CMP And even from this distance. You know, I'm almost to the western edge of Crisium, looking back across there, and even from this distance, you can still see the - the color boundary between the two and as far - It goes up north by Posidonius, and then it kind of blends in and it will look - as far as I can tell anyhow. Going from Posidonius on around to the north side of Serenitatis. Of course, it's a long ways away, and I really can't see, but I couldn't tell a definite demarcation. It just kind of blended in from the tan to - to the dark tan.

CC Oh, Roger.

06 13 50 42 CMP Yes. Bessel is the one crater that really shows up out there. It's the biggest one in the - in

the Mare Serenitatis, and it's also the one that has that - an ejecta pattern - a fresh pattern ejecta pattern around it and that really shows up in the - in the shallow Sun as you're looking back towards the Sun.

CC Roger. Roger.

CMP And this is the first time now, looking back toward the Sun where I've been able to see that ray from - That's supposed to be a Tycho ray isn't it - going right across Bessel in the north-south direction?

CMP Here's 50 18. Let's see. What are we supposed to be doing here?

CMP Get this squared away. Bright - coming in the window here, I can't see my DSKY. ... GDC - Well, this could [?] be 20 going first. ENTER 2-2 - enter - We use option - -

CC Ron, if you'll stand by with us, we're going to have a roll maneuver here real quick for you, so we get the mapping camera out of the Sun.

06 13 52 35

CMP Oh, okay. Which way?

CC Roger, Ron. We want a 360 - We want a 360 degree roll, 360 roll, 360, or 000; your choice.

CMP Okay. That's only 20 degrees.

CC Yes, it would mean a 360 roll. Just roll to 360.

CMP Yes, that's right. That's what I assumed.

CMP Fifteen degrees to go. Will that hack it?

CMP How's that? Got me in the clear?

CC Ron, looks good. As soon as the Sun goes down, you can roll back to 341, as required.

CMP Okay.

Tape 105B/8

06 13 55 01 CMP There's my NOUN 78's are 90 - plus 90 minus 19474.
Maybe it doesn't make any difference.

CC Roger. I'm looking at them, Ron, and - -

CMP - - okay; that's minus 05, plus 50. Okay?

CC Got it.

CMP 50 41 22.00. That looks good.

CC Yes, right on the money.

CC Hey, Ron, did you kill P20 when you grabbed the
stick that time?

CMP I don't know. I don't think so. Tell you what
I'm going to do. As soon as the Sun goes down,
I'll roll back to all my error needles, recall
P20.

CC Ron, they're saying that when we - when you roll
back to 341, you'll have to restart P20.

CMP Yes, that's - that's what I'll do.

CC Okay.

06 14 00 04 CMP (Humming)

CMP *** sunset.

CMP Can you tell, are the pitch rates changing?

CC Roger, Ron.

CMP Okay.

CC Must have felt good to be able to fly it by hand
for awhile, huh?

CMP Covers are open - Yes. (Laughter) Yes, we're going now. Okay. We got her going.

CC Good show, Ron.

CMP Pretty close, but we made it.

06 14 03 29 CC Just of interest to you, Ron. We are really pleased with the way that our visual display and that worked out last night during the orbital science visual. Farouk was able to feed me the questions, and I was able to get them to you. If you have any comments one way or another, if you don't want us to do it on rev 40 or not, let us know. We plan right now on rev 40 for those orbital science visuals to do the same thing going - It's the visuals through landing site down through D-Caldera, and we're going to run the same operation, since it went so smoothly down here. We hope it went that way for you up there.

CMP It sure did. As a matter of fact, I like it very much. That kind of clues me on what to look for as you're going through, because you see so many things down there - that you - that you kind of - Frankly, I have a tendency to forget what the main thing that you're trying to look for is.

06 14 04 27 CC Good show. We're prepared to do it on this next rev, and I guess you might say even though it isn't that way in the Flight Plan, we'll probably just stand by right straight through on rev 40 where you - you pick up at the landing site and go right through D-Caldera. We'll be just standing by for that whole rev - that rev - whole piece - about 12 minutes, or so.

06 14 04 49 CMP Okay.

06 14 12 07 CMP Okay. Looked like she worked. We're going 0.2 of a degree per second, now.

Tape 105B/10

CC OMNI Charlie, Ron. We'd like OMNI Charlie.

CMP There it is.

CC Okay. And we hear the crackle.

CMP Yes, it sure did. I hear the crackles up here, but I think it's a lot worse down there. Isn't it?

CC Well, we can live with it.

CMP Time for stuff that you want to feed through to the IM, prior to - lift-off?

CMP I'm sitting on an OMNI waiting for lift-off, I think.

06 14 15 40 CC ... was.

CMP Say again, Bob.

CC My fault. I just kicked the peddle down here, Ron.

CMP (Laughter)

06 14 17 47 CC Ron, just a little information for you. One of those highlights of your day. When you come around AOS on this next pass, they'll be - White Sands will be standing by in a countdown on an Aero - Aerobee rocket for UV calibration shot, and if that one doesn't go, they've got one for tomorrow, same way.

CMP Very good. Yes, I hope this one works.

CC Roger. We need the calibration data.

06 14 18 19 CMP Right.

06 14 24 25 CMP Is it starting to look pretty good on your high gain antenna scale down there - to switched to high gain yet?

CC That's your cue, Ron. What - what you think on the high gain meter ...

CMP Oh, okay.

CC You're at that time in the Flight Plan where you should be able to get it and we should be able to get our PCM data.

CMP All right.

CC Sounds like you've got it.

CMP Okay. Worked like a charm.

CC Roger. Boy, it sure does quiet down as soon as you get it in there.

CMP (Laughter) It does, doesn't it?

CC I sure hope I'm as clear to you as you are to us. You sound like you're just in the next room. It's really great comm.

06 14 25 50 CMP Well, you are really - It's really great.

06 14 30 36 CC Ron, we're about ready to lose you, and at 161:30 you have a maneuver. We want to make sure that gets started on time because of Sun problems on the camera.

CMP At 161:30. Okay.

CC Yes, it's just a matter of doing it on time - -

CMP Okay. We'll do that.

CC - - or else we'll have Sun problems.

Tape 105B/12

06 14 30 59 CMP Okay.

CC And it's because the camera's out of shade.

CMP I tell you what. I'll start that.

CMP Yes, I'll start that as soon as I get the clem [?] cover closed on T-stop. That will give us a minute or so there, too.

CC That would be real fine, Ron.

CC Okay. We've got the DSE running, Ron, as per the Flight Plan.

06 14 31 33 CMP Okay.

06 14 50 XX

BEGIN LUNAR REV 38

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 13 45 04 (Music: Texas Aggie Fight Song)

06 13 46 34 CDR-LM I want you to say it first.

CC Hello there, Challenger. The Gold Team Flight Director picked out the morning's selection, and he said that if can find some maroon dirt, today, instead of orange, you'll probably get a lot more cooperation out of him.

CDR-LM I figured the Gold Team might do that. You know, I've woke up to a lot of pleasant thoughts, but never to an Aggie before.

CDR-LM Hey, Gordo, don't forget I'm a gold - I'm a Boilermaker.

CC Roger.

CDR-LM I feel like one right now. Tell the Gold Team Flight Director we'll find about - just about anything he wants today.

CC Okay; I'll do that. The Challenger looks as good as ever. No problems at all through the night.

CDR-LM That's outstanding. How's America?

CC It's in the same shape. Just clicking along. Ron's been up for a few hours now and really gathering up the data.

CDR-LM Outstanding, Gordo.

CC Challenger, the name of the game today is to stay with the - the EVA prep time line. We're not going to talk much to you - We'd like - except to bug you a little and stay on your back to keep with the time line, if at all possible - We'd like to get out on time. Over.

Tape 106A/2

CDR-LM Okay, Gordo. That's been our motive all along, and we will stay with it. As of right now, we're 1 hour behind. Is that correct?

CC That's affirmative. Although, if you stay on the normal time line, that's fine with us. We don't need to gain any, but we just don't want to lose any - from where we're starting now.

CDR-LM Yes. Understand. Understand.

LMP-LM Good. How are you this morning?

06 13 54 52 CDR-LM Houston, Challenger.

CC Go ahead, Challenger.

CDR-LM Okay, Gordy. Crew status is good, in case you hadn't noticed. And again I'm not going to - We haven't kept an itemized accounting of the food - burning up blanks on the paper to do that. But we have ate - have eaten, pardon me - We have eaten just about everything in the various meals. I guess the shrimp was the only thing we didn't really eat. And we've been drinking a lot of water and all the juices and tea and stuff, so I think we're in pretty good shape there. The commander had a Seconal last night, and he slept 3 good and 3 intermittent hours. LMP had no medication and had 6 good hours of sleep. If you've got some lift-off time data, well, I'll copy it.

CC That's affirm. Okay; start with - for rev 38. Time is 162:22:52. Rev 39 is 164:21:24; 166:19:55; 168:18:27; 170:16:59; 172:15:31. That should have been rev 43, and read back starting with rev 38.

CDR-LM Okay; rev 38: 162:22:52; 164:21:24; 166:19:55; 168:18:27; 170:16:59; 172:15:31. And what is our present rev?

CC That's a good question. Let's see here. We're working on rev 37. Ron just went by 10 minutes ago on rev 37.

CDR-LM Okay.

06 14 01 32 CDR-LM Gordy, we're pressing on, but if you've got any good words, like news and what have you, where we are, we'd appreciate it.

CC Okay. There hasn't been a lot of news, but I'll read you what we've got. President - former President Truman is still holding on. His heart-beat, breathing, and temperature all became unstable yesterday, but then he improved again. A Methodist minister in Kansas City said, "He's a rugged guy who's hanging in there and he's going to make it." The headlines were full of reports of the find of orange dirt and the rest of your adventures yesterday. Internationally, the U.S. and North Vietnam held intensified secret peace talks, and Henry Kissinger prepared to return to Washington probably this afternoon, I understand, after a final session with Le Duc Tho. The French press said a compromise was in the works on the withdrawal of North Vietnamese troops from the South. The Houston Rockets lost to Buffalo up in Buffalo last night, but the hockey team, the Aeros, took a 6 to 4 win over the Alberta Oilers. In - Really, that's about it on the news, except maybe for the weather, which finally broke. The cold front cleared out the drizzly rain last night, and for the first time since you've launched - that I can remember anyway - we've been able to look up and see the Moon, directly. It's a pretty sight as always. That's not much of a report, but that's about all we have. Over.

CDR-LM Okay; thank you. What's the date today?

CC It's Wednesday - let's see - Wednesday, the 13th of December.

CDR-LM Thank you.

CC Right now, it's about 01:35 in the afternoon.

Tape 106A/4

CDR-LM Okay; just take a quick peek up there. I can't really see too much of the North American continent. South America looks pretty good. And it might be my eyeballs rather than the - the clouds up there, but it looks like most of the clouds are up into the north-central part of the southwestern or southeastern United States.

CC I have a satellite picture here, and that's about the way it looks.

CDR-LM Well, it's sunny and pleasant on the valley of Taurus-Littrow. And, Gordo, what is our Sun angle going out today?

CC I'll get you an answer on that. Couple of questions. First of all, the Surgeon would like a biomed rate. And they were wondering how your hands feel this morning?

CDR-LM Hands are in good shape, Gordo. No problem.

CC Okay; that sounds good. Sun is getting up there about 33 degrees now.

06 14 06 22 CDR-LM Okay; we'll go a mild midleft, and both PLSSs air have been topped off.

CDR-LM Gordy, the LMP isn't hooked up right now. He will be shortly. So stand by on the biomed.

CC Okay. Okay; I have a few words on the command module trajectory that might be of interest, although it doesn't affect your procedures any.

CDR-LM Go ahead.

CC Okay. The com - the command module orbit somehow is missing all the mascons. It's not degrading into a circular like we thought it would. It's just staying where it was, about a 70 by 50. And so what we're planning on is an extra little maneuver about 1 hour prior to the normal plane change, which will lower the command module altitude at the plane change mode to - to 60. This will be about a 11-feet-per-second

RCS burn. And then Ron will do the plane change at the normal time, but it'll be little bigger than - that we had planned. I think the last half was about 365 feet per second for plane change. And we've checked the consumables. That puts the RCS right on the preflight line. He's been running about 4 or 5 percent above it. That will use up that pad there, put him back to nor - nominal on RCS, and on the SPS, that puts you right down on the CSM rescue redline; so, really no problem. In good shape, consumablewise. Over.

- 06 14 08 38 CDR-LM Okay. Sounds like a good rendezvous posture.
- 06 14 41 31 LMP-LM Okay, Houston. You got any updates to the EVA cuff checklist?
- CC No, I don't think there is, Jack. Although I do have a wri - write-in for the Lunar Surface Checklist, and one that you really don't need to write in on the prep card. Over.
- LMP-LM Go ahead.
- CC Okay. Page 5-10 on the Lunar Surface Checklist. The reason for this change is to prevent cabin pressure from increasing. It got up to 5.7 yesterday. And it also - will also prevent water sep spindown like happened yesterday, if you happen to have the hose - the return hose blocked against the wall outlet there. The change is to write in on the upper left corner of 5-10, just prior to "SUIT ISOL, ACTUATOR OVERRIDE (SUIT DISCONNECT)." Write in "PRESSURE REGS A and B to EGRESS." And then down five lines, where it says "CABIN GAS RETURN, EGRESS," change it to "CABIN GAS RETURN, AUTO." Verify. Over.
- LMP-LM Okay, Gordy. At the top of the page, "REGS A and B to EGRESS," and then five lines down, "CABIN GAS, RETURN, AUTO. Verify."
- CC That's right. And the only other change I have is - has to do with matching - just like yesterday, - matching the purge valve to the OPS to

Tape 106A/6

maximize the OPS capability. And we can just call you when you get to that point. It's - Or if you want to write it down, you need 211, and Geno needs 208.

LMP-LM Okay. We've got that.

CC Okay. That's all.

LMP-LM Okay, Gordy. I guess we play the cuff checklist just as planned, with the exception of the bag numbers which have changed, the collection bag numbers. I have more or less repaired the - sample bag holder on my camera. It's taped on there pretty well with good tape, believe it or not, off the fruit bag. I - I don't know that we have any other outstanding hardware problems. I think in terms of sampling, Gene and I will try to shift the emphasis in the mantle area to fragments that are different from the gabbros that we've sampled fairly well, I think, up to now, that presumably are subfloor materials. You might pass that word on and see if they agree with us.

CC Okay, Jack. We copy that. And, Jack, if you guys are at a convenient place, sit and listen while you're doing some of your stuff. Let me read up the planning for EVA 3 and the summary of what we think we have so far.

LMP-LM Go ahead.

06 14 45 26 CC Okay. I'll read here from this thing just verbatim. It says, "EVA 3 continues to follow essentially the nominal premission plan. Main objectives continue to be the North Massif; station 6, 7; Sculptured Hills; and Van Serg Crater. In view of the extensive observations of the dark mantle and main - and plains subfloor unit on EVA 1 and 2, particularly there before station 5, the relative - the relative priority of station 10 is reduced, so that station 10 becomes a flexible station as time allotment is a reserve, possibly providing more time at the earlier station, if desired. However, mantle and

Tape 106A/7

block sampling at station 10 are still important objectives. Block pack constraints are not nearly as tight as they were yesterday, guys, and so we can be more flexible in reshuffling station times if we need. We probably won't be coming up against option walkbacks like we did at station 4. Closeout time at the LM has been increased by 20 minutes to make the closeout less rushed and to allow for potential ALSEP troubleshooting. It is currently planned to take this time from station 6, 7."

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 15 17 28 CC America, Houston. Don't want to interrupt your eat period, but just would like word from you on how the SIM bay configuration went. Did the UV cover come open? We're standing by on that Aerobee launch.

CMP Affirm. UV COVER is OPEN. I think SIM bay's all squared away.

CC Roger. Thank you.

CMP Sunrise was - that's 7 seconds, I think - after we closed both covers (laughter). Good timing.

CC Roger. Okay, I'll keep you posted during your eat period of how the Aerobee's coming. It's due to launch at 162:10, and we need to get the 64-kilobit data here. As soon as we get that, we'll be giving it a GO for launch, but we did want to get your word on the cover.

CMP It's OPEN.

06 15 18 41 CMP It's OPEN and verified on.

CC Roger, Ron. And they're in the count at White Sands.

CMP Okay.

06 15 21 35 CMP Okay, frame number 110 of mag Oscar Oscar was taken from window 1 off toward Lomonosov. You could really see the swirls in Marginis. They're - Trying to compare them with the same type of swirls back there in Arabia.

CC Okay. We copy.

CMP Let me take the old binocs and look out there. It's a long ways away.

CC Roger. What are you looking at again, Ron?

Tape 106B/2

06 15 22 31 CMP These are the swirls looking off across the - Marginis toward Lomonosov and - let's see, what's that other sea? Big - big crater just to the northwest of the Neper?

CC Okay, let me look at it here.

CMP About the same size as Neper.

CC I got a poor map, Ron. All I show is - next to Neper, you have the Border Sea which is northwest of Neper, called the Border Sea. I don't know if that's the proper term you want or not.

CMP Yes, that's - that's - that's what I mean. I think that's - Mare Marginis is a round one up there. I think that's what it is.

CC Yes, I think so, too. I - Soon as I get ahold of - -

CMP And in that case - Yes, my map doesn't go up that way, either, so - or the one I have out.

CC Okay. Stand by.

CMP I think Marginis is a circular basin.

CC Yes, Mar - Marginis is the name; right.

CMP And then, just north of that is - -

CC You got a big - big one called Goddard - -

CMP Yes, and then north of that is - Yes, okay. But in the case of Marginis - there's a brand new crater just in the northeast quarter of it - I mean northwest quarter.

CC Okay. Brand new car - crater in the ... Marginis.

CMP It almost looks like that - in the northwest quarter of Marginis, and it's about - let's see, I'm guessing - 100-kilometer size, probably.

CC Okay. We copy that - -

CMP Hey, no, 50-kilometer size.

CC Roger. You've never seen that before on any of the maps?

CMP But you know, it's - that - Well, no. I've got to look on the map. I'm sure it's there, because that's what's causing all the swirls going across Marginis.

CC Okay, do you see a color-texture difference between the swirls across Marginis there?

CMP Yes, the color - the texture is hard to - you just can't get any texture out of it. There's a dark - a dark gray. And then the swirls seem to be around this dark gray - the dark gray areas. The swirls, of course, are a light, light - light, light tan.

CC We'd like - Stu and I would like to know, do you think the swirls are ejecta from that new crater you've seen?

06 15 26 20 CMP Well, yes. The swirls in that one crater seem to be in Marginis, and I hope that's Marginis. I want to look at my map here in a minute and look for sure, but they seem to be emanating essentially radial from that bright crater - going out across the mare.

CC Roger. Just a reminder, Ron, we don't want to tear you away from your window if you don't want to, but this is your eat period.

CMP No, that's all right. I'd better grab -

CC And we're T minus 3 White Sands and counting.

CMP Better munch on something here. Hey, good.

CC Ron, if you were in the simulator right now, I'd have you adjust your mirrors.

CMP (Laughter) Yes, so you could tell which - where I'm looking, huh?

Tape 106B/4

CC No, sir, so you could look - you know what we used to adjust the mirror for down at the simulator all the time.

CMP (Laughter) Yes, I know what you mean. Uh huh!

CC I guess what I'm saying is I need a mirror down here on my console for those of us in the peanut gallery here.

CMP (Laughter)

06 15 28 49 CMP Okay, the crater I was talking about was Al-Biruni - is the one that's got the swirls across coming from it. And then off in the northwest corner, just outside the rim, that's a very bright crater. It shows up on this - contingency chart. So that was Al-Biruni. Goddard's got a lot of - of swirls in it also. No, wait a minute. Goddard was the one I was talking about, not Al-Biruni.

CC Okay. Goddard. Roger; got you.

CMP What? Yes, Goddard is the one I was talking about. Crater size is more relative on that one, and there weren't any craters on the floor so that had - that had to be Goddard.

CC Okay, we just had lift-off at White Sands.

CMP Hey, good! Let's hope she keeps going.

06 15 32 26 CMP You know, I'm looking north of - along Crisium. Okay, yes; there's Picard and Peirce. And you get the - same - same pattern that looks kind of like a swirl. Looks the same - same type of albedo as a - as a swirl with light places and dark places. The only difference being that you can definitely tell that these are ejecta from Proclus because the pattern is somewhat radial, you know, from Proclus itself. And then you've got the same thing, there's a crater up on the north - north rim - -

CC Roger. We got you.

CMP - - ... Crisium, just outside of it is about a 50-kilometer crater again. And it's a very bright one. And there the rays cross the Proclus swirls - or rays. Here you have to definitely call them - call them rays instead of swirls, and yet they look the same way. And the only - the only distinction is that in Crisium they go essentially radial. They have a direction to them, whereas the ones over there in Marginis and - next to Fermi or somewhere off in that part of the country are - They don't have any particular direction to them.

06 15 37 44 CC Okay, Ron. White Sands just called us and they got a good data take and their - Preliminary report shows a good report on Aerobee.

CMP Ah, perfect.

06 15 41 39 CMP You know, I'm looking out of window 2 now, and you can definitely get three different color textures on the thing. You've got the light tan of Serenitatis, and then you've got the - an annulus ring that stops somewhere in about the middle of the two ridge systems that go around. And then you come down south in the landing site area and the two dark things change - Ah, I can't quite see it anymore. Then landing site is a darker - more of a gray, and it go - goes on - goes on up - There's a subdued crater; there's kind of a - The rilles go on up there, and then there's a filled-in crater just to the west of one that's about 20 kilometers in diameter. And that's about where the dark-gray material ends, right on the edge of that crater. And then you run in to the annulus that goes all the way around Crisium. I mean - not - not Crisium - or around Serenitatis.

CC Serenitatis, Roger.

CMP Ouch!

06 15 43 33 CMP Frame 110 and 111 were taken, just now, out of mag Oscar Oscar - one of the landing site, and one north of the landing site, trying to get the color distinction between the three of them there.

Tape 106B/6

CC Roger; we copy.

06 15 47 41 CC Ron, do you have your Flight Plan handy? I've got an update and stuff like that. I don't want to interrupt eating. If you don't have it, we'll get it after the eat period.

CMP Okay. Just a second here; I'll get it.

06 15 48 31 CMP Okay, 113, 114, and 115 were taken on the western edge of Serenitatis. I'll get unwound from the cord here in a little bit and I'll (laughter). You know if we design another spacecraft, we got to have something with a - so you don't have to be tied up to this crazy cord.

CC Roger. Copy that. Hey, look, there's no hurry - hurry on the Flight Plan. Just keep doing what you want, and I'll call you at about 162:40.

CMP Let's see, where are we now? I've got -

06 15 49 14 CC We're at 152:29.

CMP Oh, that's right. Yes. I'm not doing anything. Okay, I'm ready. Go ahead.

CC Okay, what we want to do is, we have to take a look at the data longer, so at 162:45, we want to put in "MAPPING CAMERA, RETRACT" at that point. MAPPING CAMERA, RETRACT.

CMP Okay.

CC And that will delete it over at 163:05. You'll just delete it from that point.

CMP Okay.

CC And the zodiacal light photo pad, which is over there at 163:10 about - is 163:10:49 there. That's 163:10:49.

CMP Okay. Zodiacal light T-start 163:10:49.

CC Okay, the only reason I want to get that up to you is that "MAPPING CAMERA, RETRACT" there at 45 - We have to take a good long look at that data, you know. You know the problem we're having with it.

06 15 50 25 CMP Oh, yes, uh huh. Okay.

06 15 51 23 CC Okay, Ron, if you're near there, HIGH GAIN to AUTO.

06 15 51 30 CMP HIGH GAIN is AUTO.

06 16 01 06 CMP Houston, America.

CC Roger. Go ahead, Ron.

CMP You want the laser altimeter on while we try to retract that?

CC That's a negative, Ron; just let it run.

CMP Okay. Will do.

CC They're going to stay running until over at 163:35 or so is where they - they go OFF, and we're - we're just going to retract the camera.

CMP Okay. La - laser altimeter still putting out good data? As far as we know, anyhow?

CC Yes, the only problem we had was when your toe caught it that one time. It's been good all along.

06 16 02 06 LMP Okay.

CC Ron, we'd like H₂ TANK 1 FAN, ON, please.

06 16 04 02 CMP Okay. H₂ TANK 1 are going ON.

CC Roger.

06 16 04 56 CMP Okay; let's try to retract the old mapper, huh?

CC Roger. We're ready. You were watching it.

06 16 05 03 CMP Okay. TRACK EXTEND, OFF; 5, 4, - Well, let's see, I'll start it at 15 - 15:15; 13, 14 -

Tape 106B/8

06 16 05 18 CMP GO.

06 16 05 22 CMP Got a barber pole.

CC Okay, we see motion, Ron.

CMP Very good.

CC Ron, we've got one change to the Flight Plan. We should have got it to you sooner. At 163:40, we want to change that VERB 49 maneuver, because we want the lunar sounder to look at the SEP at the landing site.

CMP 163:40, okay. Go.

CC Okay, let's change this to roll, 115; pitch, 297; yaw, 0.

CMP Okay. Roll of 115; pitch, 297; yaw, 0.

06 16 06 21 CC Roger, Ron.

06 16 09 12 CMP MARK it. Barber pole.

CC Mark it. Roger.

06 16 09 22 CMP I don't mean barber pole. I mean gray (laughter). Well, whatever it was, it changed.

CC Yes, looks like it's all the way in.

06 16 09 39 CMP Yes.

06 16 12 23 CMP The - Since we're having a little trouble with that, why don't I put the TRACK EXTEND switch to OFF on that one?

CC That's okay, Ron.

CMP Okay. We'll just remember it's retracted.

06 16 13 11 CMP Houston, America.

CC Go ahead, Ron.

CMP Okay. Looks like we're running a bit - a bit beyond what it might take to do this here. Why don't you check with Bob Mercer and see if we can get by without using the - Call that one, that frame - that's - the protect frame. Either that or how real is the 40 expose - usable exposures on the front of the film? How much protection - how much room is there to - gravy - before he came to his calibration films?

CC Okay, we're checking on that, Ron.

06 16 14 12 CMP Okay. That, or he may want to skip one of the 60-second exposures in there somewhere, you know.

CC Roger, Ron.

06 16 14 39 CC Ron, our film record down here indicates you've got three more frames on there than you need for the zodiacal light, or do we have a bad number somewhere?

CMP You may have. Because I'm - let's see, ready to take - yes, I've only got 11 more pictures on here. I'm sitting on number 30, ready to take picture number 30.

CC Okay. Understand you're sitting on 30, ready to take number 30. And you've got 11 pictures left.

CMP Yes; so that's 30 - 11 pictures, the way I count it. Unless there's some, you know, a little gravy between the 40 usable frames.

CC Okay, Ron. There are 44 useful frames on that mag, so you can go from 30 to 44 in getting data.

CDR Ah ha! Okay, that's good. We can get the whole works, then.

CC Roger.

06 16 15 51 CMP Outstanding.

06 16 19 15 CMP Okay, Charlie 3 and Bravo 3 are ON. Alfa 3, and Bravo 3 are OFF. It should have been Charlie 3 and Dog 3 are ON.

Tape 106B/10

CC

Roger. We copy that, Ron.

06 16 19 46 CMP

Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 14 46 27 CC

But if 6/7 requires more time when we get there, we can borrow it from one of the other stations; I guess, in particular, station 10, probably. As the initial activity then, we are going to have to take explosive package 5 with us, and we'll stick it under the LMP seat, and I'll remind you in real time when we get down on the ground on that one. And number 5, 3 pound, will be deployed at station 10, and again I'll remind you about that in real time, so don't - you don't have to bother to write it in on your checklist. Planned traverse proceeds as normal. We're expecting to spend about an hour and 20 minutes at stations 6 and 7, and the suggestion is that we may end up wanting to spend that totally at the split boulder at station 6, but, of course, the option still exists to visit more than one place and sample other boulders if it seems feasible and attractive and desirable. They are suggesting additional 500-millimeter photographs, especially if it seems that we can use those to document tracks and sources of docu - of the sampled boulders; for instance, at stations 6 and 7. We are continuing to hold the nominal 47 minutes at station 8 - that is, 8A, and we still think that's as good a place as any to sample the Sculptured Hills. Station 9 is still nominal 30 minutes, but in view of the similarities to the in - to station 4, we're anticipating a possible desirability to remove time from station 10 to enlarge station 9, but that will have to be a real-time decision, based upon what we find at station 9. Station 47 - station 10 continues nominal. We're still interested in sampling the blocks and also interested in - in trenching to try and see - if we can say something about the dark mantle - light area relationship and, perhaps, the nominal coring. We're going to - we're going to deploy EP 5 there; and, other than that, they're basically the same. If we have the time during that closeout, and you'll know if we have enlarged the closeout somewhat, of the LM, based on our experience the last two nights, particularly for dusting; but also, if time permits, in that time

Tape 107A/2

we might try and get the - use up the extra double core, if there is one, in the dark mantle near the LM or do some trenching near the LM. But that's only if time permits at the very end, depending upon how the consumables run out. They want to call attention to two particular things here. One, since you guys really haven't gotten any very big rocks so far, they're recommending, they say here, and I quote: "The value of large individual samples has been demonstrated. We recommend that several football-sized samples of a uniform igneous rock be collected at station 9 or 10." I'll pass that on as that. Another point of interest is the 1- to 20- millimeter size section of the regolith, the dark mantle, the lithology. Then, any observations or collections you can make pertinent to that would be of interest in trying to determine the relationship of the dark mantle to the subfloor units of gabbro underneath. Two short questions which I'll ask, which I hope - hope you can answer in just a very few words. One of them is a yes and no answer. One, we - they can't find the geophone photos specifically called out in the transcript. There is probably a little bit of garble at that point, and the people in the back room will be very happy if you could say once and for all, Jack, that, yes, you did get the geophone photos. Over.

06 14 50 03 IMP-IM Yes.

CC Roger. And the second one concerns the 1/4-pound charge which we deployed on the way in last night. Two questions on that. It appears to us from your voice transcript that we weren't fast enough on it at the time that that may be deployed closer to the ALSEP than the one you deployed on the way out. And we'd like an impression on that. And, number 2, you mentioned that you placed it in a depression. We'd like some feeling for that depression in terms of how much of a danger that bomb - charge might play to the ALSEP when it goes off. If it's in a depression of any sort, they're probably pretty well protecting the ALSEP. Any comment on those two questions? Over.

06 14 50 47 CDR-LM Well, the second one. It's not in a major depression. But it is a - maybe a - it's a little ditch, maybe a third of a meter deep. I imagine it will help a little bit. That's why we picked it. Just a second.

LMP-LM I'm not sure we understand your first question very much.

CC Okay. We have a feeling that when you - -

CDR-LM Bob, don't you have the mileages?

CC Roger. But there's again some confusion on that.

CDR-LM Can't you - can't you pinpoint that?

CC Yes, and those mileages also seem to indicate that we had that callout. Remember, you drove back by and you said you saw the flag, and then you said you actually saw the charge in itself first. And it was some time after that you said you deployed the charge. And we have the opinion from both that and the mileage that you probably deployed the second charge closer to the ALSEP than the first one. Do you have a - any sort of a feel for that?

06 14 51 43 CDR-LM Oh, yes. I remember saying that, but that's when I did a big 360, and Jack was out of film. And I just lined up to take that picture with him up in the background. And when I said, hey, I saw the charge first. I was really - Don't take that comment too strong.

CC Okay. Copy that.

CDR-LM As far as position of it, Bob, I - I - we're looking for them out there now. As a matter of fact, we can't see them from here.

CC Okay. We'll let it go at that. And that's all the questions and comments we have on today's traverse. We'll have a few real-time things on the surface, which I won't bother you with. A

Tape 107A/4

possible fix to the surface electrical properties and a possible trip back to the surface gravimeter, which is still having its problems. But I'll talk with you guys in real time on those when you get on the surface, rather than bothering you with them now.

CDR-LM Hey, Bob. How far should that last charge be from the ALSEP?

CC They want it about 300 to 400 meters.

CC And, Gene, you ... 0.2 for range when - -

CDR-LM Bob, I ... - -

CC - - ... got back to the LM. And I guess the question would be, Did you ever go through zero on the way back to the LM? If you are at 0. - if you were at 0.2, and we think 9 - 092 was the bearing, then the LM is right where we thought it was, and we were just a little confused by our distances. Just doesn't quite - they don't quite hold together.

CDR-LM No, I don't think I ever went through zero, because I initiated at the SEP.

CC Okay.

CDR-LM And, no, I didn't go through zero.

CC Okay.

CDR-LM I'm positive.

CC We copy that. Okay. We'll work on that.

CDR-LM Is this something to think - Yes, this is something to think about. It's not that far out there. You know, if there is any question about that damaging the ALSEP, it - it's just hard for us to recall how close they were. And we sort of thought you had them pinpointed for us. But, if you want it 3 to 400 meters, you might think about a late ... - -

CC No. We thought about that. We don't - we don't want to do that. No, we don't want to do that. So we'll take care of it. Don't worry about it now. That's all we have. Press on with the prep.

LMP-LM Bob, I can - Hey, Bob; this is Jack. I can see the charge with the binocular. It's out almost behind a rock that's between us and the LM, but I can see it. I (laughter) - I mean, a rock between it and the LM. I can't give you any idea, though, how far it is.

CC Okay.

06 14 54 54 LMP-LM No, it's the one off to the left. It's the ... - Hey, Bob. Let me say again, I think we ought to emphasize the exotic looking fragments on the dark mantle. And we ought to try to make sure that we look at a variety of rocks from the North Massif. I think we saw the major rock types on the South Massif yesterday, but we really didn't spend a lot of time ranging along the front there to verify that completely. The other comment on the 1- to 20-millimeter size fraction. There isn't an awful lot of that in the dark mantle. That's one of the striking things about it.

CC Okay. Copy that. And we'll talk - -

LMP-LM But we'll keep our eyes open.

CC - - I'll talk with the back room about stations 6 and 7. We'll get with you on that when you get there. And press on.

06 14 57 38 LMP-LM Houston, Challenger. I was BIOMED, RIGHT, there for about 10 minutes, in case you're curious.

CC Okay, Jack. And it looked good.

CDR-LM Okay, Bob. I've got them both. And the last one we deployed, which I think is the eastern one - easternmost one, is definitely farther out than the first one we deployed. And you know, at this distance, it's awful hard by looking at Jack's geophones. What's your - I got to give you at least 300 meters, Bob.

Tape 107A/6

CC Okay, Geno. Bob's in the back room. I'm sure they're listening, and we got that.

CDR-LM Yes, I - I've got both of them with the monocular now. And the - the second one, the last one we deployed, is quite a bit farther out than the first one.

CC Okay. I think that's what they want to hear.

CDR-LM Gordo, I guess it's half again or maybe even twice as far away as - as the first we deployed. So we're going to forget it.

CC Okay, Geno. That sounds good.

LMP-LM And, Gordo, I'm going off the air also here for about 10 minutes. It'll speed things up a little bit.

CC Okay. Fine.

06 15 12 50 CDR-LM Houston, Challenger. CDR's now back on.

CC Okay, CDR. You're loud and clear.

06 15 27 42 LMP-LM Okay, Houston. This is the LMP from Challenger. How do you read?

CC Jack, you are loud and clear.

06 15 45 58 LMP-LM Okay, Houston. I'm ready for battery management, and the ED BATs are 37.2 And I'm going to POWER AMP, PRIMARY, and PM [sic], HIGH.

LMP-LM Hello, Houston. How do you read Challenger?

CC Okay. We have high bit rate now. You're GO on the battery management.

LMP-LM Okay.

06 15 48 13 CC Okay. We've got that. We're ready for POWER AMP, OFF, and PCM, LOW.

06 15 49 48 CDR-LM Bob, CDRs PDR - PRD is 17043. 17043.
CC Copy that, Gene.

06 15 50 44 LMP-LM And Jack's is 24138.
CC Roger. Copy that.

06 15 53 36 LMP-LM Okay, Houston. CDRs OPS is 5900; LMPs is 6100.
CC Okay. Copy that. Very good.

06 16 00 58 LMP-LM Gordy, the forward hatch is unlocked.
CC Copy that.
CDR-LM I'm sorry, Bob.

06 16 09 31 CDR-LM Bob, CDR is starting on with the PLSS donning.
CC We copy that, Geno. And we copy the forward hatch unlocked, right?
CDR-LM Yes. Sure did.

06 16 13 36 CC Challenger, Houston. We've lost down-links with you guys. We've got a very weak signal. You might check your configuration up there, please.
CC Challenger, Houston in the blind. We've lost down-links with you. Please check your comm configuration. Over.

06 16 14 06 LMP-LM Roger, Bob. We're checking.
CC Okay, Challenger. We have you back loud and clear.
LMP-LM Okay, Houston. That's - Okay. It looks like I might have hit the YAW knob on the steerable with the PLSS.
CC Okay. Copy that.

06 16 15 11 CC Okay. And, Jack, if you want to check those again for numbers, it's PITCH of 14 and YAW of 8, 08.

Tape 107A/8

06 16 15 29 LMP-LM Bob, that doesn't jive with what my needles say. I've got a 20 and - and 50.

CC Leave them there. We'll check with you.

LMP-LM That's minus 50.

06 16 18 20 CC And, Jack, this is Houston. What's your SIGNAL STRENGTH meter reading there on your high gain, next time you get around to it?

LMP-LM We're at 3.8. It's not quite as good as it was. We had about 3.9, I think.

CC Okay. Ed thinks maybe you want a side ..., and he's suggesting a PITCH of 14 - 14 - and a YAW of plus 8. Over.

06 16 18 46 LMP-LM Okay. I'll try it.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 16 24 07 CC Roger, Ron. We're probably going to lose you early here. You're looking good as you go around the horn. We went around the room, and everything's - all systems are GO. Just a reminder on this next back side that there is no recording so there will be no DSE recording of voice on this back side.

06 16 24 28 CMP Oh, okay. Thank you much.

06 16 49 XX BEGIN LUNAR REV 39

CMP Well, let's see now.

06 17 21 06 CC America, Houston.

CC America, Houston.

06 17 22 16 CMP Houston, America here. Sorry, but I didn't have my hat on.

CC Roger, Ron. No problem. We've got a Flight Plan update whenever you're ready.

CMP Let me get the cameras squared away here first, okay?

CC Okay. Just give me a call.

CMP I've been looking out the window, and I took - I took the four before 120 on the horizon across Arabia - with an 80 millimeter.

CC Roger.

CMP Mike. Mike Mike. There he is. That was on mag - mag - mag Oscar Oscar, by the way.

CC Roger.

CC Did you see Arabia?

CMP Yes, it was a pretty - pretty good hit at it. It doesn't really - for - You've got to study it.

Tape 107B/2

CC Okay. We don't want to talk you into something.

CMP (Laughter) That's right.

CMP ECX[sic] 20 intervalometer, f/4, 1/250 ...
19 frames. Okay. We're starting with 143. Mike
Mike.

06 17 25 50 CMP Okay. All set for a Flight Plan update here.

CC Okay, Ron. It's a couple of short items. Let's
see. First of all, at 164:35, just anywhere in
that area, we'd like you to service your biomed
harnesses if it's convenient. We're getting pretty
ratada-ratty data on you, now.

CMP Oh, I just put a new one on last night.

CC Okay. We think you need to service it with some
jelly or something.

CMP ... A sponge, I guess, huh? I guess they could
dry out. Okay.

CC Roger. Okay the next Flight Plan update is at
166:36.

CMP Okay. Go.

CC Add a VERB 49 maneuver to lunar sounder HF target
attitude at 166:40. The angles for the VERB 49
maneuver are as follows: 142, 269, 359.

06 17 27 25 CMP Okay. That's to be - Okay. It's a VERB 49 to
142, 269, and 359, and that's for the pass where
we pull film through there, huh?

CC Roger. 166:40 is the time of that maneuver. And
it's after - There's a note after that - resume
nominal Flight Plan.

CMP Okay.

CC That's it. You've got everything up to date. And
you're aware, I assume, that we have a total alter-
nate Flight Plan laid out if we should have to
jettison the an - high - the antennas.

06 17 28 17 CMP Yes, you bet. I don't know what it is yet, but
(laughter) - -

CC And, Ron, FAO - just a reminder on that maneuver
I just gave you - to start it at - at 36 to be in
attitude by 164:40. Say again; 166:40.

CMP Okay, 166. Okay. Figured it was, but - okay, I
guess that - I stay in that attitude, then, I
guess that's what it is, isn't it? Through the
best of the SEP?

CC Affirmative.

CMP Best of the receive only? Okay.

CC And just for your information, your buddies on the
surface are out walking around the Rover right now
on television.

CMP Hey, good deal.

06 17 30 10 CMP Tacquet up to Bessel E or Men - Tacquet to Menelaus.
Go right along the pass. Calderas change at
Cannon(?) Rilles. Across - 2.8, isn't it? 1/250.
The terminator's there.

06 17 34 49 CMP Well, I'm just trying to match my color wheel with
Crisium, and nothing matches.

06 17 34 54 CC Roger. Seems a few other people have found that,
too.

CMP (Laughter)

CC Hey, Ron. You're already aware, I'm sure, that -
with this different attitude you've got, your look
angle on D-Caldera photos here are going to be
pretty - pretty marginal, and CM-5, I guess, is
still the best window; But it's - I guess we're
going to go ahead and get them, but it may be
marginal.

06 17 35 21 CMP Okay. I'll see. I was - I was wondering about
that, really.

06 17 39 10 CMP You know, the Crater Dawes has got - starting from
the top going down the rim, there's a kind of a
light-tan layer, it's a concentric layer that goes

Tape 107B/4

all the way around; and then you come into a lighter - it's almost to the white and it looks like on the hills and all around the landing site. And this first layer goes down maybe - let's see, as you look at the total distance in there, about a third of the distance; and then the white layer - concentric layer that goes all the way around, and this is in the western wall I'm looking at now, and it goes down to - to about a half of the distance, not quite half of the distance from the top of the rim down to the bottom. And then the lower portion of it, the lower half, a little better than a half really, is kind of a tannish gray - has a tannish-gray albedo to it. It's all streaked. And close to the bottom of the layer, the bottom of the crater itself is - filled with - Well, oddly enough, it's the same color of material that's - that's laying around the edges of the crater. It has some radial rings around it, which gives an indication of a subsidence of some kind, or a sliding down the hill. That's really the first crater where I've been able to see any sort of layering in the walls. Now the first layer on the north side and also on the south side, in the dark brownish layer of the thing, you can see parts that are jagged, jagged, and sticking out. In other words, there's a slight change in slope in it. That looks like it's a very steep slope, which would indicate that it's a fairly con - compacted type of material in the first layer. And then the slope changes in the white layer on down a little bit more. And the white layer seems to sort of combine and maintain the same type of slope as the dark-gray stand - layer - the bottom, or from halfway down to the bottom of the crater.

06 17 42 00 CC

Roger, Ron. Did you tie in some of that ejecta material to the layer at the very bottom of the crater, like an overturned flap or something?

CMP

Yes. That's what it looks like.

CC

Roger. Got you.

06 17 42 17 CMP

The ejecta material is about the - Yes, that the - Okay, here we come on - Well, it's an odd angle, but I guess it will work. Good. I want to get some of the - 30 and let's see. The first one

started at Tacquet. I'm going to whip her back one and get one of - back the other way, because that's kind of a change in - in the color. The color of the area changes right at the Tacquet Rille to - to the brown - browns. This - I forgot my little "gouge," here. It goes north of Malinius [sic], doesn't it?

06 17 43 04 CC You come up Tacquet, and then you go right near Bessel E, up in - you follow those ridges along into Bessel, there; Bessel E, rather.

CMP Follow the - follow the rilles? Okay.

CC You're north of Malinius [sic], Menelaus E [sic].

CMP Okay.

06 17 43 32 CC And you cross just a little - -

CMP That's definitely a volcanic field.

CC - - bit south of Sulpicius Gallus. Say again, Ro

CMP Okay, south. I was going to say that - that's definitely a volcanic field or a deposition. And it's - You have relief with it from Tacquet on up to even Men - Menelaus.

CC Roger. Understand.

CMP Bob, you say we cross to the south of Sulpicius Gallus?

CC Yes, just about; just a little south of Sulpicius Gallus and the Haemus Mountains. Cross the Haemus Mountains, and then you're right over D-Caldera.

CMP Okay. I think I got D-Caldera awhile back with a 250 lens, too.

CC Good show.

06 17 44 51 CMP Now, these Haemus Mountains have the same color tones, and what have you, as the - that field from Tacquet to - to Menelaus.

Tape 107B/6

- 06 17 45 40 CC When you're a little bit past D-Caldera, you - on to - There's a line between the Sea of Vapors mare and the Apennine Mountains. That's where you change to f/2.8.
- CMP Okay. Yes, that is pretty good. We're going to hit D-Caldera, anyhow.
- CMP (Cough) There's a Cannon Rille. You know, there's a dark halo crater just to the west of D-Caldera. It's about 1200 meters or so in diameter, if my scale's right. It's about 1/4 of - 1/4 of the size of D-Caldera.
- 06 17 47 43 CC Okay, Ron. I don't show that on my map.
- CMP Okay. I think it might be on the picture there. I'm not sure. I'll have to get a better look at it before -
- 06 17 47 57 CC Okay. And, as you cross this mare that you - just to the west of D-Caldera, you'll switch - as you get across, and up into the Apennines, you'll switch to f/2.8.
- CMP Okay. Boy, that Cannon Rille's sure got something sticking up on the west side of it, there. They ought to take a look at that picture. Looks like a spire sticking up on the left side, because it creates a tremendous shadow. And, it's a perfectly round - Suppose that could be a crater? (laughter).
- CC Roger.
- CMP Yes. Might be a crater. 2.8 at 1/250.
- 06 17 48 54 CC Ron, you want f/2.8; and then, up here when you get to the Apennine Mountains, the line between the Apennine Mountains and - the mare up there, you want to go to 1/125.
- CMP Okay. 1/125. Okay.
- CC Stay at 1/250 until you get across the Apennines there.
- CMP Man, oh man. Look. I think those are the La Hire flows or something out across there. They really

stick up. You can sure see the flow fronts
the - You know, in Imbrium, you can see the flow
fronts and - the rilles a lot better than you
could in Serenitatis. They must be bigger.

06 17 50 12 CMP

2.8 at 1/125.

06 17 50 56 CMP

Eratosthenes is just - being - picked up.

CC

Roger. Roger. The terminator is going to go right
across it on the next pass, right across the
eastern edge of Eratosthenes.

CMP

Oh. Okay. That's all we're going to get.

06 17 51 28 CC

Okay, Ron. Due to the lunar sounder saturating
from the SEP, we would like to change the attitude;
and, right now, go to that - the VERB 49 maneuver
attitude that we called up for 166:36. We'd like
you to go that now. Over.

CMP

(Laughter) Okay. The old SEP is saturated. Let's
see. What was the attitude?

CC

Okay. I can read it to you. It's roll - -

CMP

42 - -

06 17 51 55 CC

- - 142, 269, 359.

CC

Okay, CMC in AUTO; ... Proceed.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 16 20 27 LMP-LM Bob, I'm in AUTO right now, and it's holding at 3.8 with those numbers that I gave you. I can't - if I go to the numbers that Ed suggests, I get down to about 0.3 and it won't lock up in AUTO.

CC Okay, we noticed that. Let's just leave her there, please. Go to SLEW, please.

CDR-LM VOX SENS at MAX. A T/R, and B is RECEIVED. On 16, your breaker open and connect to PLSS comm. Okay, connect the PLSS comm and then put your breaker in.

LMP-LM ***

CDR-LM Okay. Your PLSS comm - AUDIO breaker, CLOSED. Okay, PLSS PTT MAIN right, verify, and go MODE A.

LMP-LM Okay.

CDR-LM Okay, I got you. You'll get the tones on, vent flag, press flag, and O flag.

LMP-LM Okay.

CDR-LM Call Houston and give them your O₂ reading.

LMP-LM Okay, Houston. This is the LMP on MODE A and my oxygen is 94.

06 16 24 43 CC Copy that, Jack, you're loud and clear.

LMP-LM Okay. I'm getting a little bit of a squeal on the initiation of my transmission.

CDR-LM Yes. I hear that too, but it's - it's loud and clear here. Okay, I'm going mine open.

CC And LMP PLSS data looks good down here.

CDR-LM Yes. There's the tone. There's a press flag and a vent flag.

LMP-LM And you're - -

Tape 108A/2

CDR-LM And O₂.

LMP-LM ... you're loud and clear.

CDR-LM Okay. Okay, I cannot hear Houston but, Houston, this is CDR with 91 percent.

CC Roger, CDR and LMP. We read the CDR loud and clear. We have good LMP medical data.

LMP-LM Okay, you're loud and clear and they got good data on me.

CDR-LM Okay, you go B and I'll go A.

LMP-LM Okay, going to B.

06 16 26 50 CDR-LM Okay, how do you read me?

LMP-LM You're loud and clear. Houston, this is the LMP in Bravo. How do you read?

CC Roger. We read the LMP loud and clear.

CDR-LM Okay, Bob. And how me?

CC Read you loud and clear also, Gene. And we have good medical data on you, Gene.

CDR-LM Okay, Jack, let's go AR.

LMP-LM Okay, going to AR.

CDR-LM Okay, Houston, how do you read CDR?

CC Loud and clear on AR.

LMP-LM And the LMP?

CC Also loud and clear on AR.

CDR-LM Okay, Jack, SQUELCH VHF B, full decrease.

LMP-LM Decrease.

CDR-LM Okay. At 16, our LCG PUMP is CLOSED. At 16, CABIN REPRESS CLOSED, verify.

LMP-LM It's verified.

CDR-LM SUIT FAN DELTA-P, OPEN, and SUIT FAN number 2, OPENED.

LMP-LM OPEN and OPEN.

CDR-LM Okay, we should get a light in about 1 minute. Stand by for that. Okay, SUIT GAS DIVERTER to PULL - these are "verify" - PULL-EGRESS.

LMP-LM Okay, PULL-EGRESS.

CDR-LM CABIN GAS RETURN, EGRESS.

LMP-LM Okay, Houston. You want us to go by the checklist now on the ECS system?

CC Stand by. Roger. As per the checklist.

LMP-LM Say again. You didn't come through.

CC Roger. As per the checklist.

LMP-LM Okay, EGRESS on CABIN GAS RETURN.

CDR-LM Okay, that's SUIT GAS DIVERTER, EGRESS, CABIN GAS RETURN - EGRESS.

LMP-LM EGRESS and EGRESS.

CDR-LM And SUIT CIRCUIT RELIEF - AUTO.

LMP-LM AUTO.

06 16 28 07 CDR-LM Okay, OPS connect - you're first. SUIT ISOLATION, ACTUATOR OVERRIDE, and SUIT DISCONNECT.

LMP-LM Okay, that's done.

CDR-LM Your hoses are stowed?

Tape 108A/4

LMP-LM They're stowed.

CDR-LM Okay, connect your OPS hose, and I'll get you a number 211.

LMP-LM Let me turn around so I don't - -

CDR-LM Okay.

LMP-LM That'll do it. Keep poking this water hose here.

CDR-LM 211 is yours.

LMP-LM 208 is mine.

CDR-LM Okay, the pin is in. It's closed, you're in LOW FLOW.

LMP-LM Believe it or not, it still works.

CDR-LM You want any more?

LMP-LM Yes, I do.

CDR-LM Okay, are you through with it?

LMP-LM ... I think so, *** Right now. ...

CDR-LM I can get down there, if you can't, Jack.

LMP-LM ... I can reach it, I got it, I can reach it.

CDR-LM Okay, let's get your OPS hose. OPS hose. OPS hose, it's way down here. That's your water hose. Here's your OPS hose. Now, let's get the dust cover on it. OPS hose is going in. I verified its locked and the lock - lock is in. Cover is up, and we'll take another look at them. Okay. Okay, we got the MASTER ALARMS.

LMP-EVA ... 3 amps. Sluggish one.

CDR-LM But it's in and it's lock - and locked, and you're on - the - that's high. That's low. You're on LOW FLOW. Pin is in and everything's locked. Okay,

LMP-LM *** ... valve closed, locked. That's all those.
Install purge valve. DIVERTER VALVE - VERTICAL.

CDR-LM Okay. Okay, you want it on VERTICAL. Pick up my
OPS hose.

LMP-LM It's your OPS hose time.

CDR-LM Where's the top? I'll put yours on top.

LMP-LM That's fine. It's as good as anything.

CDR-LM I'm not sure it makes any difference. Okay, over
and locked, and dust cover, verify.

CDR-LM Okay. And the comm? ...

LMP-LM ...

CDR-LM That one's locked, verified. Here's purge valve,
and it's number 208, I hope.

LMP-LM No, you wanted a 211.

CDR-LM No. I wanted 208. I want 208 and you want 211.

LMP-LM No. I'm sorry. That's what I copied down.

CC Roger. 211 for the LMP

CDR-LM Verify that, will you, Bob?

CC 211 for the LMP.

LMP-LM That's right. That's - -

CDR-LM Okay. That's what he's got.

LMP-LM Somehow I copied the wrong one.

CDR-LM Okay, give me 208.

LMP-LM Same thing we had yesterday.

Tape 108A/6

CDR-LM Well, I think I'd remember from yesterday, and that's what I thought Gordy said. Okay. That's in, locked, verified.

LMP-LM On LOW?

CDR-LM On LOW and the pin's in. Okay.

LMP-LM *** check this one. Good. ...

CDR-LM Okay.

LMP-LM All right.

CDR-LM Okay. We just had our drink. You can turn drink - DESCENT WATER, OFF.

LMP-LM Okay, DESCENT WATER is OFF.

CDR-LM And my hand loop is all prepared. You get the scissors and the ETB. I think we finished up with that.

LMP-LM They're in there.

06 16 32 05 CDR-LM Okay. Position mikes.

LMP-LM Okay.

CDR-LM Okay. Here we go again, let's take a look at it. PLSS FAN will come ON. Don helmets and LEVAs. Drink bag, position. Lower LEVA protective visor, and secure tool harness strap, and we'll verify the following - let's verify the following, then we'll go ahead and put your PLSS FAN ON, and get your helmet, and you can put mine on.

LMP-LM Okay, going through one more time. ... connector and it's locked. And your OPS is locked, covered. You don't have water yet - exhaust is locked, covered. Inlet is locked, covered. Purge is locked and LOW.

CDR-LM Okay.

LMP-LM And vertical our DIVERTER VALVE.

CDR-LM That's right. Okay, let me take a check. Comm is locked and covered. OPS is locked - and covered. PLSS exhaust is locked and covered. Inlet is locked and covered. You're vertical. Purge valve is locked and low. Okay, let me get your helmet here.

LMP-LM Let's look at one thing here, Geno.

CDR-LM Let me put this up here. Get it out of the way, because that's half the battle.

LMP-LM ... look in.

CDR-LM That - that shade; then you can check it.

LMP-LM That's what my ... like. They're all stiff. Mine - mine is a little stiff, too, it'll come, if you pull. If need be, I can pull it down for you.

CDR-LM Yes. Okay.

LMP-LM I can get that one up another one.

CDR-LM Okay. As soon as I get this overhead, you can put your PLSS fan on.

LMP-LM Okay, now, let's watch out for all your paraphernalia there. Can you pull - that - pull that stuff away from there? Okay.

06 16 34 45 CDR-LM Well - ... Let me - let me undo this.

LMP-LM *** problem?

CDR-LM I just want to make sure I get my fingers on this thing, and make sure it's locked. Can't get it on. Do it. There, that got it. Okay, that should have it. Get your fan here in a minute. Okay, you got your fan on?

LMP-LM FAN's ON.

Tape 108A/8

CDR-LM Good. Okay, I want to verify it right now. Your helmet is locked. It's aligned. It's aligned. It's locked. Flaps are down in back. Your LEVA is locked. Your fan's on, right?

LMP-LM Yes.

CDR-LM Okay, let's pick mine up.

LMP-LM Okay.

LMP-LM Okay, you ready?

CDR-LM Yes.

LMP-LM You can feel that rim all the way around. Wait a minute.

CDR-LM Well, let me - you just -

CC And, Geno, we don't see your fan on yet.

CDR-LM It - it'll come on, Bob.

LMP-LM There, it's locked.

CDR-LM Okay, are the engage marks marked.

LMP-LM Well, they are now.

CDR-LM Okay.

LMP-LM That's in alignment only.

CDR-LM Okay, Bob, my FAN's ON. It is locked? Look good to you?

LMP-LM Yes. Fine.

CDR-LM Okay.

CDR-LM Get the LEVAs locked. The curtain down and back?

LMP-LM Yes. Velcro - Okay. Looks good. Okay, where are we here? Verify white dots plus EVA decals and then - you can don your gloves.

CDR-LM Okay.

06 16 38 08 LMP-LM Okay. Why don't you turn that way and let me turn this way?

CDR-LM Okay, Jack, I'm going to turn these lights off.

LMP-LM Okay.

CDR-LM We don't need those.

LMP-LM Okay. EVA decals, white dots.

CDR-LM Okay, URINE LINE HEATER's going to come off, and the breaker is OUT. Okay.

LMP-LM Okay, I'm ready except for TC pump - LCG pump.

CDR-LM Okay, leave it on. We can don our gloves now.

LMP-LM Okay.

LMP-LM Okay, right glove is LOCKED and verified. Okay, and the wrist cover is on there. On. ... Air is very dirty. Boy, do I need a shave. (Laughter) Okay. I got all mine down.

CDR-LM You all set?

LMP-LM I got my left hand. Got the left hand. Now, let's see what I can do with the right hand. Almost tempted to take those cover gloves off today.

CDR-LM I might take a look at that, too. I hate to argue with success, but I need that dexterity today. Bob, I don't know if you caught it yesterday - a little interesting facet of the whole 2-EVA exercise was the fact that I've already worn -

Tape 108A/10

06 16 41 33 CC Gene, you dropped out there right in the middle.

CC Challenger, Houston. We - you dropped out there.

CDR-LM Okay, Bob. How do you read now?

CC Loud and clear, Gene.

CDR-LM Okay, I hit the VOX switch on my audio panel.

LMP-LM You did?

CDR-LM Yes, when I picked up my glove. Okay, Bob, the only thing I said - little point of interest, I wore the RTV off the - not all of it - but right through the bare metal on the hammer - someday - some time in the previous 2 days. No problem; it just interests me.

CC Okay, copy that. And copy that you still have you cover gloves on today, right?

CDR-LM Yes, sir. I'll tell you, we have become very respectful of the dust.

CC Copy that.

LMP-LM Oh, yes, cover gloves, yes - We've also got the - we've also got the wrist dust - dust covers on, too.

CC Roger. Strike a blow for Mason jar rings.

LMP-LM What's left of the - and what's left of the cover gloves.

CDR-LM Okay, Jack, you're on?

LMP-LM I'm on.

CDR-LM In lock?

LMP-LM In lock.

CDR-LM Well, I just - I got my thing - I want to make sure I'm locked again. Yes, I am. I took it off again. Well, I was. Talking and you just do things - Okay. Don EV gloves. Cover, okay. PGA biting? No. Okay. LCG cold as required, and LCG PUMP, OPEN. I guess you can open it.

LMP-LM Yes, and disconnect the LM - -

CDR-LM Okay. LCG pump, water hose. And I got a tone but that's because I turned my oxygen on briefly. Okay. Okay, PUMP's OPEN. Turn around here half you.

LMP-EVA You can - you can take the water off.

CDR-LM Water's off.

LMP-LM Are the pumps off?

CDR-LM Okay, your water's off. *** that there for a minute. Okay, hang on. Okay, you're in and locked. *** over nicely. Okay.

LMP-LM Okay.

CDR-LM You're off. I'll lay that there. Where's your water? Here it is way over here.

CDR-LM Hold on. Okay, ... lock and your cover's on. I got to zap my PGA. Wait a minute, I'm biting here.

LMP-LM Okay.

CDR-LM ... Okay.

LMP-LM Okay, verify your PLSS is - WATER's MIN when you get a chance.

CDR-LM Okay, that's verified. Did that a minute ago.

LMP-LM And mine's verified and your pump on.

Tape 108A/12

CDR-LM Okay, PUMP's going ON.

LMP-LM Mine ON. PRESSURE REG A, B, to EGRESS.

CDR-LM Okay, they are EGRESS.

LMP-LM Okay, pressure integrity check. Ready?

CDR-LM Let me ...

LMP-LM Okay.

CDR-LM Awful lot of line there, isn't there?

LMP-LM Yes.

CDR-LM *** exactly what to do with it. *** Okay.

LMP-LM All right. You happy?

CDR-LM Yes.

LMP-LM PRESSURE REGs A, B, to EGRESS.

LMP-LM They are EGRESS.

CDR-LM Okay. Put your PLSS O₂ water - No.

06 16 46 43 LMP-LM ON, now. Mark it.

CDR-LM PLSS O₂ ON.

LMP-LM PLSS O₂ ON.

CDR-LM Right.

LMP-LM Okay, it's on.

CDR-LM Okay, and mines on. We'll wait till it builds us up. Press flag should clear at 3.1 to 3.4, O₂ flag is clear at 3.7 of 4.0.

LMP-LM Okay, I'm coming up. Hope the old suit integrity is just as good as it has been.

LMP-LM I don't see why not.

CDR-LM Coming up?

LMP-LM Yes.

LMP-LM About 3.5 now.

CDR-LM Yes, me too. Okay, let me know when you are up.

LMP-LM I think I'm up; I'm 3.8.

CDR-LM Okay, let's see if we can't get these -

CDR-LM I can't get yours.

LMP-LM I can't -

CDR-LM Okay, mine's OFF.

LMP-LM Mine's OFF -

06 16 48 27 CDR-LM MARK it.

LMP-LM We wanted decay for 1 minute.

CDR-LM Okay, I started at 383.

LMP-LM Okay. That's about exactly where I was. Another 45 seconds to go.

CDR-LM Okay. So far, it looks as tight as it was yesterday.

LMP-LM Another 30 seconds. Maybe lunar dust is a good sealant.

CDR-LM Houston, CDR ... at 382 to 270.

LMP-LM 270? 370.

CDR-LM 370.

Tape 108A/14

CC Understand 370.

LMP-LM Okay, LMP was - LMP was - 83 to 70.

CDR-LM Okay, Jack. You can get your O₂ on.

LMP-LM It's on.

CDR-LM Okay. Can you move to the left a little bit - to your left? I got to get in front here.

CC Okay, you're GO from here -

CDR-LM Okay, let me turn this over.

CC 17, you copy - ...

CDR-LM Okay, stand by. Okay, ... what time we have to turn the checklist over? Okay, we've got a GO for depress. On 16, CABIN REPRESS, OPEN, and CABIN REPRESS valve, CLOSED.

LMP-LM Okay.

CDR-LM The breaker open and the valve closed.

LMP-LM Okay, stand by. Can you give me a little room -

CDR-LM Let me - Okay, how's that?

06 16 50 28 LMP-LM Okay. Okay, REPRESS is OPEN.

CDR-LM Okay. Now, why don't you face the wall over there and move in as .;. and I'll get the overhead valve.

LMP-LM Wait a minute, I've got to close the REPRESS valve. You got it all right. Okay, it's CLOSED and I'll get where I was yesterday.

CDR-LM Okay.

LMP-LM How's that?

CDR-LM We'll find out in a minute.

LMP-LM Okay. I've got to get my PLSS.

CDR-LM Can you get it?

LMP-LM Well, can't ... I can turn with my back to the wall and you might have a little more -

CDR-LM Well, I think - I feel like I'm hooked on something. Wait. I can't turn either way - stay where you are. There - Okay.

CDR-LM Okay, the safety - Oh, boy, I'm glad I'm not an inch shorter. Okay, coming down, Jack. You ready?

LMP-LM Go ahead, to 3.5.

CDR-LM Okay, it's OPEN.

LMP-LM Okay, 4.5 - 4 - Stand by.

06 16 51 51 LMP-LM MARK.

CDR-LM AUTO.

LMP-LM Okay, at 3.5.

CDR-LM Can you read - the checklist?

LMP-LM Okay, I can. Okay. OPEN, AUTO 3.5 cuff checklist - cuff gage does not drop below 4.6, it hasn't.

CDR-LM Mine's good.

LMP-LM ... you put your hand down. I can't read it.

CDR-LM Okay.

LMP-LM Cabin is holding at 3.5. And suit circuit is locked up at 4.5 and PGA is decaying greater than 4.5 - 4.6, okay.

06 16 52 33 CDR-LM Okay, Bob, I'm starting my watch.

CC We're GO.

Tape 108A/16

LMP-LM Okay. You can go to - go to OPEN.

CDR-LM Okay, it's OPEN.

LMP-LM Okay, and pressure is gone up. And the next step is, when you can, open the forward hatch.

CDR-LM Okay, my suit's relieving.

LMP-LM Down to almost 1.5 now.

LMP-LM ... psi. Okay, my relief valve just seated at 5.3.

CDR-LM Okay, where are we?

LMP-LM We're at 0.5.

CDR-LM I guess the next thing is to open the hatch, huh?

LMP-LM Yes.

CDR-LM I've got to get down ... 5 ... here before I can turn too well and open the hatch. I'm going to let it come down a little bit this time so I don't get down there unnecessarily.

LMP-LM Yes. It's got a ways to go yet.

LMP-LM About 0.3 now.

LMP-LM 0.2.

CDR-LM I've got a tone and it's water tone. Okay, I'm going to go after that hatch. Can you slip to the right as far as you can? Got it.

LMP-LM Got to hold it until the pressure decreases. All sorts of junk going out there.

CDR-LM Okay, now. Okay. It's partially open.

LMP-LM Okay, get your water if you can.

CC Okay, Jack. We'd like you to close REG A, please.

LMP-LM Oh, close REG A, huh?

CC That's affirm.

LMP-LM Okay, stand by. That's not an easy task.

06 16 55 45 LMP-LM REG A is CLOSED. Gene, can you get my water?

CDR-LM Yes.

LMP-LM Did you get in there?

CDR-LM Okay, it's OPEN.

LMP-LM Okay. LMP's WATER is OPEN. You got yours.

CDR-LM Yes, I got mine. Excuse me. Well, let's see.

LMP-LM Okay, you got it open, so I need to turn around. See if I can back in and out of the way of the door.

CDR-LM Say, Bob. What did you see in REG A?

CC Stand by, Gene. We're seeing high suit pressures, stand by.

LMP-LM High suit pressure?

CC Okay, and about your - -

CDR-LM ... Yes, I'm seeing about your -

CC Challenger, Gene, you're GO to go out, and once you get out, maybe Jack can turn around and work on those a bit better. We're seeing, I guess, the suit looks a little high in pressure.

LMP-LM Okay.

CDR-LM Okay, I'm looking at 4 - at about 4.7 on the suit loop right now.

Tape 108A/18

CC Okay; we copy that.

CDR-LM Okay, Jack. You're a - there you go.

LMP-LM I'll get it.

CDR-LM Okay, turn.

CDR-LM Okay. What does it look like to you?

LMP-LM Well, you're - you're doing great; keep down. Just a little hangup on the DSKY.

CDR-LM I didn't get mine. Arm down there.

LMP-LM You need to go to your left a little to clear the purse and your harness. There we go.

CDR-LM Jack, you see this? This is one of those cards that - -

LMP-LM Yes, I saw that, Geno.

CDR-LM I'll put it right there.

LMP-LM ... Can you come forward just a little?

CDR-LM Forward?

LMP-LM That clip got away. Come towards - me, in the cabin - there.

CDR-LM Okay?

LMP-LM Wait a minute. Okay. I got it. Hey, you're in good shape.

06 16 58 47 CDR-EVA Okay, I'm on the porch. Whee - I'm still at 4.3.

CC Roger. ... on that.

CDR-EVA Okay, I'm on the porch, Bob.

CC Copy that.

LMP-LM Okay, what do you want? What can I do for you, Bob?

CC Stand by Jack. We'll get a word to you in one minute.

CDR-EVA Okay, Jack, in that - Well, I guess that'll wait. Get my LEC ready for you. Okay. And everything looks normal on me, right now. ... pressure down a little bit.

CDR-EVA Things norm, except a part of my nose itches I can't get to.

LMP-LM I'll give you the jett bag anyway, Geno, while they're thinking. I guess that's part of - R&D. Oh, yes, the jett bag.

CDR-EVA Santa Claus' bag again.

CC Okay, Jack. We'd like to have you stay in just a minute or so longer. We're trying to keep track here of the suit circuit pressure and see if it stabilizes or starts to drop. The one reg which has been intermittently leaking - we still haven't isolated it. And we think we've got it shut off, but we're still watching it. So bear with us just a minute or so.

LMP-LM I'm bearing, Bob.

CDR-EVA Hey, what else - -

LMP-LM I thought you isolated it last night. Okay. Let me give you the ETB.

CDR-EVA Yes. Give me that and I'll be on my way - work on the TGE. Okay, got it.

CC Okay, Jack, and how about taking the SUIT CIRCUIT RELIEF valve - cycle it just to OPEN and then back to AUTO.

LMP-LM Okay, Bob, stand by.

06 17 01 07 LMP-LM SUIT CIRCUIT RELIEF going OPEN, then AUTO. That's done.

CC Okay, we'll watch it for a minute here and let you know.

Tape 108A/20

06 17 01 22 CDR-EVA Okay, Bob. I'm going down the ladder.
CC Roger, Geno.
CDR-EVA Yes, still there, Jack. "Godspeed the crew of Apollo 17."
LMP-LM Good.
CC Amen there, Gene. Amen.
CDR-EVA Okay, Bob, I'm on the pad. And it's about 4:30, a Wednesday afternoon, as I step out on to the plains of Taurus-Littrow, beautiful valley. The first thing I'll do is I'll turn the TGE on, and I'll give you a reading.
CC Okay; we're ready.
CDR-EVA And I'm very much interested - very much interested in my Rover battery.
CC And, Jack, you're GO for exit and looks like we've got it taken care of.
LMP-LM Okay, and I'm checking the circuit breakers.
06 17 02 40 CDR-EVA It's on and read - Bob, it reads 222, 262, 207; 222, 262, 207.
CC Okay, I copy that, Geno.
LMP-LM Okay, get the visor down, Geno.
CDR-EVA Get the visor down - Holy Smoly. Think it'd be better to leave it up. Beautiful out here today, Bob. We can look to the east for a change - a little bit, anyway.
CC Okay, copy that, Gene.
CDR-EVA A higher Sun angle. Okay, I'll get the LCRU battery changed out.
CC Okay. And as you walk by there, if you walk by in the right side of the Rover, how about giving us a SEP temperature read-out, please.

CDR-EVA SEP temperature is 103 degrees.

CC Copy, 103.

CDR-EVA 103, and the mirror is still clean.

CC Copy that.

CDR-EVA Well, let's see if I can change this little baby now. Supposed to be simple. Bob, we have no use for the old battery, right?

CC That's affirm.

06 17 04 49 LMP-EVA Okay. I'm on the porch and the hatch is CLOSED.

CDR-EVA Oh, don't step into that.

LMP-EVA Are you talking to me or you?

CDR-EVA I'm talking to me.

LMP-EVA Okay, that sounds familiar and looks familiar - the old plain. The valley of the Taurus-Littrow.

LMP-EVA You want to get your antenna?

CDR-EVA Yes, let me get that -

LMP-EVA I'll come over there.

CDR-EVA I'll get the TV on. I've already got the battery changed.

LMP-EVA There's the Earth right in the middle of the antenna. Okay, verify MODE 3 - I am in MODE 3; LCRU blankets are open 100 percent, battery covers I'm closing, the battery - let me close it. Yes, you can probably get my antenna.

LMP-EVA Wait a minute. Let me set this down.

CDR-EVA Yes, okay.

LMP-EVA Okay, stay there.

CDR-EVA I was just try - I'm trying to.

Tape 108A/22

LMP-EVA Okay.

LMP-EVA Okay, your antenna's up. Wait a minute. Come here and I'll snap the snap.

CDR-EVA Okay.

LMP-EVA Didn't mean to do that.

CDR-EVA That's all right. I can't get close enough to you.

LMP-EVA Here you are.

CDR-EVA Lean a little more. Antenna's up. Let me get the snap.

CC And, 17, if you guys are interested, your shadows will be 8 feet long tonight.

LMP-EVA How many meters is that, Bob?

CDR-EVA I'll draw it out - I'll step it out for you. You can measure it. (Laughter)

LMP-EVA Well, I don't know. Should I take my gloves off? I mean my cover gloves.

CDR-EVA Why don't you leave them on for a while and see where we're going. See what the boulder field looks like up there.

LMP-EVA Well, I know what it's going to look like.

CDR-EVA No, you don't.

LMP-EVA The point is my hands will be much better off without them.

CDR-EVA Take them off, then. Okay, battery covers are closed and tight. High gain is already oriented. Oh, they've even got TV, I guess.

CC That's affirm.

CDR-EVA ...

CC And, Geno, when you push the Rover circuit breakers in, how about giving us a battery temperature reading on the Rover bats.

CDR-EVA Tell them what my batteries are reading if I can.

LMP-EVA Well, let me see if I can do something else while I'm waiting.

CDR-EVA No, I'm done, Jack.

LMP-EVA I'll get the old SEP receiver.

06 17 09 13 CDR-EVA Well, Bob, the - battery 1 is 95 degrees and the - battery 2 is reading zero. So we got a gage failure. No, it's not reading zero; it's off scale low.

CC Okay, read that - copy that. That's a real cool-down, isn't it? Okay, Jack, if you're going to worry about the SEP, stand by and don't do the SEP until after you worry with the ETB, and we'll get to you on that. When you get the ETB to the seat, I'll talk to you about it.

LMP-EVA Okay, it's - 1 - 1 - 102 is the temperature.

CC Okay; copy that.

CDR-EVA Okay, Bob. Mark.

CC MARK.

06 17 10 02 CDR-EVA MARK gravimeter; it's flashing.

CC Copy that.

CDR-EVA Okay, we'll take the big bag. I hope we can keep it on.

LMP-EVA ...

CC Okay. A couple of things on that, Geno. You might try tapping the thing to see if that loosens the dust. There's also the hook business on the inside of the pallet that you could hook it on. Caution: if you open the pallet, be careful not to knock the clamps off the fender. But you can also reach over the pallet to put the big bag on.

Tape 108A/24

06 17 10 42 CDR-EVA Okay, Bob. We - I brushed it and tapped it yesterday. I'm not sure we're going to have much luck with them.

CC Say again there, Gene.

CDR-EVA I brushed them and tapped them yesterday.

CC Okay; copy that. You might want to put the big bag on the inside of the pallet there, if you can't operate them.

CDR-EVA Okay.

LMP-EVA Okay, mag Kilo goes on the 500; is that correct?

CC That's affirm.

LMP-EVA Okay, I've got Mary and Franny and Nancy - and Donna - and Bobby and - -

CDR-EVA Jack, I'm also going to keep this in there.

LMP-EVA - - Karen.

CDR-EVA Because it's too hard to get off the front end. We'll find a place for that in there.

LMP-EVA Well, okay.

CDR-EVA It's just too hard to get off the front end. Okay, let's see. Big bag to gate, dustbrush to - Let me get that big bag on the inside of the gate if I can. Inside the gate or the pallet, Bob?

CC Inside the pallet. My - my fault there.

LMP-EVA That - that's - the pallet, the pallet -

CDR-EVA Yes.

CC And if you open the pallet, be careful of the clamp. Probably, if it's feasible, we suggest you reach across in front of the pallet - reach across the pallet to do it. Instead of opening it because of the clamp on the fender.

CDR-EVA It's not feasible. It's not feasible to do that. I got to open it, plus our hook is - overcenter.

Let me get something to work on that with. You know, Bob, how that pallet locking hook can - can be out of the little C-shaped - release in there? It is.

CC Oh, boy.

CDR-EVA I noticed that yesterday.

CC Jack. When you get done with the ETB, then you might save the gray tape out. We're going to use a little bit of that on the SEP when you get done.

LMP-EVA When are you going to do that?

CC We'll turn the - -

LMP-EVA What am I supposed to do, stand - well -

CC We'll turn both switches on when you're out at the SEP transmitter.

LMP-EVA Well, the tape is in the CDRs seat, and it'll still be there.

CC No, we'd like to take the tape from the CDRs seat and use it on the SEP, right now.

LMP-EVA Okay. You want me to do it or Gene to do it?

CC Why don't you do it since the tape is there. No, let's - let's let Gene do it. Doesn't really matter. Whoever wants to.

06 17 14 24 LMP-EVA Okay, we'll get it.

CDR-EVA Okay, Bob, the big bag is on the inside of the - of the pallet.

CC Okay; we copy that.

LMP-EVA I want it ...

CDR-EVA The - And I know why. This is a ... that's on the way, Jack. Get rid of this thing. We don't need it anyway. Okay, opening and closing of the pallets didn't interfere at all with those fenders.

CC Okay; copy that.

Tape 108A/26

LMP-EVA These aren't clamped now - Now the tape.

CDR-EVA Okay. The big bag is on the inside, though.

LMP-EVA Yes, but it's - also in the way. Okay, I got it.

CDR-EVA Sure is. Wait a minute. Wait a minute. Don't close it.

LMP-EVA Want me to get out of the way?

CDR-EVA I'll open it. See? It drags over that locking device. Okay, let me just see what we got to do here. Okay. Big bag, dustbrush, SCB-7 to gate, mount 20-bag dispenser on commander's camera, 20-bag dispenser to the LMP, core cap dispenser to the gate.

CC Okay. And, Jack, are you going out to take the pan now?

06 17 16 15 LMP-EVA Well, as soon as I finish up here.

CC Okay.

LMP-EVA I'll do that.

CC Okay. And after you take the pan, we'd like you to retrieve the cosmic ray experiment. They're expecting a little solar storm, and before the rain gets on the cosmic ray experiment, they'd like to retrieve it. We'll leave it in the ETB during the traverse.

LMP-EVA Okay, after the pan. All right.

CC Roger. It will just be a nominal retrieval and we'll put it in the ETB. Copy the gate.

LMP-EVA Okay.

CDR-EVA Okay.

CDR-EVA Okay, SCB-7 - 20-bag dispenser goes on my camera when it gets back. Short can under the LMPs seat. Okay. Jack, I'll just go ahead and mount some of these bags on your camera while I'm here.

LMP-EVA Okay. Thank you.

CC Okay. And, Gene, if you got time there with the camera, why don't we - when you get done with the camera, how about getting some gray tape and we'll put you to work on SEP for about a minute.

CDR-EVA The SEP receiver?

CC That's affirm. And if you get - -

CDR-EVA Stand by. Let me finish with SCB-7 here.

CC Okay. And did you get Jack's camera fixed last night? I didn't hear.

CDR-EVA Yes, we did. Okay, there is already one on the gate. Leave that one there. Okay, SCB-7 to gate, 20-bag dispenser on commander's - camera, we'll do it when I get back - 20 bags on the LMPs camera, core cap dispenser to gate - there's one there, there's one under the seat - short cans under the LMPs seat. Okay, I got to put that cap dispenser on him, I got to get my rammer, hammer - Hey, Bob, what bag do you want on the LMP? Do we ave 8 here?

CC Stand by. I think 8 went in, either 4 or 6. No, excuse me; either 5 or 4.

CDR-EVA Okay. We'll put either 4 or 5 on there. Okay. I'll have to wait until he gets back. What do you want? Or let me give you TGE reading and get that out of the way and then I'll work on your SEP.

CC Okay; copy that.

06 17 1945 CDR-EVA Okay. 670, 027, 001; that's 670, 027, 001.

CC Okay; copy that, Gene. Thank you.

CDR-EVA Fender wrinkled up in the Sun a little bit last night.

Tape 108A/28

LMP-EVA Okay -

06 17 20 17 LMP-EVA MARK it. The cosmic ray is terminated.

CC Copy that.

LMP-EVA And, Bob, I took two 5-foot stereopairs of the configuration.

CC Copy. And we'll stick it in the ETB and just hang it there.

LMP-EVA Yes. And in case you're wondering, and so you don't confuse it with a rock, it's in bag 106.

CC Copy that.

CDR-EVA Okay. What do you want done to the SEP?

CC Okay. Take some gray tape over to the receiver, Gene. And with reference to the fact that the - there is some Velcro missing on the front there which hold the covers down, we'd like to tape the two covers together - on the - in the middle there - you know, where the two - two sides overlap in the middle of the box. Tape those two together. A short piece about an inch long should do it if they are clean.

CDR-EVA Well, I doubt if the tape will stick because ..., but I might be able to go over it with one piece to clean it and another piece to tape it.

CC Okay. And the question beyond that, is there Velcro to hold one of those flaps down or not?

CDR-EVA No.

CC Okay, so both pieces - the Velcro is missing from both flaps, I take it.

CDR-EVA Yes.

LMP-EVA Bob, what happened was that the tape that held the lower Velcro on there apparently came loose, and it stuck to the upper Velcro.

CC Okay. I understand that. In that case, we'd like to take a piece of tape and tape the cover down to keep it closed when it's not - when it's supposed to be closed. The feeling is that if the cover flaps partly open, you may get specular reflection off the inside of the Mylar down onto the mirrors causing it to heat up during the drive when it's supposed to be closed.

CDR-EVA Okay, we'll give it a try.

CC Okay; thank you. And, Jack, if you're done, you might go rescue EP number 5 from the footpad, and we'll put it under the LMPs seat.

06 17 22 43 LMP-EVA Well, be a lot of other things under there. Okay. I'll rescue it; we'll see where the best place to put it is.

CC Okay.

LMP-EVA Hey, I got - I got bags on you - I got bags on your camera, Geno.

CDR-EVA Okay; thank you.

LMP-EVA Okay, we're going to put those two bags on the rear there on your PLSSs?

CC One of them will go - -

CDR-EVA ... those two on.

LMP-EVA Okay.

CC The one under LMPs seat will go on the CDR, the one with all the stuff in it.

CDR-EVA Yes, I got core tubes in 7 here, Jack. We'll put either one of those - -

Tape 108A/30

LMP-EVA Okay. So I can't put the charge under my seat.

CC That's affirm, I think, Jack, once you get SCB-7 out of there.

LMP-EVA Yes, I feel like a kid stuck in taffy.

LMP-EVA Sure is strange not to see some fine-grained rocks out here. Seen a couple but certainly not very many.

CC Copy that.

LMP-EVA That rock that you picked up at - What are you doing up there? Okay.

CDR-EVA Bob, that'll hold it down. I hope it solves the problem.

CC Roger. And so does Dr. Strangelove.

LMP-EVA Okay.

CDR-EVA Well, probably not any more than we would like to see it solved.

LMP-EVA Bob - Nothing. Gene, your bag's going to have two lowers and one upper.

CC Did you re-sort things there, Jack?

LMP-EVA What's that?

CC Did you re-sort things in SCB-7? I was told - -

LMP-EVA I said I got - Bob, I - Go ahead.

CC Okay. Our understanding was there were two uppers and one lower in bag 7, and two lowers under the LMP seat. Did you re-sort things there?

LMP-EVA Do you want - how do you want them?

CC It doesn't matter to us. I just wanted to make sure that we know what you are so we don't let you get away too far with two uppers and a lower. Two lowers and an upper is certainly better than two uppers and a lower. As long as we know what it is.

06 17 26 03 LMP-EVA Okay. It's two lowers and an upper.

CC Got that.

LMP-EVA Two lowers and an upper. Man, I'm confused.

CDR-EVA Okay. When you're ready, I'll configure you.

LMP-EVA Okay, here, let me - let me get this on you first since I got - -

CDR-EVA Okay.

LMP-EVA And I'm going to ask you to turn a - 180 degrees because you're up on a hill. I'll never be able to do it.

CDR-EVA How's that? I'm down in a hole now.

LMP-EVA That's beautiful.

LMP-EVA Okay, ... Can't get this fixed.

LMP-EVA Tallest man on the Moon right now. Okay, that's done.

CDR-EVA Okay?

LMP-EVA Just a second. Let me close the cover. Not a very good cover. Okay.

CDR-EVA Okay, Bob, I'm going to put SCB-4 on Jack.

LMP-EVA Go ahead.

CC Say again there, Gene. SCB-6? SCB-4; copy.

CDR-EVA SC - SCB-4 will go on Jack. Okay, Jack, I got to get these PLSS straps, too. Did you get mine?

Tape 108A/32

LMP-EVA No.

CDR-EVA Those harness release straps?

LMP-EVA Oh, no. Let's do that. I saw them as you go out, and then I forget about them.

CDR-EVA Yes. Okay, yours is on over here. Probably a better time to do them, anyway, rather than when we go out. Okay, let me get the bag. I'll get the other one when I configure your other side. Okay, you're on. Okay, want to get my PLSS straps? Then I'll be cleaned up, and then I finish your other one when I configure your other side. Okay, you're on. Okay, want to get my PLSS straps? Then I'll be cleaned up, and then I finish your other side.

LMP-EVA Let me get the other one. Warmer out here today. ... on the hands, Okay.

CDR-EVA Okay, stay right where you are so I can get this.

CDR-EVA Okay. Now come over here, and I'll get you a core cap dispenser, which I left here. Okay, you got SCB-4, you got the cap, you got the rammer, I'll take the hammer. You got the - That's all you need. TGE is on the LRV. Okay, what transport - what charge you got there, Jack?

LMP-EVA Five is under my seat.

CDR-EVA Five, okay. You got 5 there, we got 2 and 3 on the Rover, LCRU blankets are open 100 percent, battery cover are closed. I want to - Push that battery cover over there down just to make sure it goes down.

LMP-EVA The warning flag is up ...

CDR-EVA It's probably that - Already, huh? Yes. ... down on there.

LMP-EVA Rover - Rover warning was up.

06 17 30 09 CDR-EVA Get one right there.

LMP-EVA It's down.

CDR-EVA I'll take a look at that gage again, but the gage on the high battery looked like it may have failed. Okay, LCRU blankets are open, battery covers are closed and pushed closed, dust LCRU -

LMP-EVA I'm going to the SEP.

CC Okay, Jack.

CDR-EVA Wait a minute before you do. You got a second? Just come over here by the left front wheel. I know you got a second. Just a little bit closer to the left front wheel, towards me. Oh, that's good, anywhere in there. Wait a minute.

CDR-EVA Can you do that likewise? Or can you hold it with that other camera? It's already set at 30.

LMP-EVA Okay.

CDR-EVA And you might want to take a couple - -

CC 17, Houston. We think somebody lost their comm. Jack, it's probably Gene going to zero.

06 17 32 03 LMP-EVA You read us, Bob?

CC Roger. Read you now.

LMP-EVA Bob, do you read Gene?

CC Reading you, Jack. I haven't heard Gene yet.

LMP-EVA Bob, Gene's calling you.

CC You read me.

CDR-EVA How do you read me, Bob?

CC Okay, read you now.

Tape 108A/34

CDR-EVA Okay, I didn't do anything. I just jiggled my MODE switch here. Okay, we got 2 and 3 on the EPs, plus one under Jack's seat. LCRU blankets are opened 100 percent; battery covers are closed; dustbrush. I've got; TGE, I've got; mags and polarization filter is taken care of; and I'm ready to traverse to the SEP.

CC Roger. We understand TGE stowed and you're taken care of in the comm. And you might give us a Rover read-out either now or when you get to the SEP.

CDR-EV Okay; we'll see which is convenient.

CC Yes. SEP is probably more convenient while you're sitting there waiting for the nav to warm up or initialize - waiting for us to give you the reading.

CDR-EVA Okay, checking your TV. MODE switch is 1.

LMP-EVA Hey, Bob, are you watching LMP?

CDR-EVA Not anymore he isn't. I took the TV. Bob, you still read?

CC Roger. Read you loud and clear. We're now watching the LMP.

CDR-EVA Okay, I just wondered because I just took the TV. I just want to make sure we got comm here.

CC Yes. We're reading you in MODE 1.

CDR-EVA And, for your information, we both got our cover gloves off.

CC Copy that.

CDR-EVA Okay, that's in, that's in, that's in. Should have dusted my checklist on the Rover. I can't read down there.

LMP-EVA Bob, the old tape fix on the SEP's still working.

CC Beautiful.

LMP-EVA There's a little -- both mirrors have a little angular displacement but not more than 5 degrees.

CC Sounds like that's the least of the SEP's problem, but we have hope.

06 17 35 01 LMP-EVA Okay, you're going to be over there, huh? I'm over here.

CDR-EVA I don't believe this.

LMP-EVA What's the problem?

CDR-EVA Oh, nothing. That roll indicator isn't worth a dingdong ... roll 10 degrees.

CDR-EVA Okay. Roll zero, pitch is zero; heading is 291; distance, 001; range, 000; amps hours are 90 and 85; volts are 65 65; Sun shadow device, by the way, is 0.

CC Copy that.

CDR-EVA Batteries are 100 and off scale low, and motors are all off scale low.

CC Okay, and, Gene, we'd like to torque to 287, 287.

CDR-EVA Okay; in work. Let's see, 287. That's a heading from Dodge City to Tindall. Okay, 27 28, 287 right on the money.

CC Copy that, Geno. And --

06 17 36 31 LMP-EVA Bob, 45 - 45 Yankee is a sample - sample from near the SEP.

CDR-EVA Boy, I tell you, Jack. That was all cut out.

LMP-EVA Oh, well. I got the sample anyway.

Tape 108A/36

CC We copied 45 Yankee near the SEP. That's all we have. If you give us a frame count when you get done, and give us an approximate location for the Rover, at least crosswise from the Y, we'd appreciate it. And we also need SEP receiver power and DSEA both on. And we'd like the cover taped back - taped down when you get done, Jack.

CDR-EVA Okay, Jack, keep me honest on those rilles.

LMP-EVA Okay, you're okay now. Let me get over on the rille. I don't see -

CDR-EVA See me?

LMP-EVA Come on. You're good.

CDR-EVA Oh, there's the SEP. Wait - did I miss this other rille?

LMP-EVA Yes. There's the - I'm on the antenna.

CDR-EVA What about the one coming west?

LMP-EVA That's what I - No, you're okay on the one west - you're way away from it.

CDR-EVA Okay. Going to look back.

LMP-EVA You want to look - head towards the SEP. You're okay.

CDR-EVA Oh, I see it now. Okay.

LMP-EVA Head towards it and then turn - then make your turn.

CDR-EVA I see it. I'll go over to it.

LMP-EVA Matter of fact, turn on these tracks.

CDR-EVA Yes. I'm in good shape. I see it. I see it.

LMP-EVA Bob, that 45 Yankee was a fine-grained basalt, I think. One of the few around here. That's why I picked it up.

CC Copy that.

LMP-EVA Okay, you stopped?

CDR-EVA I'm stopped and I'm ready to go. I'm 2 meters to the west of the north line.

CC Copy that.

CDR-EVA And I guess I'm certainly within 5 meters of the transmitter.

CC Okay, we'll get that in the photos. And Gene, how's the low gain located - oriented?

06 17 39 07 CDR-EVA It's oriented 355 and my heading is 352.

CC Okay, copy that.

CDR-EVA Okay, you want the receiver on - -

CC Roger. Both - -

CDR-EVA - - and taped down again, huh?

LMP-EVA Yes, ... put ...

CC Roger. Both the receiver and the recorder on, both switches on and then tape the cover down.

LMP-EVA Okay, good luck.

CDR-EVA I don't know if that tape is going to hold. Okay, ON and ON. Okay, it's taped down more or less.

CC Thank you.

LMP-EVA And then I guess I'm supposed to get on, huh?

CC Roger on that.

CDR-EVA Hey, Bob, the NAV RESET has been - NAV RESET is now OFF and I'm all zeroed up.

CC Okay. Copy that. And we're ready for you guys to roll.

Tape 108A/38

CDR-EVA Okay, what's the first range and bearing to the Rover sample, past Jones?

CC Okay, it will be 185 and 1.5 on the range.

CDR-EVA Okay, 185 and 1.5. 185 and 1-1/2. Okay.

06 17 40 46 LMP-EVA Okay, then, Gene; no problem.

LMP-EVA Well, shoot. I've forgotten how.

CDR-EVA Boy, that Challenger looks pretty from here, you know it.

LMP-EVA Yes. Okay, I'm on.

CDR-EVA Okay.

LMP-EVA Did I want a chart?

CDR-EVA No.

CC No charts, Jack; no charts.

LMP-EVA Okay.

CDR-EVA Got it. Got it; 185 and 1.5 and I'm going to head on at about 012. We ought to go right through Jones. Oh, baby - Jones.

CC Okay, and, Gene, remember the driving fairly slow - or fairly well controlled the first 300 meters, and a mark at the end of the antenna.

CDR-EVA Watch that, Jack, watch that antenna lean - -

LMP-EVA Uh-oh. Keep going.

CDR-EVA Look to you?

LMP-EVA Okay so far; keep going.

CDR-EVA Okay, let's do that again - -

LMP-EVA Yes.

CDR-EVA - - but a little different. I'll pick up that same spot, I can see right where I was.

CC Okay. Give us another mark when you start up on that side.

CDR-EVA Okay. We'll give you a hack, Bob.

LMP-EVA Okay. You're a little - -

CDR-EVA Yes, I'm right on the track. Same tracks exactly.

LMP-EVA Well, okay.

CDR-EVA That's exactly - I just came right over. Okay, we're starting Bob -

06 17 42 36 CDR-EVA MARK it.

CC Copy that.

CDR-EVA We can't go too far in this heading. We've got a big hole up here.

CC Okay.

CDR-EVA Like a big one.

LMP-EVA Wonder if that's Rudolph?

LMP-EVA Well, let's see, this is east - looks awf - it's a double crater but it's much bigger than I thought Rudolph would be.

CC No, if you're where you think you are, you're beyond - you're east of Rudolph quite a ways.

CDR-EVA Hey, I think you ought to know where we are by now, Bob.

CC Roger that.

LMP-EVA Maybe that's Lewis and Clark.

CC After you give me a mark there, we'll give you - I'll talk to you about it.

Tape 108A/40

CDR-EVA I'm sorry, Bob. I guess you - you didn't hear it. I - we're passed the end of the antenna and we're headed south or north - northeast.

CC Okay, I - -

CDR-EVA That screw you up?

CC Did you give me a mark when you started or a mark when you passed the antenna?

CDR-EVA I gave you a mark when I started and it took about 20 seconds to get to the end.

CC Okay, copy that.

CDR-EVA Is that good enough or do you want me to go back?

CC No. No. Press on. And, Jack, if you look at your contour map there, we think you are located right now at approximately where the P in SEP is, just below the P in Poppy. In which case you're probably driving through that little crater that's just to the northeast there.

LMP-EVA Okay.

CC That's probably the one you came upon.

CDR-EVA Not very little, though.

LMP-EVA Okay, Bob. Boy, I wish I could see a little bit better.

06 17 44 59 LMP-EVA The major boulders still look like the - the pyroxene gabbro. Surface texture has not changed. There is a - there is a granule population, now that I look at it more closely, with the shadows. But I have a feeling that most of those are - they look like they're just small, very small clods. That should show up in some of the bulk samples we've taken. It is remarkable to me the - only a small number of fine-grain rocks. There's one at about halfway between the SEP and the LM that I'd like to pick up, it's a fairly good sized one. Maybe we can get it when we get back. It looks like a fine-grained basalt. I may have sampled one in 45 Yankee there.

CDR-EVA Well, I tell you, it's not exactly the greatest place to navigate through.

LMP-EVA I think you ought to bear left, don't you?

CDR-EVA Yes. That's where I'm going here. I just want to get across this mounted boulders.

06 17 46 12 LMP-EVA There's still - there's a crater we're just passing at 207.4 about 20 meters in diameter, with the pyroxene gabbro blocks on the rim, few of them. It's not an exceptionally blocky rim crater, but we are in an area where the block population is up to about 5 percent in contrast to most of the area we traversed yesterday.

CDR-EVA I tell you, going is a little bit rough; there's a population of blocks as Jack said and there is an awful lot of small craters.

LMP-EVA Yes, I was just going to add that the frequency of craters in the 10-meter size range is quite a bit higher than we were used to yesterday. Oops, there's one.

CDR-EVA Yes.

LMP-EVA Snuck up on you. And they all - although not exceptionally blocky rim - they all have a slightly, maybe 2 or 3 or 5 percent more blocks in their walls and on their rim than do the - does the normal terrain.

CC Roger, Jack. Copy that.

LMP-EVA Still no - still no obvious structure within the dark mantling material itself.

CDR-EVA Bob, you said 185/1.5?

CC That's affirm.

LMP-EVA What do you want? For the Rover?

Tape 108A/42

CDR-EVA Yes, for a sample.

LMP-EVA Oh, they changed it on us. Okay. Okay - there's - still seeing the little pit-bottom craters with the glass in them. I've forgotten the acronym already, Bob, I'm sorry. And you asked me for an LMP frame count awhile back and I believe it was 5. That was at the SEP.

CC That was after the SEP photos, right?

LMP-EVA That's affirm. Negative; that was before the SEP photos.

CC Copy that.

06 17 48 39 LMP-EVA Okay, Bob, looking up at the North Massif, we see the scattered, strewn field of boulders, that generally seem to start from a - more or less, from a line of large boulders, which might indicate some structure. And those lines are roughly horizontal across the face that we're looking at. The boulder tracks are irregular in shape, obviously downhill, but you'll see in the pictures that they - that they are curved in places but they're all - that I see - tend to be aggregates of little craters - where the boulder was obviously tumbling and bouncing a little bit. We're out in population of fragments now in the immediate area at 1 - is that 188?

06 17 49 52 CDR-EVA 188/0.9.

LMP-EVA It's generally about 1 percent between craters. But at the crater rims, it's up to about 5 percent.

CC Okay. Copy that, Jack. And how far down the North Massif - -

LMP-EVA And these craters - -

CC - - is the line of boulders?

LMP-EVA Oh, there are several of them, Bob. What I'm talking about is about 100-meter-long lines where the boulder trains initiate and they are - there's one about - looks like about halfway - maybe two-thirds of the way down in perspective. Another one that's probably about halfway - they're just sort of scattered around on the Massif.

LMP-EVA I think we're getting close to - No, we couldn't be.

CDR-EVA I've got to move over here a little.

LMP-EVA That must be Jones.

CDR-EVA Where are you looking?

LMP-EVA Off to the right.

CDR-EVA Yes, our heading that they're sending us down here, it really should put us to west of Jones. So that's about right. A lot of static in the background today.

06 17 50 58 CC Yes, I think we are talking to you guys through the LM right now, and how about a speed reading?

06 17 51 04 CDR-EVA Okay. We're at 12 clicks and we're FULL BORE.

CC Copy that.

LMP-EVA Okay.

06 17 51 24 CDR-EVA 187/1.1.

CC Copy that.

06 17 51 36 LMP-EVA Bob, I wish I could give you more on that structure in there, but I think those lines of boulder sources are about all we can see right now. Talked about the lineaments yesterday and they're not nearly as obvious today in the higher Sun. Looking up Wessex Cleft - even with the Sun in the flat area there, it looks darker than where - that North Massif side. But again, the Sun angle may be fooling us but I recall it was darker on the photos. The old man wrinkled face on the - -

Tape 108A/44

CDR-EVA Sculptured Hills.

LMP-EVA - - Sculptured Hills, though, is evident as soon
as you come out of the Wessex Cleft.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 17 52 37 CMP Hey, this is interesting. Mag Mike Mike, we're on 172.

CC Roger. We copy mag Mike Mike on 172.

CMP ... they just put that decal for the heck of it. Do I use the rest of them for targets of opportunity?

CC Stand by. I'll check with Chuck here.

06 17 53 47 CC Ron, we don't think Mike Mike's got anything left on it, but if you - if you can use it for targets of opportunity, but it's not supposed to have.

CMP Well, it's clear we've got one or two of them left here, you know, and I'll just keep it handy, and take them until - until the ... turns red, you know?

CC Roger.

06 17 54 09 CMP The next one might be the last one (laughter).

06 17 59 49 CMP Houston, America.

CC Go ahead, Ron.

CMP Is there any way the Surgeon there can tell which - which two things are out of service or is it all three of them or - You know, those things come in packages of twos, not threes.

CC Okay. Why don't you say it again, Ron? I just punched up the Surgeon here. Why don't you say it again, please?

CMP Okay. Is there any way the Surgeon can tell which lead needs to be fixed or which two leads, because the ... of all those things come in packages of twos, you know?

Tape 108B/2

06 18 01 07 CC Hey, Ron, we just talked it over down here. EKG is good and just forget the ZPN for another day. Just go EKG and forget the ZPN. That's compliments of Dr. Z.

CMP Oh. Hey, beautiful. No wonder it looked kind of erratic, because I didn't even have ZPN on (laughter).

06 18 01 43 CMP Yes, last night I moved those - moved all three sensors on the EKG to different spots and put some of that cream stuff on them, and I think that helped.

CC Roger. He can tell and he noticed that. And it's improved their signal on the EKG part.

CMP Oh, okay.

06 18 17 17 CC Ron, we're about ready to lose you in about 10 minutes. Everything's fine. We'll make one more final go-around the room before you go out of sight. I'm watching your buddies down there. They're up against a rock, which is about twice as tall as they are, and they're trying - pounding away on the side of it. Doesn't look like they're having much luck getting anything off of it, but they're beating on it.

CMP (Laughter) Tell those guys that if they don't roll a rock down a crater - They're supposed to do that for me.

CC Right. I think, I think Jack got the nickname "Twinkle Toes" last night. He was bouncing around very graceful. Every time he'd hit the rock, he'd fall over down there.

06 18 17 59 CMP (Laughter) Oh, great.

06 18 23 43 CC Ron, everything's looking good as you go here to LOS; no problems at all. Your buddies are down at station 6 right now.

CMP Oh, okay. We thank you much.

CC Okay. See you around the other side. On the Flight Plan schedule now -

06 18 24 01 CMP (Chuckle) Okay.

06 18 48 XX BEGIN LUNAR REV 40

06 19 13 32 CMP ..., I think.

06 19 13 42 CC America, Houston.

06 19 13 46 CMP Houston, America. Roger. Loud and clear.

CC How you doing up there, Ron?

CMP Okay; real fine. I just saw a - part of these rilles - type things, and it's got a light-brown - well, dark-brown - it's almost a mare-type coloring - heading in the southeast-northwest direction. And it's down from - oh, yes, there's Saenger, east of Saenger yet. Let me find it on my map.

06 19 15 12 CC Down east of Saenger there, you get into the first ring of Arabia or the second ring of Arabia there.

06 19 15 26 CMP Yes. Hey, you know this is - Let me get this picture. This is the first time I've really been able to see that first ring of Arabia.

CC You think - think you see it, huh?

CMP And it shows up as - Yes. It - I'll take two of them. First, I'd better get the dark slide out. The way the Sun is shining on the darn thing, and it shows up as a bright - I'll be darned! That's amazing! It shows up as a bright ring, just like we got it drawn on the map. You know, you - you get a brighter albedo all the way around to the top of the ring. That was frame 120 through - or 122 through 124 on mag Oscar Oscar.

06 19 16 35 CC Okay, Ron, we've got a - a Flight Plan update and a lunar sounder pad, if you want to take it before we get into the visuals here.

Tape 108B/4

CMP Okay, I better I guess.

06 19 17 51 CMP Okay. Frames - last three frames before 128 were also looking east. Okay, we had an update, huh?

CC Lunar sounder pad is at 166:40 on the Flight Plan. Let's do that one first, okay?

CMP Okay.

06 19 18 19 CC Okay. T-start time, 166:42:12; T-stop time, 47:10.

CMP Okay. T-start, 166:42:12, and T-stop is 47:10.

CC Good copy. I've got the lunar sounding - grazing attitude VERB 49 at 167:28.

CMP 7:28, okay.

CC We're tweaking up that attitude a little bit; it's 283, 063, and 328. Over.

CMP (Laughter) That's really tweaking it up. 283, 063, and 328.

CC Roger. And over there at 167:55 where it's - the antenna retract bit?

CMP Yes; right.

CC Okay. It's pretty obvious we want to take "HF antenna 2, retract" and move it above "HF antenna 1." We'll call for the retract - make sure we're ready, and we'll also cue it on our cue, Ron. What we want to do is look at HF antenna 2 retract all the way, get the times, et cetera, and then we'll go ahead and retract HF antenna 1.

CMP Oh, okay. Sounds reasonable.

06 19 20 11 CC Okay, Ron, we're all just standing by. That takes care of the Flight Plan updates, and we're just standing by for your visuals. This pass you're to concentrate on the landing site and the D-Caldera, you know?

CMP Okay.

06 19 20 39 CC Ron, we want to concentrate on the small-scale features, and your binoculars may be what you need. We want to look at the dark-halo craters in the site area and examination of D-Caldera with the binocs.

CMP Okay. That sounds like a good idea. We'll see what we can - (Laughter) That's crazy. I go over in inertial attitude, and every time I look out the window, I've got to look in a different direction.

CC Roger; we understand.

CMP (Laughter) It's funny.

06 19 22 14 CC Hey, Ron, when you come up on the landing site, we would like you to concentrate on Shorty Crater and F Crater and then the other dark-halo craters. As you know, as I told you last night, Shorty ended up with some orange-colored material that looks an awful lot like a fuma - fumarola - event anyway - fumarole. And it looks - -

CMP Fumarole.

CC - - an awful lot - Yes, okay (laughter). Looks an awful lot like it and what we're trying to do is see what you see from there, and that may give us some correlation on some of these other ones.

06 19 22 49 CMP Okay. I got to take a look and see which one's Shorty.

CC Ron, it's the dark crater on the slide, the dark crater on the slide.

06 19 23 13 CMP Oh, okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 17 52 22 LMP-EVA Yes. And they look like there are boulders up on the side of Sculptured Hills, except that they aren't nearly as big as those on the North Massif. The areas where the boulder source is look like they're made up of boulders no bigger than a meter maybe; whereas, the North Massif coulders are up to several meters. Those boulder sources all seem to be up within a third of the height of the Sculptured Hills, just south of - just east of the massif - of the Wessex Cleft. Here is a boulder track that crossed the slope. See that, Geno?

CDR-EVA Yes - yes. I sure do now.

LMP-EVA It looks like it goes, rather than perpendicular contours, it probably is crossing them in a fairly straight line on an angle of 60 degrees, maybe.

CDR-EVA Back to the east.

LMP-EVA Yes, to the east. That one may be fairly near - -

CDR-EVA Jack, see that big boulder with that big track - it looks like it's an elongated rolled-up boulder. Look at that.

LMP-EVA Yes, it does. Looks like it may be broken now.

CDR-EVA Bob, what did you say - 188/2 point something.

CC 2.8.

CDR-EVA Okay, thank you. See that big boulder, Jack, with those tracks?

LMP-EVA Yes, it looks like - -

CDR-EVA That's funny looking boulder.

LMP-EVA It looks like it may have stopped rolling because it broke up.

CDR-EVA Looks broken to me now.

Tape 109A/2

CDR-EVA Boy, they've got the low gain right on. But, I tell you, we still got static.

LMP-EVA I don't have any, Gene. You may - -

CDR-EVA Well, I sure do.

LMP-EVA ... Okay, you've got yourself in some holes here. You've never - I've read you all along, though, so there's no problem. Okay, there's a big crater. I haven't recognized Jones yet. Looks like you're getting up on the rim of Henry here.

CDR-EVA Yes - no, Henry should be to - I'm well - should be well west of Henry, I think. I wouldn't be surprised if Henry isn't right over that little rise on the right.

LMP-EVA Bob, the surface structure hasn't changed texture. We're on a little bit of a rise in here now and still about 1 percent of the surface - -

06 17 57 48 CDR-EVA There's Henry right there, Jack.

LMP-EVA There's Henry.

CC Okay, how about a range and bearing.

LMP-EVA I thought you were close to Henry.

CDR-EVA Yes. 188/1.8.

LMP-EVA And we're just southwest of Henry.

CC Okay. Copy that.

LMP-EVA On the rim. Oh, Prince Henry the Navigator.

CDR-EVA Watch that foot.

LMP-EVA It's called a wheel, I think. And Henry looks much like Horatio did. Has boulders on its inner wall - not as many. They look light colored - a light albedo gabbroic appearance. There may be some right down there, though, that are fine grained; they look a little grayer.

Tape 109A/3

CDR-EVA Jack, there's our target - there's - either one of - that's one right down there on - on ... break in slope.

LMP-EVA See the one we've got over there has a boulder track. That's the one, that crossslope.

CDR-EVA Yes, if we could get up high - -

LMP-EVA Can we get up there?

CDR-EVA We'll see.

CDR-EVA That's the one - That's station 6, and that was the - the turning boulder.

CDR-EVA Yes, that's it.

LMP-EVA The one right there.

CDR-EVA Station 6 - we can probably get up there.

CDR-EVA Okay. Here we are - 1.5 and 185.

CC Okay; copy that.

LMP-EVA Okay, is this a Rover sample?

CDR-EVA A Rover sample.

LMP-EVA Okay - -

CDR-EVA Tell me where you want it.

LMP-EVA - - see that little pit right over there about 30 feet ahead.

CDR-EVA Yes, I think so.

LMP-EVA Okay, I've got two pictures there.

CDR-EVA How's that?

LMP-EVA That's great. Okay, this is soil sample - Hey, Geno.

CDR-EVA Okay, and I just took a locator; and CDR is on frame 41.

Tape 109A/4

LMP-EVA Got it?

CDR-EVA Oh, not yet.

CC Copy that.

CDR-EVA Right now. Bag 40 - 46 Yankee.

CC Copy that.

CDR-EVA Your bag open?

LMP-EVA Yes.

06 17 54 42 CDR-EVA Okay, it's in.

LMP-EVA - We ought to tape that bead down if we can remember it next stop. It's in the way of - it's sticking up.

CDR-EVA Okay, I'll get it. That thing came down - came off that piece of Velcro. I'll get it when I get back.

LMP-EVA Okay. And LMP's frame count is 35.

CDR-EVA Okay, Bob, I'd like a - bearing and range.

CC Okay. Bearing and range for the large block, just beyond - let's see, it's just beyond the crater Henry. The large block there near the break of the slope, which is our next aiming point. The bearing and range there is 188 and 2.8.

CDR-EVA 188 and 2.8. Roger.

CC Okay. And, Jack, do you - what do you see in the way of boulders coming down the base of the Sculptured Hills, in terms of sampling opportunities of station 8 and in terms of any boulder tracks that we might - might lead down to boulders that might just possibly be accessible at station 8.

LMP-EVA Roger, Gene. Boulder tracks are not obvious on Sculptured Hills at all. It looks like there are fragments over there that would have had their sources higher up the slope. I think we can get boulders there.

CC Okay; copy that. We'll see - -

CDR-EVA We'll have to get a little closer, Bob.

CC We'll find out in a couple of hours.

LMP-EVA Yes, I will give you a reading on that before long. I wouldn't eliminate station 8 for the world - or the Moon, whatever's available today.

LMP-EVA I think we can; it doesn't look too bad. At the break in slope, right now, doesn't show anything obvious, except that's where the boulders start.

CC Okay, we hope that's fairly obvious.

06 17 59 09 LMP-EVA And on up the hill you have ... -

LMP-EVA But as I was saying, Henry just looks like somewhat more mantled Horatio (laughter). Getting to be ridiculous.

CDR-EVA Say, Bob, I'm navigating - headed northwest now - to get around the western rim of Henry.

CC Okay.

LMP-EVA And on that west rim, we've got about 10 or - 10 percent boulder cover.

CC Okay. And a reminder, Jack, to keep taking your Rober photos.

LMP-EVA Yes, sir. And when I - By boulder, I generally mean fragment, Bob, in this case. When I say 10 percent, I'm looking at stuff greater than about a centimeter in diameter. I'll try to say fragment from now on and be more precise. Okay. Here's a little area where there's - This part of Henry - this is the one part of the rim of Henry I see that has fairly large fragments, or boulders, on them up to 2 or 3 meters. But, again, they all appear to be buried. There are very few, except small ones, sitting out on the surface.

Tape 109A/6

06 18 00 32 CDR-EVA And, you know, the fragment population out here only goes out to maybe 200 meters, I expect.

LMP-EVA Okay. Now this concentration of boulders is because of a 50-meter crater in the rim of Henry.

CC Okay, say that sounds like a lot ... - -

LMP-EVA I think that was one that we -

CDR-EVA Take a picture in here, Jack.

LMP-EVA No. Locke, I can see -

CDR-EVA I'm getting the picture.

LMP-EVA Okay. That's -

CDR-EVA Yes, Locke's right ahead of us.

LMP-EVA This is one on the - about 50 meters right on the rim crest of Henry, almost due - the west rim - due west rim. Now Locke is just ahead of us. It also has boulders in its walls but has relatively few on the rim.

CC Okay. Copy that.

LMP-EVA Characteristic of both Henry, Locke, and Horatio is a re - essentially no change in the average frequency of boulders on the rim. The increase comes in the wall.

CDR-EVA We're at 184/2.3. We're just about between Henry and - -

LMP-EVA Locke.

CDR-EVA Locke. Yes; right between them.

CC Okay. I copy that. And you guys are heading for that big boulder, which must be just dead ahead of you there, about half a kilometer.

LMP-EVA Well, we're - Gene's sort of headed for station 6 now.

CER-EVA I'm going to take a tour around that boulder and get a case on it.

LMP-EVA Okay. Go ahead.

CC Yes. That would be a good mark to give us a range and bearing on, since that's a pretty good straight point.

CDR-EVA Yes, we are.

06 18 02 09 LMP-EVA Bob, the boulder concentrations in the wall of Henry have their upslope start at about - oh, I would guess an average of 30 meters down from the rim crest. The rim crest of Henry is not very well defined, but it's there. And they - from that initiation of boulders, they stream down the slope to the break in - in slope down at the floor. Still no obvious change in the dark mantle, as we're just to the east of Locke now. There's some - there's a 30-meter crater, fairly subdued but still quite deep - subdued rim. Again, it looks as if it were mantled; that - has no significant increase in blocks on its rim. That crater, in any other place, would have been a very blocky-rim crater. It has - its maybe 30 meters and- by 5 meters deep. Man, that is a big rock up there. Turning Point Rock is a split rock - has a - looks like a northwest-southeast overhang, with another block just this side of it - just to the south of that overhang. It's a pyramid shape in cross section - triangular shape in cross section. And it looks like it is pretty well fractured, although not pervasively like the rock at Shorty was.

CDR-EVA Okay, Jack, I know I can get up to that - to station 6.

LMP-EVA Yes.

CDR-EVA I might drive up there.

LMP-EVA Yes. Now, Bob, station 6 rock - one of them - is from that boulder track that runs obliquely across the contour.

Tape 109A/8

CC Okay. I copy that, Jack. Sounds like good news.

LMP-EVA And there's - the pictures ought to be able to - the pictures ought to pin down its - at least the end of the boulder track pretty well.

CDR-EVA Boy, this is a big rock, Jack. Whew.

LMP-EVA As I recall - as I saw it, the boulder tracks stopped about halfway up the slope of the North Massif. That is a big rock.

CDR-EVA We're at Turning Point Rock. And it looks like it's - I don't know if it's mantled on top, but it's certainly filleted. There's a - a lot of the dark mantle up and on some of the shallower slopes of the boulder. And it's on a little mound itself, as if much of it might be covered up.

LMP-EVA Yes. Okay. It looks like a breccia from here.

CDR-EVA Can you get a sample of it right here? You see these little chips?

LMP-EVA Yes, I probably can.

CDR-EVA Okay, Bob. I'm 3 meters from Turning Point Rock on the east side, and I'm reading 186 and 2.8.

CC Roger. Copy that. Sensational.

LMP-EVA Okay. You got to - can you drive up - -

CDR-EVA Yes.

LMP-EVA - - to the - right there, let's see - no, I can get them. The thing is, I don't know what it is.

CDR-EVA Well, but ... it's part of these fragments around here. I guess Turning Point Rock is 1, 2, 3, 4, 5, 6, - 6 meters high anyway. It's a - Well, I'd say it's a very rough subrounded type of rock - by the face - let me get this, Jack. Okay. There are two fragments in that sample.

CDR-EVA 47 Yankee.

LMP-EVA Plus some dirt. And it's about 4 meters from the -
Turning Point Rock on the north side.

CC Okay. Copy that. And presume you got some good
photos of the rock.

06 18 06 21 LMP-EVA Yes, I got a couple. I hope they're good.

CDR-EVA Well, I'll tell you what I'm going to do here,
real quick.

LMP-EVA And my locator is - -

CDR-EVA I'm going to do a - -

LMP-EVA - - 5, 6.

LMP-EVA Copy that.

CDR-EVA Jack, let me spin around this little crater here
to the left.

LMP-EVA Bob, it looks - it's very coarsely vesicular; but,
at first glance, it did not look like the pyroxene
gabbro - although the rock - that rock does. I -
It looks like it might be fragmental, although
I'm suspicious that I'm looking at zap pits. That'd
be a - Oh, yes - Getting them. I got them. Pick
one. That's a nice view.

CDR-EVA And we're on a little rise looking at this boulder.
That's incredible.

06 18 07 15 CDR-EVA Okay. We're on the roll, Bob.

CC Copy that.

CDR-EVA You know that -

LMP-EVA Bob, my guess is, right now, is that Turning Point
Rock is a big piece of subfloor gabbro.

CC Okay. I gather you changed your opinion.

LMP-EVA What looked like fragments is just - what looked
like fragments is just big spalls - spalls of where
the zap pits have cleaned off the rock.

Tape 109A/10

CC Okay. I copy that. And, guys, you might be happy to know that we think we've finally found the LM, because we were calling that for 188 and 2.8, and you got there at 186 and 2.8.

LMP-EVA That's not bad. Okay - -

06 18 08 12 CDR-EVA It's a split one up there, Jack. I've had my eye on it. There's some big boulders down here.

LMP-EVA Got it. I sort of lost track of station 6.

CDR-EVA Now, I got it. I've had my eye on that boulder. You can't see the track from here. I'll bet you can. I can see it now. We'll see it - we'll be looking right up it - looking right up the old boulder track. Man, I tell you, this navigating through here is not - -

LMP-EVA Okay. We're in a region where the really - the general fragment population is no different. We're up on the - off the break in slope, although you wouldn't notice it - but we are quite a ways. And the - but the fragment population is not much different than that on the plains. The big difference is that there are these scattered blocks that are from a meter to probably 10 meters - no, 5 meters in diameter. Hard to say, maybe 8.

CDR-EVA See that track coming down? We'll be looking right up that track.

LMP-EVA Yes, yes, you got it. I didn't realize you were that far upslope.

CDR-EVA Yes, we're way upslope.

LMP-EVA Yes. Hit it.

CDR-EVA Not very uncomfortable for me on this side.
(Laughter) How do you feel?

LMP-EVA Oh, I feel fine. I just - until I looked down there and saw the slope we're on.

CDR-EVA Yes, I know it.

LMP-EVA And I can't see any obvious change in albedo, like we could see with the light mantle yesterday. You - you - You got a - don't - There you got a nice - nice place. Oh, oh, you don't want to go over that way.

CDR-EVA I can make it. I want to park right - -

LMP-EVA ...

CC And, 17, you want to park at a heading of 107; we're going to open the battery covers and let them cool at the station. To a heading of 107.

CDR-EVA 107, huh? Okay. I'll get it up here.

LMP-EVA Hey, that's going to be moderately level right there.

CDR-EVA Yes.

LMP-EVA Trouble is, they're looking into the shady side of the block.

CDR-EVA Well, if I park on the other side, they won't be able to - I can go right upslope a little bit.

LMP-EVA That's all right. We can work in there. No, that's all right.

06 18 10 35 CDR-EVA Yes, I can't go up there. Let me just - This is going to have to be good. I can't go up there.

LMP-EVA I think you're all right.

CDR-EVA That's not too level, but - -

LMP-EVA Oh, not too - not too hard. Watch that turn.

CDR-EVA That's not very level, but we're not going to get much more level than that.

LMP-EVA Oh, that's good.

CDR-EVA Let me - they wanted 107. That's the best I can do. That's not very level for the gravimeter, but - Let me see if I can get comm. Hey, Bob, how do you read?

Tape 109A/12

CC Loud and clear, 17. How do you read?

06 18 11 24 CDR-EVA Okay. We're parked on a heading of 107. Are you happy with that?

CC Roger. Sounds great.

LMP-EVA (Laughter) You parked on a slope, too.

CDR-EVA There's no level - there's no level spot to park, here, though.

LMP-EVA You want me - some help getting off?

CDR-EVA I've got to go uphill.

LMP-EVA I just about ended up down at the bottom of the hill.

CDR-EVA Okay; 192/3.8, 3.1; 88 and 80; 108 and 0 on the batteries. The forward motors are 220 and 270, and the rears are 0 off scale low and 220.

LMP-EVA You want me to block the wheels? (Laughter) You got the brake on, I hope.

CDR-EVA You betcha. I don't know if I can lean uphill or not. (Laughter) I can't. Holy Smoley. Boy, are we on a slope!

LMP-EVA You okay?

CDR-EVA Yes. Let me get this thing set again.

LMP-EVA I don't think you can ...

CDR-EVA Boy, are we on a slope!

LMP-EVA Okay. I'm going to stay out from between the rocks. It's a beautiful east-west split rock. It's even got a north overhang that we can work with. And let me see what it is. We're right at station 6. You wouldn't believe it.

CDR-EVA I would. Oh, man, what a slope!

LMP-EVA And this boulder's got its own little track, right up the hill, cross contoured. It's a chain of

craters track, and it looks like it stops ... where it started. It starts in, what looks to be, a lighter colored linear zone - trying to give you perspective; it's probably only about a third of the way up the North Massif. Bob, are you reading us?

CC Read you loud and clear; and we got a picture.

CDR-EVA Oh, man, I tell you, are we parked on a slope! I don't know whether your TGE's going to hack it.

CC Okay. It'll pick up to 15 degrees.

CDR-EVA Bob, this is a - Well, it is going to have it.

LMP-EVA It's a coarsely vesicular, crystalline rock - finely crystalline. Looks like a - probably an anorthositic gabbro - trying to see the zap pits. For glass color, I don't have a good one yet.

CDR-EVA Say, Bob, you want both the recorder and the - and the other switch off?

CC Roger. Both of those off, and the - -

CDR-EVA Oh, man, it is hard to get around here.

LMP-EVA Bob, it looks like the glass is fairly light colored. It's not white. Well no - it's black. It's anorthositic gabbro, rather than gabbroic anorthosite, I think. Yes, that's black glass in the pits.

CC Okay. And, Gene, did you happen to notice the ... on the stuff when you dusted them?

CDR-EVA I didn't dust it yet.

CC Copy that.

LMP-EVA Bob, some of the vesicles are - they're flattened. All of them are flattened. There's a strong foliation of vesicles in the rock. Most of them are flattened, and they are up to 15 or 20 centimeters in diameter and about 5 to 6 centimeters thick - or wide.

CC Outstanding.

Tape 109A/14

- 06 18 15 56 LMP-EVA And there's some beautiful north overhangs all around the block. Well, (laughter) on the north side of the block.
- CC Okay. That's the best place - that north overhang; and I guess that means one of you guys might grab the SEC - the small can - before you leave the Rover.
- CDR-EVA Okay, Bob. It's going to take me awhile to dust. I tell you - -
- LMP-EVA Okay - -
- CDR-EVA Hard to get around here.
- LMP-EVA Bob, let's get it straight. You w - want - let's get it straight, you want the north overhang sample in the SEC - or the short can?
- CC Miracle of miracles. They don't want the short can. I'm not sure I understand that, Jack, but they don't want the short can here, they say, I guess they're looking for volcanic today.
- LMP-EVA Okay, we'll put them in bags. Oh, man -
- CC They're looking for volcanic today, Jack.
- LMP-EVA Oh, they are, huh? We found those yesterday.
- CC Well, they're hoping again at station 9.
- LMP-EVA This is - Now, that foliation I mentioned does not go all the way through the rock. There are variations in texture. One zone was strongly foliated. There's another - it almost looks like a large - it is - a large inclusion of nonvesicular rock within the vesicular rock. There may be some autobrecciation involved in the formation of this thing. It really looks mineralogically like the light-colored samples from the South Massif. But I - I tell you, that's only because it's light colored, and I - I can't give you anymore than that right now, until we get a fresh surface.

CDR-EVA 110 degrees on the SEP and you want the tape - the cover closed, right?

CC Cover open, please. Cover open. Both off.

CDR-EVA Okay. Cover's open.

CC Okay. And did you get the batteries - -

CDR-EVA Oh, my golly.

CC - the LRV battery covers open. We didn't copy that, Gene.

06 18 18 20 CDR-EVA No, I didn't copy that you wanted them open. I just got 107. I was about to ask you that.

CC Okay. We'd like them open. And, Jack, while I'm interrupting everybody here, how about a frame count, if convenient.

LMP-EVA Oh, shoot! Bob. I gave you one at the rock. It's now 68.

CC Okay. Copy that.

CDR-EVA Man, I never - (Laughter) You can't believe how tough it is getting around this Rover, on this slope.

LMP-EVA I think I'll - -

CDR-EVA Man, that - I think we're probably pitch 20 and roll 20.

LMP-EVA I think I'll get over here and get a pan while we're ... sample.

CDR-EVA Oh, I got to dust those radiators. I can't leave them like that. I tell you, this is not a very good place to dust them, though. Let me try one time. Oh, boy.

LMP-EVA Be careful, Geno. Need some help?

CDR-EVA No. I need a little finesse, though. It's one thing to reach over - here and do this on level ground. I don't know if I can do that without falling on the battery.

Tape 109A/16

LMP-EVA Well, I found a place to stand where I can take a pan.

CDR-EVA Bob, I'm going to have to give you a good battery brushing at the next site. I can't get - I get half of them, but I can't get the other half. It's too slopey.

CC Okay. We copy that.

CDR-EVA But the covers are open. What are you working on, Jack?

LMP-EVA I'm taking a pan.

CDR-EVA Very good. I'm coming right now. I bet you a dollar to doughnuts that you don't get a TGE reading.

CC Yes, Gene. If you're - if it's easy enough to take it off, why don't you take it off the Rover; and we'll try and level it in the stuff.

CDR-EVA Oh, come on. (Laughter) I'm not sure there's any place to put it on the ground level.

LMP-EVA No, you have to dig a place.

CDR-EVA Yes, I'll do it. Okay. It's coming off. Well, I'll set it right up here.

LMP-EVA It's going to fall down the hill. You'd better stomp off a good place.

CDR-EVA Yes. That looks level to me. Can you see it from there?

LMP-EVA Well, I can see it.

CDR-EVA I mean, does it - -

LMP-EVA I don't know. I have no perspective anymore.

CDR-EVA I don't either.

06 18 21 34 CDR-EVA MARK. Gravity.

CC Copy the mark - -

CDR-EVA It's flashing. Okay; now let me get to work. Okay. ... My fender got a little kinked here, which isn't going to help us.

CC Hey, Jack. And we see your gold visor up? You may want to put it down out here in the Sun.

LMP-EVA Well, I think I might - I can't see with it down; it's scratched. Bob, I'll use it.

CDR-EVA I think I can monitor that one.

LMP-EVA Hey, I'm standing on a boulder track. How does that make you feel?

CDR-EVA That makes me feel like I'm coming over to do some sampling. Think how it would have been if you were standing there before that boulder came by.

LMP-EVA I'd rather not think about it.

CDR-EVA Okay, let's go. You got a spot picked while you're here?

LMP-EVA Well, the big thing is, let's get those - let's get the boulder and then get in that east-west split. Bob, I got an undocumented sample from the middle of the boulder track.

CC Copy that. Soil sample?

CDR-EVA Whew!

LMP-EVA Soil sample. Gene, if you hit them off in there, it's going to be awful hard to find them, that's the problem.

CDR-EVA Did you pick a spot - a good spot while you were over here?

LMP-EVA No, I didn't. I just was looking at it. I think we need to get in the light, though.

CDR-EVA I - I can see with my gold visor.

Tape 109A/18

LMP-EVA Let me put a sample in your bag.

CDR-EVA Okay. Go ahead.

LMP-EVA It's bag - shoot - it's 534.

CDR-EVA This boulder looks fairly uniform from top to bottom.

LMP-CDR We've got to get a reference sample out - this soil.

CDR-EVA Let's get where we can get that 90-degree picture, too; so we want to get on the - really ought to get on the Sun side. Let me get that slab right there, though, to start with. I can get that one off. Well, there's no - let's go over on the Sun side because we can't really photograph it.

LMP-EVA Okay. I got to get out of here first.

CDR-EVA Let's go through the split.

LMP-EVA Well, okay. Be careful, though. Why don't we sample the split first so we don't - -

CDR-EVA Look at that overhang. Man, I tell you, if you can get your shovel down there, you'd have a ball.

LMP-EVA Yes, let's sample in the split first so that we don't get it too messed up. And then we can sample some of this stuff. Not - we want this overhang over here, Geno - the north facing one.

CDR-EVA Right here?

LMP-EVA Yes. I got to get - sneak by over there. Whoops! Don't shuffle too much dirt in there.

CDR-EVA Okay. You by me so I can set the gnomon down.

LMP-EVA Not quite. Don't think I can make it - without hitting you. I can't.

CDR-EVA Okay. Now try it.

LMP-EVA Okay.

CDR-EVA Ready?

LMP-EVA Okay.

CDR-EVA Let me set the gnomon down - -

LMP-EVA Set it down just outside the shadow here. Right -
Whoa - right there. That's good. There's still
some good clean ground there. Okay.

CDR-EVA Okay. I can get back far enough to take these
pictures. I want to go get a stereo pan around
the corner anyway. Let's see if I can't start
here with about 5/6. I'm so close.

LMP-EVA Okay, I'll get a -

CDR-EVA I must have a boulder ...

LMP-EVA I'll get it. Let me - -

CDR-EVA - I'm going to go around the cor - I got it now.

LMP-EVA Okay. You got a bag?

CDR-EVA All set.

LMP-EVA Okay. I'm going to get the shadowed material.

CDR-EVA It's in bag 312, Bob.

CC Copy 312.

LMP-EVA And it's - it's from - I think you saw where I
got it. It's about a half a meter back of the
limit of the overhang. Put it down. Put it down.

CDR-EVA Okay. Can you reach it?

LMP-EVA I will in a minute. You can turn it a little bit
towards me. Okay; 312. And the soil outside the
overhang will be next.

CDR-EVA Okay. Go get it.

Tape 109A/20

06 18 26 57 LMP-EVA And the first one is from the upper 2 centimeters.
CDR-EVA Bag 313.
CC Copy 313.
LMP-EVA And the second one is from probably down - from
2 centimeters down to about 8.
CC Copy that.
LMP-EVA Bob, it looks like the fragment just to the - or the
boulder just to the south of us has some inclusions
in it - light-colored inclusions.
CDR-EVA Bag 472 on that.
CC Copy 472 on that. You mean the south half of the
split boulder?
LMP-EVA Yes. I haven't seen inclusions in the other half.
CDR-EVA Okay? Okay. Now we need boulder stuff.
LMP-EVA You happy with that, Houston? Let's get ...
CDR-EVA ...
LMP-EVA Got your hammer?
CC Yes, we're happy with that ...
LMP-EVA It's a little hard, huh? I think - -
CDR-EVA I've got to find a corner I can get at.
LMP-EVA Yes.
CDR-EVA Let me get an after picture down in this hole.
LMP-EVA Oh, that's right. You almost stepped on the -
I forgot the after, too.
LMP-EVA Hey, there are chips up here on top. Also, that's
been spalled off.
CDR-EVA Yes.

LMP-EVA We can get some of those, but - -

CDR-EVA Looks like somebody's been chipping up there.

LMP-EVA Looks like there's been a geologist here before us.

CDR-EVA Let me get the gnomon. I think I can get some of these pieces over here. I want to get that 90-degree angular flight line around this boulder, too.

LMP-EVA Bob, the more I look at this thing - here's the piece that fell off. Here's the piece that was knocked off up there.

CDR-EVA Yes.

LMP-EVA Look at that.

CDR-EVA We ought to bring a big piece of that home. That's obvious it's obvious - -

LMP-EVA How about this one up here? Take your picture. I think we can just lift that off. See that?

CDR-EVA Stand by.

LMP-EVA I'd better get - -

CDR-EVA I'll get a locator from here.

LMP-EVA Okay. I was going to get my down-Sun, but I'm ...

CDR-EVA You may be down-Sun if you do.

LMP-EVA Yes, we'll get some. Get it?

CDR-EVA Yes, will it come off?

LMP-EVA Yes.

CDR-EVA Just throw it in my bag. It's broken, but it's in place. That's a nice, big piece, too. It's about the size of a - -

Tape 109A/22

LMP-EVA Don't you put it in mine. I can't get a thing in it.

CDR-EVA Okay. Got it?

LMP-EVA Yes, I got it.

CDR-EVA Don't move.

LMP-EVA Okay, Bob, there's a big spall lying on the ground here that has been knocked off up there, from right on top of the boulder. And, I tell you, the more I look at this - the south half of this boulder, the more heterogeneous in texture it looks. It looks as if it may be either a recrystallized breccia of some kind, or you had a gabbroic anorthosite - magma catch up an awful lot of inclusions. I guess I prefer the latter explanation because of the extreme vesicularity of the rock.

CC Okay; very interesting.

LMP-EVA Now, some of the - a few of the inclusions are - well, they're all subrounded to rounded, and a few - and a few of them are very light colored. I'm going to try -

CDR-EVA I'm coming around the corner ...

LMP-EVA Are you going to do it now? Okay. Well, you know, I ought to get one shot back here with a black and white. I'll get this half black and white.

CDR-EVA Okay, if we could get -

LMP-EVA I think we ought to pick up a piece of that spall there by the gnomon -

CDR-EVA I can break it off.

LMP-EVA There's one right by the gnomon we can just pick up. It's a finer-grained vesicular rock than - wait - where - -

CDR-EVA Oh, oh, oh, oh -

LMP-EVA I thought I was going to get this half.

CDR-EVA Okay. I don't care. I've started down, Jack.

LMP-EVA Well, they like to have some of it in black and white, you know.

CDR-EVA I'll get that rock.

LMP-EVA I forgot to look at the objectives for this station. I hope we're meeting them.

CDR-EVA Well, we want to get 500s of that boulder track. I know I want to get that.

LMP-EVA Okay. A piece of that Spalled rock that was sitting by the gnomon - Ooh, watch out gnomon. How about that? - is in - bag 535.

CDR-EVA You got one in there already?

LMP-EVA Yes.

CC Okay. We copy that one, Jack.

CDR-EVA You won't be able to reach - you won't be able to reach my bag.

LMP-EVA No, but you can put it in mine. Can you reach it?

CDR-EVA Oh, darn it.

LMP-EVA Bob, one of the light-colored inclusions looks like it may be anorthositic - gabbroic anorthosite - Let me get my terms straight. The host rock has dark enough zap pits that it's probably gab - anorthositic gabbro, if I didn't say that. Some of the light-colored inclusions have slightly lighter colored glass, and they may be the gabbroic anorthosite.

CC Okay, I copy that, Jack.

LMP-EVA Inclusions like this one and that one.

Tape 109A/24

CDR-EVA Some of those inclusions get to be bigger than the size of a baseball. There's one here and a couple up there.

LMP-EVA Let be borrow your hammer.

CDR-EVA Yes. Jack, try a little higher. See that one right on the - right there. Right -

CDR-EVA Yes, that's a hard rock.

LMP-EVA Yes, that's a hard rock. You might be able to do it; I can't.

CDR-EVA I can't get down there. Okay, we need some of the soil outside the shadow here.

LMP-EVA Yes. How about over where your bag went? Let's move around here - I think there is some - oops! Get on this slope over here. Okay. How about out over here? Are we supposed to get a - Where are we here?

CDR-EVA I don't know. I'd like to get - When you face uphill, your camera faces down.

LMP-EVA We want to get a rake on the rim of that little crater down there, I guess.

CC Okay, 17. Roger. You were asking about objectives. Of course the primary objective is docu - documented samples of the blocks; and then, also, we'd like to get some of the rake and soil sample out in the surface, namely, the rim crater there, if that's available. And one of the things, of course, we're looking for is the variety of rocks here, if there's more than just the one boulder. You can sample the boulder for a while, but we would be interested in seeing if there is more than just the single type of rock. Probably, also, samples from both sides - both halves of the rock. What we said this morning in terms of combining stations 6 and 7 to an hour and 20 minutes -

06 18 35 18 LMP-EVA Come on up here, Geno.

CDR-EVA Okay.

LMP-EVA If you can.

CC And so it's sort of your option as to how much time you spend here and how much you go on to station 7 and spend. If you feel that it's worthwhile, we could spend essentially all that hour and 20 minutes at this station. But if we did that, we'd like to get a fair variety of blocks, if they're available.

LMP-EVA Okay. Geno, we sampled some of the light colored group - as a matter of fact, this block looks different.

CDR-EVA Well, so does that big one - -

LMP-EVA It's grayer.

CDR-EVA That's why I've been photographing it.

LMP-EVA What it is, I think - it's a big blue-gray rock - itself is crystalline, I believe. The inclusions are much more sharply defined, and it's nonvesicular; and it's included, or at least it's in contact with the very vesicular anorthositic gabbro - right up there. See that?

CDR-EVA Yes, the whole big one. I just ...

LMP-EVA Did you get some pictures of it?

CDR-EVA As I bounced around there, I took pictures of it.

LMP-EVA Look, we can get some of that light-colored stuff in there, along with the blue-gray.

CDR-EVA We ought to get as big a piece of that inclusion as we can. There's - -

LMP-EVA See it up in there.

CDR-EVA Yes. I think we're out of line of sight with them. We're behind a boulder.

LMP-EVA Yes, sorry about that. But - -

CC We can hear you loud and clear. We're just looking at rocks right now.

Tape 109A/26

CDR-EVA Okay, Bob, the boulder downslope is more of a light-gray vesicular boulder. The one Jack just talked about with some of the larger white inclusions is less vesicular, and it's a - more of blue-gray rock. And if I don't fall on my tail here, I'll get - -

LMP-EVA The locator is of Henry.

CC Copy that.

CDR-EVA Okay, let me try and get up there. Henry? We must be high enough to see something. I haven't even looked back.

LMP-EVA Let me get a closeup before you start pounding.

CDR-EVA No, I might go from this angle too. That will give them something a little different up in there too, Jack.

LMP-EVA Yes.

CDR-EVA We ought to try and sample that. Okay. Let's get the -

LMP-EVA You want me to get my scoop under there? Probably won't fall out.

CDR-EVA Okay. Get as many of these pieces as we can. I don't know how many are going to come out.

06 18 38 19 LMP-EVA (Laughter)

CDR-EVA Outstanding! Outstanding! This whole thing will come out here in a minute.

LMP-EVA I'll watch it. I'll watch it. Got it?

CDR-EVA Move your arm up or down. Okay. I got it in case we don't get another one.

CDR-EVA Hey, we're getting good at that.

LMP-EVA Yes. Can't hold that much longer.

CDR-EVA Let me get up on this - up here.

LMP-EVA Why don't we get a - get a bag out. Let me put these in a bag.

CDR-EVA That's why I'm getting up here so I can - -

LMP-EVA Oh, okay.

CDR-EVA - - just get my balance. Bob, 556 is one of the light-colored inclusions in the blue-gray rock.

LMP-EVA It's chips.

CDR-EVA Chips of it.

CC Okay. Copy that.

LMP-EVA I think we lost that other one. That's good enough.

CDR-EVA I got it; I know where it is.

LMP-EVA That's all right. It's not a lot of sample, but it's representative, I think. It looks a lot like that sugary rock I sampled yesterday, doesn't it? Found in the - that we sampled in the - -

06 18 39 43 CDR-EVA Yes, it's pretty easy to break up; it's really not very coherent at all.

LMP-EVA You know, I thought last night, Bob, that I should use the word aplitic for a texture that we saw in that inclusion yesterday on the South Massif.

CDR-EVA If I could keep from falling on my tail.

LMP-EVA Can you get a - -

CDR-EVA I want to - -

LMP-EVA Okay, you going to get some of that?

CDR-EVA Yes, that's a different kind; that's a more beat up inclusion of some sort. Oh, there's a nice piece coming out. Oh, wait a minute - don't lose it.

Tape 109A/28

LMP-EVA I got it. I've got it.

CDR-EVA Got it.

LMP-EVA Okay.

CDR-EVA Okay. We have another inclusion that, on the surface, has a more reddish-brown texture. Interior looks pretty much the same; it's a very light gray.

LMP-EVA This looks like a piece of breccia. Looks like a fragment breccia that got caught up in this thing.

CDR-EVA Yes, well, the whole thing is obviously a breccia. I'd sure like to get that - -

LMP-EVA Well, I'd say - I'm not sure; it's obviously a breccia. I think it may - may be an igneous rock with breccia inclusions.

CDR-EVA Well, okay, but -

LMP-EVA Which is sort of in the same class.

CDR-EVA Sort of makes a breccia - -

LMP-EVA Well - -

CDR-EVA - - out of the big rock.

LMP-EVA Okay.

CDR-EVA Except you can - -

LMP-EVA I can't get in there, Geno, you'll have to.

CDR-EVA Okay.

LMP-EVA No way -

CDR-EVA Let me -

LMP-EVA Watch it. Hold still - opps. I think it's easier for you.

CDR-EVA Did I give them a number on that? - No.

CC Negative.

CDR-EVA It's - 5 - 536.

LMP-EVA Squash it - cramp it a little bit, if you can; a little more.

CDR-EVA Did you get that 536, Bob?

CC Roger. 536 for the last one.

CDR-EVA Let's get a - -

CC And -

CDR-EVA Okay. Let's go get the host rock here.

LMP-EVA How about that - How about that - whew - how about that piece?

CDR-EVA How about this one, with the inclusion? Maybe I can get this one.

LMP-EVA Okay.

CC Okay; and, 17, we'd like -

LMP-EVA That may have been a little optimistic.

CC Do you guys have a feeling that the two halves of the big boulder are different rocks? Or is it the same rock split?

06 18 42 13 LMP-EVA No, they're - they're two - they were all one boulder, I think. They are just two major rock types in the - whatever they came from. And I tried to describe that to you. We have the contact in the control boulder. They're really three big boulders. The central boulder had the contact between the light-gray rock - or the blue-gray rock and the vesicular anorthositic gabbro.

CC Okay. And you guys have that pretty well photo-documented, right?

Tape 109A/30

LMP-EVA Yes, it's in pretty good shape. We're working on it still.

CC Okay. Copy that.

LMP-EVA Try going on the side there, Geno.

CDR-EVA Just went from the side, Jack.

LMP-EVA That's enough. You got a piece of the - -

CDR-EVA ... host rock.

LMP-EVA I think you can get this one up here, can't you?

CDR-EVA I wanted that one cause it had that inclusion wrapped in it. Let me go to high here for a minute. Which one are you talking about? This one here?

LMP-EVA Yes, I just - It's about to come. Oh - oh - oh, okay. I've got it. I've got it.

CDR-EVA Okay.

LMP-EVA ... bag.

CDR-EVA They're both host rocks; we can put them in the same bag.

LMP-EVA No, let's don't. No, they're different places. 537, is a chip of the blue-gray rock; and the host - the blue-gray host rock - and let me get that other one -

LMP-EVA Oh -

CDR-EVA Oh - Be careful -

CDR-EVA Pick the rock up while you're there. It's right at your hand.

LMP-EVA I will.

LMP-EVA Okay.

CDR-EVA ... hammer somewhere.

LMP-EVA Okay. And 538 is another sample of that material - a little dustier.

CC Okay. We copy that.

06 18 44 57 LMP-EVA That's the blue-gray - that's the blue-gray Bob, with the inclusions in it. Now the blue-gray, the more you looked at it, it looks like a - -

CDR-EVA Give me your left - your right hand.

LMP-EVA Huh?

CDR-EVA Give me your right hand. Turn it over. Turn it over. Turn it over.

LMP-EVA Well, I did. How do you want it over?

CDR-EVA You kept turning it over in the same direction. Like that, so I can fix that. Okay. Now give me your bag, and I'll get it in there.

LMP-EVA It - the blue-gray rock, on closer examination, looks like a partially recrystallized fragment breccia. It's very hard.

CDR-EVA And I'm going to - -

LMP-EVA Are you going to get the afters in there?

CDR-EVA Yes, I'll get them. I want to do a little bit better documentation on this thing - Bob -

LMP-EVA I'm going to go over and look at that contact.

CDR-EVA I got a few closeup stereos of the inclusion that we tried to sample, and I'm going to see if I can't give you a little ... stereo around this thing - if I can stay on my feet.

06 18 46 32 CDR-EVA Do you read me, Jack, okay?

LMP-EVA Yes, I hear you.

CC Yes, Houston reads you loud and clear, also.

Tape 109A/32

CDR-EVA You can see where we've been pounding on this rock. We didn't succeed in getting samples everywhere. And I'm giving you a 90-degree corner.

LMP-EVA Bob, it looks to me like there are inclusions of blue-gray in the gabbro - in the anorthositic gabbro.

CC Positively outstanding.

CDR-EVA Are you saying you think this whole bit - You think this whole big blue-gray thing is an inclusion?

LMP-EVA Yes, sir. And there's some little ones over here.

CDR-EVA Yeah, but then within the blue-gray, we've got all these other fragment.

LMP-EVA Well, that's right. It's just several generations of activity; and it looks like the gabbro though, picked up the fragmental breccia as inclusion. Bob, I'd - it really looks that way right now. There's a - -

CC Okay, Charlie is here mumbling something about it looking just like house rock [?].

LMP-EVA It's very crystalline. I'll tell you, it's not a breccia - not like house rock [?]. Not to take anything away from house rock [?], though.

CDR-EVA Hey, Bob, there's a lot of mantling on a very shallow slope of a fracture here on one of the upslope rocks. I would assume it's just part of the ... picked up as its rolled down. But if it's worth sampling, you might think about it.

CC Okay, Gene, if you can get that fairly readily, why don't you - You can perhaps just scoop it up with the bag.

CDR-EVA That's exactly what I can do.

CC If you can get up to the rock there.

CDR-EVA And it will be in my - It will be in my flight line stereo, and it's going to be bag 557. And I'll take an after and show you where it came from.

CC Okay. Copy that.

CDR-EVA This is the easiest part of the rock in the world to work. Man, here's a big - here's a big white clast. There's one on top about a foot and a half across, and here's one - must be 2 feet across - 3 feet. And that's in the blue-gray.

CDR-EVA Feel like a kid playing in a sandbox.

LMP-EVA Well, Bob, I think I've done the best I can. I would - I'd say that they're pretty clearly inclusions of blue-gray in the anorthositic gabbro here near the contact.

CC Okay. And Gene, your bag is hanging by one hook there. Be careful, if you can - or LMP - -

CDR-EVA Okay. I gave you 557, I believe. Didn't I?

CC Roger. We have that one. And whoever is giving us 557 - -

CDR-EVA Okay, I'll have Jack fix by bag.

CC Yes.

06 18 50 07 LMP-EVA Okay, Bob, by accident - I didn't think I could do it but I got a sample of the inclusion. And it's in bag 539.

CDR-EVA Hey, Jack, that's your bag that's hanging by one hook. Let me go get it.

LMP-EVA Oh, they're talking to me, huh?

CDR-EVA Yes, because I didn't - -

CC Yes.

CDR-EVA I didn't think they could see me. I'm way up on top.

Tape 109A/34

LMP-EVA And it's blue-gray with light colored - -

CDR-EVA Put these in my bag.

LMP-EVA - - inclusions in it.

CDR-EVA All right.

LMP-EVA But the whole thing seems to be pretty well altered, or metamorphosed - compared to the major rock we sampled - to the other blue-gray rock.

LMP-EVA This bag is terrible. I can't - it won't latch.

CDR-EVA Man, there's a dark hole in there.

LMP-EVA Don't let me - I'm not -

CDR-EVA Here's another bag to put in there before you go.

LMP-EVA Oh, okay. It won't latch.

CDR-EVA Well - -

LMP-EVA Not at this angle.

CDR-EVA Put the thumb on one side, and I'll - -

LMP-EVA It's dead or something. There, that's pretty good.

CDR-EVA Now let me fix your bag.

CC And, 17 - -

LMP-EVA Okay, Bob, I think that inclusion will give you an example of what this thing - what the anorthositic gabbro did to the blue-gray breccia.

CC Okay. We copy that. And we're ready for you guys to leave this rock and press on and either get the rake soil and cores near that crater down below the rock just a shade, or else go on to some other different variety rocks in the area.

LMP-EVA Well, I tell you, going down to that crater is not a problem. Getting back up is.

CC Okay, well, find a decent area to get the rake soil from a couple of cores.

LMP-EVA Tell you what, Gene, I could go down there and start a rake, and you could come down there.

CDR-EVA Okay. I - Yes, I don't think you ought to try and walk back up, Jack. Let me get a pan from right here where I got this sample.

LMP-EVA Okay. I'm going to come over and - I'll go get the rake and get the - -

CC 17, it's not that vital to get to that crater. We just need a good place for a rake soil and a double - a single core.

LMP-EVA Get uphill a little bit, if you can, for the pan, so that you don't - so you see my other pan station.

CDR-EVA Where was it?

LMP-EVA It was over there in that crater, just uphill from the Rover.

CDR-EVA I'm going up there.

CC Hey, and, 17, we aren't all that gung ho about that particular crater, if it's that much of a job to get down to it and back up. Just - we just need a decent place for a rake soil sample and a single core.

LMP-EVA Okay.

CDR-EVA Bob, we don't move around from here too much. I tell you, these slopes are something else.

CC Yes. We agree with that, from what we see on the television. So use your judgement, and get them where it's the best place

CDR-EVA Well, you might take a look at me walking up. But I don't think I can get to the top. I just got to get a place I can get a pan from, right here. Right in this little hole. Okay, now I left the gnomon down there.

Tape 109A/36

LMP-EVA Okay. I'll have to go get it. I think they're set up right here near the Rover.

CDR-EVA I think I'll go and save some water, back on INTERMEDIATE. Okay.

CC Copy that.

CDR-EVA Hope my lens is clean. Bob, from up here, the light mantle is not evident until you see the angular reflection up on the scarp. Very thin-like patches might be evident out on the valley, but not nearly as pronounced as I might have thought from this altitude.

CDR-EVA Oh, and there's Challenger. Holy Smoley. You know, Jack, when we finish with station 8, we will have covered this whole valley from corner to corner.

LMP-EVA That was the idea.

06 18 55 20 CDR-EVA Yes, but I didn't think we'd ever really quite get to that far corner. Not 2, but this other one. And we're going to make it.

LMP-EVA Bob, that blue-gray rock near the contact with the anorthositic gabbro does get some vesicles in it. I think they'll show up in Gene's pictures.

CC Okay. We have that too, Jack.

CDR-EVA Okay. I just ran out of film at 160. And I'm about two pictures short of the pan, and they're upslope. I think I can cover most of that with the 500.

CC Okay, Gene. You going to go to the Rover and change your mags now?

CDR-EVA Well, Jack's going to need some help from me.

CC Okay. Let me know when - -

LMP-EVA I'm starting to rake.

CC Let me know when you get to the Rover to change the mags after you get done with that, and I'll tell you what mag to change.

CDR-EVA Jack, if you got - -

CC But press on and help Jack with those first.

CDR-EVA Jack, if you got enough film, I'll just come and help you.

LMP-EVA Okay.

CDR-EVA Okay?

LMP-EVA Yes.

CDR-EVA Remind me to dust my camera, too, will you?

LMP-EVA Don't forget to dust your camera.

CC Okay. We'll keep track of that for you, Gene.

CDR-EVA Okay. Did you get any before pictures?

LMP-EVA I'm getting them now.

CDR-EVA Okay.

LMP-EVA (Laughter) It ain't easy, McGee.

CDR-EVA Man, I tell you, these slopes are great. I wouldn't mind being up on top coming down; but - hey, that boulder track is quite a trench.

LMP-EVA Yes, sir.

06 18 57 26 CDR-EVA That thing must be a meter or 2 deep, huh?

LMP-EVA Okay; the big rake. Well, I think I'll try - -

CDR-EVA Wouldn't it be easier to rake downhill.

LMP-EVA It would, but the stuff wouldn't stay in.

CDR-EVA (Laughter)

LMP-EVA Right?

Tape 109A/38

CDR-EVA Well, I don't know.

LMP-EVA It's a thought.

CDR-EVA Make sure you get that one by the - -

LMP-EVA Yes, I will.

LMP-EVA We're not really supposed to be selective about raking.

CDR-EVA Well, you're not; you're just covering the area.

LMP-EVA That's why I set up there.

CDR-EVA A selective sample is better than no sample at all. Let me put some in there.

LMP-EVA Okay.

CDR-EVA Bag 558.

CC Copy 558.

CDR-EVA Bob, most of them are - -

LMP-EVA Let me go another couple of flights [?].

CDR-EVA Okay. There's one a couple of inches. Most of them are an inch or so or smaller. They're angular to subrounded fragments. Some of them look like the inclusions. As a matter of fact, the ones that are broken open look like some of the light-colored inclusions we saw in the big boulder. The others are too dust covered to say anything about.

LMP-EVA A couple of them look fairly coarsely crystalline. Okay. Put these in there.

CDR-EVA Big deal. Now we ended up with three more.

LMP-EVA Let me get an after, such as it is. Oh, we want the - -

CDR-EVA They want the soil here.

LMP-EVA Soil - that's right.

CC That's affirm.

06 18 59 46 LMP-EVA Okay. You want to put that in?

CDR-EVA Yes, I'd better put it in before I - Okay. Let's try for the soil. 559's the soil.

CC Okay. Copy that. And, 17, our present plans from the back room are that we'd like to get the single core, the 500 millimeter shots - and, I guess, maybe one could do one, and one could do the other - and then we'd like to press on and do a short station 7, unless you think you have got a fair variety of rocks here. The feeling is to do that ... variety of rocks.

LMP-EVA Yes.

CDR-EVA Little more, little more, little more.

CDR-EVA Okay, Bob. I'll get the core and let Jack get the 500. 559 is the kilogram of soil. I think we've pretty much covered the general variety we've seen here. I think we've seen most of them in that boulder.

CC Okay. And so we'd like to go on to station 7, then, when you get the 500 and the core, in hopes of finding a variation of boulders along the front.

06 19 01 02 CDR-EVA Okay. Let me know when you get it. Okay. The after. Okay, why don't you get the 500, and I'll get the core.

LMP-EVA And the LMP's on 120.

CC Copy 120 there. And, Gene, if you want to change, we recommended magazine Foxtrot or Fran, as the case may be.

CDR-EVA Okay. Will try Foxtrot - Franny. Dont' forget to get that boulder track.

Tape 109A/40

CC ... And while you're at it, Gene, you might remember to ... when you're leaning over the seat.

LMP-EVA Let me look at your camera.

CDR-EVA Oh, man, if this Rover wasn't here, we'd roll downhill.

LMP-EVA Hey, Bob, I think we could use an upper here if you want to save the lowers.

CDR-EVA I think so, too.

LMP-EVA Whichever you want. Do you want your - -

CDR-EVA No, I'll get it. Why don't you get your 500, and I'll - -

LMP-EVA Okay. But do you want a core? Watch the fender.

CDR-EVA The core's in there, isn't it?

LMP-EVA Well there's some under my feet if you want to use those.

CDR-EVA I'll use those.

CC Stand by, Jack. We have three lowers and two uppers, so we'd just as soon use the extra lower here in the single core. That'll give us two uppers and two lowers left - -

LMP-EVA Okay.

CC - - for doubles.

LMP-EVA There should be a lower in there, Geno.

CDR-EVA Yes, Bob, any special place you want that? Just out here on the slope?

CC That's affirm.

LMP-EVA Should have put the gnomon up. Well -

CC Just out there on the slope. I guess if you saw a crater ... you might look at that, but primarily we're looking at the crater.

CDR-EVA I'll get it. I'll get it, Jack. Don't worry. Okay. We have a couple of dents in our fen - in our wheels. That's better than having a flat tire.

CDR-EVA Did he say in a crater?

LMP-EVA I'm not sure what he said. Thinking - How do I get this doggone -

CDR-EVA ... to come off?

LMP-EVA You got to unlock it.

CDR-EVA Yes, it is unlocked.

LMP-EVA Okay. Now push down and turn.

CDR-EVA Okay. I got it.

LMP-EVA How am I going to see up there to shoot this thing?

CDR-EVA Well, why don't you lean against the rock? Go over there and lean against it.

LMP-EVA Well, I have to do something. I was trying to get so I could lean against the Rover, but that ain't going to work.

CDR-EVA The Rover isn't steady enough for you to lean against.

LMP-EVA Well, it's steady enough. There's just no place to lean.

CC Okay. And, Jack, and if you'll listen for a minute, I'll tell you some possible 500-millimeter targets the people have in mind. One, the LM, if you can see it from there. Two, Nansen, if you can see it from there. Three, Lara; and four, Shorty. In other words, I guess they're talking about looking along your traverse from yesterday. It would be mostly the back shots, apparently. And then, also, the South Massif, and I don't know what you can get of boulder tracks leading up the North Massif. And most of those will be looking downhill towards the LM, stations 2, 3, and 4. Over. Nansen, Lara, and Shorty.

Tape 109A/42

LMP-EVA I got you, Bob.

CDR-EVA Yes, the LM is visible by the way.

06 19 05 27 LMP-EVA Okay. I got a set of the - the - what looks like the outcrop from which the boulder came.

LMP-EVA I'm afraid they're moved a little bit.

LMP-EVA Oh, I can't - That's it. I got a few pictures looking up the boulder track and then off to the right - to the left a little bit - and one off to the right. And I think - I'm not sure how well they overlap; that's just an awful hard shot.

CC Okay; good on that. And if you're done with that, have you got a frame count - or you're still taking them, I guess, it looks like.

LMP-EVA Yes.

CDR-EVA Okay. My camera is clean. Magazine Foxtrot - is on about frame 2, and I cycled through it. And I've got the core all set, and I'm going to go get it. And I didn't hear where you said to put it, Bob.

CC Anywhere.

CDR-EVA Oh, man, you're easy.

CC And did you get your camera - -

CDR-EVA Anywhere. Not the bottom of a small crater, huh?

CC Any place. And did you get your camera dusted?

CDR-EVA Yes. I got it all dusted and the mag's changed.

CC Good.

CDR-EVA It's 448.

CC Copy that.

06 19 08 06 CDR-EVA Okay. I'll even get you a picture of it.

CDR-EVA Oh me. Oh my.

CDR-EVA Oh me. Oh my. Can you get the LM from there?

LMP-EVA Yes.

CDR-EVA That core went in very easy, Bob. I pushed it in about a quarter of the way. And about another five or six whacks, and it's in all the way.

CDR-EVA Okay. Come on out now, baby.

LMP-EVA Okay, Bob. Shorty, and station 3, and station 2, and what else.

CC And any sort of outcrop you see in the South Massif.

LMP-EVA I thought we shot those.

CC Okay. If you got those, fine.

LMP-EVA No, I mean the other day.

CC Well - -

LMP-EVA I'll try again.

CC Stereo is stereo is stereo, I guess.

LMP-EVA Okay, and I got you a little soil me - Well, but it's not stereo; it's right along the same line. Little soil mechanics of the hole, which stayed intact; very nice and round.

CC Okay. We copy that.

LMP-EVA Okay. Oh, man.

CDR-EVA Yes, sir, we got a couple of dented tires.

LMP-EVA Okay. My hands have had it.

CC Okay; good enough.

LMP-EVA You aren't going to get anything else out of me if I keep taking pictures.

CC And, Gene, what's a dented tire?

Tape 109A/44

CDR-EVA A dented tire is a little - oh, a little golfball size or smaller indentation in the mesh. How does that sound to you? Doesn't hurt anything.

CC That sounds like a dented tire; that's how it sounds.

LMP-EVA Frame 31, Bob.

CC Cappy - copy frame 31.

CDR-EVA That's sort of like what it is.

LMP-EVA Okay. LMP was what? 120? I guess we can get to the next station with that.

CC Yes, Roger.

CDR-EVA Yes, I got a brand new mag out.

CC And we'd like to get you guys rolling as soon as feasible there.

06 19 11 29 LMP-EVA Yes, sir. It's our policy.

CDR-EVA Okay. I'll need your rammer, so if you'll just turn right.

LMP-EVA Good timing. Pin's out; core tube is safe. In full.

CDR-EVA I knew it was. Okay. You take this and put this under your seat, if you want, Jack. And I'll get the TGE. Oh, let me put your shovel back on for you. I'll get it.

LMP-EVA Get that?

CDR-EVA Yes.

LMP-EVA Don't lose that. Boy, if you do -

LMP-EVA Okay. Did you give them the number?

CDR-EVA Yes, they got the number.

LMP-EVA Under the LMP's seat.

CC Roger. We got it. Copy that - under the LMP's seat.

LMP-EVA (Laughter) I'm sneaking up on the TGE.

CDR-EVA You need some help?

LMP-EVA No. No, I was - just sneaking up, that's all.

CDR-EVA ... let you lean on me.

LMP-EVA No, I got it.

06 19 12 51 CDR-EVA 670, 109, 801; 670, 109, 801.

CC Okay. We copy that.

LMP-EVA I wish we - the one thing I didn't do. While you're doing that -

CDR-EVA ...

LMP-EVA Didn't get pictures of those foliated vesicles. I don't think the ones you had were in that kind of rock.

CDR-EVA I don't want to lose that thing, so I guess - -

CC Okay, 17, when you get back on here, we don't need any charges, and we'll leave the sets turned off.

LMP-EVA I'm not sure. Did you turn it off, Gene?

CDR-EVA Yes, I turned it off. I turned it off. Okay. Let me see. We want to move on to 7 here. Rake, talus, documented core, you got your stereos, we got two pans, TGE, camera. Okay, we're going to head east and look for station 7 - block variation, contact change, and get a different sample of rocks. Okay, I sure want to get one or two of those nice ones in the big bag while you're over there.

CC Okay - -

LMP-EVA Open the gate, and I'll bring one.

Tape 109A/46

CC - - Seven - Okay. And let me know when you get ready to get back on the Rover there, 17.

CDR-EVA Guess what isn't opening again. Should, though. It's all set right.

CC You could put them under Jack's seat if it's easier.

CDR-EVA Okay. What do you want done to the SEP while I'm here? Do you want the blanket stayed - left open?

CC Okay, we'd - Negative. We'd like the blankets closed and taped down again, if possible, and both switches left off. We won't touch it again until station 8.

CDR-EVA Oh, tape's not going to stick anymore, I'm afraid.

CC Well, try.

LMP-EVA Big bag open?

CDR-EVA Yes, it's all open. All set.

LMP-EVA Get me a - I need a normal sample bag for one here. It's pretty fragile.

CDR-EVA Okay. Oh, that doggoned thing's not going to - That tape is full of dust now. Okay. Wait a minute, Jack.

LMP-EVA Here, let me get this big one. I'm about ready to drop it. It looks like a gabbro.

CDR-EVA There's sample bag 560.

CC Copy 560.

LMP-EVA And 560 has an undoc - undocumented except by the pans - very white - looks like a crushed anorthosite. It looks like the - some of the inclusions in the breccia - in the gray breccia - gray and recrystallized breccia.

CC Okay. We copy that.

CDR-EVA Jack, when you get around, and we close this gate, you might try and hit that - top of that SEP down again.

LMP-EVA I will.

06 19 16 30 CDR-EVA Hey, Bob, you're staying keyed an awful long time. We can hear a lot of what's going on back there. Wait a minute. Let me get this out of the way. Okay. Close it. Yes. That's got it.

LMP-EVA ... it's -

CDR-EVA That's got it. Okay.

LMP-EVA Oop, oop, oop. Why'd that come off?

CDR-EVA Well, because it's not locked. It's ... never was locked.

LMP-EVA (Laughter) We lucked out.

06 19 17 10 CDR-EVA Okay. We're moving. Sort of.

CC And, before you get on, remember to close the battery covers if they -

CDR-EVA Yes.

LMP-EVA Your camera lens looks all right, Geno.

CDR-EVA Yes, I dusted it already.

LMP-EVA Oh.

CDR-EVA Okay. Cover closed -

LMP-EVA Okay. Do they want it on or off? Leave it off, huh?

CDR-EVA Leave it off, but try and close that cover as best you can.

LMP-EVA Well, I'm afraid the tape has had it.

CDR-EVA I know it.

Tape 109A/48

LMP-EVA You want us to tape it again, Bob? What did you do with the tape?

CC If you can grab the tape right off, but don't spend a lot of time on it.

LMP-EVA What did you do with that tape?

CC Let's worry about - let's worry about it at station 7, if we're going to worry about it. Press on.

LMP-EVA Okay.

CDR-EVA Yes. Let's - let's forget it now. It's too hard, to work on there, and it's not going to take just a minute. It's going to take too much time. I'm not sure I can get back on here.

LMP-EVA Well, let me give you a hand. We need any a - we don't need any -

CDR-EVA No.

LMP-EVA Nothing. As a matter of fact -

CDR-EVA I can drive, Jack.

LMP-EVA Why don't you drive down and get - so you're not ... You can get on -

CDR-EVA You can go downhill very easy.

LMP-EVA Yes.

CDR-EVA Okay. Let me get the TV; The battery covers are closed - Let me carry - -

LMP-EVA Why don't you just go down there.

CDR-EVA - - I'll carry the Rover samples. ...

LMP-EVA Got it?

CDR-EVA Okay. I'll get that out of your way, too.

LMP-EVA Okay. I'll head down to that, ... that side hill over to those boulders right over there and then see if that's any change.

CDR-EVA Okay. You might, if you get another sample - a large sample, you might grab it, and we'll throw it in the footpan here - and - and I'll see if I can't find a level spot to - -

06 19 19 14 LMP-EVA I sort of ought to have my scoop, too.

CDR-EVA - - help you get on. No, don't take too much; just take that. That's all you need.

LMP-EVA How about letting me have your hammer, then?

CC Okay; and, 17, can you verify that the - that the gnomon is back in the Rover?

CDR-EVA Gnomon is on the Rover. The TGE is on the Rover.

LMP-EVA The rake.

CDR-EVA The rake is on the Rover. The scoop's on the Rover. We got the - you put the core under your pan, right?

LMP-EVA Yes, that's right.

CDR-EVA Okay. I'm going to power up and see if I can't come down and get you.

LMP-EVA It's fun walking downhill. Boy, that boulder track is impressive.

CC Okay; and, 17, when you get moving - when you get moving we want to get, and I quote, a maximum variety of hand samples with a minimum amount of documentation, in a minimum amount of time at station 7. It's just an attempt to see what kind of variety we can get along the face of the front. Over.

CDR-EVA Roger. Okay. Well, I'm not sure I can get down without ending up in your seat.

LMP-EVA Need some help?

Tape 109A/50

CDR-EVA No ...

LMP-EVA I shouldn't have left.

CDR-EVA No, no. I don't need any help. I'll get on.

06 19 21 00 LMP-EVA I probably ought to turn my water off of MAX if that's where it is. It's cold. I don't want to run out today.

CDR-EVA Well, the roll indicator says 15 degrees; and the pitch indicator says about 12. I don't know if I believe all that. Bob, you with us?

CC Go ahead. Right. We're with you.

06 19 22 10 CDR-EVA Okay. I'm rolling.

CC Copy that.

CDR-EVA Man, this is still a slope. Jack, I'm going to pull around and in the front of the way you're facing.

LMP-EVA I can go down - There's a crater over here. Don't drive through it.

CDR-EVA Oh, there you are. This is much better. How is this?

LMP-EVA That's great.

CDR-EVA We ought to be able to pick up lots of those fragments out in that field out there.

LMP-EVA Be right with you.

CDR-EVA Okay. Bob, I just came downslope reading 193/3.1 - just about 100 meters to pick up Jack.

CC Okay, copy that.

LMP-EVA Okay. Bag 48 Yankee has a sample of about a half - one-third-meter boulder that was lying in - that's sitting right smack dab in a little crater of it's own.

CC Copy that.

Tape 109A/51

CDR-EVA Oh, Jack.

LMP-EVA What?

CDR-EVA Oh, you just kicked a snowstorm of dust across here.

LMP-EVA I'm sorry. I just fell, too.

CDR-EVA Did you? You all right?

LMP-EVA Yes. Got your hammer?

CDR-EVA Yes.

LMP-EVA Okay.

CDR-EVA I got to drop it in the pan here. Hold on to it, I think.

LMP-EVA Couldn't help that one.

06 19 24 12 CDR-EVA Yes. I think we can get some more level spots. I can dust this thing back there.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 19 28 50 CMP Oh, I hope we got a pan camera picture of that - what the - Condorcet [?] or ... or something like that, the one I was describing had a little bit of diamond down in it?

CC Roger.

CMP Because what that - little diamond turned out to be with the binocs - It's a dome of material in there, and the reason it looks like a diamond is because you have slide material or talus-type stuff that's slumped down around it. And in that dome-type material, there are three or four black spots in it. I call it black; they're really a - I con - I kind of consider it a greenish - greenish black, you know?

CC Roger.

CMP I sure hope we - If - Why don't you check with Farouk and see if our pan camera coverage covers that - that crater? I think it probably did. That's an interesting one to take a look at anyhow.

06 19 30 12 CC Ron, Farouk thinks it is on the pan.

CMP Very good.

06 19 31 02 CMP You know, in the eastern wall of Picard - I'm looking at it with the binocs now, and you can definitely see the first part of it up there has some vertical escarpments [sic] - escarpments along the edge of it. And the vertical escarpments are kind of in irregular layers - well, just kind of like you would suspect if you - you eroded out a bunch of lava layers. In other words, they're noncontinuous, but they're kind of intermingled along, and they go about - oh, a third of the way down from the top of the rim, down to where the talus starts sliding on into the - into the crater.

Tape 109B/2

06 19 31 56 CC

Good show. We'll tie that - tie that up with what you gave us last time on Picard.

CMP

Okay.

CMP

All these dark-halo craters in the - in that one picture by that little diamond we've got up there by Yerkes. The one that's farthest to the south looks like an impact type of crater. In other words, you've got a definite ejecta lopping out around on those. The one that's hard to look at in the middle of my picture, but I think it's probably the second one down from the top. It has rounded ridges - rounded rims, and - coming up on the side here - I don't know if I am going to be able to see it until I go by it. It has rounded - a rounded rim. The ejecta pattern or the dark halo is about twice the size of the ... one crater diameter. And it doesn't - it's - it's either a highly eroded impact-type crater, or it's a volcanic-type structure. And, to me, it doesn't look like a highly eroded impact one. Again, that's a little one we can probably pick up ground truth, so to speak, off of the pan camera film.

06 19 35 38 CC

Ron, are there any similarity between the highlands, west of Crisium and those east of Serenitatis?

CMP

You know, I loo - that's just what I was looking at. And the ones east of - west of - well - yes, east of Crisium and west of - No.

CC

West of Crisium - -

CMP

What I was looking at was the - -

CC

- - and east of Serenitatis.

CMP

Yes, west of Crisium and east of Serenitatis. Those are different - seem to be a different type of islands, and I want - I want to check the other ones when I go by, but it looked like when I was coming up on - on those west of Crisium, they're more of a tan-type colors, smaller - undulations smaller - They have a corn-cob effect, I guess is

what you'd call it - what I call it anyhow.
Smaller - smaller ears of corn or smaller mounds
closer together as - as opposed to, when you get
over to the landing site - The ones on the landing
site seem to be more - raised, I guess. In other
words, you still have a - a group of the small
mounds and what have you, but they're a little
more massive; you get more of an appearance of a
dark flow - or a dark albedo between the mounds
and between the bumps.

CC Roger. Good show.

CC Are you getting the landing site into view now?

06 19 37 34 CMP I got it in window 2.

06 19 37 51 CMP Okay. I've got Shorty in the - picture. It looks
like a sharper crater than any of them in the
Pentagon complex. The other thing that looks
sharp, just like that one, is F Crater.

06 19 38 48 CMP ... back to the other window.

CMP Did they kind of find that orange stuff on the
north side of it?

CC Let me check on that, Ron. I'll be back with you
in a second. I don't think so; their stop was at -
station 4 was on - -

CMP ... I'll get ...

CC Station 4 was on the south side of it.

CC Just go ahead with what you see and - -

CMP I'd say they just barely got into the stuff, then,
becau - But it - but it looks like - kind of the
north rim of it has more of a - a tint of a dif-
ferent color to it.

CMP I ... my pictures.

CC Is the color differentiation concentric around the -
the crater or is it just in - in splotches?

Tape 109B/4

CMP No. It's just in the - kind of the north side of it.

CC What would you say the color is then? Is it one of the different tans?

CMP Yes, the color - (chuckle) Yes, it's a kind of a different - Would you believe kind of an orangish - tan through this - mic - through these binocs? I got to take another look at that when I go by the next time.

CC Roger. I'm with you.

CC Ron, when you get back - when you get done with this, we'd like you to sketch - when you get a chance, the color variations - just some thoughts on where the color splotches are with respect to Shorty, in particular.

CMP Okay. The - I'll do that when I finish up here.

CC Roger. Did you get a chance to look at F Crater?

06 19 41 50 CMP Yes, F Crater is - is sharp - just like - Shorty. I hope I was getting F Crater. F Crater is about the same size as Shorty, isn't it? If not, I was getting one between Family Mountain and -

CC Just about the same size, Ron. Maybe just a tad bigger.

CMP Yes.

CC Ron, is there a cone associated with F Crater?

CMP I didn't get a chance to look at it that much. I'll have to check it the next time.

CC Okay. Have any thoughts on how - what's its origin?

06 19 43 02 CMP I'll have to look at F Crater again the next time I come over on the thing, because I spent most of the time looking at - Shorty.

CC Okay.

06 19 43 14 CMP You know -

06 19 43 32 CMP This - this formation again from - Tacquet on down to Menelaus or Melinor [sic]. Just went over that again, and I was looking at it with the binoculars, and I saw one sharp crater in the area that had a - an ejecta - almost the same color as the stuff around Shorty.

06 19 44 16 CC Roger, Ron. You may point - pinpoint that crater between Tacquet and Menelaus when you ... down here.

CMP Okay.

CMP Boy, oh boy, D-Caldera is going to be - between all the windows.

CC You have any flow scarps in that unit - near that Menelaus Crater?

CMP No. I'll tell you what. There aren't any scarps there at all. That's why - That's another thing I was looking for, it's just a gradual degradation or gradual change in the color.

CC You have any topography changes with respect to that color?

CMP Yes, but the - the - No, the topography change is just a gradual - gradual change - with - There's a mound - There it is. I got to switch to all the windows.

CC Are - are you able to get up on the D-Caldera?

06 19 46 07 CMP Yes, I got D-Caldera into my sights now. The mound - ... in the center - are the same type of material - same type of material as that surrounding the D-Caldera itself. Down in the caldera, the gray blocky-type of stuff - and you know what? I'd almost say that - You know how water drops kind of form on a - on a - on a surface as you - as you - Have you ever had a high spot and something kind of slowed up - up to it, high spot - and water kind of flowed up to and didn't quite stick to it - you know it doesn't stick to it, all in one spot - -

Tape 109B/6

CC Roger.

CMP -- but it would leave a - a depression due to a surface tension as you come on up there - and then you have kind of a little - little bubbles that - float across there, and that's what that looks like to me.

CC Roger. We copy that. Keep - keep going; that sounds great.

CC How about the dark-halo crater west of the D-Caldera?

06 19 47 59 CMP Hey, I'm finding out with - with the binocs, your observation is - is cut in about a half, and I'm going to have to get that the next time over.

CC Roger. You think the dark halo crater is any relationship to those marelike patches in D-Caldera itself?

CMP No, I don't think so. Just a - because the color differences are - or the color is completely different. So that - that's what - that's an open question on that one, and I'll have to find out the next time around.

CC Any thoughts about the light-colored annulus around D-Caldera.

CMP No. I couldn't see a light-colored annulus.

CC Okay. Hey, we need a RECORDER, ON, here on the lunar sounder.

06 19 49 16 CMP Oh, okay. Let's see. RECORDER is - The RECORDER is ON.

CC Okay, Ron, let me read you some questions here real quick on D-Caldera. Determine the color difference between D-shaped expression and it's surroundings. I think you pointed some of that out. You got any more comments on that?

CMP Okay. There is nothing - surrounding D-Caldera that looks anything like the - the silver - silver-gray material that has depressed. It's definitely depressed with - with respect to the surrounding terrain. The little bumps that are in D-Caldera are the same color and the same - smoothness - kind of - smoothness as the rest of the material - the mare material surrounding the area.

CC Okay.

06 19 50 17 CMP I could not detect the - an external annulus around the caldera itself.

CC Okay. Do - do you feel that any of the material on the caldera is related to the material in the immediate vicinity?

CMP The smooth-looking - let me get my picture - the smooth-looking - bumps in there are definitely - doesn't look to me like they're the same material as the stuff in the whole area.

CC Okay.

CMP They're smooth - tannish.

CMP You know, if I look at that picture, the dark-colored stuff looks to me like it's a depression, you know? And it's - and it's the other way around. The light - light - the light-colored light-albedo stuff in the picture is the part that's depressed and the darker portions that look like the - the material surrounding the area is the part that's raised up.

CC Roger. We copy that. ... on D-Caldera, do you have any view of any more of this terrain below you, or are your windows pretty well messed up?

06 19 52 17 CMP It just got dark.

CC Okay.

CMP Yes, I - I stopped talking just about the time we got to the terminator.

Tape 109B/8

CC Okay. Good show.

CMP Let me - let me go back to a map and make sure I was talking about F Crater.

06 19 53 03 CC Ron, I think if you put an order of priority on some activity, as far as the geology goes, you might consider sketching out on Shorty - with just a rough handle on where you thought you saw some of the coloring differentiation up on the northern side of Shorty - and also give some thought on F Crater, if you will. I know you didn't get a chance to look at it because - If we can tie up the - what you see from orbit on Shorty to what we know we've got from the ground truth, we might really have something here, as far as matching up on some of these other craters.

CMP Uh huh; that's a good point.

06 19 54 04 CMP Guess I can change the DAP here and get that out of the way.

06 19 55 04 CMP Well, let's see, just kind of fouled that one up. Really wanted 142, narrow dead band, don't you, at 142, 269, and 0 - and 359? Thought we were already in that attitude.

CC Ron, you might want to trim your attitude that - you were not to go to that VERB 49. That was the deleted at one thir - at 166:36. That VERB 49 was deleted, and your attitude is back to the - 142, 269, and 359, and you might want to trim that up.

CMP Okay. Just did it. Thank you, Bob. I'd have done it by myself if I hadn't gone to CMC FREE, but I'd forgotten we were already in that attitude.

CC Roger. No sweat here; you got a minute or so before we're in the lunar sounder attitude for the Marius Hills there.

CMP Okay; 166:42.

06 19 58 16 CC And, Ron, you may be interested that, after we got the lunar sounder unsaturated there with the different attitude, we - we could detect the SEP in the lunar sounder data.

CMP Oh, very good. Kind of proves it's working anyhow.

CC Yes, that's for sure. Everybody seems to be pretty tickled with what they're getting so far. Just hope the film comes out as well.

CMP Oh, I'm sure it will. People out at Goodyear out there at Litchfield Park do a good job.

06 20 01 39 CC Ron, we got 30 seconds to T-start.

CMP Oh, thank you.

06 20 01 50 CMP OPERATE; she started at 42:12. Okay. RECORDER's ON; RADAR is ON. Go to work.

CMP 9 - -

06 20 02 12 CC MARK.

CMP - - 10, 11, go. Hey, it worked out fine (chuckle). Must have hit it 3 seconds early.

CC Roger. I still haven't figured out how to time this thing, I guess.

CMP (Laughter) No, that was good. I got the mark the same time I did it.

CC Okay, and you can relax, Ron, and I'll give you a call at 40 - about 30 seconds prior to 47:10, so you don't have to sit there and watch for anything.

CC Okay, I'll -

CC Got to earn my pay down here somehow.

CMP (Laughter) Boy, you already have, I'll tell you.

06 20 06 37 CC Okay, Ron. We're about 30 seconds from T - from LUNAR SOUNDER STANDBY time.

Tape 109B/10

CMP Okay; 7:10, OPERATE to STANDBY.

06 20 07 06 CC 5 seconds.

06 20 07 09 CC MARK.

06 20 07 14 CMP Got it.

06 20 08 10 CC Okay. There's your 1 minute, Ron.

06 20 08 16 CMP Okay. RECORDER is going OFF, not to HEATERS.

CC Roger. Good show, Ron. Farouk just came out and said a real good show. He's real excited about what you saw there, and we're real pleased with it.

CMP Okay. I think I said north and as I look at the map - the orange distribution goes generally about a - a crater diameter to the north, but it essentially starts - Well, if you'd cut a - on a 60-degree angle - from Dog Sierra at 63 - cut a 60-degree angle there and then - and then make that go around - out about a crater diameter.

CC Okay. To the north at Dog Sierra at 63?

CMP Yes, Dog Sierra at 63; that's on the 400-meter scale there.

CC Yes, I've got it.

06 20 09 50 CMP On TL-50. And, at the right-hand side - if you're looking at the thing from the bottom, the right-hand side is 0 - go up 60 degrees. You're 60 degrees up from the horizontal and 30 degrees down from the vertical. It'll be something about like that.

CC Okay.

CMP It had kind of a brownish-orange tint to it.

06 20 11 57 CC Ron, I guess one of the things that at least goes through Stu's and my mind on that Shorty Crater - and I think you dispelled it when you say it goes out like in a 60-degree angular cone away from it.

But the question we'd really like to be thinking about - Is that a concentric coloring around there, like it might be just a layering from a flap ov - you know, a turned-over flap or something like that, or whether it just seems to be some sort of a - I don't want to say flow, but something that would give it direction that one - the one 60-degree direction like that.

CMP Yes, I see what you're saying. And - It all - almost looked to me like it was gradational, as you, - as you went away from the crater. In other words, more - more orangish - more orangish closer - closer to the crater than as you got away from it.

06 20 13 05 CC Okay. We're - we're ending up looking at future passes, not today probably, but for the future and see if we can fit in one or two more observations to you here, where we can set up the back room like we had in all the - if you'll go along with that, and if we can fit it in, would you like to do that?

CMP Oh, sure. The crater that I described as looking comparable to Shorty, I don't think is the one on Family Mountain. I think it's the one on - bright dot - about the same size dot as Shorty on the 17-1 leadin for the - 17-1 for the landmark tracking.

CC Okay.

06 20 14 15 CMP I think Family Mountain is the bigger of the two mounds to the west of the landing site, isn't it?

CC Stand by a minute, Ron. Let me clarify that. Roger, it's west of the landing site, and I believe it's the bigger of the two.

CMP Yes. Okay. The one that I said that looked like Shorty is kind of between the two mounds, and that's the one I looked at.

CC You say it looked like Shorty or looked like the other one?

CMP - - ... a little bit.

Tape 109B/12

CC F Crater or Shorty?

CMP Looked - looked like Shorty.

CC Okay.

CC Ron, we'd like the H₂ TANKs and 3 FANs to ON, please.

06 20 15 48 CMP Okay, H₂ TANK 2 FAN is ON now; TANK 3 FAN is ON.

CC Roger. Thank you.

06 20 16 53 CC Ron, I just might draw your attention to the Flight Plan at 167:20, in that area where the lunar sounder finishes up, and it says that there will be no SIM bay or PCM data recorded until 169:03 and then you have to configure the DSE there. Just want to draw your attention to that.

CC Okay. That's a good point.

06 20 17 33 CMP Hey, when you all drew that 60-degree angle, were you making that 63 degrees up from - not 60 - 60 degrees up from line 63?

CC Yes. I - I didn't know how to handle on 63, but I took a point at Dog Sierra and 63 and kind of - caught - created a 60-degree cone away from the crater at that point.

CMP No, you want to create a semicircle. That's the center of the sem - Well, let's see. With the flat half of the semicircle along the line that goes through Dog Sierra 63 and Dog Whisky 57.

CC Dog Whisky 57? Roger.

CMP Right.

CC Okay. I've connected a line - -

CMP Connect a semicircle to the right of that line.

CC Okay. To the right of that line or - to the north side of that line?

CMP Yes. Actually, it will be kind of to the northeast, but to the north side of it, yes.

06 20 22 03 CC Ron, we're going to lose you shortly, and all the systems look GO here. I've got a bet with EECOM that you'll get everything in the Flight Plan. You won't miss anything for me.

CMP (Laughter) Okay. We'll try. Hey, before I go, take a look at Crisium and Serenitatis, 3 of 5; and the second one down from the top - or second one from the north, is the one I was looking at as that - is described as - as a partially subdued and - I mean a rounded-type thing with - with the kind of breaches in the side of the wall - what I consider breaches in the side of the wall.

CC Okay. We got it. Crisium, 3 of 5, second one from the north, huh?

06 20 22 47 CMP Yes. And the other one's not even circled; it's just north of the - the one in the bottom, and that's the one that even shows up on here and the - impact-type, because it's got ray - ray material, but it's a fresh impact bringing up bluish - bluish-type material.

CC Okay. Good show. You're - you're saying that the two of them are distinctly different from - when you're viewing. One's impact and one is possibly volcanic ...

CMP Yes. Right.

06 20 23 20 CC Good show.

06 20 46 XX BEGIN LUNAR REV 41

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 19 24 10 LMP-EVA Couldn't help that one.

CDR-EVA Yes. I think we get some more level spots, I can dust this thing back there.

LMP-EVA Am I really on?

CDR-EVA You're high. You're twisted. Go away from me one twist.

LMP-EVA Okay.

CDR-EVA Is it caught in something? Yes, it is. You're - Hold it - wait a minute - get up, get up, get up. You've got - you're sitting on - get up.

LMP-EVA What am I sitting on?

CDR-EVA Can't get out. You didn't put this away. Wait a minute. Get up, out - all the way.

LMP-EVA Oh, that thing.

CDR-EVA Yes, this thing.

LMP-EVA That's right. That's where it's setting high. I knew I'd forget that. Okay. Now, let me get this thing out. Okay. Okay. Let's press. Better get latched.

CDR-EVA Okay. All set?

LMP-EVA Yes.

CDR-EVA Okay.

06 19 25 36 CDR-EVA We're rolling, Bob.

LMP-EVA LMP frame - is 130.

CDR-EVA You got a lot of static now?

LMP-EVA Yes.

CDR-EVA Okay.

Tape 110A/2

LMP-EVA Hey, you got a rock on your right. I guess you - -

CDR-EVA Yes. I got them.

LMP-EVA ...

CDR-EVA I got the low gain set. Hello, Houston. Do you read?

CC Roger. We read loud and clear.

CDR-EVA Okay.

06 19 26 10 LMP-EVA Okay; how about that field, not this block but there's sort of a collection of them - -

CDR-EVA Yes. Way out there - -

LMP-EVA - - way out there, about 300 meters or so.

CDR-EVA Oh, at least. Yes.

LMP-EVA Oh; going into the Sun, I can't see a thing to tell you about Wessex Cleft.

CC Okay. Station 7 is nominally 208 and 3.3, but it's any group of any significant boulders you want to stop at in reality.

CDR-EVA Understand.

LMP-EVA Oh, easy.

CDR-EVA You feel like you're on a downslope over there?

LMP-EVA Yes. I feel like you're about ready to spin out downhill any minute.

CDR-EVA Do you? I don't feel that at all up here.

LMP-EVA Bob, it's hard to give you much, looking into the Sun the way we are.

CDR-EVA We must be about 200 meters up the slope, looking at that little valley down there, Jack. Am I right?

LMP-EVA Yes. I think you're right. The pattern on the slope really doesn't look much different than on the light mantle. Matter of fact, it looks very much like light mantle, except for these large blocks that are in it.

06 19 27 23 CC Okay. Copy that. And you guys may still have your visors up. We can't tell, but you might be better off with them down, if you've forgotten they they're up.

LMP-EVA Well, boy, I can't see. My hands work just as well as my visor, as a matter of fact.

CDR-EVA No, I can't believe - mine could be up.

LMP-EVA You've got a crater right in front of you.

CDR-EVA Yes. I got it.

LMP-EVA Okay. That looks like a pretty good pile to work on.

CDR-EVA Yes. Let's go over in there.

LMP-EVA Hey, wait a minute. Okay.

CDR-EVA Bob, what heading are you going to want me to park on? I want to get in that flat area, Jack, so I can dust the radiators.

06 19 27 57 LMP-EVA Yes.

CC We have no constraints, Gene. This is going to be a very short station. Probably not more than 10 or 15 minutes. But just to grab, as I say a maximum variety of hand samples with a minimum amount of documentation and a minimum amount of time.

CDR-EVA Okay. We can do a pan, and pick up a lot of those small ones, Jack.

LMP-EVA Yes.

CDR-EVA Rather than trying to chip.

CC Okay. We would like to have the - -

Tape 110A/4

CDR-EVA I'd like to see us a little more level.

CC - - TV camera and its mirrors and stuff dusted there, however. But we won't do anything to the battery.

LMP-EVA I thought you were going to stop back there.

CDR-EVA Well, okay. I was going out - out here around this big one.

LMP-EVA I'm sorry. I misunderstood you.

CDR-EVA Yes. See, there's a lot of little ones up in here I want to -

CDR-EVA Okay. Do not do anything to the batteries. Understand.

CC Roger.

LMP-EVA I can't figure out where you're going to stop.

CDR-EVA Right in here - right here to give you as much of a level spot as I can. That's about as level a spot as I can find. I'm inside the slope of a crater.

06 19 29 05 CDR-EVA Bob, I'm at 200/3.3.

CC Copy that.

LMP-EVA You want me to help you with it - that thing, Geno?

CDR-EVA No, I'll get it. Only one guy can do it.

CDR-EVA I just - we'll take - you take a pan before, and we'll start picking up some of those samples, and I'll take a pan afterward.

LMP-EVA Well, let's see here.

CDR-EVA See what kind of variety we can get here.

LMP-EVA There is another one of our blue-gray breccias, I think, over there; recrystallized breccias with some of that crushed anorthosite in it. I think right in here I'm going to take the pan at about - -

CC And, Jack, what's your frame count?

LMP-EVA 131.

CC Okay. Press on.

06 19 30 23 LMP-EVA Bob, I'm going to take the pan at 11 - feet, so you can see the fragments that we are going to pick up here. Then we can take another one at - for location work.

CC Copy that.

CDR-EVA Should have it, Bob.

06 19 31 09 CC We've got a TV. And, I repeat, we'd like to get some dust both on the mirror - dusting of the mirror and the lens of the TV; TCU and the TV.

CDR-EVA Let me get you - let me get you out of the Sun.

CDR-EVA I wouldn't do this for anybody but you, you know that.

CC Okay. Looks good, Gene. Thank you.

CDR-EVA You know what? I'm getting tired of dusting. My primary tool, the dustbrush and the hammer - and my head. Okay. You ready to start picking?

LMP-EVA Picking.

CDR-EVA Okay.

CC And - -

CDR-EVA You notice the temperature difference with that high Sun angle?

LMP-EVA Yes.

CC Roger. You're probably letting in a lot of infrared through that - without having that gold visor down, too. That's sort of an infrared shield.

CDR-EVA Yes, but mine's been down all the time, Bob.

CC Copy that.

Tape 110A/6

CDR-EVA Except in the shade.

06 19 33 09 LMP-EVA Okay, 540 is the first bag of selected samples.

CC Copy that.

LMP-EVA Okay. I'm going to leave it open, but don't let me - let me get -

CDR-EVA Here, put that one in there.

LMP-EVA Wait a minute, let's get a bag on it. We're getting too many rocks, and we don't know where they came from.

LMP-EVA I don't think it will fit. Know it?

CDR-EVA Yes, we'll wrap it a little bit. ... it will fit. ... fit.

06 19 34 03 LMP-EVA Okay. Bag 541 is partially around another big rock in Gene's - Gene's collection bag.

CDR-EVA Did you get pictures of this thing here?

LMP-EVA Yes; well, not the big rock yet. Not in focus anyway.

CDR-EVA I got to do that.

LMP-EVA I was just collecting in this area.

CDR-EVA Why don't you keep grabbing a few, and I'm going to - -

LMP-EVA That's what I'm doing.

CDR-EVA That's one of the blue-gray rocks, Bob. And it's got a light-colored fragment that runs the full height of it, about a meter and a half thick. And then it's got the gray or blue-gray rock on the other side. As a matter of fact - Let me look at it closely. It's a fragment in it all right.

CC Okay. Copy that, Gene. And remember to document around the corner at your ... get some photo documentation of the boulder.

CDR-EVA Bob, I wouldn't be absolutely positive, but it sure looks like I see a dikelet in here that's in the inclusion. And I'm going to get a closeup stereo of it. I'd call it a dikelet, if you pinned me down.

CC Okay. Copy that.

LMP-EVA Pin him down.

CDR-EVA I wish I could break a sample right off. Here's another one. It is a dikelet! There's three or four of them.

CC Okay. Copy that, Gene. Very good.

CDR-EVA Oh - me; oh, my. The material in the dike looks - Yes, it is, it is, it's not covering it. It's between the - it's between the - lighter colored rock, and it's the blue-gray rock.

06 19 37 05 LMP-EVA 542 is another bag of goodies.

CC Copy that.

LMP-EVA Gene, let me get rid of this.

CDR-EVA Oh, wait a minute. I got - I got - Well, maybe it isn't a dikelet. Maybe it's just a screen covering, a flow covering.

LMP-EVA No, you got - They're - they're dikes.

CDR-EVA Let me - let me -

LMP-EVA They're little veinlets of -

CDR-EVA Let me get this whole thing in a bag.

CDR-EVA I got a - I got a rock, Bob. It's fractured, primarily around the dike. It's in several pieces, but we're going to put it all in one bag.

06 19 37 35 LMP-EVA 543.

CDR-EVA Some of the men are going to have to assemble that.

CC Copy, 543.

Tape 110A/8

LMP-EVA Here.

CDR-EVA Here, I got - I got - Let me get it piece by piece.

LMP-EVA Okay. We need to get a - put one of those dikes in another bag. Bob, it looks like some fraction of the blue-gray material has obviously - -

CDR-EVA Not too full. That's all right.

LMP-EVA - - intruded. Huh? Now, can you get that dike there? Piece of it?

CDR-EVA That's right. Yes.

LMP-EVA Can you get that?

CDR-EVA I can get it right here.

LMP-EVA No, I think - No, get the piece with the - you get more of it, right there.

CDR-EVA Yes. It's this soft, white inclusion again. It breaks pretty easy.

CDR-EVA Oh, it's got to be a dike. Look at that.

LMP-EVA It is. It is.

CDR-EVA Okay.

06 19 38 40 LMP-EVA Okay, 544.

CC Copy that.

CDR-EVA Oh, yes, it is because I just broke into it.

LMP-EVA Yes.

CDR-EVA I'm looking - -

CC And we'd like to have you guys moving again in 5 minutes to get to station 8 on time.

LMP-EVA Yes, sir. Looks like - although the blue-gray up on the hill looked like a fragment breccia, if this is still related, then it's - been some partial melting at some time.

CDR-EVA There's a preserved contact between the dike and
the - -

LMP-EVA That's what I wanted.

CDR-EVA - - white material.

LMP-EVA That's what I wanted.

CDR-EVA Why don't we get this big piece of dike now?

LMP-EVA See if you can get - Whoa! Don't hit it again.
There, you've still got some - still got some
contact there.

CDR-EVA Now, there's some good contact. Man, that'll do
it.

LMP-EVA Okay.

CDR-EVA that'll do it.

06 19 39 32 LMP-EVA Dike and intruded rock in 544. Now, these dikes
are a dark bluish-gray. And it looks like there
are some - it looks like they're very finely
crystalline - maybe with some - -

CDR-EVA Get my bag. I'm taking some closeups.

LMP-EVA - - very fine phenocrysts.

LMP-EVA Okay.

CC Okay. We copy that.

LMP-EVA We ought to get - Well - we ought to get a piece
of the normal gray that the dikes are coming from.
You got your hammer handy still?

CDR-EVA Yes.

LMP-EVA ...

CDR-EVA I want to get this - -

LMP-EVA Go ahead.

Tape 110A/10

CDR-EVA - - finish documenting this thing.

CDR-EVA Ah-hah! Ah-hah!

LMP-EVA Hey, over here on this side, it looks like the vesicular anorthositic gabbro.

CDR-EVA I got to get some regular pictures on this set. Okay. Here's the - if that one won't come off, this one will. Got it?

06 19 40 38 LMP-EVA And - Yes. 561. That's a sample of the gray, looks like recrystallized breccia that the dikes are continuous with.

CC Okay. And a -

LMP-EVA And a - Bob, that's my turn to say "and a." And the - the vesicular rocks -

CDR-EVA Let me finish the stereo around the corner here.

06 19 41 19 CC Okay. And you guys have dropped the scoop there on the ground. And we're ready for you guys to leave.

CDR-EVA I know you are.

CC And you might grab one FSR on the way out.

CDR-EVA Okay. We'll do that.

06 19 41 39 LMP-EVA Okay. There's that one. The vesicular anorthositic gabbro is in 5 - What is it? 62.

CDR-EVA 62.

CDR-EVA I'll get this in there, and you take the -

LMP-EVA I got to get the scoop.

CDR-EVA Scoop, and I'll get the hammer. Then make sure your bag is closed.

LMP-EVA Yes, I've got to check yours, too. Let me get uphill from you, though.

CDR-EVA Wait a minute. Give me the hammer. Hows that?
Can you get it now?

LMP-EVA This is one of the worst bags we've had - packing.
It just doesn't stay down. Probably - If we get
time somewhere, we ought to change that out.

CDR-EVA Two of the corners are - -

LMP-EVA Yes. Well -

CDR-EVA How's she doing?

LMP-EVA It's okay. It'll hold for a while.

LMP-EVA Okay.

06 19 42 52 CDR-EVA Okay. Here's an FSR that's about -

CC And, Jack, you're untied on one - one side of your
bag is undone again.

LMP-EVA Oh, I'll get it - for you.

06 19 43 09 CDR-EVA Here's a football-size rock that was 50 percent
varied.

LMP-EVA Can you grip it? I got the gate open.

CDR-EVA I'm going to get your bag. Hey! Did you see the
way I handled that hammer?

LMP-EVA Yes.

CDR-EVA Tell you what, I'm getting accustomed to things.

CDR-EVA That gate's a little sluggish, too, Jack.

CDR-EVA Boy, I think everything is so full of dust, nothing
wants to move any more.

LMP-EVA Okay. That one looked like a piece of the gray
rock, I think.

CDR-EVA Yes. I'll bet I didn't push the gravimeter here.
Did I, Bob?

CC No. We'll get it at station 8.

Tape 110A/12

LMP-EVA No. They didn't tell us to.

CDR-EVA Okay. Jack, you're going to have to close the gate, and I'll have to hold the big bag over the top.

LMP-EVA Okay.

CC Okay. And, Jack, before you leave, we'd like you to change mags before you get to - before you leave this station.

LMP-EVA Yes, sir. I'll do that. No. ...?

CDR-EVA Wait a minute.

LMP-EVA I've got it.

CDR-EVA Yes, but don't push.

LMP-EVA I won't.

CDR-EVA One of those little ... strip - Okay, now you can push. Okay, that's blocked. Well, it's in. Wait a minute, wait a minute, wait a minute. Let me see what's going on in there. Oh, - we - this thing isn't - didn't - isn't released all the way. Pull it out this - That's it. Push. Okay, now -

LMP-EVA There, you got it. It went in.

CDR-EVA Okay, that's the dust again. Now, the bag's in the way. Let me get the bag out.

CC Okay. And, Gene, you might get the -

CDR-EVA Okay. Now shove it. That's too much. Wait a minute, wait a minute, wait a minute. Let me - Okay. Let me lift it up and do it. Well, wait a minute, I've got to tweak this thing. Okay, now shove it in. Right now.

LMP-EVA That got it. No? Why don't you play with it, and I'll see if I can change a mag.

CDR-EVA Well, dadgummit! That latch is -

LMP-EVA ...?

CDR-EVA I'll lock it. I'll just push that latch - that latch is just sticking, that's all. It's just dust, I guess. I don't know what you do about those problems.

LMP-EVA Okay, what magazine did you want, Bob?

CC Magazine Mike, as in Mary.

06 19 45 56 CDR-EVA Okay. It's latched.

CC Gene, you might spend your time taking a - -

CDR-EVA It's latched.

CC - - standard 74-foot pan while Jack is changing his mag, if you got a chance there.

CDR-EVA That's a splendid idea, sir. And that's exactly what I'll do. I don't mind going uphill, because it's so much fun coming down. Down in my little hole here. Oh! That's stability. That's stability.

CDR-EVA Boy, Challenger looks a long way away. That's 3 kilometers, huh?

LMP-EVA Yes.

06 19 47 26 LMP-EVA Okay. Mag's changed.

CC Copy that.

LMP-EVA Bob, those two bags with the goodies in them will have enough soil to be representative of the area we sampled, too, I think.

CC Okay, copy that. And did you guys get your bags fixed up there, Jack? We were concerned about your SCB for a while.

LMP-EVA No. We have to do that.

CDR-EVA We'll do it.

CC Okay.

Tape 110A/14

LMP-EVA Look at my camera lens and see how dirty it is.

CDR-EVA Now it's the other hook that came - turn a little more left. No, it didn't - it didn't come off, I don't think - unless it - the bottom's off, but the bottom is not going to stay up. And it's not - you're not going to lose it. The tops are so tight you'll - Your bottom's loose, but that - that's because your harness shrunk a little bit.

LMP-EVA Okay.

CC Okay. It looked like, from time to time, guys, that only one of Jack's hooks was hooked. On the top.

06 19 48 37 CDR-EVA Yes. They're both on, and they're both tight. And - -

CC Okay. We copy.

CDR-EVA - - I got the bottom hooked again, too.

LMP-EVA Yes. Okay.

CDR-EVA Bottom - but his bottom is not going to stay.

LMP-EVA Okay. Check my lens.

CDR-EVA Oh, your lens is beautiful!

LMP-EVA ... What's mine look like? Can you see it?

CDR-EVA Yes, I know it's clean. Let's forget it.

06 19 48 58 CC Okay; and, 17, as you get around to the front there, Gene, would you dust the LCRU; we don't think you did that here, and the top of the TV camera. And, Jack, would you take a peek at the SEP temperature for us?

CDR-EVA I'm sorry, Bob. I already did that when we stopped at the station.

CC Okay. It's ... - -

06 19 49 17 LMP-EVA SEP temperature is about 115.

CC Copy. 115.

CC Okay, then. Press on.

LMP-EVA Okay.

CDR-EVA Jack, this is tied down everywhere. You're just going to have to watch it.

LMP-EVA I will. Okay, I'm in.

LMP-EVA Hey, we seem to do an awful lot of down-Sun driving for - or up-Sun driving for all the planning we did.

CC Yes. Wait until we come home from station 8, then we'll take care of it.

CDR-EVA Okay.

CC And, Gene, as you get started there, we'd like a couple of Rover battery temperatures; at least one, we know what the other one says. And, Jack, we might get a frame count from you - Oh, excuse me, we already got that. Thank you, because it's changed.

06 19 50 48 CDR-EVA Well, okay, 110; and CDR, by the way, is about 73 on the frames.

CC Copy that.

06 19 51 00 CDR-EVA Okay, Bob. I'd like the range and bearing to the - We're roll - we -

LMP-EVA How did you get in reverse?

CDR-EVA I don't know.

06 19 51 09 CDR-EVA Okay. We're rolling, and I'd like the range and bearing to the next -

CC Okay. We want a heading of around 1 - we want a heading of around 125, and there's going to be a short - a small turn, I think it's at crater - the SWP Crater at 225 and 3.4, there'll be a slight turn. That's a heading of 125 is what you should start out on.

Tape 110A/16

CDR-EVA That's what I'm looking for.

CC And 225 and 3.4 -

CDR-EVA I thought we were bypassing -

CC No, we just do that - -

CDR-EVA I thought we were bypassing SWP.

CC - - to ... the planning stages.

CDR-EVA 225 and 3.4. Okay.

LMP-EVA That's pretty close to nominal.

CDR-EVA Yes. ... got my - Man, I tell you, this little navigation map I've got on my hand - cuff checklist is - is unquestionably the greatest thing that I've ever - done.

LMP-EVA Sure hard to tell where north is on it, though.

CDR-EVA Trying my best to keep you out of those slopes.

LMP-EVA That's all right. I'm learning to tolerate it.

06 19 52 27 LMP-EVA Okay, Bob. We're pretty close now to - no, really not. We're still about 100 meters, I think, from where the break in slope is - with the flank. And - but we're away from the block population except for scattered - two great big blocks out ahead of us, this side of the SWP Crater. And - but the average population is down to the 1 percent or less, again.

CDR-EVA That average population really never changed up in here. Just the big blocks were around. I saw some little - -

CC ...

LMP-EVA Half-meter to one-third-meter, glass-lined, pit-bottom craters.

LMP-EVA Look at the size of those things!

CDR-EVA Boy, aren't they big mammoos (laughter).

LMP-EVA (Laughter) And it looks like they're probably the same thing that we sampled. They have the inclusions in them, white inclusions. They look like a mixture of gray and the - sort of a tan-gray of the - the gray of the recrystallized breccia, and the tan-gray of the anorthositic gabbro.

06 19 54 02 LMP-EVA That must - Hey, look! There's Van Serg, blocky rim crater. That's the other side of Cochise there. See it?

CDR-EVA Yes. Way over there.

LMP-EVA Yes. Cochise is certainly a shallow crater, although we knew that. It doesn't have any - it only has one place I can see that has any blocks on the inner wall of Cochise. Otherwise, it has a surface much like what we're driving on for walls and for the floor. One place on the south - southeast wall is a concentration of blocks much like we saw in Henry or in Horatio. But the rest of the crater seems to be pretty well mantled. Van Serg is a very blocky rim crater, big blocks up on the rim.

CDR-EVA Do you have a lot of static, Jack, or is it just me?

LMP-EVA No, I think it's just you. People are always giving you static.

CDR-EVA Bob, if you are still reading me, I'm looking at the Sculptured Hills, and I still have that - that old man wrinkled face appearance, even up close at this Sun angle. And those wrinkles go from, generally, upslope at the west to downslope at the east.

LMP-EVA Hey, are you - No, you're right at the edge of Cochise. Aren't you?

CDR-EVA Where? Right here?

LMP-EVA Yes. Aren't you?

Tape 110A/18

CDR-EVA No, we're not that close. Uh-uh. Cochise is up at - see that rim where those blocks are?

LMP-EVA No, that's a small crater.

CDR-EVA Oh, I'll bet you that's Cochise up there. We've got to go quite a ways yet to get to -

CC How about a range and bearing there, guys?

CDR-EVA This sideslope driving is really a tough - -

06 19 55 45 CC How about a range and bearing?

CDR-EVA Okay. It's 210/3.4.

CC Copy that. 210/3.4. And you should be somewhat north of Cochise there, as per planning, although you may be cutting south to try going directly up-Sun.

CDR-EVA I guess that's some other - That's just a depression. I think Cochise is over that rim.

LMP-EVA That's just a depression. Yes, yes. Those are getting warm.

CDR-EVA Yes, I tell you that. Every bump you go over on that sideslope is just accentuated.

CC Yes, we don't think you're anywhere near Cochise.

LMP-EVA Yes. I agree.

CDR-EVA Yes. I think it's over that rim up there.

LMP-EVA That's just a big, shallow depression.

CDR-EVA All I'm doing is flying the 3.4-kilometer arc right now.

CC Say again there, Gene.

LMP-EVA There's another one of those deep craters that's not - that doesn't have a blocky rim.

06 19 56 57 CDR-EVA Okay. 214/3.4.

CC Copy.

LMP-EVA That's one of the more striking characteristics of the mantle are these craters that look, as far as the diameter-to-depth ratio is concerned, like they ought to be fairly young. But there's no blocks on the rim, and they seem to be - have this mantled appearance, just like some of the large craters.

CDR-EVA As I look up Wessex Cleft from just about abeam of it - Let me get over here - It still shows me an albedo change and a surface wrinkle-texture change.

LMP-EVA And - yes, I think so. I've got it at the same Sun angle more or less, or part of it there.

CC Okay. Copy that. You guys may be getting just a little far north.

CDR-EVA It's sort of a perfectly formed ...

LMP-EVA Yes.

CC You may want to head just a little south to avoid running right into the middle of SWP Crater.

LMP-EVA Yes. I think we see it now. Is that SWP?

CDR-EVA Well, I don't know. I don't -

CC SWP will be at 22 - SWP will be at 225 and 3.4.

CDR-EVA Yes. That's my - that's what I'm shooting for, Bob.

CC Okay.

CDR-EVA I'm just flying a 3.4 mile - or kilometer arc.

CC Roger. I was going to suggest that.

LMP-EVA Bob, there's something I haven't mentioned, but if one had time on the next program - -

06 19 58 31 CDR-EVA I think that's SWP right there, Jack.

Tape 110A/20

LMP-EVA - - you can sample secondary craters, and they tend to have blocks either in them or on one rim, suggesting that you could tell directions if you put your mind to it. Directions of the - where the secondaries came from. These are small ones.

CDR-EVA Did we ever get a piece of glass in place?

LMP-EVA Yes, I did yesterday.

CDR-EVA Documented in place?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA That's what I was trying to protect in the SRC yesterday.

06 19 59 00 CDR-EVA Here's SWP, Jack. It's coming right up, and I'll go along the southern rim.

LMP-EVA I wish I wouldn't lose - start concentrating. I'm forgetting to take my pictures.

CC Roger, Jack. Don't forget to take your pictures.

CDR-EVA I'll tell you, if we don't concentrate, we end up -

LMP-EVA Okay. I'll quit thinking and just take pictures.

06 19 59 25 LMP-EVA There's a crater, that double pit-bottom crater. That's the first one of those I've seen.

CDR-EVA Right here, Jack, you're going to be able to peek right over the top of SWP.

LMP-EVA Right.

06 19 59 36 CDR-EVA Right here. How's that grab you?

LMP-EVA That's SWP, all right. SWP's a bigger hole than I thought it was.

LMP-EVA Might - SWP even has some blocks in the wall.

CDR-EVA Yes, but the eastern and southeastern rim of SWP are just continuous - Ooh - they're just continuous with the slopes of the Sculptured Hills.

CC Okay. Copy that.

06 20 00 16 CDR-EVA How does 238/4.2 sound for the beginning of 8?

LMP-EVA Hey, you're -

CDR-EVA May have to take these slopes just the most comfortable way we can.

CC 238 and 4.0 we're expecting for station 8, the beginning of it. 238/4.2 - 4.0, excuse me; 4.0.

CDR-EVA Roger.

CC And remember again, station 8 is a very flexible area. You just get to a place where it looks like it's feasible to sample Sculptured Hills.

LMP-EVA That's right.

CDR-EVA Yes.

CDR-EVA Let me tell you, this Rover is a machine. I don't know if it saw that hill we're climbing, but I did.

LMP-EVA How's your - how're you doing?

CDR-EVA Doing fine. I'm trying to get around SWP over here and start hitting that -

LMP-EVA East Massif has outcrops on it. I can see now on the north side. And they also tend to have linear upper terminations. And some of those line up as if there's roughly horizontal structure within the upper one-half of the East Massif.

CC Okay. Copy that, Jack. Stop thinking and take pictures.

LMP-EVA Go by that little dark crater over there. There's a very blocky-rim small crater that's a dark-rim crater instead of a bright rim like we'd seen some around that looked fresh. It partly may be the angle at which we're approaching it.

Tape 110A/22

06 20 02 35 CDR-EVA Bob, we're on the southeastern rim of SWP at 226 and 3.6.

LMP-EVA Why don't we get some samples of that material in there.

CC Copy that.

CDR-EVA Right here.

LMP-EVA Okay. Keep driving toward the rim and then just - a shallow curve. Okay. Now, curve it.

CDR-EVA That your spot?

LMP-EVA Okay. Right. Just keep going, and I'll stop you.

LMP-EVA Whoa, straight in. Good, good.

06 20 03 03 CDR-EVA Okay, Bob. 226/3.6. There's a - there's a highly fragmental, small crater about 40 - 30 or 40 meters across, right on the southeastern rim of SWP. And at - there's a - most of the fragments are football size and smaller, and they're very angular. And probably the inside of that rim is - -

LMP-EVA Turns out that they'll break. They're clods.

CDR-EVA Are they clods?

LMP-EVA Yes.

CDR-EVA I guess that's going to be about 70 percent covered on the inside of the rim with these things.

LMP-EVA It's all instant rock, but the crater rim looks dark compared to - to other fresh craters like this that we've seen.

06 20 03 47 CDR-EVA 50 Yankee.

CC Copy. 50 Yankee.

06 20 03 52 LMP-EVA And the frame count is 26. LMP frame is 26.
CC Copy that. Press on.

06 20 04 02 LMP-EVA Yes, you're ... We are, we're rolling.
CC And, 17, we're hoping to go to station 8A - -
LMP-EVA Yes. Your wheels are just chewing those things up.
CC - - the northernmost section of station 8, if we can, of course.
LMP-EVA Yes. I think - I think we ought to head just about - -
CDR-EVA Yes. We'll get there.
LMP-EVA Well, the most - I think we ought to get below the highest peak up there because that seems to have the rocks on it.
LMP-EVA I only see one rock so far - -
CDR-EVA ... straight ahead, in there. See that one. Of course, I don't know where that came down. Doesn't look like it may have come down from the top.
LMP-EVA Certainly aren't many rocks. It's certainly not like the old North and South Massifs. Yes. There's one big rock over there. That doesn't look like it might be -
CDR-EVA Well, let's head that way. That's about where the station is, anyway.
LMP-EVA ... I think we're starting to see blocks. That one is so - so unusual -
CDR-EVA That's about the station. That's the northernmost station anyway. There's another one there.
LMP-EVA Well, this probably is - We can get the other smaller population around it. I'm worried about that one being exotic to the Sculptured Hills.

Tape 110A/24

CDR-EVA Yes, it doesn't look like it rolled -

LMP-EVA No.

CDR-EVA But I don't see any others, do you?

LMP-EVA Well, there's some small ones up in there. Off to about the 2 o'clock position. But I think that's all. We're going to have to be satisfied with small ones. Big ones don't get down. There's some big ones way up on the slope.

CDR-EVA Yes, I see those.

LMP-EVA Watch it; crater. You're ...

06 20 05 59 CDR-EVA Yes, let me get it for them. Okay. We're at 227/3.9.

CC Copy. 227/3.9.

CDR-EVA I think it's worth - There's smaller ones around here, too, Jack.

LMP-EVA Yes. That looks like subfloor from here.

CDR-EVA What's it look like? If it doesn't look worthwhile stopping, I'll move on up over there.

LMP-EVA Yes, it looks like subfloor. I would recommend that we - -

CDR-EVA All right.

LMP-EVA - - try to get up to some of those. I don't know whether we can or not. How's your - what's your pitch indicate?

CDR-EVA Well, that doesn't mean anything.

LMP-EVA See that - those two up there would be reasonably well up the slope.

06 20 06 47 CDR-EVA Bob, no parking constraints on the battery?

CC Roger. No parking constraints. We'll park at 045, Gene. Or wherever you like, really.

CDR-EVA I have to park about 045 because I've got to be pointing uphill so we can get out.

CC Okay. Either - any place you want to. 045 is fine.

CDR-EVA Jack, I'm going to park - -

LMP-EVA How about just that rim of that little crater there?

CDR-EVA Well, this is so level right here, Jack, I'm going to just park it -

LMP-EVA Well, I was just thinking on top of that crater is closer to the - That's level, too, on the rim. It'll give them a view of the - a good view of the sampling area. I think we can - if we work on those blocks there, we're in pretty good shape.

06 20 07 28 LMP-EVA Bob, we're directly downhill, and that is from the highest point that I could see up on this first mass - first Sculptured Hill.

06 20 07 40 CDR-EVA Bob, I'm parked at 026; bearing is 226; distance, 6.6; range, 4.0; amp-hours, 85 and 80; battery is 1 - I think it's 115; and motors are all off scale low.

CC Okay - -

CDR-EVA Not really, but - Okay - -

CC And here, we would like - -

CDR-EVA - - 0 - 230 on the - on the forward and off scale low, and 220 on the right rear.

CC Okay. We copy that. We'd like to get the usual dusting here. Up front.

CDR-EVA Yes. And I'm fairly level.

LMP-EVA Not really.

Tape 110A/26

CDR-EVA I'm not, huh?

LMP-EVA (Laughter) I just about rolled downhill again.

CDR-EVA Oh, man. (Laughter) I am pointing uphill, aren't I?

LMP-EVA Yes.

CDR-EVA Well, at least we don't have a sideslope.

CC And, 17, we'd like - -

CDR-EVA Battery covers stay closed?

CC Battery covers stay closed. But we do want the LCRU, and the TV camera, and the TCU dusted.

CDR-EVA Okay.

CC And, 17, we'd like the SEP blankets opened and dusted one more time.

CDR-EVA I think you're a dreamer, Bob, but I'll do it.

CC Roger. We keep hoping.

CDR-EVA Start doing your thing, Jack. It's going to take me a little while to get this dusted.

LMP-EVA Bob, the first block I looked at here looks like subfloor gabbro.

CC Okay. We copy that.

CDR-EVA Should have it, Bob.

06 20 10 17 CC Okay. We've got a picture.

CDR-EVA You even sound better. Battery covers are awful dirty, but I will not dust them as long as you're happy.

CC Yes. I don't think dusting the battery covers gives us any cooler batteries.

CDR-EVA Well, I know; but it keeps the batteries from getting dust in them. I've had pretty good luck with them. They've been pretty clean.

CC Roger on that.

CDR-EVA You are dusted; and you're shiny bright all over.

CC Okay. Copy that.

CC We thank you. Ed thanks you.

CDR-EVA And we all thank you. Listen, if Ed thanks me, that's enough. A man couldn't ask for any more than that. Okay. I've got my ... - -

CC I think your LMP just ran away.

CDR-EVA Where'd he go? Jack?

LMP-EVA What?

CDR-EVA Oh, there you are. I thought maybe you fell in that crater I'm looking at. Okay. I'm going to give you a TGE reading.

CC Roger. Give us a mark.

06 20 12 00 CDR-EVA Our fender's beginning to fade and, uh-oh, the clip came off on the inside; that's what's wrong. We'll have to fix that before we start. The outside ones hold but the inside one's not.

LMP-EVA Bob-o, all the blocks bigger than 20 centimeters that I've looked at up here are subfloor gabbro in appearance.

CC Copy that.

LMP-EVA I've looked at about five.

CC Did we get a mark there on the gravimeter, Gene?

06 20 12 39 CDR-EVA Thirty seconds to go, Bob.

Tape 110A/28

CC Roger. I copied it. Just wanted to check.

CDR-EVA Okay. Jack. You find anything up there?

LMP-EVA Gene, I'm going to go up and look at this one rock. Why don't you set up and sample any one of these other big ones. They're all the same. Like the one near the Rover. And I'll go up and try to get this big one down there.

CDR-EVA Well, okay.

LMP-EVA It's the only one left to look at, but right now we're dealing with subfloor material, I think.

CDR-EVA What about some of these little fragments that seem to be sitting more on the surface?

LMP-EVA Yes, we're supposed to rake here. We'll get those with the rake.

CDR-EVA That one up there, by the way, is sitting on the surface. These others are submerged.

LMP-EVA Yes. That's why I want to look at it.

CDR-EVA If you - you won't - you don't have a hammer, but if you need me, I'll come up there because I think that may be worthwhile.

LMP-EVA I'll roll it down to you.

CDR-EVA Yes. Thanks a lot.

06 20 13 56 CC A reminder, 17. We'd like to have you leaving here in 30 minutes to make up some of the time we spent at stations 6 and 7, a little extra. And we'd also remind you that we'd like a rake soil sample here, too. That may be the only way we try and pick up some stuff other than subfloor if that, indeed, has come down from the top of the Sculptured Hills.

06 20 14 20 LMP-EVA Okay, Bob. This rock is a big chunk of shattered, but still visible, bluish-gray anorthosite. It's glass-coated, and it actually looks like it's vesicular. I'm going to roll it downhill so we can work on it. Well, I'll document it first.

LMP-EVA Did you copy that?

CC Roger. I copy that. We'll be watching it coming.

LMP-EVA Okay. But the point is, as Gene said, it's the only rock, big one anyway, in the area that I see that's perched on the surface as if it might have rolled here.

CC Okay. Copy that, Jack.

LMP-EVA But I don't see a track.

CDR-EVA Man, this one here is tough as a -

LMP-EVA Well, we can get some small ones.

CDR-EVA Yes. That's what I'm going to do. I tell you, this one is so -

LMP-EVA I thought you might be able to break it up.

CDR-EVA Well, there's no - there's no corners on it.

LMP-EVA Ready for this?

CC We're ready.

06 20 16 28 CDR-EVA Bob, 563 is the sample.

CC Copy, 563.

CDR-EVA Over here to the - ... - -

LMP-EVA Are you ready? Are you ready for this?

CDR-EVA I'm not sure I am, but go ahead.

LMP-EVA Go, roll. Look, I would roll on this slope, why don't you? Five-sixths gravity that's missing. Hey, I'll bet you they would like, if I didn't step on it, sample out of the bottom of that thing.

Tape 110A/30

CDR-EVA Yes. These others all look - You're right, Jack, they look like what we've been sampling. And they're all pretty well mantled except the ones you got up there. There's one more piece I see on the side of that crater that may not be.

06 20 17 44 LMP-EVA Bag 545 will be soil from under that anorthosite boulder. Bob, the only thing that bothers me about that boulder being subfloor - I mean at Sculptured Hills - is that it's glass-coated.

CC Copy that.

LMP-EVA It may have been thrown in here by an impact. Oh, you're here.

CDR-EVA Thought I'd sample it, and then roll it down.

LMP-EVA Well, okay. I never would have moved it if I thought you were coming up.

CDR-EVA Well, I wasn't coming up; but I looked at some of those others, and there's only one more -

LMP-EVA Okay. Well, I got it documented up in place. Let's - That's not the - I think that's the side that was down. Let me roll it over -

CDR-EVA Well, let me get a piece of that side since it was underneath. Then we'll roll it over and get a piece of the other side.

LMP-EVA Good thinking. Oh, okay, yes. Let's do it again. Except I got dust all over it.

CDR-EVA Well -

06 20 18 57 LMP-EVA The albedo - the down-Sun picture's not going to mean much. Let me get this sample in your bag. I think we ought to change your bag because the stuff's going to start flying out.

CDR-EVA Okay.

LMP-EVA It won't stay closed.

CDR-EVA Jack, after this one, there's only - there's one more in that crater. It may be from that crater, but I don't know.

LMP-EVA How's your hand for hammering?

CDR-EVA Ohhhh

LMP-EVA This will be easy. This will be easy.

CDR-EVA The old hammering hand -

LMP-EVA This will be an easy one, Gene.

CDR-EVA Two pieces for you.

LMP-EVA Okay. Let me - -

CDR-EVA Oh, that's a pretty one inside!

LMP-EVA Well, it's stained by the glass coating.

CDR-EVA Oh.

LMP-EVA It's stained by that glass coating.

CDR-EVA That's a pretty one inside.

CDR-EVA Can you get that? Here, take my hand.

LMP-EVA Thank you.

CDR-EVA While I'm at it, I'm going to chop another piece off right here.

LMP-EVA Yes, get more than that.

CDR-EVA Piece right there. You've got three pieces laying around. Let's get those before we lose them.

06 20 20 26 LMP-EVA Bag 564. Maybe. I - Okay. I got it.

CDR-EVA Have you already got them in the bag?

LMP-EVA No.

CC Copy. We copy; 564 from the bottom of the boulder.

Tape 110A/32

CDR-EVA Sure that's the bottom, huh?

LMP-EVA Yes, it's got - mixed with local soil. I'm pretty sure. Let's turn it over. I think I'd recognize the top, although it's got dust all over it now.

CDR-EVA I think I'll get one more swap off there. I don't want to seal this. Let me get another swap off there. I can get it.

LMP-EVA Okay.

LMP-EVA Well, that disappeared. Get it this way.

CDR-EVA One time. That disappeared, too? That probably went into orbit.

LMP-EVA Yes.

CDR-EVA Boy, is that pretty inside. Who! We haven't seen anything like this. I haven't. Unless you've been holding out on me.

LMP-EVA No, this is a nice crystalline rock.

CDR-EVA Okay, I see that one.

LMP-EVA Where did that one go?

CDR-EVA That's a good one. I'll go get it with my tongs. That's a good one. That one I worked too hard to get. Hey, I see how it makes boulder tracks. I just made one - it just - it just skipped along, made those little pothole craters as it went.

06 20 22 30 LMP-EVA Hey, Houston. This is a - about a 50-50 mixture of - what looks like maskelynite or at least blue-gray plagioclase, and a very - let's say yel - light yellow-tan mineral, probably orthopyroxene. It's fairly coarsely crystalline.

CC Copy that. Okay. When you guys get done with that rock, we'd like to get to the rake sample, please. And that's probably just as well done by the Rover as anyplace else. We don't seem to see anything worthwhile here doing besides that.

CDR-EVA Did you get it?

LMP-EVA Yes.

06 20 23 29 CDR-EVA Okay. That went in the same bag, Bob, as the other - rest of the chips from the bottom. All the chips from the bottom are in 464.

CC Copy.

LMP-EVA Here, let me roll it over. Go ahead. Want to put it in?

CDR-EVA Yes.

LMP-EVA Okay.

CDR-EVA Oh, boy.

LMP-EVA By coarsely crystalline, it's - probably, the average grain size will turn out to be about 3 or 4 millimeters, maybe - maybe half a centimeter. Hold this, and I'll - -

06 20 24 09 CDR-EVA Well, I got to go get a couple of pictures.

LMP-EVA Yes. Yes, we really got that one messed up.

CDR-EVA Yes, I -

LMP-EVA That's all right.

CDR-EVA If you'd hold your scoop where that one came off, it'd help.

LMP-EVA Yes: I was just going over there.

CDR-EVA On that other side.

LMP-EVA Just going over there.

CDR-EVA This side is clear. That last one I took off. Okay.

LMP-EVA Right there.

CDR-EVA Okay, that's good. Let's move the gnomon, and we won't roll it over on the gnomon.

Tape 110A/34

LMP-EVA Watch it. Watch it. Oh, yes. That other side is the one that was up. Well, I'm not sure now. It's got so much dust on it. But let's -

CDR-EVA It's not going to roll down that hill unless we got it on edge.

LMP-EVA No. Did it come up to you?

CDR-EVA Well, look at that glass on it. That's what you said, huh?

LMP-EVA Yes.

CDR-EVA Which side was the glass on when you looked at it?

LMP-EVA It's on all sides. It's on all sides.

CC 17, there's probably not much point in spending a lot of time out here trying to decide which is the top. It's not big enough, anyway, really to worry about - -

CDR-EVA We're not.

CC - - the top and bottom samples. They're radiologically significant.

LMP-EVA Well, let's - If you don't want another sample, then we can go ahead.

CDR-EVA Well, let me get a piece of this glass.

LMP-EVA Righto.

LMP-EVA There it is. Okay. Let me try to get them. Put them in here.

06 20 26 29 CDR-EVA Okay; a piece of the glass from it, Bob, is 546.

CC Okay. We copy 546.

CDR-EVA With a little of the local soil.

CC And now we're ready for you guys to rake - -

CDR-EVA Okay. We'll rake.

CC -- and I guess they suggest the crater rim if possible. Probably over there near the Rover.

LMP-EVA Okay. Now you got a sample of that big block down there, huh?

CDR-EVA Yes.

LMP-EVA Okay. Don't forget your gnomon. Whoo! Oh, boy.

06 20 27 08 CDR-EVA Bob, on my frame count; 85.

CC Copy, 85 for the commander.

LMP-EVA Too bad I don't have my skiis.

CDR-EVA Jack, did you get a pan up here?

LMP-EVA No.

06 20 27 25 CDR-EVA I'll get one.

LMP-EVA Good, I forgot. I got interested in skiing. Whoo! Can't keep my edges. Little hard to get a good hip rotation.

CDR-EVA Let's see, I must be looking back at - well, there's SWP. Golly, I don't know. I'm looking back at the complex: Cochise and Shakespeare, and I can see the LM.

LMP-EVA Hey, Bob. One interesting thing up here, you can see the erosional pattern of the talus, the mantle that - I call it a mantle, but the talus that's on the Sculptured Hills, there's little - little boulder tracks of all sizes from all these little clods. And they all, of course, point downhill or nearly downhill.

CC Okay. Copy that.

LMP-EVA Hey, Bob. In the interest of time, I'll document this without the gnomon.

Tape 110A/36

CC Okay. I presume Gene's got the gnomon up there.

LMP-EVA Yes. I should have brought it, but - -

CC Okay. Don't forget the gnomon, Gene.

LMP-EVA - - I didn't think about it.

CC And we concur - -

LMP-EVA Don't forget the Gene, gnomon [sic]!

CC - - with Dr. ... about the gnomon.

CDR-EVA Whee! Boy, when you do this, and you go downslope, that first step is a long one.

CDR-EVA I'm having - This is the best way for me to travel. Uphill or downhill.

LMP-EVA What's that?

CDR-EVA Like this. Two-legged hop.

LMP-EVA There seems - Yes.

CDR-EVA And on level ground, I can skip. I don't like that loping thing.

LMP-EVA Oh, the loping's the only way to go.

CDR-EVA Well, when I'm on level ground, I can skip. But this two-legged thing is great. Man, I can cover ground like a kangaroo. Oh, okay. You documented already; I was just going to put this in the field of view anyway.

LMP-EVA Yes. Here on the after ... right out there.

06 20 33 55 CDR-EVA Well, what do you think about that? There's not much in here worth - Man, there's just nothing - This has been totally mantled with Talus. Well, it is, because that - that downhill pattern goes right down the slope of this crater, and, actually, it goes upslope of the crater. This may be on a ray somewhere. Because it goes right downhill - this little ... boulder trail pattern goes right up the slope.

LMP-EVA I think those are later than the crater by a long ways.

CDR-EVA Did you - did you sample anything over here?

LMP-EVA No, I haven't done anything - -

CDR-EVA I'm going to pick up the piece out of that little - -

LMP-EVA Yes, get this - -

CDR-EVA - - crater.

LMP-EVA Want your gnomon over there?

CDR-EVA No. I'll just take it to it. Let me know when you're ready for a pan.

LMP-EVA Well, I'm about ready.

CDR-EVA You about ready?

LMP-EVA Yes.

CDR-EVA Okay.

06 20 32 17 LMP-EVA I went - I raked about a 2-meter square area - maybe - yes, about 2 meters, and down to 4 or 5 centimeters for these. Pretty good population. They all going to go in?

CDR-EVA They're all in; 5 - -

LMP-EVA Wait, wait.

CDR-EVA - - 5 - 565.

CC Okay. Copy that - -

CDR-EVA 565.

CC Sounds great. Sounds like a good rake sample for a change.

CDR-EVA Yes, sir.

Tape 110A/38

CC And this is a kilogram soil locations, fellows.

LMP-EVA Yes, sir.

06 20 32 54 CDR-EVA Jack, your bag is full; we're going to have - No, it isn't, but we ought to change it when we get back, anyway. And that one ought to go under your seat.

LMP-EVA Oh, okay.

CDR-EVA Get your kilogram. I'll be ready to take it.

06 20 33 16 CDR-EVA The kilogram is in 566.

CC Copy that. And, remaining here, we'd have primarily a trench. If you fellows think it's feasible, we'd like to be moving in 1 - 1 minutes, 11 minutes. And we could use a pan from this lower location also, probably.

CDR-EVA Why don't you go back and dig a trench at the Rover?

CC Roger. That sounds good to us.

CDR-EVA Okay.

CC And we also remind you of getting - -

CDR-EVA Once you get a trench at the Rover - -

CC - - a pan at the lower section there.

CDR-EVA - - we just scoop this out. I'll get the sample here that I got documented now and - -

LMP-EVA Did you? - Is that - is that all going to go in there?

CDR-EVA Yes, it'll go.

LMP-EVA Can you twist it?

CDR-EVA Yes.

LMP-EVA That ... rock may have been too much. Take that rock out, and - -

CDR-EVA No, it'll stay. We're going to have to put it in mine, though. Well, let me try. Since we're going to unload your bag, this may be the last - the last one. That's the last one for your bag.

LMP-EVA Okay.

CDR-EVA Okay.

LMP-EVA Did you get anything out of that little crater?

CDR-EVA No. But I'm going to right now.

LMP-EVA Okay.

CDR-EVA Why don't you get your after picture over there and go down and get that trench. I'll come down -

LMP-EVA You don't want a bag? Okay.

CDR-EVA I can - I can back it - I can do it -

LMP-EVA ...

06 20 35 04 CDR-EVA Boy, almost pure white and very friable. Oh, boy, is it! Pure white. Right out of a small little pit crater on the side of this crater I just walked in, Houston. And it's pure white, very friable. I got about - well, one big piece and several small in 567.

CC Copy that.

LMP-EVA Bob, the walls of these craters, the big craters around here, that is, the ones that are, say, 15 meters in diameter, tend to be a little bit lighter albedo than ones down in the mantled area. I'm afraid those pictures on that rake may be a little bit made - be through a dust-colored lens.

Tape 110A/40

CDR-EVA Yes, they were also in my documented sample here, too.

CDR-EVA Okay. Where do you want this trench? On the side of this crater?

LMP-EVA Well, - -

CDR-EVA I'll drop my gnomon.

LMP-EVA - - I don't know. I don't - I was just thinking about that. I think - I think we - we - we ought to get out in the inner crater area to see if there's any stratigraphy to the - to - to whatever the talus is.

CDR-EVA Okay, Jack. I'm going to leave the gnomon right here.

LMP-EVA I'll get it.

CDR-EVA And, while you're digging that trench, we've got to pan to get, but I want to fix this fender.

LMP-EVA I guess this - The pan's mine, isn't it, this one?

CDR-EVA Yes, it is. And I want to fix the fender before - -

LMP-EVA Okay.

CDR-EVA - - before we leave. ... - -

CC Okay. We agree with that, and you might get us a - -

CDR-EVA - - ... one, and I'll tighten - -

CC - - you might get us the gravimeter reading there, Gene, while you're at it. And if you have time, you might drop the gravimeter on the ground, and we'll get a reading with it on the ground as well.

06 20 37 31 CDR-EVA Holy Smoley. The gravimeter's coming up. 670, 096, 001 - 670, 096, 001.

CC Copy that.

CDR-EVA You want it dropped on the ground, huh?

CC Gently.

CDR-EVA Gently. I can't find a gentle level spot, but I'll level it. If it takes pictures - or does it's thing on the Rover, it'll do its thing here.

CC Yes, this is just to get a check - -

CDR-EVA Okay.

06 20 38 14 CDR-EVA MARK. ...

CC Copy that.

CDR-EVA It's fender-fixing time, it's camera-taking-off time. And I think I'll zap myself with a little cool water.

CC And how's the trench going, Jack?

LMP-EVA Oh, down.

CDR-EVA Oh, man, I tell you. When you call for cold water, does it come in nicely. Whew! I'm really happy with this fender, really happy with it.

LMP-EVA Bob, I have dug - have gotten a wall, now in one place that's standing about 25 centimeters high. And it shows no apparent change in the texture of the soil to that depth; except possibly at the lower 5 centimeters, there's some zones that might be slightly more granular. Particle size may be up a little bit.

CC Okay. I copy that. Probably just three samples then will be sufficient, then.

LMP-EVA I think - I think so. Maybe four.

CDR-EVA Be there in a minute, Jack.

LMP-EVA Oh, that's all right. I can probably get started.

Tape 110A/42

CDR-EVA Oh, oh, oh, boy.

LMP-EVA Need some help?

CDR-EVA No. Boy, we're sure giving this suspension system a workout. Whew! I can't even see it. Well, everything's getting awful dusty. Boy, everything is stiff. Everything is just full of dust. There's got to be a point where the dust just overtakes you, and everything mechanical quits moving.

LMP-EVA Like scoops.

CDR-EVA I'm not sure whether Detroit would like the fender, but it will sure buy the fix. Okay, it's fixed.

CC Okay. Copy that.

CDR-EVA And I'm happy; I like it.

CC Roger. We copy that. And copy it again. And we'd like to have you guys moving in about 3 minutes.

LMP-EVA Good luck.

CDR-EVA You need any help you get - bag those samples, huh?

LMP-EVA Yes, sir. I think I do. I can't adjust my scoop to my belt-bagging method.

CDR-EVA Let me get back on some lighter cooling here to - to save some water. Okay, now.

LMP-EVA Okay - the bottom 10 centimeters - -

CDR-EVA Let me get your bags - I left my camera off when I -

LMP-EVA - - of a - Well, shoot! I didn't take a picture of the trench after I dug it. Let me take one - one shot.

CDR-LM Which is the bottom?

LMP-EVA That's the bottom.

06 20 42 30 CDR-EVA Okay. The bottom is in 548. It's very cloddy. Looks very much like the surface we're standing on except it clods up quite a bit more. Can you tell them anything from the trench itself?

LMP-EVA I told them - I talked to them a little bit about it.

CDR-EVA Okay.

LMP-EVA It looked a little coarser grained, but that's all.

CDR-EVA Okay. It sure holds a nice wall, though.

LMP-EVA Yes.

CDR-EVA That's the kind of wall I expect those core tubes held.

LMP-EVA You got another one?

CDR-EVA Okay. Skim of the upper - We'll see - how well I do - skin sample of the upper - half centimeter. Maybe a centimeter deep.

LMP-EVA Okay. Can you hold this?

CDR-EVA I'm going to put it in your bag.

LMP-EVA Is it going to fit in there?

CDR-EVA Well, there's no choice, right now. Let me see if these little ones will fit in there. Stand by. I want to put this one in there, too.

06 20 43 45 CDR-EVA That's in bag 549.

CC Copy that.

CDR-EVA Okay. Try again. Okay. The upper - Below that skin, the next 5 centimeters.

Tape 110A/44

LMP-EVA Put it down, Geno.

CDR-EVA ... put over.

LMP-EVA Well, I can't turn it.

06 20 44 33 CDR-EVA 550.

CC Copy that.

CDR-EVA And the next 10 centimeters down -

LMP-EVA Can you get this one too?

CDR-EVA Yes. Now, I got to get your bag.

LMP-EVA Okay.

CDR-EVA Okay. That was the next 10 centimeters, and then the first sample, of course, was the 10 centimeters below that.

CC Roger. Copy that.

06 20 45 05 CDR-EVA And that last bag was 551.

CC Okay. Copy that. We're ready for you guys to move out.

LMP-EVA Okay.

CDR-EVA You didn't get a pan here - while I clean up the Rover, you can get a - get your after of the trench in the pan.

LMP-EVA I will.

CDR-EVA I'll get the TG and clean up the Rover.

CC That's affirm. We agree with that.

LMP-EVA What's the key that keeps - I keep getting keyed.

CDR-EVA It sounds like Bob's stepping on his foot mike.

LMP-EVA Yes, he's so excited - -

CDR-EVA Okay - -

LMP-EVA - - he can't stand it.

CDR-EVA - - You done with the gnomon?

LMP-EVA Yes. Okay. I'll get the pan.

CDR-EVA You get your pan, and I'll get the TG and clean up.

LMP-EVA You took a pan up the hill there?

CDR-EVA Yes. I took it way up there, somewhere.

LMP-EVA Okay. I'll take it right here, then. Uh oh.

CDR-EVA What?

LMP-EVA Sample came out.

CDR-EVA The sample came out?

LMP-EVA I'll pick it up.

CDR-EVA Yes, your - your top came open. It's awful full, Jack. If you can't get it, I'll get it with the tongs.

LMP-EVA Go ahead and go to work, and I'll get the pan first. I lost two of them, I guess.

CDR-EVA Yes, those are the last two I put in there. They just - your bag is so full they won't stay. Let me give them a reading here. Hey, Bob, can I move it on the Rover and then give you a reading?

CC Yes. As long as you're careful not to hit the button while you're doing it.

CDR-EVA I won't hit the button. Just easier to do it that way. I don't know why I asked you; I know I can.

06 20 46 44 CDR-EVA Even this thing doesn't want to go on; it's so dusty. Okay. It's on and it's locked, and here's your reading. 670 - 670, 117, 301 - that's 670, 117, 301.

Tape 110A/46

CC Okay. We copy that.

CDR-EVA I've got to dust that thing the next time around. Jack, we've got to do some bag changing here.

LMP-EVA Yes.

CDR-EVA I'll get those things with my tongs. You can't get them - You'd have to bend over. Every time you jump around, you come close to losing something. I'll just take them back there. Put them under the seat.

LMP-EVA Okay. You want me to take that one?

CDR-EVA No, I got it.

LMP-EVA Okay.

LMP-EVA Darn.

CC You got another one dropped there, Gene - Jack got it.

CDR-EVA Another one?

CC Jack's getting it.

CDR-EVA Okay. Jack, we've got to make a place in here for your - that full bag. Let me put this small can over there, and core tube over there.

LMP-EVA I have a sample.

CDR-EVA Okay. Let me take your bag off first.

LMP-EVA Okay. Well, you might as well fill it as full as you can.

CDR-EVA Yes, I am. Holy Smoley.

LMP-EVA (Laughter) Turn - turn to the left.

CDR-EVA Okay. It's off. Let me fill it.

LMP-EVA Your bag isn't in much better shape.

CC Roger. We'd like to have you check the commander's bag. You might put them both under the seat there.

LMP-EVA Well, we're running out of bags, aren't we?

CC Okay. We've got one bag left - we should have there. It was on the gate, right?

LMP-EVA Okay. Yes. We - we could have put it under the seat.

CDR-EVA Okay, bag number 4 - bag number 4 is - is absolutely full - and it's under Jack's seat.

CC Okay. I suggest that you take the other bag that's on the gate there, and put that on either you or Jack. And also, the commander's bag is pretty full also, we suspect.

06 20 49 57 LMP-EVA Why don't you put it on me? Mine gets full faster, somehow.

CC You might - you might check Gene's bag anyway.

CDR-EVA There. Stay there, stay there. I'm trying to get the bottom off.

LMP-EVA Oh, I'm sorry. I checked it. He's got about six samples to go.

CC Okay. And - -

LMP-EVA And I just want to be sure that it's locked down.

CDR-EVA Okay. Well, turn to the left so I can get this other hook.

LMP-EVA Okay.

CDR-EVA It's not coming out; I guarantee you that. No ... take your - -

CC Okay. And SCB 5 is one for the LMP if you want to take it off the gate.

CDR-EVA I got it.

LMP-EVA SCB-5 is on the LMP.

Tape 110A/48

CC Okay. Copy that.

LMP-EVA There is nothing on the gate.

LMP-EVA Well, I think that'll stay down, but it's not very good - -

CDR-EVA Okay. I've got one more loose sample I'm going to throw in the big bag back there. ...

LMP-EVA A local one, you mean?

CDR-EVA Yes.

LMP-EVA Well - -

CDR-EVA Well, let me leave it under your seat.

LMP-EVA Now, let's - Can I put a bag a round it?

CDR-EVA No, it's got a bag around it - It's all bagged.

CC Okay. Jack, while Gene's doing that, why don't you read the SEP temperature, or somebody read the SEP temperature anyway, and close the blankets.

LMP-EVA Okay. I'll do that.

CDR-EVA Okay, Bob. Let's see, you got your readings - -

06 20 51 25 LMP-EVA 120, Bob, 120.

CC Copy. 120.

LMP-EVA Those blankets just aren't staying closed.

CDR-EVA Okay. I guess we're ready to head on out. Do you agree?

CC Okay. And, Gene, when you go to change the - when you go to change the LCRU, we'd like you to turn it to OFF - O-F-F, on the POWER switch, the INTERNAL POWER EXTERNAL switch. And we'll be reading you through the LM. It will give you a chance to cool down the LCRU on the way home to station 9.

CDR-EVA All right.

LMP-EVA And, Houston, what's the temperature limit on the DSEA?

CC Stand by, Jack.

CDR-EVA Do you read us, Bob, through the LM?

CC Roger. We read you through the LM. Do read us through the LM?

CDR-EVA Yes. Not as well, but we're reading you.

CC Okay. And the temperature limit, Jack, is 160. We'll just leave it as is until we get back to the LM.

LMP-EVA Okay. I was going to say, we could take it out and put it under the seat or something, but that sounds all right.

06 20 52 51 CDR-EVA Okay. An EMU status check. I'm at 388, and I got 48 percent, no flags, and I'm INTERMEDIATE cooling.

CC Copy that.

06 20 53 05 LMP-EVA And the LMP - is at 47 percent, no flags, 3.86. Hey, Gene?

CDR-EVA Yes.

LMP-EVA What - Well, Bob, I guess - remind us to change the LRV sampler at the next station. It's almost out of bags.

CC Okay.

CDR-EVA Well, let's do it next time around.

CC Okay. When you get on, Jack, you can give me a frame count as you start moving.

LMP-EVA Yes. Hang on. Need some help?

CDR-EVA Nope.

Tape 110A/50

LMP-EVA Go downhill. Get your feet downhill.

CDR-EVA Yes.

LMP-EVA Okay. Let me help you.

CDR-EVA (Laughter)

LMP-EVA Watch it, there's a crater right behind you.

CDR-EVA I got it. I got it.

LMP-EVA Here, here. Grab my hand.

CDR-EVA Okay, now, just push up on my head.

LMP-EVA Okay. I'm not going to do it too hard. Going backwards.

CDR-EVA All right; just push up.

LMP-EVA Okay?

CDR-EVA Okay.

LMP-EVA Boy, are you - you got your pockets completely filled with dirt.

CDR-EVA Well, extra samples.

LMP-EVA Do we throw those pockets away this time around?

CDR-EVA Extra sample.

LMP-EVA Are you a mess!

CDR-EVA Well, that one was coming for a long time.

LMP-EVA My hand's are already tired from dusting you.

CDR-EVA That one was coming. I keep trying to blow the dust off my camera, which is very frustrating.

LMP-EVA Very ineffective, too.

CDR-EVA Okay. Do we try that trick again? You know that happened on an upslope getting on the Rover. Okay. I'm all locked in. Let me know when you are.

LMP-EVA How come we aren't deploying any charges? I guess the last one - I remember when that one is.

CDR-EVA Okay.

CC We'll deploy one at station 10.

06 20 55 33 CDR-EVA Okay. We're heading to station 9 pointed about 267. Okay, and they're reading us through the LM, so I won't worry about the low gain. We're powering up. The switch is on. Okay, I'm going to make a turn to the right.

CC Okay. And the updated headings, since you're at the north end of station 8 will be something like about 240.

CDR-EVA Okay, Bob. 240.

LMP-EVA Bob, I think your rake sample here at the Sculptured Hills is going to have to tell a tale combined with the observation that most of the blocks we saw were, like Gene sampled, looked like subfloor gabbro. It's conceivable that the Sculptured Hills could be the same kind of material. I think it's fairly clear that the boulder population does not resemble the massif population at all.

CC Okay. Copy that.

LMP-EVA (Laughter)

CDR-EVA You been riding on this downslope all the time?

LMP-EVA (Laughter) Yes, but - -

CDR-EVA And you hadn't said anything, huh?

LMP-EVA Scary, isn't it?

06 20 56 58 CDR-EVA Man, I'm glad I'm driving.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 21 13 09 CMP Hello, Houston; America. It looks like we're with you again.

CC Roger, Ron.

06 21 15 02 CC Ron, we're GO for retraction on HF antenna 2, HF antenna 2. You're GO for retraction.

CMP Okay, just half a second here.

06 21 15 22 CC Hold on that, Ron. Hold. We've lost data here 2 second. Please hold.

CMP Okay, will do.

06 21 15 43 CC Ron, will you verify you hadn't started to retract them yet?

06 21 15 49 CMP Yes, that's verified. I did not touch anything.

CC Okay, fine. We'll give you another call, as soon as we get data here.

CMP Okay.

CC It's important, Ron, for us to get the currents on this one, so we can compare it on HF 1.

CMP On the other one, yes. Okay.

06 21 17 08 CC Okay Ron. Let's try HF ANTENNA 2, RETRACT now, please.

06 21 17 15 CMP Okay.

06 21 17 27 CMP There we go. Let's see. Give you a countdown on it. Okay, 5, 4, 3, 2, 1 -

06 21 17 44 CMP MARK it. Barber pole.

CC Okay Ron, we're reading good data on that.

06 21 19 56 CMP MARK it; gray.

Tape 110B/2

06 21 19 58 CC Mark it; Roger.

CC Stand by for HF 2. We're changing some data points here.

CMP Okay.

CC I'm sorry; HF 1.

CMP (Laughter) Okay, no problem.

CC You should hear - hear it in the room when I make a comment like that. I get 14 people saying, "1 not 2."

CMP (Laughter) Well, I knew what you were talking about.

06 21 21 14 CC Okay, Ron, if you'll give us a hack, we're - you're GO for HF ANTENNA 1, RETRACT.

CMP Okay, just a second. (Chuckle) You know that's funny. I can't remember which one I can see out my left window over there.

CC Believe you and I could call it ANTEN - ANTENNA 2 - -

CMP I hope it's number 1.

CC If it's still out there, it better be 1.

CMP That's what bothers me. That's what I'm saying. If it's still out there, it better be 1. Okay. I'll give you a countdown on this one here. 5, 4, 3, 2, 1 -

06 21 22 04 CMP MARK it. Barber pole.

06 21 22 15 CC We've got ... - -

06 21 22 16 CMP It's going in.

06 21 22 17 CC - - ... indication of motion that it's going in. Roger. Is that the one you can see?

CMP Yes. I can't anymore. It was gone. I could only see about - I don't know, 6 or 8 - maybe 8 feet of it sticking out there. Started to move and it's gone!

06 21 24 23 CC Ron, we can see stall current now. Can you give ANTENNA 1, OFF?

06 21 24 30 CMP Okay; it's OFF.

CC And you do not have a sight. Is that so?

CMP It was ... compared to the other one.

CC That was affirm. I did not.

CC I got about 9 seconds when they called stall current; 9 seconds difference in the other one.

CMP Gee, it ought to be pretty well in there then, hadn't it?

CC Yes, it should be.

06 21 25 30 CMP Ready for PAN CAMERA MODE to STANDBY?

CC Stand by; let me ask OSO. Stand by on that, Ron.

CMP Wilco.

06 21 26 07 CC Ron, we're analyzing the data on the antenna that - We're 1 second out of the tolerance that Stan had established for determining it to end.

CMP (Chuckle)

06 21 27 44 CC Okay, Ron, PAN CAMERA to STANDBY.

06 21 27 50 CMP Okay, PAN CAMERA. ... STANDBY. Errr - It's coming on. Barber pole. Gray.

06 21 28 58 CC Ron, you can turn HF ANTENNA 2, RETRACT, switch to the OFF position.

06 21 29 05 CMP Okay. Thank you. Sorry.

Tape 110B/4

CC Ron, on X-ray X-ray, is it still in - -

CMP He says we're 1 second off? - Yes. Go ahead.

CC If X-ray X-ray is still in the Nikon, you should shoot off one frame as a protect frame, and then you can just keep shooting on all the rest of them until it won't pull anymore. And you'll feel that, of course. And those are your options.

CMP Oh!

CMP Don't get too happy. It might just pull one - one frame and be done.

CMP (Laughter) Yes; probably.

CC Okay, Ron, PAN CAMERA POWER, OFF.

06 21 30 10 CMP PAN CAMERA POWER is OFF.

06 21 31 23 CC Ok - okay, Ron. You got your steno-maphic [sic] tools out up there? Because we got a Flight Plan update for tomorrow - the trim burn or the bagel burn, I guess.

CMP Okay. Ha, ha. You know what I did on that camera? I forgot it. I wound it up in there. I haven't had a chance to take the film out yet. But I wound it back in the can (chuckle).

CC Okay, well; sorry about that. Okay, let me tell you, Ron, we're - all that data analyzed says we got a good retract on HF antenna 1. We're going to fly nominal Flight Plan the rest of this - tonight, and then all this update I'm talking about is for tomorrow morning at 180:15.

CMP Ah ha! Outstanding. I figured you should come to that real good conclusion.

CC Yes, we think so, too - -

CMP Okay. ... - -

CC - - Boy, you should have seen the Flight Plan changes we would have had.

CMP (Laughter) I can imagine them.

CMP Over there; okay.

CC Say again, Ron; I cut you out.

CMP I was just going to say that - running Volume 3 tomorrow morning.

CC That's right. So it - -

CMP Okay.

CC Yes, volume 3.

06 21 32 10 CMP Okay. At - Okay, I've got volume 3 now.

CC Okay, and it's at 180:15; 180:15 is the first one.

CMP Okay.

CC Okay, I know I told you we wouldn't update the ones in the block, but the very first one is inside the block so you - where it says "LOPC target load." Just cross that out and make that "Trim target load."

CMP Oh, okay.

CC And below the update block - the next block - as part of that block, add "Trim pads." We'll be coming up with you with trim pads.

CMP Okay.

06 21 33 02 CC Okay, the first one is at 180:20. Add "Poo," and below it, add VERB 49 maneuver to P52/trim attitude."

CMP Okay.

CC And put a note: "Maneuver will take 14 minutes."

CMP Okay.

06 21 33 54 CC Okay, we're going to give you the high gain angle numbers and the VERB 49 maneuver numbers tomorrow morning. They'll probably change on latest updates,

Tape 110B/6

so we won't give anything for the - You can just put three blanks for the roll, pitch, and yaw there with that VERB 49 maneuver. Okay, if you go down the page - -

CMP Okay.

CC You go down the page to 180:27. Delete - Cross out "CMC MODE, FREE; POO; CMC MODE, AUTO; LIMIT CYCLE, ON; ATTITUDE DEAD BAND, MIN; and RATE, LOW." And delete that note that starts "Do not stop ORB RATE early (avoid gimbal lock problems)" over there right next to that. Just delete all that.

CMP Okay; got it.

CC Okay, on the next column, 180:40, delete the VERB 49 maneuver.

CMP Okay.

CC Okay; at 180:44, add "UV COVER, CLOSED."

CMP "UV COVER CLOSED," 180:44.

CC Roger. And at 180:45, if you can fit it in between the O₂ fuel cell purge and that, add the following:
"UV, OFF; IR, OFF, and enable all jets."

06 21 35 46 CMP Okay, after "IR COVER, CLOSE," we'll put "Turn the UV, OFF; the IR, OFF"; and then enable all jets before the fuel cell purge, huh?

CC Well, if you can fit it in there wherever it's convenient; Roger.

CMP Okay.

06 21 36 04 CC Okay. At 180:58, where it says "Configure DSE," change "HIGH BIT RATE" - cross it out, and make it "LOW BIT RATE."

CMP Okay; LOW BIT RATE instead of HIGH BIT RATE.

CC Okay, at - over on the next page at 181:15, add the following.

CMP Okay.

CC "Pre-SPS burn - burn sim prep cue card." Let me read that again. "Pre-SPS burn sim prep cue card." Another statement: "Secure equipment for trim/LOPC."

CMP Okay. At 181:15, we'll do the Pre-SPS burn sim prep cue card and secure the equipment for trim/LOPC.

CC Roger. And right after that, put "P30 - P-30."

CMP Okay.

06 21 37 37 CC Okay. And you might as well scratch out those words where it says "Eat period" on that line, and down at 181:23, add "P41 - P41."

CMP Okay, P41.

CC Okay. At 181:33, add "Trim burn - Trim burn."

CMP Okay, trim burn.

06 21 38 20 CC Okay. At 181:35, add the following: "VERB 49 maneuver to LOPC burn pad attitude."

CMP Okay. VERB 49 to the LOPC burn pad attitude.

CC Roger. At 181:43, add "Report burn status."

CMP Okay.

CC Okay. At 182:15 on the next page - 182:15, delete "Pre-SPS burn sim prep cue card; IR, OFF; UV, OFF; enable all jets; secure equipment for LOPC." Delete all those because you've already done it.

CMP Okay.

CC Okay. At 182:20, delete the note which says "PCM data will not be recorded during LOPC." Delete that note.

CMP Okay.

Tape 110B/8

06 21 39 58 CC Okay. And then the last - -

CMP Is that - -

CC - - one is just a general comment, Ron. As you can see, we're cutting into your eat period, and you're going to be awful busy, and your eat period is very short. So, right at wakeup, while you're working, you might be considering getting eat things ready to go up with - ready to eat. You know, just as you're doing you postsleep check and that, you might be getting some food out. You're going to be busier than the proverbial one-armed paperhanger there.

CMP Okay. That's probably a good idea (chuckle).

CC And we wanted that up to you so that you might get a chance to look at it this evening or the rest of this rev and make some thoughts or pull your thoughts together on that burn in the morning and see if we've covered all bets.

06 21 40 57 CMP Okay. So far it looks pretty good here. We'll have some different high gain angles there at 181:00. And you're going to give those up anyhow.

CC Okay, at 181:00 - -

CMP You can send those up with the - well, for the next AOS there.

CC Yes. We see that. Okay. We'll have to be calling that up to you tomorrow as you go around, I guess.

CMP Oh, won't that - well, that'll be the same, because the LOPC burn attitude should be the same as nominal.

CC Yes. Roger.

CMP Or about.

CC Yes; you're right.

CMP Okay, so it's all right. I'm sorry.

CC Ron, just to make sure. You understood the reason why we have to do this trim burn or ham burn or whatever you want to call it?

06 21 42 11 CMP Yes. As I understand, the mascons didn't work the way we thought they would.

CC That's about the size of it.

CMP It didn't get down into a circular orbit. Let's see. Just glancing through here, it looks to me like we're going to do the trim burn and the LOPC REFSMMAT, right?

CC That's affirmative, Ron.

CMP Okay.

CC And, Ron, just - I think you realize it, but all this has been checked out in the CMS down at the Cape already, and it's all been run. And there's no gimbal lock problem as far as we know.

CMP Hey, outstanding. Okay; good.

CMP Yes. Those guys in the CMS down there do good work.

CC Roger.

06 21 46 17 CMP You know that crater - that circle next to D-Caldera - has a lot of blocks - blocks - blocky material laying around it. That - little bit of a terrace that I could just barely see on the west side of - western rim - down inside the western rim.

CC Got you. I didn't think you were going to be able to see anything with the attitude. I'm surprised you can see anything at all.

06 21 47 09 CMP Yes. I was, too. I just happened to look out, and there it was.

CC Just talked to El Lago a few minutes ago, Ron, and all the neighbors are out - are at your home around the squawk box, listening. And Jan said to tell you

Tape 110B/10

that Jaime and Jon will be out here at - with us tomorrow. We're going to all - They're going to watch the burn from here - the LOPC and the trim burn.

CMP Oh, hey, good deal! Yes, I've got some real fine neighbors down there, I'll tell you that.

06 21 48 59 CMP You know, I look at that D-Caldera from a distance - I can still see it in the binocs - and I keep trying to look for some hint of a topographic expression, a topographic rise surrounding D-Caldera. And I can't see a hint of a shadow, difference in the color, or anything. It's just flat out in the middle of a flat plain, and it's a D-shaped depression that's slumped down. There's no rise around the rims - or anything.

CC Roger. Got you. Must be frustrating, because it's supposed to have some type of topographical expression, huh?

CMP Yes; right. You know, it's supposed to have something. But it looks like it just fell right out of the flat plain, you know. It took part of the - took part of the plain with it, because there are these bubble-looking things down in D-Caldera.

06 21 51 06 CMP How many frames in the next Nikon mag do I have to diddle with?

CC Okay, we're running that one through FAO here. Stand by a moment, Ron, on that.

CMP Okay.

06 21 53 23 CMP For the ejecta pattern of Eratosthenes, you can just see it looking back into the Sun now, and the terminator is right - right in the middle of Eratosthenes now. And you can sure see the classic impact ejecta pattern around it. It goes out for - you know, almost two crater diameters as we can see the topographic expression. You can see the scalloping or scouring as it's gone back across there, due to the shadows that are created in the low Sun angle.

Tape 110B/11

06 21 54 07 CC Ron, at your convenience, we would like H₂ TANKS 1, 2, and 3 FANS, OFF. H₂ TANKS 1, 2, and 3 FANS to OFF.

06 21 54 20 CMP Okay. I'm going to turn off all the H₂ FANS. There's 3, 2, and 1, are all OFF.

CC Good show.

CMP I took a bath last night. I think I'll try to shave tonight. Starting to itch underneath this helmet.

CC Roger.

CC You mean you're not going to come home with a beard, huh?

CMP Well, Jon wanted me to, but I can't seem to get past the itching stage.

CC Just be comfortable. Just be comfortable. You got another week to go.

CMP (Laughter) I know it. I've already shaved once. And when you - when you start to shave, you can only - you can only put that brushless shaving cream on - oh, maybe a third - a third of your face and start hacking on it there because it dried out real quick. So you put on a little bit, then scrape it off with a razor, then get some more on and then scrape it off.

CC Roger.

06 21 57 10 CC Okay, Ron, FAO's data says that on magazine Yankee Yankee, we have 20 unscheduled frames that you can use prior to the scheduled photography. After the scheduled photography, anything that's left will also be yours.

CMP Oh, okay. Yankee Yankee must be the next one up then. I can change - put that in, huh?

CC That's affirm, Ron. You can go ahead and put it in and shoot 20 and then you have to hold the rest for the scheduled photography.

Tape 110B/12

CMP Okay, will do.

CC I can see your thoughts there, Ron. You're going to get those 20 shot up before Jack ever gets up there, huh?

06 21 58 03 CMP (Laughter) Oh, that is a good thought. No, it's just that every once in a while at these terminators, you know, you - you have some real good shots, and we just can't schedule them, you know, all the time, because sometimes you can't do it. But you take one or two shots of each terminator when it comes by, you get some real good pictures.

CC Roger. We understand.

06 22 00 37 CMP (Humming)

06 22 04 51 CMP Okay, magazine Yankee Yankee is in the Nikon - finally.

CC Roger.

CMP I think I mentioned here the other night, didn't I, putting that magazine in there - you know, it's a real critical tight fit. And you get it pushed in there just right, and then in zero g, the thing bounces back out of the way, you know - before you can get the back on there.

CC Roger. You don't think - -

CMP Good camera, though.

CC - - Nikon was designed for zero gravity, huh?

CMP (Laughter) No, it works great. Sure something to be said about a removable magazine cassette though.

CC Roger.

CMP But then again, you can focus the Nikon.

CC Roger.

06 22 14 27 CMP Hey, Houston; America.

CC Okay, Ron. We're here.

CMP Okay. I was looking over this transfer list - about 184:00, and I don't remember Gene and Jack leaving their helmet stowage bags back to me. So I think they must have them in the LM - in Challenger.

CC Okay, we'll make a note of that and check it out tonight.

CMP Okay.

06 22 18 07 CMP Well, let's see, probably about time to P20 here. Plus-X forward, SIM bay attitude; 2 ENTER ENTER, plus 5 ENTER - ... - okay, PROCEED. Noun 78 - Well, that's already loaded. 52.25; plus X is 180; okay? Except we're going to do - half degree dead band 2 ENTER - 2-1/2 degree dead band, I mean. Plus 2.50. ... number 50 is the Moon. And right now, we'd like to orbit around the Moon. ... - 2 - ...

06 22 20 39 CC Hey, Ron, do you have your volume 3 handy?

CMP Yes, as a matter of fact.

CC Your last call about the helmet stowage bags. Where - whereabouts in volume 3 is that?

CMP At 184 - about 19.

CMP Took -

CC Okay, we got it. Thank you.

CMP They got suited and took their helmets and gloves with them over in the LM - took their helmets and gloves with them over to LM, and they said they were going to send the back. But I don't think they ever did. We all got busy, and so they've still got them over there somewhere.

06 22 24 30 CC Ron, we're going to lose you in about 1 minute, and you're looking great. No problems at all.

CMP Okay, we'll see you on the other side there, Bob. Thank you.

Tape 110B/14

CC Roger, Ron. And at 169:51 or thereabouts, we'll see you.

CMP Okay.

CC And you'll be eating, wo we won't call you. But we'll be standing by.

06 22 24 55 CMP (Laughter) Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 20 57 01 CC Okay. And, Jack - -
LMP (Laughter)
CC - - When you're not holding on with two hands,
we'd like the frame count from you.
LMP-EVA Wait a minute. Yes.
CDR-EVA Is that Van Serg over there?
LMP-EVA Ahhhh -
CC You have a bearing of 234 - -
LMP-EVA I think it's - -
CC - - and a range of 2.1.
LMP-LM I don't know - no - it's - Okay.
06 20 57 27 LMP-EVA We got to get around SWP here and then - -
CDR-EVA Well, let's - yes.
LMP-EVA - - and then head on more westerly. LMP frame is
at 80.
CC Copy 80.
LMP-EVA SWP or Bowen, I mean - Bowen, I guess it is.
CDR-EVA Well, yes.
LMP-EVA That's SWP over there. Bowen is out here ahead
of us.
CDR-EVA Yes. ... he said two - -
LMP-EVA Bowen - Bowen isn't much of a crater on the map.
CDR-EVA - - 225 - What did you say, Bob? 225 what?
CC 234/2.1 - -

Tape 111A/2

LMP-EVA 234 - -

CC Heading ought to be about 240; 240 for a heading for there.

CDR-EVA Did you hear him? I didn't hear him.

LMP-EVA 240. Are you not reading him?

CDR-EVA But what did he say for bearing and range? That's what I'm interested in.

CC 234 - -

LMP-LM 240. State bearing and range, Bob.

CC - - 2.1.

CDR-EVA Okay. I got that.

CC Okay. And we think you're even farther north than I was saying. Maybe it's about 215 would be your heading for there.

CDR-EVA Okay, Bob. I'll find it. 234/2.1.

CC Roger.

LMP-EVA And all the big blocks still look like subfloor from the Rover. But big blocks in here are only about a - a third of a meter in diameter. And they're subrounded to subangular. Okay. We're up on the plains again now, just off the brink and slope.

06 20 59 48 LMP-EVA That sure looks like - looks like outcrop ... down in the East Massif on the lower slopes, if it's here the high albedo is. Doesn't it? See it over there?

CDR-EVA Yes - Yes. Yes. It does - ... was one of my guidelines for the geophone deployment - ... points.

06 21 00 21 CDR-EVA There's some more of the blue-gray rock here in the east end of the South Massif down low.

LMP-EVA Yes. It looks like it might have been a slump block or something.

CDR-EVA Yes. You can see it's blue-gray because of it's contrast with the light mantle.

LMP-EVA Yes. It might be a slump block, or something - like that.

CDR-EVA Jack, I'm going to go to the left.

LMP-EVA You going to go soon? (Laughter) Need 234 - -

CDR-EVA No, No. I'm going over here. This is closer. That's a shorter cut.

LMP-EVA Okay, that - that's probably Bowen there, don't you think?

CDR-EVA I think - -

LMP-EVA Oh, well - -

CDR-EVA Well, see, we never got too far - -

CC How about a - how about a range and bearing, guys.

LMP-EVA ... aren't very far from SWP.

CDR-EVA Maybe we got too far east. Okay. It's 228/3.4. And we're moving along at 10 to 12 clicks. That's all it'll hack.

CC Copy that. How about an amps reading? We haven't had one of those for a couple of ...

LMP-EVA Starting to rain again. Got a crater ahead of you.

CDR-EVA Oooh, boy.

LMP-EVA Down-Sun isn't much easier than up-Sun.

CDR-EVA It's just easier on the eyes. You just can't see any more, that's all. You don't have that static, huh?

Tape 111A/4

LMP-EVA No. Hope you've still got an antenna; I haven't looked recently.

CDR-EVA Hope there's no holes in the high gain.

LMP-EVA Might have hit it on a rock.

CDR-EVA Oh, boy. Okay. The - we're back into the mantle area population of fragments is still 1 percent or so. The crater off to our left, which is at 227 and 3. - What is that?

LMP-EVA 3.1.

CDR-EVA 3?

LMP-EVA 3.3; 227/3.3.

CDR-EVA - is a fairly good-sized depression, but it's completely mantled. There's no blocks showing in the wall at all. How do you read, Bob?

CC Loud and clear. We're listening.

06 21 02 38 LMP-EVA Now there's that crater in the wall of that depression or hollow near it. And it has one big block in the side as if it penetrated the mantle and exposed some of the wall of the depression. Just about a 30-meter crater. Valley of Taurus-Littrow is not planar.

CDR-EVA No, it isn't.

LMP-EVA I'm glad we changed it to a subfloor instead of a plains unit.

LMP-EVA (Laughter)

06 21 03 21 LMP-EVA Okay. We're in the inner wall of the depression here, and the rocks still look like subfloor gabbro. Boy, there's certainly not much variety.

LMP-EVA Okay. Generally, there are few exotics.

CDR-EVA Ooh, now that's got to be Cochise.

LMP-EVA Ah, look at Cochise.

CDR-EVA That's Cochise.

CC Roger. We think you're coming up on Cochise.

CDR-EVA Get your self a couple pictures while you're looking right at it.

LMP-EVA Could you swing right. Swing right.

CDR-LM Bob, we are on the south - or northeastern rim of Cochise. I'm going to work my way around the other side. And Bob - -

CC Roger. Copy that.

CDR-EVA - - looking at the western wall of Cochise, I can see a contact within the subfloor between albedo units, one of which is a light tan-gray and the other is a light blue-gray. May reflect the two kinds of subfloor gabbro we've already sampled. Vesicular and nonvesicular. And that contact that looked like it was dipping - apparent dip in the wall - was to the north. And the west wall dipping to the north about 20 degrees.

CC Okay. Copy that. What - which one's on top? Can you tell?

CDR-EVA Yes. The blue-gray's on top. I'm sorry.

CC Thank you. And you got a bearing and range there at the rim of Cochise?

CDR-EVA I took a picture of it and - Okay. We're at 228/3.0, and we're not - we're headed south and not quite on the - on the east rim.

CC All right.

CDR-EVA I'll give you a hack at the east rim.

CDR-EVA Bob, I got a - a picture of that contact so, I - I was -

LMP-EVA I took some pictures right into Cochise, too, when we were coming up.

Tape 111A/6

CDR-EVA Good. It'll show on yours, too, probably - I hope.

CDR-EVA Okay. We're sort of on the inner -

LMP-EVA Quick; give them a mark.

06 21 05 39 CDR-EVA MARK. 230/2.9. We're on the east rim.

CC Copy that.

CDR-EVA Well, we're sort of inside the east rim a little bit.

CC Well, don't get too far inside.

CDR-EVA We're halfway between the rim and where the blocky wall starts.

CC All right. Copy that.

LMP-EVA Did you get that, Bob?

CC Yes. We got that.

LMP-EVA Cochise is much like Horatio and - actually, more like Camelot, although not as blocky in the walls, in general, in that it - it has blocky walls but a mantled rim. Again, all the blocks I see in here are big ones. And blocks down to about 20 centimeters are subangular, in general, and appear to be the - have the appearance of the subfloor gabbro, although most of the smaller rocks are not - do not appear to be highly vesicular.

CC All right. We're copying that all.

06 21 07 05 CDR-EVA We're at 232 and 2.7.

CC Roger. Copy that.

LMP-EVA Watch it.

CDR-EVA You know why - what happened there?

LMP-EVA What?

CDR-EVA I was just about to take a picture, and the minute you take your eye off anything -

LMP-EVA Yes.

CDR-EVA Yes. I got another view of that contact, and let's put that - let's put that on the northwest wall of Cochise and dipping to the southeast.

LMP-EVA All right. South and east is to our left.

CDR-EVA No, no, no, no, no. Put it on the northwest wall dipping to the northeast.

LMP-EVA Yes, that's right. See that, Geno, can you see that over there?

CDR-EVA Oh, yes. I can see it now between the gray and blue-gray?

LMP-EVA Yes.

CDR-EVA Oh, yes. Yes, I sure do.

LMP-EVA Can you swing in there, and let me get another shot of it?

CDR-EVA You betcha.

LMP-EVA Oh, this is a good view right here. Okay now, I need to have you go left.

CDR-EVA Okay. I got two of them in there, too.

LMP-EVA Great.

CDR-EVA Look at that rock right in front of us. It looks like a contact between a blue and a gray.

LMP-EVA Oh, yes, there it is. Yes, you're right.

CDR-EVA We can't get down to it, but take a picture.

LMP-EVA Well, I think we've done - I think we've got that relationship. I think we got it at station 1, as a matter of fact.

CDR-EVA But that's a big beautiful boulder on the - -

LMP-EVA Yes, that's - -

Tape 111A/8

CDR-EVA Inner rim - -

LMP-EVA - - that's ... a block.

CDR-EVA - - inner south rim of Cochise.

LMP-EVA Oooh - -

CDR-EVA It's a single block.

LMP-EVA That's how you bend your tires.

CDR-EVA Well, that's what it's for. Oh, that's a mou -
Oh, man, would that be ... - -

LMP-EVA Well, now, that might be glass covered. That might
be a glass coating; the way it sort of hangs on
the outside there. Hard to say.

06 21 09 20 CDR-EVA Okay, we're at 234/2.5.

LMP-EVA Starting to sling dust. I wonder if we've lost
our fender.

CC Roger. Copy that.

CDR-EVA No, they're on there tight. ... - -

LMP-EVA You think that's Van Serg? Right over there.

CDR-EVA No.

LMP-EVA There it is. Bet you.

06 21 09 37 CDR-EVA Yes. I think you're right, because that's just
about the right place. Let's see, 234 - okay, is
where - and 2.1 is where we want to go, and I'm
at 230/2.5.

LMP-EVA Okay, our - -

CDR-EVA Pretty close.

LMP-EVA - - Our block population in - here now on the south
rim of Cochise and it's - and up ahead of us looks
like it's up to 5 percent. And it's - all looks
like subfloor - light to tan subfloor gabbro - or
tan-gray. You don't see much blue-gray; not out
on here.

LMP-EVA There's a recent hit.

CDR-EVA This Rover is getting tested for what it was built for now.

LMP-EVA Yes.

CDR-EVA I tell you it handles just the way as advertised, maybe even better.

CC Okay. We think you guys are getting to the point we ought to swing a little bit west to make that 234/2.1.

CDR-EVA Yes, I am, Bob.

LMP-EVA I think we - We've got it. Tallyho.

CDR-EVA Bob - Bob. That's my fix. I'm just navigating to it.

CC Okay. Copy that.

CDR-EVA I know where. I'll get there.

CC Roger.

LMP-EVA We have a Tallyho on Shorty - I mean of Van Serg. How about through there, Geno. Thanks.

CC Let's not prejudge the crater too much.

CDR-EVA You want 234/2.1. Okay.

CC And remember we talked about parking on the south-east rim.

CDR-EVA It wanders like our wander factor in here has got to be 50 percent.

CC Copy that.

LMP-EVA Bob, you're cut - you're being cut out. I can't tell what you're saying. Isn't that where we want to go, over there?

CDR-EVA 23 - Well, -

Tape 111A/10

LMP-EVA Well, - look, ... way to get - -

CDR-EVA - - ... found the crater.

CC 234 or 232 - -

LMP-EVA No, we didn't ... there on the right.

CC - - It doesn't make much difference, 17. If you see Van Serg, that's what we want.

CDR-EVA Well, you're - Let me wander over that way. That's where I want to get, but I couldn't go there because of that -

LMP-EVA There's a different looking rock there.

CC And remember, we're talking about parking on the southeast rim.

LMP-EVA Yes, I think you're going to have to bear right.

CDR-EVA Yes. That's why I - I've got to get through this field, though.

LMP-EVA Yes, I know (laughter).

CDR-EVA Okay, Bob. We're still primarily in an extreme block field here now. It's up to a 20 percent cover, and - of fragments mostly the subfloor. Some of it looks quite highly shattered. There's - I just saw one piece that looked like a white anorthositic rock.

CDR-EVA How's this look to you? We can go farther up there, I guess. Let me go farther up.

LMP-EVA Well, okay, if you can get up.

CDR-EVA Get a little farther on the southeast.

LMP-EVA A little higher is apt to overdo it.

CDR-EVA Okay.

LMP-EVA There are - there is some - some grayish rocks that are - -

CDR-EVA Oops! I centered. Right, coming up here. I turn to the right and park right here.

LMP-EVA - - That have a - somewhat of a swirl texture.

06 21 13 10 CDR-EVA Okay, Bob, we're at 230/2.2.

CC Copy that. Copy you parked.

CDR-EVA Yes. What did I say? 230 on that? Yes, bearing is 230/2.2, and I'm parked on a heading of 320, which gives you a better view.

CC Copy 320 for the parking.

CDR-EVA Yes, 3 - 330.

LMP-EVA Oh, boy. This is getting harder and harder. Got it ... also. Don't know what's wrong with it, now. I might have got it twisted.

CDR-EVA Here, let me look at it.

LMP-EVA Got it hooked, but not so I can get it undone.

CDR-EVA Here let me look at it. I'd say stay put, but I don't think you have any choice.

LMP-EVA That fender just curled under, that's where we're getting the dust - starting to warp.

CDR-EVA Look at those other fenders, talk about warping.

LMP-EVA Did I get it twisted or something?

CDR-EVA Yes, you did twist it when you put it on. Okay, squanch down.

LMP-EVA I'm squanched.

CDR-EVA Okay. Had one twist in it.

LMP-EVA Boy, that makes a difference.

CDR-EVA Sure does. Here. Your footpan's down, too.

Tape 111A/12

LMP-EVA I'll get it. It's lost it's stiffness in there.
Okay - okay, I guess now I'll plan for Shorty,
huh? ... Van Serg.

CDR-EVA Okay, 2 POWER's ON -

LMP-EVA Van Serg looks like a blocky rim fresh impact
crater right now.

CC Okay. We copy that. How about scuffing your feet
and seeing if it looks orange underneath?

LMP-EVA Slight differences - Don't worry.

CC And, Gene, before you go away, we'd like the rest
of the Rover readouts, like batteries. And how
about a SEP temp readout before one of you guys
leave there?

06 21 15 45 CDR-EVA Get - Can you get that on that side, Jack?

LMP-EVA I will.

CDR-EVA Should have TV.

CC Roger. We have it, and I'm sure that Ed would like
a good dusting job up front.

CDR-EVA Well, there's so much - -

LMP-EVA I'll dust it if you can't read it. I'll get it.

CDR-EVA - - dust. I've got it.

LMP-EVA I'll get it.

CDR-EVA - - Just over the gage. It's about 12 - 125 on
the SEP.

CC Okay. Copy that.

LMP-EVA Boy, everything is really bad now. The fender
warped.

CDR-EVA Yes, the fender cut - dug under. See if you can
straighten it out.

CC Okay, and leave the covers - -

CDR-EVA Okay. Amp hours, 82 and 80. Battery, 122 and off scale low. Forwards are 210, 240; Rears are 225 and 2 - 220.

CC Okay. We copy that.

CDR-EVA That's just a sample of the kind of - kind of dust we would have got, Jack, if we hadn't of had that fender yesterday. Fender's almost worn out.

LMP-EVA Can you get a dustbrush, and let's check our camera.

CDR-EVA Stay where you are, and I'll give you a zappareno wherever you are.

CDR-EVA Okay.

LMP-EVA That it?

CDR-EVA Yes.

LMP-EVA Okay, how many bags do I have.

CDR-EVA I don't know, but I've got a lot of dusting to do here.

LMP-EVA Do you have a lot of bags?

CDR-EVA Yes. I must have - I've got four of them is all.

LMP-EVA I'd better change my bag.

CDR-EVA Can't even read the Rover.

LMP-EVA Yes. I have an empty bag on me now, right, a collection bag?

CDR-EVA Empty.

CC Okay, 17 - -

LMP-EVA Don't know how much time do we have here?

CC Okay, 17. We're looking at a nominal station 9 here. You've got about 25 minutes remaining.

Tape 111A/14

CDR-EVA No such thing as a nominal station anymore.

CC This may be the first and only one of the traverse.

LMP-EVA The geology won't let it be nominal. Hey, I've got some new bags, Bob.

CC Okay. We copy that, Jack.

LMP-EVA And I guess I'm pretty good on film.

CC Okay. And you're going to get a radial sample here, and so you might check your Rover sample bag supply.

LMP-EVA That's right. I want to take that.

CC And you might - and you might give me frame count or check it to make sure you're okay.

06 21 18 34 LMP-EVA I just did, and it's 123.

CC Okay, good enough.

CDR-EVA How do you want the SEP blankets?

CC Leave them closed, please, Gene - -

CDR-EVA Open or closed?

CC - - as closed as they'll get.

LMP-EVA CLOSED.

CDR-EVA We been riding with this thing off?

LMP-EVA What?

CDR-EVA SEP?

LMP-EVA Yes, it should be off.

CDR-EVA Yes, it is. Doesn't seem like it'd get much data that way. Even if it's hot.

CC Yes, but it's - it's automatic - -

CDR-EVA I guess they're worried about getting it so hot
it - -

CC It shuts itself off when it gets above 108, so it's
no good anyway.

CDR-EVA Are you kidding? We're - oh, boy.

CC We've been hoping all day - it's been off all day.
We've been hoping that it would - since station 6 -
We've been hoping that it would cool down so that
we could get some more data, but it's not,
obviously.

CDR-EVA It's not going to make it, Bob.

CC That's obvious by now.

CDR-EVA That's a - that's a shame.

LMP-EVA This is starting to look like a geological survey
expedition. The vehicle's are all covered with
dust.

LMP-EVA Oh, look what's in there.

06 21 20 16 CDR-EVA I don't think I can read that unless I dust it with
a lens brush - Okay. Get my - Okay, can I get by
you here?

LMP-EVA My - my bag look all right to you.

CDR-EVA Yes, it's still closed.

LMP-EVA Okay. Okay. What are we going to do here? We're
going to go up there and sample on the rim, look
at the walls, and the floor, and miscellaneous,
and - -

CDR-EVA Well, we are on the rim ...

LMP-EVA - - then you're going to take 500 millimeters when
you get back to the Rover while I do a radial
sample.

CDR-EVA Okay.

Tape 111A/16

LMP-EVA But the big - the first thing we do is go up to the crater. Bob, I think the mantle objective here really is immaterial and - because the - there's - the blocky ejecta around the crater covers - oh, boy - Well, it looks like it - it extends several hundred meters out from the rim - say a couple of hundred meters.

CC All right. Copy that, Jack.

LMP-EVA We're quite a ways - we're pretty close to the rim.

CC Yes, we can see that.

LMP-EVA We're pretty close. I'll go up on the rim, Gene, and see what we've got.

06 21 22 21 LMP-EVA Tiptoe through the tulips (singing) - -

CC Okay. Let's get grabs before you guys leave.

LMP-EVA (Singing) I'm getting it right now. Let me see; anything else you want me to do while I'm here?

CC Negative.

LMP-EVA Sure look like shocked rocks to me.

CDR-EVA Lot of glass splattered on some of these, Jack.

LMP-EVA Yes.

CDR-EVA We might even find some shatter cones. But don't tell anybody.

CDR-EVA Well, I'll say one thing for old Van Serg, it's blocky. Whoo!

06 21 23 22 CDR-EVA MARK. Gravimeter.

CC Copy that.

LMP-EVA Bob. This is about - I think this is the only clearly - well, I won't even say that. This is at least a blocky - a large blocky rim crater. But even it has the mantle dust ma - material

covering the rim, partially buried rocks. And it's down on the floor, as near as I can tell, and on the walls. The crater itself has a central mound of - of blocks that's probably 50 meters in diameter - that's a little high - 30 meters in diameter. It - Many of the blocks are - -

CDR-EVA Holy Smoley!

LMP-EVA - - intensely shattered in that area, as the ones that are on the walls. I don't see any sign of organization of the blocks in the walls right now. There's a possibility that on the west wall, there's an indication that there's slightly darker gray rocks starting about halfway down the crater. And that's - that level is coincident with what appears to be a bench on the northwest wall. And that bench - hints of that bench - it's not continuous, but hints of it are around on the north wall and, I think, right below us - yes, on the southeast wall. The - We'll start - The rocks are pretty badly broken in many cases. And - well, I haven't seen any real glass yet. Yes. We'll start looking at them a little more carefully.

CDR-EVA Some of them - That looks like a breccia right there in front of us.

LMP-EVA Yes. There's some interesting patterns on the surface.

LMP-EVA Stand by. Wait, wait, wait. I keep - Aw! Sorry, Geno, but -

CDR-EVA Okay?

LMP-EVA Okay, there. Afraid I haven't been doing my duty on locators, occasionally.

LMP-EVA Do that?

CDR-EVA Yes. I got it.

LMP-EVA Okay, Gene's tearing apart one of the - -

CDR-EVA Here. There you go.

Tape 111A/18

LMP-EVA - - very intensely fractured rocks. And it comes off in small flakes. Let's get this one, because this will be the best oriented one for documentation, plus why don't you get that one you've got inside there?

CDR-EVA Yes, I am.

LMP-EVA Got a bag?

06 21 27 14 LMP-EVA Bag 568 is a fragment from the surface. That's a corner, I think, off the block that Gene documented here.

CDR-EVA Yes; it is.

LMP-EVA We'll get - we'll get another sample - that'll be from inside the block.

CDR-EVA Get it with this real easy. Here's a whole big - we ought to take that just as is.

LMP-EVA Well, put it - put it in your - put a bag around if we - around one end if we can. Here the other end is smaller.

CDR-EVA Yes. Hold this - -

LMP-EVA Let me hold this end. Let me hold it, and you put the bag on.

CDR-EVA That's breccia, too. That's - -

LMP-EVA Well, it's - -

CDR-EVA Well, see that? See the white fragments in there?

LMP-EVA Yes. It certainly - -

CDR-EVA It's got a lot of very small - -

LMP-EVA It - it looks like this big one over here. You know, it might be that the - these are - might be pieces of the projectile. I don't know. Because it doesn't look like - it's not subfloor.

CDR-EVA Okay. Pin it down.

LMP-EVA Well, that's wrapped in - if you can put it - if you put it end down, it may stay in the bag.

CDR-EVA I doubt it.

LMP-EVA What's the number?

06 21 28 45 CDR-EVA It's a 480, and it's a - a relatively tabular [sic] shape, and it's about - -

LMP-EVA And it's going to - -

CDR-EVA - - 10 inches long.

LMP-EVA And it's highly friable. It breaks apart.

CDR-EVA Oh, not so much.

LMP-EVA In small chips. Well, you can - you did it with your hands there. I call that being friable, compared to what we've seen anyway.

CDR-EVA Okay, and let me get in after of that.

LMP-EVA Let me get a - soil - soil right over here. Okay. The soil next to the boulder down about 3 centimeters, is in bag 569.

CC Copy that.

LMP-EVA Okay. And the soil and chips - about two-thirds of a meter from the boulder - -

CDR-EVA Get another one?

LMP-EVA Yes - are in bag 570.

CC Copy that.

LMP-EVA Okay?

CDR-EVA Let me get over here. You're going to step on your gnomon there.

LMP-EVA I wouldn't step on my gnomon. I'm going to get this one - crimped. Okay. There, very clearly, is a central mound. And now that we've looked at

Tape 111A/20

this one, the mound looks like it's composed of gray fragment breccias much like what we've just sampled - -

CDR-EVA ...

LMP-IM - - dark gray. And again it might be related - -

CDR-EVA Jack.

LMP-EVA Oh, excuse me. I didn't hear you.

LMP-EVA Related to the projectile. Now, we've got to see if there is subfloor up here, or whether we're dealing with another unit somewhere.

CDR-EVA got your after. Okay. I don't see any - -

LMP-EVA Well, the more coherent rocks - this looks like subfloor.

CDR-EVA I don't see any orange material either.

LMP-EVA Not yet.

CDR-EVA This particular rock we've sampled has tabular fractures, and in one-half of the rock, they are definitely oriented.

LMP-EVA Boy, I'll tell you, I don't - There's more dust on these rocks. It's harder to see a fresh surface. They're not as clean. That's subfloor.

CDR-EVA Hey, and even the floor of the crater is mantled down there.

LMP-EVA You know, that seems - Yes. That seems like a - what you got? A piece of glass?

06 21 31 51 CDR-EVA Yes, I think it is glass. At least it's glass covered - just glass covered. Houston, I've got an undocumented sample. It's about 2 meters left of where we just sampled. It's a glass-covered - oh, baseball-size rock in 571.

CC Copy that.

06 21 32 14 LMP-EVA A lot of these blocks up here, Houston, are - particularly the more fractured ones, but even some that aren't - are a gray matrix fragment breccia. And it looks like - really, the fragments are quite fine. There are no - On the rim anyway, we haven't seen any large fragments. The largest I've seen is about 2 centimeters. But down in the mound you can see some fragments that are probably half a meter in diameter.

CDR-EVA Jack, are you going around that rim of the crater up there?

LMP-EVA I was just looking at rocks.

CDR-EVA Well, okay.

LMP-EVA We - we - -

CDR-EVA I want to get a pan before we leave back there.

LMP-EVA Oh, yes. We need to see if - we can get some of the subfloor. I'm not sure I understand what's happened here, yet. This should have brought up subfloor according to the theory, and it hasn't.

CDR-EVA That looks like some of the - look at some of the breccias - the blue breccias with the white - big old slabby white - with the fracture face with the white inclusions.

LMP-EVA Down there.

CDR-EVA Yes, down in the floor, Jack.

LMP-EVA Yes, it has that appearance all right. Hey, Gene. Do you see that rock - -

CDR-EVA That's a - -

LMP-EVA - - that rock that's fractured in sort of a pyramid shape down there? Out here on the right - the right end of - of the floor down there - that big one?

CDR-EVA Yes.

LMP-EVA It's sort of pointing west.

Tape 111A/22

CDR-EVA Yes.

LMP-EVA It's really neat. That's a unique fracture, isn't it?

CC Roger, 17 - -

LMP-EVA And there's another one that's fractured almost in a ... - -

CC - - And we'd like to be moving from here in about 10 minutes, so we probably better be trending back toward the Rover, unless you're seeing something really great out there.

LMP-EVA Well. Hey, Bob, we ought to - we ought to find out whether or not we got - whether - what the rock is here, if you've got a little time.

CDR-EVA Jack, do you want me to put this in your bag and start - I'm sorry.

CC Roger. You got - you got 10 minutes. I'm just telling you to start thinking about getting back.

LMP-EVA Yes. We're always thinking that way.

CDR-EVA Okay, Bob. One thing I noticed we do uncover. There's a lot of - oh, 2- 3, 4-millimeter-size fragments of glass we're kicking up all over the place.

LMP-EVA Yes.

CDR-EVA Little glass balls.

LMP-EVA Hey, Gene?

CDR-EVA Almost like Pele's -

LMP-EVA Gene?

CDR-EVA Yes.

LMP-EVA Can you come over here? I think there's some subfloor here. We ought to - -

CDR-EVA Okay.

LMP-EVA We ought to try to document it. But I tell you, most of the rocks are the - are the fine-fragment breccias. Let me see if I can't get one of those little - -

CDR-EVA There's some glass.

LMP-EVA Hey.

CDR-EVA You see if they're like Pele's - -

LMP-EVA Okay.

CDR-EVA - - ... eyeballs or whatever they are.

LMP-EVA I think we can get some over here. If you're - if you're careful coming over here, we can get glass that looks like it may have crystallized in place there.

CDR-EVA Okay. I'm talking about those little - little balls, too. See that - -

LMP-EVA Whoo, take it easy - Take it easy.

CDR-EVA Where are you? Right there?

LMP-EVA Yes, but put your gnomon right over here, and we can get that for glass and that for subfloor.

CDR-EVA Okay. Let me -

LMP-EVA But I'm not sure that is. I just - It may be breccia there - Everything is covered with dust here, and it's hard to tell the types. Most of the rocks we're seeing are breccias. Make sure that glass is in your stereo.

06 21 35 45 LMP-EVA Okay, be careful with it.

CDR-EVA Oh, shoot!

CDR-EVA I don't have any bags so -

LMP-EVA Okay, the glass - looks like a glass agglutinate. Oh, no!

Tape 111A/24

LMP-EVA Didn't break? Good. I think that will survive going back now.

LMP-EVA Okay. It's a frothy - glass agglutinate is going to be in bag 481.

CC Copy that.

LMP-EVA And - and it looks like a - almost like a cowpie - pile-type of bomb, Bob, if you'll pardon the expression.

CC I will. I don't know whether anybody else - -

LMP-EVA Although it's not flattened. It's - it's - it's a - it's an aggregate of glass in - or it's a pile of about four fragments, much like the one we're sampling.

CDR-EVA Jack, we want to get a good scoop sample here. Maybe can we get some of those little fine pieces of glass around.

06 21 37 19 LMP-EVA And it looks like it's - it's in place from the day it was born.

CC Copy that.

CDR-EVA Oh, gol dig da! I'm having a hard time with this one.

LMP-EVA A piece of that rock right behind it.

CDR-EVA If I can -

LMP-EVA Want a bag?

CDR-EVA Yes. I'm going to turn around. Just not going to be able to get that one in the bag, I don't think.

LMP-EVA Okay, Houston. My sample's in - 482 is a rock, but it doesn't look like subfloor. It looks like the blue-gray material we've been seeing - the breccia-type material.

CDR-EVA Yes.

LMP-EVA I don't think there's difference.

CDR-EVA Got it in!

LMP-EVA Might just as well throw them in my bag.

CC Okay, and - -

CDR-EVA I want a scoop out of here, though, Jack.

CC 17, why don't we get that scoop sample as the first sample of Jack's radial sample, 17?

CDR-EVA Okay. That's right. You're getting a radial sample. That's fine. I forgot you were doing that.

LMP-EVA Oh, man.

CDR-EVA That's all right, Jack. That won't come out. Just put it in there.

LMP-EVA Oh, boy.

CDR-EVA Okay. Let's let that one be the last -

LMP-EVA Here's one.

CDR-EVA Well, okay. Those are the last ones that you can take. Got a lock?

LMP-EVA No, I don't see in my ... on that.

06 21 39 46 CDR-EVA Okay. Okay, before you go back - I got to go down after a picture here. And I want to get a pan of this thing. We can get a stereo pan - as you start your radial sample.

LMP-EVA Yes. Are you going to - You - you take the after from there, and I'll go over here and -

CDR-EVA Okay. You - -

LMP-EVA Well, wait a minute.

CDR-EVA - - you need the gnomon?

Tape 111A/26

LMP-EVA No.

CDR-EVA Okay. I'm going to go over behind me and take part of the stereo.

LMP-EVA Where are you going to take your pan? Let me see.

CDR-EVA From - from behind me, where we were.

LMP-EVA Well, I think I'll just take my radial right from here to the Rover.

CDR-EVA That's great. That's great. Just do that, and then you'll be right back at the Rover.

LMP-EVA And I'll take my pan from here, so you -

CDR-EVA Man, there's about four or five different modes of travel out here.

06 21 42 06 CDR-EVA I don't believe it.

LMP-EVA What?

CDR-EVA I think I'm out of film.

LMP-EVA You're out of film?

CDR-EVA 150. And it stopped clicking. Jack, I - I - I didn't get the rest of that crater down there.

LMP-EVA Okay.

CDR-EVA I only got it 12 o'clock and around. Well, shucks.

LMP-EVA I can get it.

CDR-EVA Well, here's where I -

LMP-EVA Well, I'm going to be out of film, too, here before long.

CDR-EVA Okay. Just don't worry about it then. Just press on with your radials.

LMP-EVA I've got - I got a good pan over here. Did you get the crater at all?

CDR-EVA I got the right half of it and probably two-thirds of it, so we're going to - I'm just going to have to let that do. Okay. I'm going to see if I can get some 500s while you're doing that.

LMP-EVA Hey, this isn't going to be an ideal - radial sample - but it will have to do. Giddyapping over hill and dale (singing).

CDR-EVA Bob, would you tell me what your primary desires are again on the 500, based upon what we have?

CC Okay. The primary desire will be the North Massif, the blocks, and the trail.

CDR-EVA Okay.

CC And while you're at the Rover, they want you to take the gravimeter off again, and we'll get another Rover and a - well another surface measurement here, as well - to check against the Rover.

CDR-EVA Okay. Here's a reading. I think I owe you one of those, don't I?

CC Roger.

CDR-EVA 670, 037, 801; 670, 037, 801.

CC Copy that.

CDR-EVA I didn't know we were going to do both of these things. I thought we were going to do one or the other. But - if we're going to do it, we might as well do it right.

06 21 44 56 CDR-EVA MARK it. It's flashing.

LMP-EVA Okay, bag - stand by - 52 Yankee is at the rim crest.

CC Copy that.

CDR-EVA Well, I'll tell you what I'm going to do. I'm going to use the Rover to steady the 500, and see what happens.

Tape 111A/28

LMP-EVA Oh, I should have let you take this scoop back.
Oh, no. Oh, me. Well, shoot! This isn't working
out too well, Dr. Parker.

CC Say again there, Jack.

LMP-EVA This isn't working out too well. I've got to get
rid of this scoop.

CDR-EVA Just set it there and take your sample. We'll get
it.

LMP-EVA I'll take the samples going back.

06 21 47 46 LMP-EVA Just like in training, the scoop doesn't stay
locked to the ...

CC Okay, 17. We'd like you to press on. We'll abort
the radial sample. We'd like to leave here imme-
diately, if not sooner, to head for station 10.
Enough of the 500 millimeters, Gene. And we'll
give you some information here on mags. We need
the gravimeter put back on the Rover, if you haven't
already. If it's on the ground, we didn't get the
mark, but it's probably done by now. And we're
going to take the DSEA out of the tape recorder
here, and we'd like to get that all done pronto.

CDR-EVA Okay. 85 is the mag count on the 500.

CC Copy 85 on the 500.

LMP-EVA I think that's a smart move, Bob. I don't think -
I don't think the radial sample's going to tell
you much here.

CC Okay. Let's take a -

LMP-EVA I don't under - I - I -

CC Go ahead.

CDR-EVA Jack, you ought to get a scoop of that dirt,
though.

LMP-EVA Well, there's one scoop - -

CDR-EVA We don't have a scoop of it, do we?

LMP-EVA Look what's underneath it.

CDR-EVA Well, I don't know what's underneath it.

LMP-EVA It's white.

CDR-EVA Well, I wanted to make sure we got some of those small glass balls.

LMP-EVA Yes, we'll get a scoop of it. Upon the top.

CC 17, we're anxious for you guys to get going.

06 21 49 52 CDR-EVA Okay. Here's your gravimeter reading from the surface; 670, 057, 101; 670, 057, 101.

CC Copy that.

CDR-EVA You want me to change my mag at the next station?

LMP-EVA Come here, Gene, quickly. We can't - we can't leave this. This may be the youngest mantle over - whatever was - -

CDR-EVA Take pictures of it. I don't have any film.

LMP-EVA - - was thrown out of the craters.

CDR-EVA Take pictures of it. Bob, we've got to take 5 more minutes. We'll be right with you.

CDR-EVA What Jack's done is he dug a - a trench in a - the southwest-northeast direction, and he discovered about 3 inches below - 4 inches below the surface - a very light-gray material.

LMP-EVA Possibility here - Careful, Geno.

CDR-EVA Yes.

CDR-EVA Take that crust.

LMP-EVA Well, I'm trying - I'm trying to get the - the upper portion there. There we go.

06 21 51 04 LMP-EVA The first 2 centimeters, bag 483. The next 5 - Ahhh - in 484. Augh!

Tape 111A/30

CDR-EVA Get some?

LMP-EVA I got quite a bit.

CDR-EVA That's enough.

LMP-EVA I got quite a bit. Here, you got to put that away, don't you?

CDR-EVA Yes.

LMP-EVA And the next 10 centimeters of the light-gray material, be in - probably in 486, if we're lucky - get it off.

CDR-EVA Okay.

LMP-EVA I think it is 486, right?

CDR-EVA Yes. 485!

LMP-EVA 485. Okay. What did I say 483, 484? Okay.

CDR-EVA You with us, Bob?

CC Roger. We're with you.

LMP-EVA He's mad at us now.

CC How'd you guess?

06 21 52 29 LMP-EVA Okay. The third sample is in 485.

CC Copy that.

LMP-EVA Okay. Whoops, sorry. Bob, a possibility here is that the - this upper 6 inches of gray material in here is the latest mantling in the area and the light-colored debris may be what's left over from the impact.

CC Okay, I copy. I understand. But we'd like to get you going. In case you didn't get the clue.

CDR-EVA I know. We're going. Okay.

LMP-EVA All right. What else? Magazines.

CDR-EVA No, we'll change them at the next station. Isn't that right, Bob?

LMP-EVA No, I've got to have some. I got to get some, or I can't take -

CC Okay, 17. We need Jack to put on magazine Nancy. And we'd like, Gene, for you to pull out the DSEA tape recorder at this station.

CDR-EVA Okay, I need a magazine too, Bob. I don't have any film at all.

CC Roger. That'll be Bravo if you change yours here. You could change it at station 10.

CDR-EVA I'll change it here. It's just as easy while we're in there.

CC Okay.

LMP-EVA Okay. You want Bravo, huh?

CDR-EVA Bravo. And I'll get the tape - I'll get the DSEA. Bravo was outside there, I thought.

LMP-EVA There you go. Let me get this - hold it one - long enough for me to get this. Then I can get rid of this all at one time.

CDR-EVA Oh.

LMP-EVA Well, that's all right.

CDR-EVA I can't put that back in.

LMP-EVA Got it?

CDR-EVA I got - I got Bravo.

LMP-EVA Okay. I got that one.

CDR-EVA We lost the dark slide out of Bravo, and it's in the dirt. I'm not going to pick it up.

06 21 54 23 CC All right. Copy that. There's no point in putting it back in. It probably wouldn't go in anyway.

Tape 111A/32

CDR-EVA Well, that's dirty. Okay. I'm changed. And I don't know what the mag count is, but let me get the DSEA. If this thing is true to form, I'm going to have to get in there - I got to - ... tripped. Well, now what's - Hey, we got some rocks in that big bag. Okay. We're done with the SEP. DSEA is coming out. I hope there's something on it.

06 21 55 45 CDR-EVA Oh - Jiminy Christmas - I can't even pick up that big bag to close the gate.

CDR-EVA I've got to - I've got to trip that latch with - with tongs or something to lock it.

CC Okay. And, Jack; Houston. Over.

LMP-EVA Go ahead.

CC Okay, we've - -

LMP-EVA Go ahead.

CC - - had a change of heart here again, as usual. And we're going to drop station 10 now that we've heard you so much, and we're going to get a double core here. And we'd like to get the - some football-size rocks while you're doing that. But double core here, and then we're going to leave here and go back to the LM.

LMP-EVA You don't want a - You don't want a - you don't want a double core here. I don't think we can do it, Bob. It's too rocky.

CDR-EVA You don't think we'll get through that stuff you just trenched?

LMP-EVA Well, I'm afraid there are rocks all through it, Gene. We can try, but -

CDR-EVA Let's try it.

LMP-EVA Well, I don't like to try things that there is a probability of failure on - if you can - You're just going to lose some time. Okay, mag Nancy in on the LMP's camera.

CC Copy that.

LMP-EVA Well, this is - you can see the rock population here, Houston. But we can try it.

CDR-EVA Sure. If we get a single, we get a single out of it.

LMP-EVA Oh, you're doing it, huh?

CDR-EVA I've got it started.

LMP-EVA Well, you're not even - okay. Not even going to debate the issue.

CDR-EVA No, it takes too much time debating it.

LMP-EVA Well, let's see how much time it takes. I hope you're right.

CC Okay. And -

CDR-EVA Okay, and we need a - we need a lower out of my bag.

LMP-EVA Let me get the core.

06 21 57 44 CDR-EVA A lower out of my bag is all we need.

LMP-EVA Watch it. You're in a crater almost.

CDR-EVA Yes. I want to get ... for you.

CC Okay. We have to have you guys moving in 10 minutes. And we'd like to also deploy EP number 5 here.

CDR-EVA Okay. I'll start on the ... - -

LMP-EVA - - ... the lower 5?

LMP-EVA This is a lower, right?

CDR-EVA Yes.

Tape 111A/34

LMP-EVA You got an upper?

CDR-EVA Yes. Why don't you get 5 out, and I'll start on the core.

LMP-EVA ... And I'll put it - I'll put that right there.

CDR-EVA Okay. The lower is 50; the upper is 37.

CC Copy. 50 and 37.

CDR-EVA You got 5, Jack?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA Why don't you put it up - well - You put the gnomon away. Put it fairly near that trench. At least there is some documentation there. I'll try to have the pan going while you're doing it. Okay, Houston. Which way you going to drive out of here?

CDR-EVA I'm driving out of here -

LMP-EVA Left or right?

CDR-EVA I - I've got to go right. I got to go right.

06 21 59 20 LMP-EVA Okay. Pin 1 is pulled and safe. Pin 2 is pulled - safe. Pin 3 is pulled and safe.

CC Okay, Jack. And we'll document it back to the Rover, I guess is the best way. That doesn't look too hard, Gene. Until just now.

CDR-EVA Thank you. Oops, looks like you proved me wrong.

LMP-EVA The first core was easy; the second one a little tougher; and then it got tough down at the end. There, I'm getting a picture of you. Okay?

CDR-EVA Okay.

LMP-EVA I got it.

CDR-EVA You got it from here? Okay.

LMP-EVA Yes.

CDR-EVA Core but it wants to slide out. It's full. No rocks in it. It looks like just the same stuff we've been traveling through.

CC Okay, Jack. I think you better help Gene with that - recovering that core there where the ... going to fall out.

LMP-EVA You know, I think you're right. And if you'll just wait until I finish the pan, that's exactly what I'm going to do.

CC Okay. I didn't know what you were doing.

06 22 01 10 CDR-EVA Bob, it's capped.

CC Got you. Okay.

CDR-EVA You hold - just hold the handle.

LMP-EVA Okay? I can take this one.

CDR-EVA It's very - very loose soil, Jack. And it's - just any little movement and you'll lose some of it.

CDR-EVA Let me cap that end. Don't move it.

LMP-EVA Uh-oh, you're - you almost knocked some out. Get your - you know where your thing is.

CDR-EVA Yes, but I need you - that - that cap's on you. The last one's gone off the Rover.

LMP-EVA That's all right. I'll stay here. Go put yours out there. I won't move it.

CDR-EVA Any little movement and that stuff starts - -

Tape 111A/36

LMP-EVA Yes. Okay.

CDR-EVA Go - turn around. I'll get the rammer.

LMP-EVA Okay.

CDR-EVA Oh, man! Even these pins are getting stiff. Okay, Bob. The top rammed down - oh, almost half way without any effort.

CC Copy that.

LMP-EVA The ... back on.

06 22 03 14 CDR-EVA The bottom rammed down about an inch.

CC Copy that.

CDR-EVA Okay, Robert. Let's see. Turn around and I'll get this. What was the last thing - let's see - we had to do?

LMP-EVA A couple of football-size rocks.

CDR-EVA You got the DSEA?

LMP-EVA I got it. I got the charge. You got the double core. I got the double core. And I got one sample of a radial sample (laughter).

CC We got a - that's a unique one.

LMP-EVA In my pocket (laughter).

CC And have we got the gravimeter back on the Rover?

LMP-EVA Yes; it's on.

CC Okay. Copy that.

LMP-EVA And we want to get a large block. Why don't we - Why don't we - -

CC Okay, and there's a - -

CDR-EVA No, let's get a couple of them. I've got - I've got one.

CC - - ... here for a SESC from the shallow trench. We'd also like to have you moving in 4 minutes. That's with wheels rolling in 4 minutes.

LMP-EVA SESC, huh?

CC Roger; but we have to have the wheels rolling - -

LMP-EVA I don't know if we can do that. We can try it.

CC We want the wheels rolling in 4 minutes, so I don't think it's practical at this time.

CDR-EVA Bob, we cannot get an SESC in 4 minutes - -

CC Okay. Copy that - -

CDR-EVA - - and roll - -

CC - - Copy that.

CDR-EVA - - at the same time.

06 22 04 31 CDR-EVA Now, I've got to push this latch on the - on the gate to get it locked - on the pallet to get it locked.

LMP-EVA Need some help?

CDR-EVA Push the pallet while I trip the latch, will you? Because I got to trip the latch. There's so much dust in that core.

LMP-EVA Get it?

CDR-EVA No. No. Wait a minute. Open it up. Wait a minute.

LMP-EVA Okay.

CDR-EVA Now - now that's where - now let me trip it.

Tape 111A/38

LMP-EVA Okay. Try it.

CDR-EVA Locked?

LMP-EVA Yes. Yes.

CDR-EVA Should be locked now.

LMP-EVA That got it. That got it.

CDR-EVA Okay.

LMP-EVA Got a big rock there, too?

LMP-EVA It's a - well, you know, the thing that amazes me is that there's no subfloor around here.

CDR-EVA I got one here.

06 22 05 47 CDR-EVA Okay. I'm about ready to clean up the Rover here.

CC Okay, 17. What's out there in the distance on a hillside in the field of view of the camera? The camera is pointing at it. Oh, I'll bet that's the - that's the - -

CDR-EVA What's out there in the distance. Which hill? Let me see the - -

CC - - that's the flag, I bet, on the charge.

CDR-EVA Yes, but it's only - you're looking right at it, but it's only 10 meters away.

CC Okay. It's hanging in front of the hills. That's the problem.

CDR-EVA You're looking right at the flag.

CC Okay. It's hanging in front of the hills. We thought we had an artifact or something like that. Okay. Press on.

LMP-EVA Bob, bag 486 is a light-colored rock taken about 3 meters to the right of the Rover. It should be - you should be able to pick it out in that last pan, unless the focus was bad.

CDR-EVA Bob, you got all your TG readings?

CC Roger. We've got that. We'd like to have you climb on.

CDR-EVA You want the LCRU off?

06 22 07 08 CC Roger. Let's go to LCRU power off.

CDR-EVA Okay, Jack, let's - better get going.

LMP-EVA Yes. You know, I don't think there is any sub-floor in here. The rocks are so dust covered that it's hard to be sure, but no rock I picked up looked like subfloor.

CDR-EVA Get on there one time. Ready? I got three of them that time.

LMP-EVA (Laughter)

CC 17, Houston. Do you read me through the - the LM?

LMP-EVA You're loud and clear.

CC Roger. Thank you.

LMP-EVA I hope they came out.

CDR-EVA I get that twisted this time, if I can get off.

LMP-EVA Oh, let's see if old twinkletoes can do it.

CDR-EVA Jack, there's a big - a big one right there in my floor pan. That's what I did last time.

LMP-EVA Okay. I'm on, strangely enough.

CDR-EVA Okay. Let's see. Okay. The charge is off to the - right.

LMP-EVA Yes, you're all - You can clear it this way or - -

CDR-EVA Yes. I see it. I see it.

Tape 111A/40

LMP-EVA Okay.

CDR-EVA I bet you they thought there was some more orange soil over there on the hills.

CDR-EVA Get out of this block field, we'll be able to move it a little bit.

LMP-EVA I wonder where we stand on time.

06 22 09 25 CDR-EVA Well, we've been out about 5 hours and 20 minutes or so.

LMP-EVA Where is it - where are we headed, now that we are moving?

CC That's affirm - -

CDR-EVA Well, I'm trying to get around - trying to get out of the block field here, then I'll head back to the southwest. We going to Sherlock at all, Bob?

CC No, we're going ... follow the ... - -

LMP-EVA That must be Gatsby over there.

CC And a reminder, Jack. We can get lots of photos. We've got lots of film left right now.

LMP-EVA Okay.

CC And, 17. Gene, I guess you're the one that took the SEP out. If you could give me - do you remember the reading of the SEP temperature when you broke it down?

CDR-EVA Didn't even look, Bob.

CC Okay. Copy that.

CDR-EVA It was 125 - 125 when we started the station.

CC Roger. Copy that.

CDR-EVA That's Gatsby there, I guess, huh?

LMP-EVA Yes.

CDR-EVA It's not - it's not unlike Van Serg, though. Hey, you know that looks like mantling.

LMP-EVA Hopefully, we can get a - watch your rock - there you go - we can get a shot looking back to the northwest - -

CDR-EVA Yes, I'll get that when I - -

LMP-EVA - - into Gatsby, because it looks like the mantle streams over the - the side from the southwest. Can you swing to your right - get up a little closer to the rim, there?

CDR-EVA Hey, here's a couple fragments in spots -

LMP-EVA Look at that. See that?

CDR-EVA Yes.

LMP-EVA See that structure. See how the - -

CDR-EVA Yes.

LMP-EVA - - See how the mantle streams over -

CDR-EVA Yes.

LMP-EVA - from the northwest. Can you get that?

CDR-EVA Yes.

LMP-EVA And from the southwest.

CDR-EVA Got it?

LMP-EVA Yes. Go ahead. Keep going. Good shape. Got it.

06 22 11 41 CDR-EVA We're 236/2.1.

Tape 111A/42

LMP-EVA Bob, what I'm looking at is the - northwest portion of Gatsby, where there's a very very concentrated block field on the inner wall, except where there are, on the southwest, three streams and on the northwest and north a continuous stream, if you will, on band, radial band, of mantle that is bur - appears to be burying that field, overlying and mantling the field. We got some pretty pictures of it, I think.

CC Okay. Copy that.

LMP-EVA Bob, I'm more and more convinced there's a mantle. One possibility, I guess, is that, if it's a pyroclastic mantle, that in the lunar vacuum environment and with whatever volatiles we're dealing with, the stuff becomes extremely fine upon vesiculation. We may have been on it all the time and not known it - as far as recognizing it.

CDR-EVA As soon as we come through this draw, ... smooth or free of any debris or boulders it is on the other side of the upslope.

LMP-EVA Yes. Watch it.

CDR-EVA Bob, do we have an extra EP?

CC No. We have two of them behind you. We're going to deploy - we're going to deploy one. I'll give you a reading soon on that.

CDR-EVA Okay. Well, one - one I deploy at the end I know. I thought we had an extra one here somewhere.

CC Okay. Yes, that's what I - Okay, that's the one we were planning on deploying all along, and it's there. We'll be deploying at a range of 0.1, which is just before you get to the SEP.

CDR-EVA Okay.

LMP-EVA I guess Sherlock's going to be right over the top over here. I saw it when we were on that other ridge.

CDR-EVA Hey, you know, there's a lot of bad landing places around here. That old Sun angle, I think, shows most of them up. Bob, I - -

CC And, Geno, we were looking - -

CDR-EVA I don't under - -

CC - - at the map here - -

CDR-EVA - - I don't unders - -

CC - - and if you keep going straight to the LM, you're probably going to run into this crater area around San Luis Rey. You probably ought to head somewhat south of directly back to the LM, so we can at least tip the - western edge of Sherlock and then pick it up and go from there back to the SEP. It looks like it might be rather rough there in that dotted-lined area, if you can look at the backside of your map, Jack.

06 22 15 00 CDR-EVA Bob, I've already been doing it. I'm at 244/1.7.

CC Copy that. Thank you.

CDR-EVA Already been doing that.

CC Okay.

LMP-EVA And, Bob, about - about 200 meters back, we crossed back into our standard mantle surface of about 1-percent fragment cover - -

CC Okay 200 meters back, you - Okay. Copy that.

CDR-EVA - - out of this - the block field, which -

LMP-EVA I can see the LM.

CDR-EVA Yes, I can see the LM. And there's Sherlock, where those blocks are.

LMP-EVA Yes, that's the block field, the Sherlock block field; that's right. That is a block field.

Tape 111A/44

CDR-EVA Some big ones there.

LMP-EVA Yes.

CDR-EVA Old station 10. I might even call it 10 Alpha in honor of the Apollo Program Office. The - -

CC 10 Bravo, Apollo.

CDR-EVA - - Apollo Spacecraft Program Office.

CDR-EVA Oh, that's right. 10 Bravo. I knew I'd never get that straight.

CC Do those blocks look like gabbros, you guys?

CDR-EVA How fast do you think we're going, Jack, without looking?

LMP-EVA I think we're going about 18 clicks.

CDR-EVA Hey, you're just about right. Seems like the first time we've been able to go downhill.

LMP-EVA (Laughter)

CDR-EVA Not really.

LMP-EVA Pull close to this big block, if you can.

CDR-EVA Oh, yes.

LMP-EVA And I'll try to get a reading on what it is - some pictures of it as we come up to it.

CDR-EVA Yes. Boy that's a big one.

LMP-EVA Watch it! ... Looks like our old friend, the subfloor - -

CDR-EVA Subfloor, isn't it? Yes.

LMP-EVA Yes. Vesicular subfloor. Vesicles are about a centimeter maximum size. Didn't look like they were - they look like they're fairly evenly sorted. And the rock itself seemed to be massif.

06 22 17 08 CDR-EVA 250/1.4.
CC 250/1.4.
LMP-EVA Okay, we're back into a - we're back into about a 5-percent rock cover as we cross the edge of the Sherlock block field.
CDR-EVA That's Sherlock over that rim over there.
LMP-EVA Yes. Yes. Once again, all these subfloor blocks look as if they're buried. Now - not mantle, necessarily, except maybe that one. Can you swing right, just a tad?

06 22 17 41 CDR-EVA That one's got the mantle blowing up on it, in it - -
LMP-EVA Yes.
CDR-EVA - - in it's fractures and everything.
LMP-EVA That's the best example of that, I think.
CDR-EVA Take a picture of that?
LMP-EVA I got it. I got it.
CDR-EVA Watch it.
LMP-EVA Got it; got it.
CC Okay. Now, do those blocks look like the same subfloor gabbro?
CDR-EVA Yes, that's just got the mantle -
LMP-EVA Watch it.
CDR-EVA ... one of those.
LMP-EVA Yes. Everything in here so far is the tan-gray subfloor gabbro that I've seen. I haven't - Oh, there's one over there that's a blue-gray. But blue-gray is not abundant.

Tape 111A/46

CC Okay. Copy that. And, 17, as you're getting closer, we're going to want an LRV sample at 1.1 on the range.

CDR-EVA Okay.

LMP-EVA What are we now? 1.2?

CDR-EVA 1.2. Okay. We'll try to get block and soil.

CC That'd be good.

LMP-EVA There's a fresh little pit.

LMP-EVA Bob, I am continually impressed by the lack of exotic fragments in here.

CDR-EVA Hey, Jack. How about picking out a place over there?

LMP-EVA Okay. If you head into that little - Well that's a crater there.

CDR-EVA Let me get around it. We can go a little bit further.

LMP-EVA Yes. Maybe - -

CDR-EVA I'll go up on that flat area up there.

LMP-EVA Yes, yes. There are a lots of little fragments over there by that area - ha, ha.

CDR-EVA Any time.

LMP-EVA Okay. Now swing a shallow turn. Whoa. Yes, that ought to ...

CDR-EVA - Did you get any of those?

LMP-EVA Unfortunately, I can't see them - the shadow.

CDR-EVA How about that one right in front of you, in front of the television camera shadow. See that little one up there? Right there. With the - -

LMP-EVA It's a little big, I think.

CDR-EVA Upper right, no upper right. Straight up the line.

LMP-EVA Oh, okay. Yes. If you can get over there, I can get it.

CDR-EVA I can get there.

LMP-EVA Oh, I guess I had the wrong - I guess I wasn't looking at the right one. The shadow is making it impossible to see down there. Now, see what you can get.

06 22 20 04 CDR-EVA Bob, we're at 253/1.1.

CC Copy that.

LMP-EVA You're going to have to - If we do another sample, you're going to have to swing right so I can - see. I can't see this way.

CDR-EVA Yes.

06 22 20 28 LMP-EVA And 53 Yankee.

CC Copy that. Is that soil or rock?

LMP-EVA That's soil. I can't see to get a rock.

CC Okay.

LMP-EVA Go forward just a little bit, Gene.

CDR-EVA Okay.

LMP-EVA Bet you're going to get yourself in a box there.

CDR-EVA No, that's all right.

LMP-EVA Whoa.

CDR-EVA Oh, boy, sorry.

LMP-EVA Little more. Okay.

CDR-EVA Get it?

LMP-EVA I will. Got it.

Tape 111A/48

CDR-EVA I can't see the LM anymore.

06 22 21 10 LMP-EVA Okay. The rock fragments, that's 54 Yankee. Ahh!
Okay. You got a rock right in front of you, don't
you?

CDR-EVA I see it. Rolled over. Good old Rover.

LMP-EVA LMP frame for that sample - Looks like about 60.

CC Copy that.

LMP-EVA 60! Have I taken 60 pictures?

CDR-EVA Boy, these rock fields are something else again.

LMP-EVA Yes, 60. Looks like some of our gray variety of
subfloor up here - around the rim of that little
crater. You know, I'm starting to think that
maybe the gray relatively nonvesicular subfloor
may be deeper - deeper fraction, based on what
we saw - well, actually, though, let's see - that
could have been overturn, I don't know. Take
that back. There just isn't much of it around
here, although we saw a lot of it in the wall of
Cochise.

CC Roger. We got that.

06 22 23 02 CDR-EVA What do you think this is, San Luis Rey? We're
at 252/0.9.

LMP-EVA I wouldn't doubt it at all. I'll bet that's San
Luis Rey. Around the east side of it - Mariner
and San Luis Rey. They're shallow - filled with
rocks.

CC As close as we can tell, you're at one or the
other of them.

06 22 23 36 CDR-EVA Boy, I tell you they're a lot - Okay. We're
at 250/0.9.

CC Copy that.

CDR-EVA Mariner should look pretty fresh.

LMP-EVA Boy, I certainly don't see much variety other than the gray and the tan subfloor variety. There's old Challenger.

CDR-EVA There she is. Pretty as a picture. Boy, I tell you, there's no getting out of this stuff. You go from one to the other.

CC Okay, 17 - -

CDR-EVA I don't know whether I said it or not - -

06 22 24 25 CC Gene, your range is 0.1. We're going to deploy the quarter-pound charge, and that'll be Jack's getting off to deploy it like we talked about last night.

CDR-EVA Okay. That's EP-2, Jack.

LMP-EVA EP-2; right.

LMP-EVA Bob, we're still - we're moving in and out of areas of say 1-percent to 5- to 10-percent blockiness. And where it gets blocky - not only is it more blocky, but we seem to have more of the medium-sized craters in the range of 20- to 5-meter-diameter craters. That may be Mariner right there.

LMP-EVA How do you read, Bob?

CC Loud and clear. Loud and clear.

LMP-EVA Hey, Van Serg, let me mention again, was an unusual experience in the plains geology here. That must be part of San Luis Rey or Mariner, one.

CDR-EVA Yes. That's pretty deep. Pretty deep.

LMP-EVA Yes, it is.

06 22 26 13 CDR-EVA It's really big. Yes, we're at 252 and 0.6.

CC Copy that.

LMP-EVA The crater on our left - that is, south of us - is a large crater. It's somewhat deeper than craters of the same size that we've seen. And it, too,

Tape 111A/50

though, has - its blocks - mainly - large blocks mainly in the walls, although there are blocks - blocks up here in the rim, occasionally up to 3 meters.

LMP-EVA Look at that string of blocks over there - that may be it.

CDR-EVA Yes.

LMP-EVA That's an edge of a crater, I guess.

CDR-EVA Want a picture of that?

LMP-EVA Got it. Look at the way that thing's fractured.

CDR-EVA Yes, this is the San Luis Rey, Luis complex, because see how elongated it is?

LMP-EVA Yes. Yes.

CDR-EVA Fact is, we're going to cut right through the western half here.

06 22 27 30 CDR-EVA We're at 244/0.4.

CC Copy that.

LMP-EVA Bob, I may have said earl - early - early on up there at Van Serg that I saw subfloor, but we never did sample any that I know of. And the dust was thick enough that I'm just not sure. Breccias were the most obvious thing there.

CC Okay. Most interesting.

LMP-EVA It might have been a window in the plains here, of some kind. But - it's strange to see it there, with so much subfloor all around it that we saw.

06 22 28 29 CC And, Jack, you're going to get a feedwater tone pretty soon.

LMP-EVA Got it. Hey, I should be in OFF now.

06 22 28 51 CDR-EA 252 and 0.2.

Tape 111A/51

CC Copy that.

CDR-EVA There she is.

06 22 28 56 CC And as soon as we get to the 0.1, let's stop and
deploy the charge.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 22 45 XX

BEGIN LUNAR REV 42

06 23 10 12 CC America, Houston.

06 23 13 49 CMP Okay, Houston. This is America. Once we get the antenna set right, it is easy to lock up.

CC Roger.

CMP How would you like - how would you like to have some P52 stuff?

CC Standing by. All ears.

CMP Okay, NOUN 71's - excuse me - on 6 and 42; NOUN 05, 0.01; NOUN 93, plus 0.053, minus 0.011, minus 0.039. And I torqued at 169:21:00.

CC Roger. We copy, Ron. And, Ron, while you're there we'd like H₂ TANK 1 FANS to ON.06 23 14 52 CMP Okay. TANK 1 H₂, FANS 1, are on.

CMP I got too much junk. It won't all fit in one jettison bag.

CC Ron, just to update you on several things that happened while you were on the back side this time, the surface crew is at the LM and did their - they're in the close-out procedures there. And they unveiled the plaque and read a message to the school children on the world, And they received a telephone call from Dr. Fletcher, who said he'd been in close contact with the White

Tape 111B/2

House and was following - they - the White House was following the journey very closely and expressed the good wishes of all people down here to all of you up there.

06 23 17 31 CMP Hey, that's mighty fine, by gosh.

06 23 33 04 CC Ron, sorry to interrupt you eating, but could you take the H₂ TANK 2 and 3 FANs to ON? We're trying to get the pressures up prior to sleep.

06 23 33 16 CMP Okay. 2 and 3 are ON.

06 23 34 39 CMP You know, through these glasses, Stoney still looks like it's a light - light tannish-orange. And it's - doesn't come all the way down to the center of the crater. It's kind of tangent to the north edge or tangent to the edge - it's perpendicular to the scarp line, itself, as it goes down through there.

CC Roger; copy.

CMP Man, it's hard to see that -

06 23 36 09 CMP Everytime I focus on F Crater (laughter) I jiggle a little bit, and I can't focus.

CC Roger. Sounds like you use binoculars at a football game, huh?

CMP ... stabilize binocs.

CMP Yes, these - you know you need the 10 power, but you sure need something to stabilize it.

CC Roger.

CMP You know, I looked down here, - Oh, boy! Just between Tacquet and Menelaus and off to the west of Menelaus, there's a crater that's about 10 kilometers in diameter. And just to the right of it, out in the brown stuff, there's a brand-new spanking-fresh impact crater that has brown ejecta on it. And then some of the other craters - that crater happens to be right on the edge of the

brownish-type material, right over one of the rilles. Hope I can mark that on a picture on the map. And some of the other craters about that same size, around the area, out in there, they have the light-colored ejecta just like the normal small impact craters - recent impact craters out in the Mare Serenitatis itself.

06 23 40 56 CC

Roger, Ron.

CC

Ron, we'd like to get ready - started on some of these state vectors earlier - this state vector, and the jet-on monitor. So if you'll get ACCEPT, we'd appreciate it.

CMP

Okay, you can have it, now. It that - Yes, let's see. Clear the computer for you.

CC

Ron, just for my information - -

CMP

There you have it.

CC

- - I'm sure we - the back room's got it. Could you pinpoint that new crater between Tacquet and Menelaus? Is it what - like halfway between, or something like that. Is it on a check line? Or is it in the rilles there from Tacquet, say east - west of Tacquet, but in the rille area.

06 23 41 53 CMP

It's - Let me get my map.

CC

Oh, that's all right, Ron. It's not that - don't need it that close. Don't want to interrupt your eating.

CMP

No, that's all right.

CMP

That crater is closer to Menelaus - Melanoff, whatever it is.

CC

Okay.

06 23 42 49 CMP

And it's almost directly east of Menelaus.

Tape 111B/4

CC Roger. I'll put a mark here and mark it on my map so you can look at it preflight - postflight.

CMP Okay.

CMP You know, I was looking at D-Caldera and you got a lobate - a lobate flow front sticking down in the crazy thing. I'll be darned.

CC Must be amazing up there. That whole scene seems to change as that terminator is shifting - each rev is something is different in each area, because of that - Sun angle, I'm sure. But - -

CMP Yes.

CC - - But, boy - -

CMP You know, it's almost like - what I originally said, you know, like - maybe there's a high spot or a dry spot and you try to wet it, you know?

CC Roger; I understand exactly what you're talking about.

CMP The flow has come up to it - Yes. That's what it looks like. Just like that.

CC Kind of like a waxed surface, where you throw water on it and it - and the surface tension gathers it together in various lumps and the rest isn't clear.

CMP Yes. Yes, that's it.

06 23 44 47 CMP And the part that the waxed surface - so to speak - in analogy there, is a light bluish-gray.

CMP Picture number 1 on the Nikon was looking south along the terminator in the rilles east - west of Aristoteles.

CMP And the picture number 2 is looking toward Timocharis.

CC Say again. Looking towards where?

06 23 48 12 CMP Timocharis.

CC Okay.

CMP Timocharis is right on the terminator now, the middle - -

CC Roger. Got it.

CMP On that crater that has the definite tan ejecta blanket, if you'll go - directly north - directly north of the center of the crater Auwers, A-u-w-e-r-s, until you come out about one of those rilles there in the Tacquet area, that's about where it is.

CC Roger. Got it.

CMP Well, I had better get busy and start eating, I guess.

CC Roger. You have got to eat here and then - Well, don't get too busy eating. You've supposed to have been eating. I've got to read you up a TEI-55 pad, if you want to take that - -

CMP Oh. (Chuckle)

CC - - then you've got to do your presleep checklist and we'll see you - -

CMP Okay. *** seem like there's enough time to get everything done that you want to get done.

CC Roger. Okay, the computer is yours - back to BLOCK.

06 23 50 55 CMP Okay, going to BLOCK. And you say you have got a TEI pad, huh?

CC Roger. TEI-55.

CMP Okay.

Tape 111B/6

CC Okay, it's SPS/G&N: - -

CMP Copy.

06 23 51 15 CC - - 36076; plus 0.56, plus 0.80; 196:58:46.51; NOUN 81's: plus 2785.7, minus 0957.1, minus 0174.6; roll of 179, pitch is 085, yaw, 343. Rest of the pad is not applicable. Sirius and Rigel are the set stars, but we got a little difference on the hour line. Tonight's hour line is 136:16:00.34; four jet, 12 seconds. I've got three comments. First comment - -

06 23 52 19 CMP Okay. Go.

CC - - longitude of the T_{ig} , minus 156.91 degrees. This pad assumes a trim burn and a LOPC-1 burn. And this pad assumes a lift-off REFSMMAT. Over.

CMP Okay. The last note was assumes lift-off REFSMMAT, huh?

CC That's right.

CMP Okay, TEI-55. SPS/G&N; 36076; plus 0.56, plus 0.80; 196:58:46.51; plus 2785.7, minus 0957.1, minus 0174.6; roll, 179, 085, 343; Sirius and Rigel, 136, 160, 034; four jet; 12 seconds; longitude at T_{ig} equals minus 156.91; assumes a trim and LOPC burn; and a lift-off REFSMMAT.

06 23 54 00 CC That's a good readback, Ron. Okay, it's all yours on the Flight Plan, and - Ron, we might point out that, if you get going into the presleep checklist here, in the VHF comm configuration. Get that done, then there's a break - you'll lose comm and you'll have a 15 - 20 minute break, you can jump into your eat and then go right to bed.

CMP Oh, okay.

CC Ron, my last call, I promise. I need - Here's your H_2 tank configuration. We want H_2 TANK 1 and 2, FANs to OFF. H_2 TANK 3 FAN to AUTO. And you can delete cryo stir from the presleep checklist.

CMP Okay. I've got TANK 1 and 2 FANS, OFF. And H₂ FAN number 3 to AUTO.

CC And delete the stir from the checklist.

CMP Okay, we'll do that. We'll delete the stir.

CC Okay, and we'll be standing by for your onboard readout ... - -

CMP Okay, here's the pan - Oh, okay. May as well get those there. Let's get VHF - -

CC Roger. We concur on that.

06 23 55 03 CMP *** on panel 9. Okay, it's RECEIVE. And, we are in DUPLEX Alfa. And SQUELCH B is - Whooh! About 5, that cuts out the noise. I don't know if I'd ever hear them or not, but, anyhow, it cuts out the noise. Okay, let's see - *** C is about 36.7. Pyro A: barely below the line, but we'll say 37.0, and pyro B is 37.0. Okay, that looks like that's in good shape.

CMP Okay, quantity in RCS Alfa, about 79; Bravo is 76; Charlie, 78; Delta is 80.

CC Okay, we got them. I don't know what they're advertising down here, but on one of the big screens here for the science group, they've got three, four signs put up now. It says the "Marines are looking for a few good men," "United States Air Force is a challenge for the bold," and "Fly Navy," and "Stay in school."

CMP (Laughter)

CC The first thing they put up was - -

CMP Putting all the good things up, huh?

CC Roger; well, the first thing they put up was "Marines are looking for a few good men" and Deke gave me a dirty look, there.

Tape 111B/8

CMP (Laughter)

CC By the way, the troops are getting into the LM right now.

CMP Okay, they're all ready to crawl back in, huh?

06 23 59 02 CC That's affirm, Ron. That closes it all out and you can just precede [sic] through your checklist and we'll stand by, if you want any calls. We will see you tomorrow. And, the Doctor's just - -

CMP Okay.

CC - - wanted one question - whether or not the cream had done any good on those spots where the ZPN was? Has it made it feel better?

CMP Yes, it did, as a matter of fact. And, I forgot to look and see if it is still red.

CC That's all right. As long as it made it feel better.

CMP There's a little bitty spot that must have been the center of it. It's only about one-eighth of an inch in diameter. It's still a little bit red, but the rest of the redness is all gone. And it doesn't itch any more.

CC Real good.

CMP I think I am going to have to use a different mag than what's listed down there for the Hasselblad. I got November November and it's already got 160 frames on it.

07 00 01 58 CC Okay, let me look at FAO here. He's - he'll give me the word.

CMP Okay.

CC Ron, you should use Kilo Kilo in place of November November.

Tape 111B/9

CMP Okay. It's setting there with 65 frames on it.

CMP Okay, Houston; America.

07 00 04 07 CMP Go ahead, Ron.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

06 22 29 02 CDR-EVA All right.

LMP-EVA Okay. And then I guess - then I'll head back to the LM.

CDR-EVA Yes, I don't go to the - -

LMP-EVA Unless you want to go to the ALSEP.

CDR-EVA (Laughter) I think I'm going to.

LMP-EVA When do I go to the - Oh, you go to SEP. That's right.

CDR-EVA No, you're SEP when I ... - -

CC We're going to let you play the return to the ALSEP game there, Jack. We've got a few things for you to do out there, when the time comes.

LMP-EVA Okay.

CDR-EVA ... We're almost to SEP. We're about - -

CC Roger. We'll be just short of SEP.

CDR-EVA - - 50 meters from SEP.

CC Is it short of the antenna?

LMP-EVA Well - -

CC - - We'd like to have this - -

LMP-EVA - - You see, we can get to the end of the antenna - -

CC No, no. Don't - let's have it east of the antenna. If we are there, let's deploy it right where you are.

LMP-EVA Okay. We're about 30 meters east of the antenna. How's that?

Tape 112A/2

CC That sounds great.

06 22 30 11 LMP-EVA Okay. And we're measuring 221 and 0.2; 221 and 0.2.

CC Copy that.

CDR-EVA There's a rock. I stood up down there, and I want to get it - -

CC And it's EP number 2 that we're after, Jack, in case you didn't follow us.

LMP-EVA Okay. Hey, our gate's open.

CDR-EVA It's open?

LMP-EVA Yes. But it looks like everything's here.

CDR-EVA How about the big bag?

LMP-EVA Big bag's there.

CC Is that the gate or the pallet?

LMP-EVA They wouldn't dare run away.

CC The gate or the pallet?

LMP-EVA The pallet. I'm sorry.

CC Well, that's worse.

LMP-EVA Seems to ride all right that way.

CDR-EVA Boy, that dust. It's getting into everything.
(Humming) Okay, I'm going to leave the gate like it is. Seems to be all right.

LMP-EVA Okay.

CDR-EVA Okay; EP-2.

LMP-EVA Where is that? There it is.

CDR-EVA Hey, Jack. You're just going to walk back from here, aren't you?

LMP-EVA I can, yes.

CDR-EVA Well, why don't you just go turn the SEP receiver off? Oh, we did that. The receiver's all done.

LMP-EVA ... the transmitter - but you've got to come out here anyway.

CDR-EVA Yes, I've got to come out here. Forget it.

LMP-EVA I can do it.

CDR-EVA No, I was just reading ahead, but no sense - Forget it.

06 22 32 03 LMP-EVA One thing I want you - Okay. Pin 1. Pulled and safe. Pin 2. Pulled and safe. Pin 3 is pulled and safe.

CC Copied all those.

LMP-EVA And I'll try to put it in a depression. I'm going to put it in a depression, if you want. Okay. And then I've got to take a pan, huh? Will a locator - yes - How about a locator to the LM?

CC Be fine.

CDR-EVA You going to get on, Jack, or walk back? Dealer's choice.

LMP-EVA I'll get on.

CDR-EVA Okay.

CDR-EVA Okay. Locator to the LM. I'll give you a frame count, if I can read it: 90 92.

CC Copy; 92.

LMP-EVA You're going to have to go left a little, right here.

CDR-EVA Go left?

LMP-EVA To avoid the antenna.

Tape 112A/4

CDR-EVA Oh - -

LMP-EVA Yes, we don't have to worry about it.

CDR-EVA - - we don't have to worry about it, but - but I will anyway.

LMP-EVA Go ahead.

CDR-EVA Okay. I'll take it easy.

LMP-EVA Oh, that's all right.

LMP-EVA I want to point out a rock to you I set up on end. You need to get in the bag, and you can let me off there and I'll carry it.

CDR-EVA Okay.

LMP-EVA But drive close enough so I can reach down and use the ... for support.

CDR-EVA Where is it?

LMP-EVA It's out over here. Between the - -

CDR-EVA Oh which side of that antenna?

LMP-EVA It's - -

CDR-EVA Oh, there it is. Right there?

LMP-EVA No. No, it's out - it's on the - it's near the LM.

CDR-EVA Oh, okay.

LMP-EVA Here, I can go across this thing I already did.

CDR-EVA That bag is empty, isn't it?

06 22 34 13 LMP-EVA Yes, that's the one I lost, I mean, I dropped.

LMP-EVA Look's like you got over.

CDR-EVA Yes. Yes.

LMP-EVA I think it's that one there that's sort of dark.

CDR-EVA Up there, straight ahead?

LMP-EVA Yes.

CDR-EVA Bootprints are by it. That must be it.

LMP-EVA That's it, yes. Can you swing over so I can lean on the Rover when I put the - -

CDR-EVA Oh. (Laughter)

LMP-EVA That's good. No, that's good. That's perfect.

CDR-EVA Okay. Get off.

LMP-EVA Okay. I am now - I'd hate to get run over this late in the game. Well now, what did I do that for?

CDR-EVA (Laughter) What did you do? Kick it under?

LMP-EVA Yes.

LMP-EVA Need your oil changed?

CDR-EVA Yes. While you're under there, would you check (laughter) - check my transmission, please?

LMP-EVA (Laughter)

CDR-EVA (Laughter) And - any bubbles on the inside of the tires? (laughter)

CDR-EVA Okay. Have you got it?

06 22 35 35 LMP-EVA Yes, I got it. Hey, Bob. I got my rock. It's halfway between the SEP and the LM. Wait, wait. Let me put it in the big bag - in the big bag.

CDR-EVA Big bag. ... - -

CC Is this that - is this that brown one you saw out here before, Jack?

Tape 112A/6

CDR-EVA Okay. Go ahead.

LMP-EVA No, it's a gray one.

CC Okay.

CDR-EVA Oops - Okay?

LMP-EVA Yes, I just lost the sample. It's in my pocket, I guess. Let me get some tongs.

CDR-EVA Okay.

LMP-EVA Then you can go ahead. I'll walk back.

06 22 37 47 CDR-EVA Okay, Bob. I'm back at the LM - -

CC Roger. We have you back at the LM.

06 22 37 51 CDR-EVA 151, 12.0, and 001. Well, wait a minute.

LMP-EVA Can you get it?

CDR-EVA I got to get your bag - -

LMP-EVA I got it; I got it.

CDR-EVA Let me get your bag off.

06 22 38 19 CDR-EVA I'm reading 80 on the amps, 78 on the amps - Correction, that's amp-hours. Voltages, 62 and 65. Battery 1 is 132, ... 0. Motor temps are 200 and 210 on the rear, 200 and 250 on the fr - forward.

CC Okay. We copy that.

CC Okay. And let's - let me brief you here on the closeout tonight, 17. A number of things we - we're going to do here that are slightly different. We've got some stuff for you over at the ALSEP, Jack, and I'll get with you when you go over there. Nothing we have to worry about in the meanwhile. When we unload the Rover, we're going to take the SESC out, and we're going to use that to collect the contaminated sample

out behind the footpad there as per plan, and when we take the traverse gravimeter off, we're going to want to get both a grav and a bias reading, because the pallet was swinging in the breeze there. Otherwise, let's press on with the close-out, and we'll get with you as times change.

06 22 40 11 CDR-EVA Okay, Bob. The core tubes are going in SCB-7 - I mean - Yes, 7.

CC Okay. I copy that.

CDR-EVA You should have TV, Bob.

CC Roger. We have TV. Thank you.

CDR-EVA Did you get my bag already?

LMP-EVA Yes.

CDR-EVA Jack?

LMP-EVA Yes.

CDR-EVA We'll have one more to put in here. I'm just going to lay this one over here. Yes, the big one. Man, there's some big ones in there, too.

LMP-EVA We can get some of that subfloor.

CDR-EVA Yes, there's one in my footpan, too. You see it there?

LMP-EVA Yes, we'll have to - -

CDR-EVA Why don't you leave that there for a minute? Okay. What did you say about the TGE, Bob?

CC Okay. We'd like to take TGE, of course, as we planned. Take it off, and we'll try and get both a grav and a bias reading. You might initiate one of them now. We'll initiate another one later on. We've got plenty of time while it's sitting on the ground there to - to do our thing with it.

Tape 112A/8

CDR-EVA ... - -

CC I see where you've got ... coming up pretty soon, Gene.

06 22 41 53 CDR-EVA Bob, I already got it and I'm in AUTO. Just about 30 seconds ago.

CC Okay.

CDR-EVA Okay. How are we fixed for samples? Here's 5, and it's about 1/2 to 3/4 full.

LMP-EVA Well, let's dump - -

CDR-EVA We've got to carry the SECS up.

LMP-EVA - - let's dump these - -

CDR-EVA We got 3.

LMP-EVA - - 3 in there, the Rover samples.

CDR-EVA Okay. Okay. We probably ought to put the SESC in there, huh? If there's room for it.

CC Yes, let's put the SESC someplace - -

CDR-EVA Where do you want the SESC, Bob?

CC Let's put the SESC someplace where it's accessible to get that contamination sample. We probably want to get it before you go off to the ALSEP, but there's no real hurry on that. We'll see what works in best. I'm not sure where the most convenient place for you - -

CDR-EVA Yes. Why don't we get it now, and then we can - then we can have this bag - -

CC - - to put it right offhand is.

CC That's probably is the - -

CDR-EVA Let's get it now. We can get the bag cleaned up. We can put it in bag 5.

CC Roger. There's probably not very many convenient places to put it. That sounds like a good idea to me.

LMP-EVA Okay. Let - let me my scoop.

CDR-EVA Get your scoop. Let's get it over with.

LMP-EVA Say again, Bob. You want that - I don't have a scoop, I don't even have a rake.

CDR-EVA They're both gone, huh?

LMP-EVA Yes.

CDR-EVA Use your - your Rover sampler.

LMP-EVA Yes. They both fell off when that thing opened.

CDR-EVA Yes.

CDR-EVA Here's a full core tube we can't forget.

LMP-EVA Yes, oh, that goes in the - -

CDR-EVA Is there room for it?

06 22 43 37 LMP-EVA Yes, why don't you get that scoop off, and I'll put it over here in 4. I mean in 7.

CDR-EVA That was a good time to lose it. I'm glad we didn't lose it (laughter) any earlier. If we were going to lose it, that couldn't have been more ideal.

LMP-EVA Yes. That was appropriate, I guess.

CDR-EVA We got two - we've got two empty core tubes. Feel like we took a lot of them, though.

LMP-EVA We'll get it. We'll use them, maybe.

Tape 112A/10

CDR-EVA Back here.

CC Okay. We confirm that. Please go forward - -

LMP-EVA Hey, I'm getting this ... - -

CC - - and don't have to worry about bringing back, huh?

CDR-EVA Here's your thing.

LMP-EVA ...

06 22 44 20 CDR-EVA We're going to get this SESC now, and get it out of the way, Bob.

CC Roger. We agree with that.

CDR-EVA Okay.

LMP-EVA Minus-Z, huh? You want it in front of the minus-Z footpad?

CC Roger. Sort of underneath where you probably had the - -

LMP-EVA Looks like a good place.

CC - - solar side of the cosmic ray experiment there. Between the SES - between the footpad and the ALSEP doors there.

LMP-EVA Full?

CDR-EVA Oh, I've got about an inch to go.

LMP-EVA Okay.

CDR-EVA ... me. Let's fill it up.

LMP-EVA Looks good.

06 22 45 40 CC Okay. And both you - your feedwaters are up, 17, so things look good.

CDR-EVA Thank you.

CDR-EVA Would you brush the - that white thing off for me?

LMP-EVA Yes. Here, let me get - there, you got her.

CDR-EVA Okay. Take a couple over here.

LMP-EVA Let me go past the radar. Good job.

06 22 46 43 LMP-EVA Bob, radar's built better. I'm on frame 96, and the short can sample - contaminated sample is documented by two stereopairs prior to that. And the before is the cosmic ray pictures.

CC Copy that.

CC Okay. And which SES - which SCB is that going in, Jack?

LMP-EVA Number 5.

CC Okay. Copy that.

LMP-EVA Okay. The SCB's in - the SCB's in 5. That what you have?

CDR-EVA Yes, short can in 5.

LMP-EVA The ... short (laughter) SCB. Okay.

CC Okay. And while you're doing that - -

CDR-EVA Yes. He can ... your - let me get this - -

CC - - remember, I want inventories of the stuff as it comes off the Rover and where you put it over there by the footpad, so we can help you keep track of it.

06 22 47 47 LMP-EVA Okay. I've got the - we've got the big bag, bag 7, bag 5, bag 4 at the footpad.

CC Copy that. We've also got SCB-3 with the Rover samples in it on the Rover, if there - if you have any - yes, you have some of those today.

LMP-EVA No, we - we emp - we emptied those into 5.

Tape 112A/12

CC Okay. Copy that.

CDR-EVA Okay, Bob. The gravimeter's on the surface. And you want a gravity reading and a bias reading, is that correct?

CC Roger. We'll get the grav first.

CDR-EVA Okay, Bob.

06 22 48 34 CDR-EVA MARK it. Let's see, where am I?

CC Copy that.

CDR-EVA What did you do with the - -

LMP-EVA Okay.

CDR-EVA - - gravimeter - You've got another big rock over here from the - -

LMP-EVA It's in my footpan.

CDR-EVA That's from station 9, right?

LMP-EVA Yes.

CDR-EVA That's what I told them. Station 9, I got a football-size rock, and I've put it in there.

LMP-EVA Well, we eventually lost one clamp. Let's see what we've got left on here.

LMP-EVA Okay. Gene's football-sized rock looks like it might be glass coated. And it might even have a shatter cone or two on it.

CC Okay, Jack.

CDR-EVA Okay. I'll let you get - -

LMP-EVA I don't know what you're focused on - -

CC And - -

LMP-EVA - - but here's his rock.

CC - - and, Jack, we're making plans here, to change the camera usage at the end of EVA here. And we're going to let you take commander's camera out to the ALSEP and take a few photos that people think we need. And Gene's going to take your camera out and document the geophone. When he deploys it, we will not deploy it for the long-term experiment, however. And we'll bring both back, and carry them to the ETB when we get done.

LMP-EVA Okay.

CDR-EVA Okay. We've got to reverse the rolls of the camera here.

LMP-EVA While you're getting that, we've got to doff our harnesses. Let me - before you take this - -

CDR-EVA Are you going to start loading the ETB yet or not?

LMP-EVA Well, I'm just about there.

CDR-EVA Okay. I'll be right with you.

06 22 51 46 CDR-EVA Okay, Bob. I've got the cosmic ray in the ETB.

CC Roger. Copy that. It's been in there all along, hasn't it?

CDR-EVA Yes.

06 22 52 02 LMP-EVA Mag Foxtrot, or Franny, I guess, we changed it to. Mag Donna, the DSEA. Mag Echo. Mag Linda. Mag Mary.

CDR-EVA That's the only fallacy. They're not even watching this. Come over here and watch me, Ed. Oh, me. Let me have it.

LMP-EVA Wait a minute. Move over that way. He - he can't - Okay. ... - -

CDR-EVA Did you see me?

LMP-EVA - - see if it comes off.

Tape 112A/14

CDR-EVA Nod your camera if you can see me.

CC Roger. We can see you.

LMP-EVA It's taking too long. Just take it off. Is it off? ... - -

CC That's - that's - that is almost ... at the Cape. Roger.

CDR-EVA Jack, wait - wait - wait a minute before you - Hey, Bob, are we going to need those other core tubes?

CC We'd like to have you leave the two core tubes and the extension handle and the hammer and I suppose the core cap dispenser here. If we get back in time from doing all our appointed tasks at the VIP site and at the ALSEP, we'll try and drive a double core here to end things up with a bang.

CDR-EVA Don't leave it - don't - don't leave it there. Do it. No, don't leave it there.

LMP-EVA Oh, I'll leave it here. You got it.

CDR-EVA We'll play games with the extension handle, but that's all right.

LMP-EVA Okay. Let me set them over here. Where am I? Okay. Big bag, all those - -

CC 17, did you guys leave your - -

LMP-EVA Don't need the LRV sampler any more.

CC - - extension handles when that pallet came open?

CDR-EVA Yes, but we can - I can still drive a core with the hammer if we need to.

CC Okay. Copy that.

CDR-EVA I think.

06 22 58 43 LMP-EVA Yes. One went with the rake, and one went with the scoop. Okay, Bob. As I read down that page, it looks like we got it. The ETB check, I think we had four mags in there, and the DSEA, and the maps, and the cosmic ray.

CC Roger. You've got six mags.

CDR-EVA Okay, and - -

LMP-EVA I guess I'm ready to go to the - -

CDR-EVA Wait a minute. I want you to do something.

CC Okay. One - -

LMP-EVA Six mags, is it?

CC - - one further question.

LMP-EVA You want these - We don't have - -

CC - - Did all the FSRs get off the Rover into the big bag?

LMP-EVA That's affirm.

CDR-EVA Yes, ... more than you need anyway. That's color. Why don't you see if you can grab a couple? Yes, right here.

CDR-EVA Are you through with the 500?

CC Roger. We're through with the 500.

CDR-EVA Jack, where is the cosmic ray? Did you put that in the ETB already?

LMP-EVA Yes.

CDR-EVA Okay.

LMP-EVA I don't think the 500's working anymore, anyway.

CDR-EVA It was working ... - -

Tape 112A/16

LMP-EVA There it is.

CDR-EVA - - I used it.

LMP-EVA There it is. Okay. Film cycle. Three times.

LMP-EVA ... wait a minute ... Okay. Okay. In go the scissors.

CDR-EVA Okay. I'm going to go get a gravimeter reading.

LMP-EVA Now, let's see. ... There it is.

06 22 54 49 LMP-EVA Okay. Mag Karen is in.

CC Copy that. That sounds like all of them to us.

LMP-EVA Okay. And there are two on the cameras.

CC Roger.

06 22 55 09 CDR-EVA Bob, I'm reading 670, 010, 701; 670, 010, 701.

CC Okay. Copy that. We're ready for a bias, Gene.

CDR-EVA Okay.

06 22 55 36 CDR-EVA Bias, and it is flashing.

CC Roger. Mark that.

LMP-EVA Okay. Let me take a look around.

CDR-EVA Jack?

LMP-EVA Yes.

CDR-EVA Was that bag in there?

LMP-EVA Yes. It's over here on the MESA.

CDR-EVA Okay.

LMP-EVA Yes. Oh. Let's get rid of these tool harnesses. We don't need those anymore.

CC Yes. That's affirm.

CDR-EVA You're - You've come loose on the - you've come loose on the right.

LMP-EVA Yes. Take a picture for you.

CC Let me know when they come off, guys. Don't get them tangled up in the hoses. Stand still ... - -

CDR-EVA Let me pull it off for you. ...

CC - - stand still ... untangle it.

CDR-EVA Yes. Okay. Turn this way.

LMP-EVA Now get the other side.

LMP-EVA Okay. That's off.

CDR-EVA Came off, huh?

LMP-EVA Yes.

CDR-EVA You don't have to get it around those hoses and everything? See if you can do it.

CC Works a lot better than the simulations, doesn't it?

CDR-EVA They won't find the other one. Stand by.

LMP-EVA Boy, are you dirty.

CDR-EVA I know it.

LMP-EVA Let's see. I don't know whether I can get to you.

CDR-EVA Yes, you can.

LMP-EVA Ed, you've got your camera in the way.

CDR-EVA Oh, just take them straight on. That's all right.

Tape 112A/18

LMP-EVA That's sort of - ... Okay. (Laughter) Such -
such a pose. Let me get a little different -
focus. That looks good.

CDR-EVA Hey.

LMP-EVA Try one more over here. Have your pick.

CDR-EVA One - one more.

LMP-EVA How's like this?

CDR-EVA Okay. (Laughter) You got that camera. That's
the color camera.

LMP-EVA Yes.

CDR-EVA You take it.

CC Okay - -

LMP-EVA I've got to go get a new neutron flux probe, I
guess.

CC That's right.

CDR-EVA Oh, yes. That's going to be easy to pull out.

LMP-EVA Okay.

CDR-EVA Okay. Let's see if I've got everything in here.

CC Okay. And - -

LMP-EVA You ready for me to go to the ALSEP?

CDR-EVA Jack?

CC Roger. We're ready for both of you guys, now.

LMP-EVA Bob?

CC Roger. Go ahead.

LMP-EVA Hello, Houston.

CC Hello, 17. Stand by. I think we're having a slight handover or something.

LMP-EVA Houston, do you read? Gene, do you read me?

CDR-EVA Yes, I read you.

CC Okay, 17. We had a - -

LMP-EVA ... Well, I don't know ...

CC - - slight bit of trouble there, and we've got you again.

LMP-EVA Are you ready for me to go to the ALSEP?

CC Roger. We're ready for both of you guys, now.

LMP-EVA What do you mean? I'm headed for the ALSEP.

CC Gene, are you ready for Jack to go to the ALSEP, now?

06 23 01 33 CDR-EVA Oh, let me see. Yes, he's gone. He's doing it. I'm ready to get out, and go to the VIP site. Wait a minute, Jack. Wait a minute, here. Wait a minute. Where are you?

CC Yes. We're trying to - -

LMP-EVA Right over here.

CDR-EVA Come on back here a minute.

CC - - we're trying to be subtle there, guys.

CDR-EVA Come on back here a minute. Come on back here a minute. I didn't realize you were going out there quite so soon.

LMP-EVA Well, I just looked to see where it is.

LMP-EVA There. I'll - -

CDR-EVA What did you - what did you do with that -

Tape 112A/20

LMP-EVA How about one of - how about this one?

06 23 02 11 CDR-EVA You got it?

CDR-EVA What was it happened to that one in my footpan?

LMP-EVA I put in the (laughter) big bag.

CDR-EVA Okay. Here we go, Jack. I - Here's one here. Here. All right?

LMP-EVA Yes. Let me - let me get it, so you won't get it too dirty.

CDR-EVA Okay. (Laughter) Very good.

LMP-EVA You hold it.

CDR-EVA Okay. Got it?

LMP-EVA Yes. How about over here?

CDR-EVA I'll put it right over here against that back - background.

06 23 03 11 CDR-EVA Houston, before we close out our EVA, we understand that there are young people in Houston today, who have been effectively touring our country, young people from countries all over the world, respectively, touring our country. They had the opportunity to watch the launch of Apollo 17, hopefully had an opportunity to meet some of our young people in our country. And we'd like to say first of all, welcome, and we hope you enjoyed your stay. Second of all, I think probably one of the most significant things we can think about when we think about Apollo is that it has opened for us - for us being the world - a challenge of the future. The door is now cracked, but the promise of the future lies in the young people, not just in America, but the young people all over the world learning to live and learning to work together. In order to remind all the people of the world in so many countries throughout the world that this is what we all are striving for in the future, Jack has picked up a very significant rock, typical of what we have here in the valley of Taurus-Littrow. It's a rock composed of many fragments, of many sizes,

and many shapes, probably from all parts of the Moon, perhaps billions of years old. But a rock of all fra - sizes and shapes, fragments of all sizes and shapes, and even colors that have grown together to become a cohesive rock, outlasting the nature of space, sort of living together in a very coherent, very peaceful manner. When we return this rock or some of the others like it to Houston, we'd like to share a piece of this rock with so many of the countries throughout the world. We hope that this will be a symbol of what our feelings are, what the feelings of the Apollo Program are, and a symbol of mankind that we can live in peace and harmony in the future.

06 23 05 50 LMP-EVA A portion of a - of a rock will be sent to a - a representative agency or museum in each of the countries represented by the young people in Houston today, and we hope that they will, that rock and the students themselves, will carry with them our good wishes, not only for the new year coming up but also for themselves, their countries, and all mankind in the future. Put that in the big bag, Geno.

CDR-EVA In the big bag.

CC Roger - -

CDR-EVA We salute you, promise of the future.

CC - - Jack and Gene. We thank you for your sentiments and your interest.

CDR-EVA And now, let me bring this camera around. To commemorate not just Apollo 17's visit to the Valley of Taurus-Littrow but as an everlasting commemoration of what the real meaning of Apollo is to the world, we'd like to uncover a plaque that has been on the leg of our spacecraft that we have climbed down many times over the last 3 days. And I'll read what that plaque says to you. First of all, it has a picture of the world. Two pictures, one of the North America and one of South America. The other covers the other half of the world including Africa, Asia, Europe, Australia, covers

Tape 112A/22

the North Pole and the South Pole. In between these two hemispheres, we have a pictorial view of the Moon, a pictorial view of where all the Apollo landings have been made so that when this plaque is seen again by others who come, they will know where it all started. The words are, "Here man completed his first exploration of the Moon, December 1972 A.D. May the spirit of peace in which we came be reflected in the lives of all mankind." It's signed, "Eugene A. Cernan, Ronald E. Evans, Harrison H. Schmitt, and most prominently, Richard M. Nixon, President of the United States of America." This is our commemoration that will be here until someone like us, until some of you who are out there, who are the promise of the future, come back to read it again and to further the exploration and the meaning of Apollo.

CC Roger, Gene. We in Houston copy that and echo your sentiments, and Dr. Fletcher is here beside me. He'd like to say a word to the two of you.

MCC Gene and Jack, I've been in close touch with the White House, and the President has been following very closely your absolutely fascinating work up there. He'd like to wish you Godspeed as you return to Earth, and I'd like to personally second that. Congratulations. We'll see you in a few days. Over.

CDR-EVA Thank you, Dr. Fletcher. We appreciate your comments, and we certainly appreciate those of the President. And whether it be civilian or military, I think Jack and I would both like to give our salute to America.

06 23 10 00 LMP-EVA And, Dr. Fletcher, if I may, I'd like to remind everybody, I'm sure, of something they're aware, but this valley, this valley of history, has seen mankind complete its first evolutionary steps into the universe, leaving the planet Earth and going forward into the universe. I think no more significant contribution has Apollo made to history. It's not often that you can foretell history, but I think we can in this case. And I think everybody ought to feel very proud of that fact. Thank you very much.

MCC I'll see you in a little bit.

CDR-EVA Okay, babe. Let's go to the AL - Okay, Bob. I owe you a - a bias reading.

CC Okay. Or you can get it later. There's no hurry on that. And we're off to the ALSEP.

CDR-EVA I'm going to give it to you right now.

CC Okay. Ready to copy. I presume you've a UHT out at the ALSEP, Jack.

LMP-EVA That's affirm.

06 23 11 11 CDR-EVA 337, 417, 101; 337, 417, 101.

CC Okay. Copy that.

CDR-EVA Are you through with this?

CC Roger. (Laughter)

CDR-EVA Bob?

CC Roger. We're through with it.

LMP-EVA Be kind. Be kind.

CDR-EVA Well, I love it, and I'm sure it did a good job - -

CC Well, we're not through with you, Gene, so don't throw yourself too far.

CDR-EVA No, sir. I just don't want to hit old Challenger there.

LMP-EVA That was unkind. You did the javelin. That was unkind.

CC Roger, Gene. And we - -

CDR-EVA I didn't throw it as far as I could have. I just - -

Tape 112A/24

CC - - we timed the parabola for that, and we have one excellent measurement of g on the Moon now.

CDR-EVA Yes, I didn't get you a - I didn't get you a pendulum, but I don't know where I would, Bob. Okay. I'm going to have to take you out to the VIP site - -

CC Okay. We're ready for that, and we'll - -

CDR-EVA - - if you concur?

CC Okay.

CDR-EVA Well, let me make sure I got everything. Okay. Remember, we -

06 23 13 11 CDR-EVA Okay. Bob, I guess you're reading me through the LM, huh?

CC Roger. Read you through the LM. You guys both read me through the LM?

CDR-EVA That's affirm. Okay. The first thing I want to do - Tell John I'm going to do it exactly like he wants. Okay. The camera is under the seat, I hope. Let me look. Yes, camera's there. Jack, did you do something with the dustbrush?

LMP-EVA No.

CDR-EVA It was under the seat, right?

LMP-EVA It was, yes.

CDR-EVA Yes, I want to make sure it is because I'll need it out there.

LMP-EVA No, wait a minute. I don't know that it's there now.

CDR-EVA Well, I want to make sure that I can get - get something to dust with.

CC Okay. And, Jack, as you go out to the ALSEP, let me cue in on your next 3 hours worth of work out there, repairing the ALSEP. All right? Over.

LMP-EVA Oh, okay. Go ahead. I'm here.

06 23 14 19 CC Okay. Number one, we want to retrieve the UHT. And I quote, "tap sharply" - that's "sharply" on the gimbal, which is the center section there, the little square metal piece in the middle - tap sharply on the gimbal with the UHT, and then re-verify the level on the LSG. We'll check response here in Mission Control after you've done that.

LMP-EVA You mean tap on the thing that swings?

CC That's what they say.

CDR-EVA You always wanted to do that, didn't you?

CC Yes, that's right.

LMP-EVA Well, let me see if I can grab a clean UHT to do that.

CDR-EVA Okay, Bob. Everything is zeroed.

CC Okay. And I'll be talking to Jack here, Gene, for a while. You can interrupt with your comments over - talking over me, and I'll try and copy them.

06 23 15 22 CDR-EVA One comment. I got a flag on the other battery, 139 degrees.

CC Okay. We copy that.

LMP-EVA How much - how much is sharply?

CC Sharply is sharply. It's probably not heavily, but sharply. Fairly light, but sharply.

LMP-EVA On the edge?

CC No. You can see that little square metal piece in the middle there?

Tape 112A/26

LMP-EVA On the edge?

CC You see that little square metal piece on there?
You can just sort of rap on that - -

LMP-EVA Oh, yes. Okay. Here goes. I did it.

CC Okay. And then it says - -

LMP-EVA You want me to do it again?

CC Stand by.

LMP-EVA That was sort of a med - moderate hard tap.

CC Go ahead, and hit it harder.

LMP-EVA It is level.

CC Hit it harder, please.

LMP-EVA Okay. Okay? I can hit it harder yet.

CC Okay. We've observed something there. Stand by.

CDR-EVA Bob, you might be getting TV the way the antenna's oriented right now.

CC Okay. Jack, go ahead. We'll do some more stuff here. In the meanwhile, while they're thinking about what's wrong with it, did you just tap it again?

LMP-EVA No, I didn't touch it. I'm over at the central station now.

CC Okay. They're looking at it. All right. Now, we want to take some photographs at the central station and a few selected - a few selected photographs of the ALSEP. Number one, we want a 7-foot cross-Sun to the south of the ALSEP central station and then a 7-foot down-Sun of the central station. Over.

LMP-EVA A 7-foot cross-Sun to the south.

CC That's what it says.

LMP-EVA And then a down-Sun.

CC Roger. A 7-foot down-Sun.

LMP-EVA You might tell me what they're trying to get with it. I might be able to help them.

CC Okay. I presume that what this means is looking to the south. It was cross-Sun originally. I suspect that's what happened here, the way it was written up. So it's a 7-foot looking at the - all the switches to make sure you guys turned them the right way, I suppose. And then a 7-foot looking down-Sun, so that would be facing west, that side of it.

LMP-EVA Okay. I got it. What else?

06 23 18 08 CC Okay. Now, there's a problem with the central station - which they think the south end is buried more deeply in the dirt than they had intended. And the central station is at the present time getting very warm on the back side on the south side there, which is - they believe you probably buried in the ground when you were trying to tilt it to the proper alignment. They are requesting that, when you're at the ALSEP, you remove any soil buildup or debris with a convenient tool. They don't want you to touch it because it's fairly warm. But if you have a UHT or something to move it - Do you have a UHT with you or something with you that you can brush that soil aside with?

LMP-EVA Yes, sir.

CC Okay. You know the ... - -

LMP-EVA It is piled up there. That's ... - -

CC Yes. Okay. They'd like that brushed away. And you can give me a call - -

LMP-EVA Fortunately, I brought my handy-dandy Rover sampler out.

Tape 112A/28

CC Okay. You can brush that aside, and give me a call when you think that's cleared up the way it ought to be. That's probably one of those things we didn't think about when we decided to tilt the central station.

LMP-EVA Well, you didn't - you couldn't anticipate the soil, Bob. It's very soft.

06 23 19 30 CDR-EVA Bob, we are at VIP.

CC Okay. And Ed Fendell is hard on my back to remind you that it's better to be too far away than too close.

CDR-EVA All right.

LMP-EVA I thought I was, but I think I may move just a little bit. There's a little rise here I can give you. I think I'll give it to you.

CC Okay.

LMP-EVA By the way, Bob, the soil gets more cohesive with depth. I hadn't really noticed that before.

CC Okay. We copy that. What do you notice?

LMP-EVA It's - it's quite a bit more cohesive at - about the - feels about the same down to 3 centimeters out here, and then the cohesiveness goes up, so it's difficult to scrape with the Rcover sampler.

CC Copy that, Jack.

CDR-EVA Well, I think you can see almost everything from here.

CC Okay, Geno. And, Jack, let me know when you get done scraping that soil away.

LMP-EVA I will.

LMP-EVA And now comes the hardest alignment of them all, but I'll get it.

LMP-EVA Somewhere about there. See if I can't tweak it up for you. Bob, the east-west level bubble is not quite level. The north-south is. Do you want me to tweak that up?

CC Yes, you might tweak that up. We are getting a good signal, but go ahead and tweak it up just a little bit.

CC And, Gene, what are you doing these days?

CDR-EVA I'm getting the high gain set up for you.

CC Okay. Now you know why we didn't make you park it in that orientation all the time, don't you?

CDR-EVA Boy, I'll tell you ... it was a piece of cake up until now.

CDR-EVA There, I got you.

CDR-EVA Bob, you got - Bob, you're looking right down the center of my eyepiece. You - -

CC Okay, I don't think - -

CDR-EVA - - you should have TV.

CC Yes, we're getting TV there, Geno.

CDR-EVA You getting it?

CC We've got TV.

CDR-EVA Well, let me take a look, and clean things up.

CC Okay. I guess you can dust and dust and dust some more for a while.

CDR-EVA Let me get this dusting problem out of the way before I do anything else.

CC Roger.

Tape 112A/30

CDR-EVA You can look at your vantage point, and if you don't like it, let me know.

CC Okay. I'll call Captain Video.

LMP-EVA Bob?

CC Go.

LMP-EVA How close can soil be to this back plate of the ALSEP?

CC Stand by. I'll check.

06 23 23 56 LMP-EVA It's about 30 centimeters away, most of the places now.

CC Okay. That sounds good. We'd like you to return to the surface gravimeter, Jack. What you did had some effect, but not - not a lasting effect. And we'd like you to rap even more sharply, more strongly on the gimbal another three times. And we're again watching it, and we'll let you know what to do. And - I might tell you that this has all been done recently this afternoon up at Bendix on the qual unit, and it survived it and so we aren't in any real danger apparently of destroying it.

LMP-EVA Okay. Three times, huh?

CC Roger. Or up to three times.

LMP-EVA Bob, don't let me forget to bring a dustbrush back when I come. ... - -

CC Okay. I'll mark that down and remind you. And, Jack, you'll be glad to know that the temperature of the back plate there has already dropped 20 degrees - 20 degrees.

LMP-EVA Oh, beautiful.

06 23 25 58 CDR-EVA Bob, I don't think that bubble is working.

CC Oh.

CDR-EVA How's your signal now?

CC Stand by. I'll check. But why don't you go to the - to the surface gravimeter?

LMP-EVA Bob, how's your TV lens? I don't have a lens brush. It looks good from here. I don't want to use this unless you think so.

CC Stand by.

LMP-EVA Knock three times. (Singing)

CC Roger. Get out of the way please, Jack, and we'll take a look against some bright soil.

CDR-EVA What?

LMP-EVA No, that's me he's talking to.

CC Okay. It looks pretty good, Geno. Go ahead.

CDR-EVA I ... with the lens brush.

CC Yes, go ahead. It looks pretty good to us.

CDR-EVA Okay.

LMP-EVA Okay, Bob. Here come the raps. Knock three times. Okay.

CC Okay, Jack. That's really fighting it pretty hard. We'd like you to put the UHT in the socket, and rock it very firmly. Don't pick it up, but rock it very firmly from side to side in all four directions - Move the UHT about 6 inches in each direction while you're doing it.

06 23 27 39 LMP-EVA Okay.

LMP-EVA Okay, I rocked it. It's swinging.

CC Okay. Is it reading?

Tape 112A/32

LMP-EVA And the level bubble is - better.

CC Okay. We understand it's in good configuration again as far as alignment and leveling is concerned, Jack. Let's go on and take some more ALSEP photos, and let them think about it for a minute.

LMP-EVA Okay. What do you want?

CC Okay. Next, what we want is some heat flow - Okay. We just got late word. They'd like to do it one more time, and then call it quits.

LMP-EVA The rocking bit, huh?

CC Roger. The walk - rocking bit one more time.

CDR-EVA Bob, I may have moved the high gain. Do you see any change in signal?

CC Stand by.

CDR-EVA If you're happy, I won't touch it.

LMP-EVA Okay, Bob. It's rocked. The shadow ... - the shade is aligned to the Sun now, and it's level.

06 23 29 49 CC Okay. We copy that, and let's go get some ALSEP photos, Jack. I think you got some heat flow photos the other night, besides the two pans. If you did, we may - these may be redundant. They're - they want the cross-Sun and down-Sun of the east hole and cross-Sun and down-Sun of the west hole. And I'm not sure but what you got those earlier. You said you got some extra heat flow, but tell me if you did. They're both - all four of these are 7-foot - -

LMP-EVA I -

CC Go ahead.

LMP-EVA I'll get the heat flow pictures. They - One was 11-foot, I think. And then the steropair.

CC Yes. I think all they're asking for is the two
7-foot stereopairs.

06 23 30 51 LMP-EVA Okay. That's one of them.

CC Okay. What they're asking for, Jack, is a 7-foot
down-Sun and a 7-foot cross-Sun, which isn't quite
what we've been taking in the past.

LMP-EVA I'm getting the standard ones, Bob.

CC Copy that.

LMP-EVA Okay. You got the standard documentation.

CC Okay - -

LMP-EVA 11-footers and 7-foot stereos.

CC Okay. Go ahead. They can't complain about
that, certainly.

LMP-EVA Okay. Now what?

CC Okay. We'd like a 3-foot shot of the lunar mass
spectrometer, including the orifice where the
breccia was. And, Geno, we are observing some
degradation and would like to have the high gain - -

LMP-EVA Cross-Sun?

CC Yes, yes, Jack; 3-foot cross-Sun. And, Gene; this
is Houston. We'd like to get the high gain re-
oriented a little bit. We're observing some de-
gradation in the picture.

CDR-EVA I'll tweak it.

06 23 32 15 LMP-EVA Okay. Got it. Now what? LMS is complete.

CC Okay. Copy that. Now we want to go over the
neutron flux, Jack.

LMP-EVA Okay.

LMP-EVA How's the gravimeter doing?

Tape 112A/34

CC We're looking at it, Jack. I'm not sure.

CDR-EVA Hey, Bob. The panel you want covered. Yes, that's the panel. Okay. You want the - the panel with the - with the ON-OFF switch and the - and the signal strength switch and so forth covered, don't you?

CC Roger. And be sure to get the thing to EXTERNAL before you cover it there, Gene.

CDR-EVA Okay. That was going to be a question of mine.

CC Okay. That goes to EXTERNAL.

06 23 33 58 CDR-EVA Okay. It's EXTERNAL.

LMP-EVA What - what do you want me to do with the neutron flux?

CC Okay. We want a photograph facing south, for the 7-foot. So a 7-foot cross-Sun, essentially, of the neutron flux in the soil.

LMP-EVA Okay. Would you like to have the RTG in that picture?

CC Oh, I suppose if you're generous, you might take a partial pan around to the RTG.

LMP-EVA Well, it's just about that direction. Okay. Now what?

CC Okay. Now let's remove - remove the neutron probe - probe experiment from the ground, and turn it off.

LMP-EVA Okay.

LMP-EVA No more on the gravimeter, huh?

CC No, the gravimeter is looking very bad, still. And, Jack, you might note as you withdraw just how difficult it is to withdraw it. It - it - whether or not it's been seized by the soil collapsing around it or not. That's soil mechanic's goody.

LMP-EVA Not at all, not at all.

CDR-EVA It won't be, I'll tell you. No problem.

CC Okay. We copy that.

CDR-EVA Okay. The high gain is - the high gain is tweaked.

CC Okay. We'll consider ourselves tweaked.

CDR-EVA And I'm giving the LCRU another zap here. Boy, I tell you, I ain't going to do much more dusting after I leave here. Ever.

LMP-EVA Okay. Upper probe is OFF -

06 23 36 06 LMP-EVA MARK it.

CC Copy that.

LMP-EVA Okay, Bob. I'm going to put bus B and D, OPEN, and AUX circuit breaker BYPASS, ON.

CC Okay. Copy that.

LMP-EVA And let me see. Bravo. Okay. And Delta. Okay. Bravo and Delta. Upper probe is OFF -

06 23 36 43 LMP MARK it.

CC Is that upper or lower, Jack?

LMP-EVA Up - oh, lower. I'm sorry, Bob.

CC Copy that.

06 23 36 52 LMP-EVA AUX POWER circuit breaker is ON. BYPASS, ON. And the lower probe is capped.

CC Okay; and, Gene, you need to close that CAUTION AND WARNING FLAG. It's heat sink when it's open, I guess.

CDR-EVA Okay; it's closed.

Tape 112A/36

CC Copy that.

CDR-EVA You want me to put a bag in front of that thing?

CC No, I don't think - -

CDR-EVA Want me to put a bag in front of it in case it pops open again? I guess it won't.

CC No, I don't think so. I can't imagine why it's really a problem anyway, because we got the BYPASS, ON there, and that heat's not going anywhere.

LMP-EVA Okay; now the switch is off, except my 15 volts. Bob, you want me away from the ALSEP now?

CC Stand by, Jack. I'll get one more word before we come back to the LM.

LMP-EVA Okay.

CDR-EVA Yes, I got a camera, over there. I'm going to look under the seats one more time. Nothing but a 500 - Okay. Used tape.

CC Okay. Jack, we're ready to leave the ALSEP.

LMP-EVA Well, I hate to do that, Bob. I'm sorry about this gravimeter, though.

CC Well, you're not the only one. The word is down here there's a whole room full of people who are sorry.

CDR-EVA Okay. I got the LMP's camera. Nothing in here but couple of old bags. We used about all the bags we had, Jack. Not many here. Bob, I have the dust brush tethered.

CC Copy the dust brush.

06 23 39 57 CDR-EVA Okay; let me get one parting shot of - one of the finest running little machines I've ever had the pleasure to drive.

CC Okay. And, Geno, some people down here are concerned about whether you've opened the battery covers or not.

CDR-EVA Yes, sir; they're open.

CC Roger. Copy that.

CDR-EVA Oh, what a nice little machine. Parked on a little downslope, but at the heading you want, and I guess Ed's satisfied with the TV response, huh?

CC Roger. We're satisfied with the TV, Gene. We're ready for you to take the EP number 3.

CDR-EVA Good old Mother Earth is right smack in the center.

CDR-EVA Bob, while we've got a quite moment here, as I go to de - deploy that EP charge, I'd just like to say that any part of Apollo 17, or any part of Apollo, that has been a success thus far is probably, for the most part, due to the thousands of people in the aerospace industry who have given a great deal, besides dedication and besides effort and besides professionalism, to make it all a reality. And I would just like to thank them, because what we've done here and what has been done in the past - As a matter of fact, what has been done for 200 years, you've got to contribute to the spirit of a group of people who form the aerospace industry. And I God bless you and thank you.

CC Roger, Gene. And we thank you guys.

CDR-EVA Well, we're just two little - two little sets of twinkletoes here. There's a lot that goes to getting this Rover running out here that we don't have much to do with. And I guess there might be someone else that has something to do with it too, and I've been reading his signs, maybe not from Him directly, but His in spirit, as we run up and down that ladder. And that's Godspeed, the crew of Apollo 17. And if He's listening, I'd like to thank Him, too. Pin 1 is pulled.

Tape 112A/38

06 23 44 29 CC MARK that.

CDR-EVA I meant the end of the west SEP antenna. Do you agree with that?

CC Roger. Exactly right.

06 23 44 41 CDR-EVA Okay. Pin 2 is pulled. Still safe. Pin 3 is pulled, and it still safe.

CC Copy that, and - -

CDR-EVA Don't know what I would do if it wasn't. (Laughter)

CC - - and now, also, do you have the SEP transmitter turned off there, Gene?

CDR-EVA No, sir. Thank you. Okay. Bob, - -

CC Then we're ready for you guys to get back to the LM and dust it.

CDR-EVA - - it's getting ready - it's getting right adjacent to the ring on the west end, and I'm going to go back and turn the SEP off.

CC Okay. And when that's done, Gene, we're ready for you and your dust brush to hasten back to the LM and dust each other and climb in.

CDR-EVA You know what, Bob?

CC What, Gene?

CDR-EVA Great as an experience as it has been, I'd say we're probably both ready.

LMP-EVA Oh, I don't know. Hey, Bob, 55 Yankee is an exotic-looking rock I found about 5 meters south of the neutron flux hole. It's another gray - possibly gray basalt. It's just that there aren't many of them around here, and so I picked it up.

CC Copy that.

LMP-EVA Cheating a little again.

CDR-EVA Jack, you'll always be picking rocks.

LMP-EVA Oh, I don't know.

06 23 46 10 CDR-EVA Okay, the transmitter is OFF.

CC MARK that.

CDR-EVA I don't blame you. There's so many interesting things around here.

LMP-EVA Just don't lose your brush, Gene.

CDR-EVA Okay, Bob, according to my inventory I'm going to return to the LM and the camera is going to ETB.

CC That's affirm. We'll have - -

CDR-EVA ... we're done with the TGE.

CC Roger.

CC We need a bias reading if you want to use it again, Gene.

CDR-EVA Jack, come to think of it, I - come to think of it, I guess you are, aren't you. Where are you, Jack?

LMP-EVA I'm at the MESA.

CDR-EVA Okay.

LMP-EVA Trying to snap a snap.

CDR-EVA I need a locator here to the LM.

CC Okay; and, 17, we need you guys in the LM in 15 minutes, 15 minutes because of oxygen constraints.

CDR-EVA Okay, Bob, my pictures are taken; I'm on the way. Oh, Boy, where else can you do this?

Tape 112A/40

CDR-EVA If I had landed 30 meters back, Jack, we'd be pitched down 5 degrees.

LMP-EVA You're right.

CDR-EVA Okay, what they're saying is, I don't need my hammer any more.

CC Roger.

CDR-EVA ... dust and get in.

CC We want you to dust and get in. We got 14 minutes remaining before we need the hatch closed.

CDR-EVA Okay, Bob. We'll - we're doing our best. Well, that RTV worked on the hammer, but look at it, Jack. It's worn completely to a nub. It's off.

LMP-EVA I guess that's all right - Look at - Here - my - I don't know where I am. Oh, boy, how about that? Okay.

CDR-EVA Okay, sir, you ready to go on up?

LMP-EVA Well, I don't know. Got to take my camera off. I got another batch of pictures - the LM and the flag and - -

06 23 49 57 CDR-EVA Well, watch this real quick.

LMP-EVA Stereo, even.

CDR-EVA Jack - -

LMP-EVA Let me have your camera. Go ahead. Oh, there ... there. Let me throw the hammer.

CDR-EVA Okay.

LMP-EVA Let me throw the hammer, please.

CDR-EVA It's all yours.

LMP-EVA You got the gravimeter --

CDR-EVA you deserve it. A hammer thrower - you're a geologist. You ought to be able to throw it.

LMP-EVA You ready?

CDR-EVA Go ahead.

LMP-EVA You ready for this? Ready for this?

CDR-EVA Yes. Don't hit the LM or the ALSEP.

LMP-EVA Look at that! Look at that! Look at that! Beautiful.

CDR-EVA Looked like it was going a million miles, but it really didn't.

LMP-EVA Didn't it?

CDR-EVA Okay, here, this is an ETB.

LMP-EVA Let me - let me make sure that that's all cinched up.

CDR-EVA Okay. And then start on up. We got to get going here.

LMP-EVA Yes. Unfortunately, their little plan didn't count for the fact that it's hard to pack the ETB with the film magazines in it.

CDR-EVA And I'll try and get the big bag here cinched up.

LMP-EVA That is a major task.

CDR-EVA Yes, that's going to be - oh, is it heavy. Is it heavy. Something in that core tube you put in there?

LMP-EVA Yes, sir. Don't tell anybody, though, because they'll get mad at me.

CDR-EVA Oh, man, is that heavy. Holy smoley. Oh!

Tape 112A/42

LMP-EVA ... 252. That's about three-quarters of a core - hand pushed - half a meter inside the plus-Y footpad.

CC Okay; copy that.

CDR-EVA Okay, Jack, how's that ETB coming so you can get going?

LMP-EVA Fine.

CDR-EVA Okay, I've got to - -

LMP-EVA I've got to put it on a strap, though.

CDR-EVA I can get that. You can - This is all cinched up. I think it'll hold. Why don't you start on up? Then I'll start dusting you.

LMP-EVA Okay.

CDR-EVA Okay. Very good.

LMP-EVA Anything fall out?

CDR-EVA No.

LMP-EVA Okay. Oh - -

CDR-EVA Let me dust you. Set that down, and I'll hand it all to you.

LMP-EVA Okay, you'll have to hand stuff in - -

CC Okay; and, 17, we - a reminder, we need you inside in 10 minutes.

CDR-EVA Okay, Bob. ...

LMP-EVA I'll do a lot of jumping up here in a minute.

CDR-EVA Your back is clean.

LMP-EVA I'll get the legs as best I can.

CDR-EVA Okay. Why don't you get me here before you do that?

LMP-EVA Okay. And while I'm doing that, will you take this - I'll get it.

CDR-EVA Okay.

LMP-EVA Boy, you got dirty today. I think we're just going to have to live with it.

CDR-EVA Get my top. I can kick a lot of that stuff off my legs. How do I look in back?

LMP-EVA Terrible. Okay, turn.

LMP-EVA Oh, man. You're going to have to - Your legs are really filthy. Not much I can do about it.

06 23 53 58 CDR-EVA Okay, I'll get them off. Why don't you start back - -

LMP-EVA Just kick them against each other ... - -

CDR-EVA Okay. Start on up.

LMP-EVA You might shake the bags.

CDR-EVA Okay.

CC And don't forget your PLSS an -

LMP-EVA No.

CDR-EVA Do what?

LMP-EVA PLSS antennas.

CDR-EVA Okay.

LMP-EVA Although it doesn't make much difference anymore. That's to get them out of the way.

CDR-EVA The big bag didn't stay closed very long.

LMP-EVA I don't know how we can get that in.

Tape 112A/44

06 23 54 30 CDR-EVA There, I'll stand - I can hand it to you.

LMP-EVA It never had a very good closure on it - -

CDR-EVA That velcro won't hold.

LMP-EVA - - but it can be closed.

CDR-EVA I had it over - over the top. The latch was closed, but -

LMP-EVA Oh, it won't hold with all that weight in there. Okay, I got your antenna.

CDR-EVA Okay, let me get a high - Got to close this. You don't want that in your way.

LMP-EVA I can't close it.

CDR-EVA Oh, okay.

LMP-EVA You might try.

CDR-EVA Get all your flaps? Okay, hold your head down.

CDR-EVA Yow.

LMP-EVA Won't go, huh?

CDR-EVA No. Will that bother you getting in?

LMP-EVA I can probably make it.

CDR-EVA Okay, get on up.

LMP-EVA Oops, try that again. Okay, why don't you hand me the neutron flux, and I'll put it - -

CDR-EVA Okay, neutron flux.

LMP-EVA - - on the platform? Okay.

CDR-EVA Why don't you start in, and I'll get some of these bags out of the way.

LMP-EVA Well, I just - You don't want to hand them to me up here?

CDR-EVA Okay.

CC And, Jack, for your thoughts, we've agreed that you can delete the tracking light. We'd like to get you guys in as soon as possible - 7 minutes now. And we'll delete the tracking light test.

LMP-EVA Okay.

CDR-EVA Okay, Bob.

LMP-EVA Okay, that's all I can handle up here. One more - one more and I can put it up here.

CDR-EVA Watch the cover on this one. Got it?

LMP-EVA Got it.

CDR-EVA Stand it up because the cover won't hack it.

CDR-EVA Okay. If you get on in, I'll come up to the porch.

06 23 57 48 LMP-EVA Where's that EVA pallet that's always in my way?

CC I think we aren't going to have one of those tomorrow, Jack, so we did away with that. We hope we're not going to have one of those tomorrow.

CDR-EVA Bob, we're maximizing our efforts, so just bear with us. Jack's going to be in about 30 seconds, and I'm on the ladder hauling some stuff up now.

CC Roger. Don't panic.

06 23 58 23 CDR-EVA Well, we're not. I just don't want you to.

CC I never panic there, guys.

LMP-EVA Got some stuff for me?

CDR-EVA Yes, sir. This is not the time to rush. It's the time to do it nice and slow and right.

LMP-EVA Oh, we're all right.

Tape 112A/46

CDR-EVA Okay. You're not going to like this, but I'm going to give you this one first because I've got it in my hand.

LMP-EVA Either one. Oh, hang in there - I've got it. Yes, that's a heavy bag.

CDR-EVA That is heavy, babe. Let me tell you, that's heavy.

LMP-EVA Okay, next.

CDR-EVA Can you reach that one? If not, I'll shove it in further.

LMP-EVA Okay.

LMP-EVA I got it.

LMP-EVA Okay.

CDR-EVA One more coming at you.

LMP-EVA Okay.

CDR-EVA Tilting up right now.

LMP-EVA Go ahead.

07 00 00 00 LMP-EVA Okay, next.

END OF TAPE

APOLLO 17 AIR-TO-GROUND TRANSCRIPTION

07 00 04 10 CMP Okay. The mike is cutting out on my lightweight headset. But I - but the earphone works real good - works okay. So I'm going to wear the earphone and the lightweight headset, and I'll keep the other - the other one hooked up - you know, this carrier hooked up on different system, so if I need to talk, I can pull the comm carrier over. But I'll be sleeping, and so I'll have to pull the comm carrier over to talk to you. But I can hear you is what I'm saying - ... the headset - -

CC Yes. No problems - no problem, Ron. You're not breaking up to us. You know better than we, though, so - no sweat.

CMP Yes. No, that's on the lightweight headset that I'll be wearing tonight.

CC Roger; copy.

07 00 04 53 CMP I'm wearing the comm carrier now. But it itches if you sl - if you leave it on all night, you know?

07 00 05 17 CMP Okay; get the onboard readouts, recycle the fans; we'll save the potable water - WASTE MANAGEMENT OVERBOARD DRAIN - okay, that's OFF; WASTE STOWAGE VENT valves are closed. BATTERY VENT, by the way, is in VENT. How about a battery readout? ... Alfa is 1. - Okay, OPTICS are ZERO ... OPTICS is ... Optics are stowed. CABIN PRESSURE REGs, two - -

07 00 06 36 CC Hey, Ron, we didn't - we didn't copy your battery manifold - or battery manifold readout.

CMP Battery manifold? It was 1.2, about. And it was that last night, too.

CC Okay. Thank you, sir. You've just made EECOM very happy.

Tape 112B/2

CMP Okay. I don't know when it was 0.6 up there, but I looked at it last night, and it was 1.2.

CC Roger.

07 00 07 19 CMP CABIN REPRESS valve - I haven't kicked them off. I think one of them was closed. Okay. TUNNEL VENT valve should still be off. Okay, it's OFF.

CMP (Humming)

07 00 15 07 CC Hey, Ron. We hear an intervalometer going off every 20 seconds - -

CMP That right?

CC - - It's timed out exactly right. Do you have the intervalometer running on something?

07 00 15 17 CMP (Laughter) No; I can't figure out what that is.

CC We can't either. Because we hear - -

CMP It times it every 20 seconds, huh?

CC Roger. Tommy just timed it out; every 20 seconds exactly.

CMP I got both valometer - intervalometers stuck to the wall over here. They're not hooked to anything.

CC Well, I hope - -

CMP That's funny, because I don't hear that.

07 00 15 41 CC Roger. I'm sure. Well, we're going to get a recording of it. I mean, we - I am going to ... to the recording when I get a chance and I'll show it to you. Because it's been the last 2 days, every 20 seconds, big as life.

CMP (Laughter) I would be curious as to what - see what that is. I don't even have this tape recorder going now.

Tape 112B/3

CC Roger. Understand. We went around the room, Ron.
And everything is in great shape and you're -
you're GO for sleep or whatever you want to do.
We won't call you.

07 00 16 18 CMP (Laughter) Okay. Thank you much. We'll see you
all in the morning then.

07 00 16 24 CC Roger

07 00 43 XX BEGIN LUNAR REV 43

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

CDR-EVA Okay, tilting up at you.

LMP-LM Got it.

CDR-EVA Okay. Okay, next. Okay, Bob, we've got it - -

LMP-LM Up here -

CDR-EVA - - big bag, three SRCs and a neutron flux.

CC Okay, and we gather an ETB coming up with two cameras in it.

CDR-EVA ETB's next.

LMP-LM You have an ETB in.

CDR-EVA ETB has two cameras.

07 00 00 47 CC Okay. And as you guys say farewell to the Moon, we're looking up to the Earth down here where you guys are returning pretty soon.

CDR-EVA Okay.

LMP-LM You're going to have to push that.

CDR-EVA Okay, let me get it. That's all right - I'll wait until you're ready. Okay. Can you make it?

LMP-LM Yes, I've got it. Okay, let me get that other thing in here.

CDR-EVA Bob, this is Gene, and I'm on the surface and as I take man's last steps from the surface, back home, for some time to come, but we believe not too long into the future. I'd like to just list what I believe history will record that America's challenge of today has forged man's destiny of tomorrow. And, as we leave the Moon at Taurus-Littrow, we leave as we came and, God willing, as we shall return, with peace and hope for all mankind. Godspeed the crew of Apollo 17.

Tape 113A/2

CC Roger, Geno. Thank you very much.

CDR-EVA Bob, I am up on the ladder and I'm going to be going through the hatch.

LMP-LM Gene, I've got to get out of your way.

CDR-EVA Yes.

LMP-LM Okay.

07 00 03 16 CDR-EVA Okay, let me - Okay, babe - here I come.

LMP-LM Come on in.

CDR-EVA Hatch look good to you?

LMP-LM Still looks dirty. Okay, keep her down - buttoned. Come towards me a little - there you go. Okay, you've got it.

CDR-LM Okay, I'm inside the hatch.

LMP-LM Okay.

CDR-LM Let me look - let me see that hatch once more.

LMP-LM Okay.

CDR-LM That's the last time we want to have to - open that.

LMP-LM Caught in the same way again.

CDR-LM Let me just - I can see down there.

LMP-LM I can see -

CDR-LM Does it look good to you?

LMP-LM It's clear -

CDR-LM Okay.

LMP-LM There is a little bit of dust but it's all in the - I don't think ...

CDR-LM Roger.

LMP-LM There you go.

CDR-LM If I can turn around.

LMP-LM Yes, I've got to get out of your way.

CDR-LM Yes, I'll wait for you.

CDR-LM Yes, now I can.

LMP-LM Okay.

LMP-LM Okay, I've got to get my hand over here. Okay, I'm out of your way.

CDR-LM Okay. And -

LMP-LM Close the hatch.

07 00 04 46 CDR-LM Hatch is closed. Let's see if I can lock it.

LMP-LM Then we've got to turn our H₂O off. Oh, we've got to turn our - let's turn our water off first, before you lock it.

CDR-LM Well, it's locked now. Can you get your own water? If not, I'll get it - -

LMP-LM Yes, I doubt it. Haven't been able to before.

CDR-LM Okay, I'll get it.

LMP-LM Have you got yours?

CDR-LM Let me see.

LMP-LM Mine's off. No, wait a minute, I can't get it.

CDR-LM Okay. I'll get it for you. And - before you move any more, let me get over here out of the way.

Tape 113A/4

CC Okay. And pay attention here, 17, when you come on, we'd like you to leave PRESS REG A which is the one that's been OFF - we'd like to leave that closed.

CDR-LM Turn around.

CC Just use PRESS REG B going to CABIN.

CDR-LM Okay, Bob.

LMP-LM Get it, Gene?

CDR-LM Turn some more, I can almost reach it - another.

LMP-LM Okay.

CDR-LM Okay. Your AUX water is OFF.

LMP-LM Okay.

CDR-LM Okay, Bob -

LMP-LM No, no. The - the PRIM water.

CDR-LM Okay.

LMP-LM Your PRIM ...

CDR-LM Your PRIM water is OFF.

LMP-LM Is your PRIM OFF?

CDR-LM Yes. It's OFF.

LMP-LM Okay.

07 00 06 19 CDR-LM Okay. PLSS PRIM water closed. Pprt hatch CLOSED and LOCKED. Okay, I've got to get the upper valve, Jack. Move in.

LMP-LM Okay. How's that?

CDR-LM Oh, that ought to do it.

CDR-LM AUTO and I've got the lock on it. Okay, now, Bob, say again which REG A you want left.

LMP-LM REG A left closed, we got it.

CC That's affirm, Jack.

LMP-LM Go ahead.

07 00 06 57 CDR-LM Okay, DUMP valves are both AUTO - CABIN REPRESS, AUTO.

LMP-LM CABIN REPRESS, AUTO.

CDR-LM Okay, and I've got plenty of oxygen so we're in good shape for an AUTO REPRESS. CABIN REPRESS breaker CLOSED at 16.

07 00 07 11 LMP-LM Okay, CABIN REPRESS, CLOSED.

CDR-LM Come on, baby, there it comes. Half a psi. Okay, it is increasing - you can go to CABIN on the regulator.

LMP-LM REG B.

CDR-LM Yes, just the one regulator B. 1.5.

LMP-LM REG B is in CABIN.

CDR-LM Okay, she's coming up. There's 2.0. Your next move will be to get PLSS O₂ OFF. 2.5. Okay, get your PLSS O₂ OFF.

LMP-LM Mine's OFF.

CDR-LM Get it?

LMP-LM ... shortly.

CDR-LM Turn around - I'll get it for you.

LMP-LM I think that I've got it. There I got it.

07 00 08 20 CDR-LM Okay. Verify cabin pressure stable at 4.6 to 5.0 Let's watch it here.

Tape 113A/6

LMP-LM I'm watching; 5.

CDR-LM Okay. 5.0.

LMP-LM 5.0.

CDR-LM Boy, it got hot in here, didn't it? Okay, purge valve to DEPRESS; verify your circuit breakers.

LMP-LM Say again, that last one.

CDR-LM You don't need your ... DEPRESS but you don't need it.

LMP-LM Oh, yes.

CDR-LM Verify your circuit breakers - White Dots - ... EVA decals.

LMP-LM The White Dots.

CDR-LM Okay, I'm squared away there. Squared away?

LMP-LM Am I?

CDR-LM Okay.

LMP-LM Looks good.

CDR-LM Stay at 16 now, ECS SUIT FAN 2, CLOSED?

LMP-LM SUIT FAN 2, CLOSED.

CDR-LM SUIT FAN DELTA-P, CLOSED.

LMP-LM CLOSED.

CDR-LM Caution lights are on, that's good. Until the SEP - wait, ECS caution can still go out when it winds up.

CDR-LM Doff gloves, stow on comm panel. Oh, oh. Sweet music to my ears.

LMP-LM Have to put them on again, in a few minutes.

CDR-LM I know, it's still sweet music.

LMP-LM Come on, now.

CDR-LM I have never seen so much dirt and dust in my whole life. Ever. Ron's not going to be able to see either one of these helmet visors.

LMP-LM (Laughter) Yes he will.

CDR-LM But they sure do get scratched, if you're not careful. Okay. Hey, it's harder getting them off ... than it is getting them on. Maximum effort.

LMP-LM Ah, I did it. Patience. Okay, helmet and gloves are off.

CDR-LM My gloves are off.

LMP-LM Right there.

07 00 11 14 CDR-LM Okay, verify safety on the dump valve. ...

LMP-LM Okay, I verify that there. Just a minute, I want to take a double look at something down there.

CDR-LM What's that? Locked?

LMP-LM Um-hum.

CDR-LM ...

LMP-LM Yes. Okay, DESCENT H₂O valve OPEN.

CDR-LM Okay, DESCENT H₂O valve OPEN.

LMP-LM That's OPEN.

CDR-LM Remove purge valves, stow in purse.

LMP-LM Okay.

CDR-LM Okay, disconnect OPS hose.

LMP-LM Oh boy.

CDR-LM That lock/lock is just tight on there, Jack.

Tape 113A/8

LMP-LM It is. Got it.

CDR-LM Is it off?

LMP-LM Yes.

CDR-LM Okay. Connect LM hoses, red to red, and blue to blue. We've got to do that this time, because we've got to dump the PLSSs. Okay?

LMP-LM Okay. Let me turn around here. Let me get out of your way.

CDR-LM I'll get back in here. Okay, I'm out of the way now.

07 00 13 03 LMP-LM How would you like to get off the PLSS water and get some spacecraft water, too?

CDR-LM Oh, that's the next thing. Suit ISOL and suit FLOW, ON; and then we'll put PLSS pump and fan OFF. Then we'll disconnect the PLSS water and connect spacecraft water.

LMP-LM You might unhook that stuff up there so you can get to your hoses.

CDR-LM I can't reach it though.

LMP-LM Oh, okay. I can get it ...; I can get it.

CDR-LM Okay, I guess.

LMP-LM Okay, we want red to red and blue to blue. We got to verify these two because -

CDR-LM Yes. Bob, you still with us?

CC You bet, I wouldn't leave for the world.

CDR-LM Okay.

LMP-LM Okay, I'm hooked up and locked.

CDR-LM Okay.

LMP-LM You want to verify? And I'll veri - I'll do it for you, if you want.

CDR-LM Okay see if you can't find this one. Okay?

LMP-LM Yes ... verify the red one.

CDR-LM Okay, in and locked?

LMP-LM Got the red one, locked. Locked.

CDR-LM Okay.

LMP-LM Let me take a look at yours.

CDR-LM Locked. Locked.

LMP-LM Okay.

CDR-LM Okay, now -

LMP-LM Ready for suit FLOW.

CDR-LM Yes sir - suit FLOW on both of them.

LMP-LM Okay.

CDR-LM Oh man, it feels great.

LMP-LM Yes sir.

07 00 15 00 CDR-LM PLSS pump OFF and PLSS fan OFF.

LMP-LM PLSS fan is OFF; pump's OFF.

CDR-LM Okay, disconnect PLSS water from PGA. Connect LM water. Boy, I never thought air could feel so cool.

LMP-LM Yes.

CDR-LM Okay, the PLSS water is disconnected.

LMP-LM I think that's mine. Yes, that's mine. Spacecraft water.

CDR-LM Okay. Mine's connected.

LMP-LM How about pushing on that?

Tape 113A/10

CDR-LM Okay. Got to see it, yes - but, I want to see it first. Watch your helmet, Jack. You're going to scratch it. Got it - Yes, got it.

LMP-LM You don't have your visor on - neither do I.

CDR-LM Okay, connect - Okay, PLSS mode, CN. Bob, we're both going off the air. We'll get on LM comm.

CC Okay. We'll be waiting for you. We're here.

CDR-LM Okay, go "0", Jack.

LMP-LM How about some cooling?

CDR-LM Okay, zap me with it, and go "0", and then put your audio breaker OPEN and connect the LM comm. Then ON audio breaker CLOSED. Okay?

CDR-LM You read me, Jack?

CDR-LM You read me?

CDR-LM Read me?

LMP-LM You're loud and clear.

CDR-LM Okay. Next thing, VHF B - wait a minute. You get the audio breaker OPEN, CLOSED - Okay - VHF squelch B LMP. Okay, noise threshold, plus 1-1/2.

LMP-LM Yes.

CDR-LM Okay. AUDIO, both panels. VHF A RECEIVE, and B OFF.

LMP-LM A RECEIVE and B is OFF here.

CDR-LM Okay, mode ICS/PTT.

07 00 21 09 LMP-LM Okay, Houston. We're back on LM comm.

CC Roger, 17. We copy you loud and clear on LM comm.

CC And 17. Jack and Gene, we have a couple of - in fact, we have three records here to read out to you guys. On Apollo 17, two of them; one, the longest single EVA, 7 hours 37 minutes and 22 seconds. The longest total lunar surface EVA time 22 hours 5 minutes and 6 seconds. And the summary, the total lunar surface EVA time for the Apollo Program, 80 hours 44 minutes and 8 seconds.

CDR-LM That's quite a tribute to the people who made it possible. Thank you, Bob.

CC Roger, Geno. And I can't speak as authoritatively as some people have tonight, but for all of us around me, I'll say thank you, also.

CDR-LM Your words are well taken. You know how I feel.

07 00 22 56 CC Hey, Gene and Ron, this is the CSM CAPCOM. Thought you might be interested. Your buddie up on - above you there is chugging on and about ready to bed down himself, right now. And he did take a good look at the landing site through binoculars tonight and took a good look at Shorty crater there, and noticed quite a lot of variations in color. That may be the same color changes you saw in that orange soil and that, but we're trying to match it all up. And Farouk and Ron are working it out. We're trying to match it all up and see if we can get a comparison there.

LMP-LM Excellent. Tell him we'll see him tomorrow.

CC Yes, he's counting on it.

CDR-LM How's America looking to you, Bob?

CC Well, I'll give an update. It - it's working perfect. No problems at all and we got good SIM bay data on everything. The UV, the IR, the lunar sounder, and everything that we - every data point we can see is just great. It's - it's just hardly any anomalies at all. Everything is just wonderful.

Tape 113A/12

CDR-LM Outstanding.

CC Gene, about this total limit of any problem there is, and it's not a problem, is we're just having to stir those H₂ tanks manually because of that limiting cycle on the pressure switch there. We could go back to auto but it's easier to go manual.

CDR-LM I'll be back up there tomorrow and I'll stir them for you.

CC Roger. And Jack and Gene, let me make a note here for you guys. There will be a series of references to this throughout the checklist but there's a general thing and you might even put a piece of tape across it if you want to or something - rather than go through and call out all the locations. We'll leave PRESS REG A closed for the rest of the time. Might just keep that in mind.

LMP-LM Okay, Bob, we'll - I think we'll handle that one okay.

07 00 25 26 CC Gene, there's one thing you may be interested in as - as the Commander. We're going to have to do two burns tomorrow on America. The - the orbit - the mascons didn't deteriorate the orbit as much as everybody thought it was so there's going to be an RCS burn about an hour prior to the - to the LOPC burn.

CDR-LM That's interesting, Bob. Are you going to do a DOI 3, huh?

CC Well, yes, I guess that's what it'll be - it's going to be an RCS burn at about 11 foot per second. It'll drop the - it'll circularize the orbit and then we'll do the plane change burn.

CC Okay, and 17, we'd like you to press on reasonably diligently tonight. You're just about on schedule but if we can turn off this Marine, we'd like you guys to press on. We're looking at a nominal

launch time and we've used up, of course, all the MCC-H conference but we think you're within a few minutes of being right on. If you can press on like you did last night we'll be in great shape.

CDR-LM Okay, Bob. I never stopped doing what I wanted to do anyway even though a Marine was talking.

07 00 29 09 LMP-LM Okay, CDR's OPS 6100; LMP, 6500. Okay, Houston this is the LMP. LMP's OPS is regulating at 4.25.

CC Okay, copy that.

LMP-LM And the CDR's is 3.9 - 3.9.

CC Okay that.

LMP-LM That might be - I started - let me bring it off and let me see where it regulates at next time. I didn't have my hose locked, Bob, and it came off the first try. Bob, we'll take another OPS check later on when we stow them. We're pressing on.

CC Jack, they're saying we better do that before you ... the PLSSs because we have to verify a good one before you - before you dump the PLSSs.

LMP-LM Okay, we'll do that.

07 00 35 16 LMP-LM Okay, Houston, we rechecked the LMP's OPS and it's regulating at 4.25, again.

CC Is that a steady 4.25, Jack?

CMP-LM Yes, it's done that twice now.

CC Okay, and it's steady once you do it, Jack, right?

LMP-LM Right, it's open now. We've been watching it for about a minute, now.

CC Okay, we'll go with it then, Jack.

LMP-LM Okay.

Tape 113A/14

07 00 37 42 LMP-LM Okay, Bob, we're going to start the weighing process here - -

CC Okay we're ready to copy - -

LMP-LM - - It might take a couple minutes to get things squared away.

CC Okay give us a call. We're ready to copy the weights.

LMP-LM Okay.

LMP-LM Bob, sample 15 Echo has a bunch of dust and that gradually accumulated in my pocket.

CC No fair, Jack, you can't go collecting samples after the EVA's over.

LMP-LM Say - say Bob, right now I can't find the sample containment bag number 5. Number 5 collection bag will be in bag 3.

CC Okay, we note that. Thank you. Very good.

07 00 41 49 LMP-LM Okay, and we're going to cross out 3 on the bag, and put a 5 on it.

CC Okay, I think we could keep track of it otherwise; but that's fine.

LMP-LM That's for our reference too.

CC ...

07 00 56 33 CDR-LM Okay, Bob, you ready?

CC Roger. We're ready.

CDR-LM Okay, bag 7 is 32, bag 4 is 31.5, bag 5 is 21, the big bag is 71, the ISA is 22.

CC Okay, we have those five weights there, Geno. We have 32 for number 7, 31.5 for number 4, 21 for number 5, 71 for the SR - the big bag, and 22 for the ISA.

LMP-LM That's affirm, and we're standing by for your GO for jettison.

CC Okay 17. Challenger, we are ready for jettison.

CDR-LM Roger. Understand.

CC Okay and 17, we'd like - -

CDR-LM How do you read, Bob?

CC - - loud and clear, 17. And Challenger, we'd like to keep out the original BSLSS bag, the one that you launched with. We - we think we're going to need that to stow samples in.

CDR-LM Okay, it's out.

CC Okay. Or - or it's in, we hope.

SC-LM Okay.

07 00 59 30 CDR-LM RECORDER, ON.

LMP-LM Whichever way.

CC We want it kept in the cabin, right.

CDR-LM RECORDER's, ON.

CDR-LM Okay, don EV gloves. Let me - -

LMP-LM Okay, the recorder's not giving us any recording though.

CDR-LM See if I can't get a little ... out of some of these things. Don your gloves, Jack. You're -

LMP-LM Why isn't the recording recording?

CDR-LM Are we out of tape?

LMP-LM Be 8 hours on it. I don't think I left it on. I might have left it on. I probably did if it's on now. I thought I read it in the checklist though. Don Arabian will never forgive me.

CC Shall we save ourselves some ascent weight?

Tape 113A/16

SC-LM (Laughter)

CC Unfortunately, Owen wasn't listening.

LMP-LM Well it was okay up until - it was just this EVA if it was on, Bob.

CC Okay.

LMP-LM Because it was working when we prepped, I'm sure of that.

CDR-LM Okay. Did you don your EV gloves? And we'll check each others connectors again.

LMP-LM I'll take my cuff checklist off.

CDR-LM Needless to say, you don't have to put your dust covers on, Jack. If that makes you feel better.

LMP-LM Oh boy.

07 01 01 51 CDR-LM Bob, how long were we out today, 7 what?

CC Stand by, we got it here someplace; 7 hours and - 7 hours 15 minutes and 31 seconds.

CDR-LM How many kilometers did we put on the Rover?

CC We have an approximate total of about 36.1.

LMP-LM Boy this one is really getting stiff.

CDR-LM Probably another 1/2 kilometer on that when the nav wasn't working.

CC I don't - yes, we didn't - we didn't get distance readouts all the time. We sort of interpolated those distances there, Gene.

LMP-LM Push on the button.

CDR-LM Are you opening or closing?

LMP-LM Closing, trying to.

CDR-LM You don't have to push on the button to close it.

LMP-LM Well yes - -

CDR-LM It's not locked.

LMP-LM Now I know why I brought you.

CDR-LM Jack, did you put those gloves on?

LMP-LM I don't know. I was listening to you for one thing. Boy, it is stiff though. Never get it off. ... off.

SC-LM I ...

CDR-LM I ... this thing down there so it - -

LMP-LM Wait a minute. Tangled.

CDR-LM Okay, it just don't want to -

CDR-LM All we need.

SC-LM Okay, ...

CDR-LM Okay, EV gloves are donned. Let's check our PGA connectors. Do you want to check mine?

LMP-LM That's locked, that's not ...

CDR-LM Okay.

LMP-LM Helmet ... changed. Okay. That's locked, locked, locked, locked. Over, I can't see, locked.

CDR-LM Okay, suit circuits shall not be maintained at elevated pressure greater than 5 minutes.

LMP-LM Okay, we want to do an integrity check here.

07 01 05 22 CDR-LM Now, we're not going to use REG A at all.

LMP-LM Right.

CDR-LM Okay, SUIT GAS DIVERTER, PULL EGRESS, verify.

LMP-LM PULL EGRESS.

Tape 113A/18

CDR-LM Now you can verify all that other stuff. CABIN
GAS RETURN EGRESS, verify.

LMP-LM Verified.

CDR-LM And SUIT CIRCUIT RELIEF is a CLOSE. CLOSE it.

07 01 05 40 LMP-LM Okay, it's going CLOSED. CLOSED.

CDR-LM Okay, PRESSURE REG A - let's leave A OFF, and
PRESSURE REG B to DIRECT O₂ - ... 4.0, and then
go to EGRESS, and we'll check on decay.

LMP-LM Okay, go on to - -

CDR-LM Wait a minute ... I should have ...

LMP-LM Yes. Okay, it's unlocked.

CDR-LM Okay.

MS-LM For 3 you're ready for O₂.

LMP-LM How high do they want the suit?

CDR-LM 3.7 to 4.0 cuff gage.

LMP-LM Okay, it's warming up, slowly.

CDR-LM Yes, it could be some warmer.

LMP-LM Off the peg. Down off the peg.

LMP-LM There, you come up on 3.5.

CDR-LM Okay, when you hit 3.7, I'll be with you. So
you can -

LMP-LM Okay 3.7. Okay.

07 01 07 36 LMP-LM MARK it. One minute.

CDR-LM Okay.

CDR-LM You did go EGRESS, right?

LMP-LM Yes.

CDR-LM Okay.

SC-LM (Laughter)

07 01 08 01 LMP-LM Well, it's suppose to be possible to do it.

CDR-LM Hope so, ...

CDR-LM There. Get it.

LMP-LM Yes.

CDR-LM Okay, we've got another 15 seconds to go.

07 01 08 46 CDR-LM Okay, MARK it. In one minute you go to SUIT CIRCUIT RELIEF, AUTO.

LMP-LM Okay, suit - watch your ears.

CDR-LM Okay.

LMP-LM There.

CC And 17, we're watching you, and you look good to us. You're GO.

LMP-LM Okay, I had about 2/10.

CDR-LM And I had 2/10. 3.7 to 3.5. Hey let's make sure we got everything. You went to 4.0, then you went to EGRESS then we monitor SUIT CIRCUIT RELIEF, AUTO; pressure is decaying at 4.8. Okay, that's good. Okay. We're GO for cabin repress.

CC Roger. Roger, you're GO for -

07 01 09 27 CDR-LM Okay, 16 ECS CABIN REPRESS, OPEN.

07 01 09 33 LMP-LM Okay, REPRESS coming OPEN. CIRCUIT BREAKER, OPEN.

CDR-LM Okay. ... I think I'll get this down here.

LMP-LM They want this left in auto?

CDR-LM Huh?

Tape 113A/20

LMP-LM Leave this in auto?

CDR-LM ... just all you want is - -

LMP-LM - - circuit breaker.

CDR-LM - - 16 CABIN REPRESS, OPEN.

LMP-LM Okay. Overhead or forward dump valve OPEN and then AUTO at 3.5.

CDR-LM Get that one down there, now.

LMP-LM Okay, you ready?

CDR-LM Okay, go ahead. I'll give you a call at 3.5.

CDR-LM Circuit relief was AUTO, right?

LMP-LM Yes. Had to be.

SC-LM Okay.

LMP-LM Okay, going OPEN.

CDR-LM It's coming down. I want your AUTO at 3.5, I give you a call my suit is going up.

07 01 10 26 CDR-LM MARK it. Okay, you're 3.5. Verify cabin 3.5 and LM suit circuit locked up at 4.3 and decaying. Okay, it's about 4.6 and decaying. How's it look to you, Houston?

CC Looks good to us, 17.

CDR-LM Okay, Jack. Overhead - make it forward dump, OPEN. And I'll verify we lock up ...

LMP-LM Is decaying, the auto's working.

07 01 11 22 CDR-LM Locking up, and the cabin's at 1.

CDR-LM Okay, hatch opening. Downward.

CDR-LM When I get the hatch partially opened, you can go to AUTO on that valve.

LMP-LM Still no good words about the gravimeter, huh, Bob?

CC No, there's an out - outside chance that it's been a little cold. And they're hoping that if it warms up, that it may take care of itself but, no, everybody's very sad about that.

LMP-LM Well, I could have sprinkled dirt on it, maybe.

CDR-LM Let me ... to the hatch, Jack. Still about 4.2.

LMP-LM Okay, you want that in auto?

CDR-LM I can get it from here.

LMP-LM Okay. And I'll lock while it's on.

CDR-LM Turn around over here, boy I wish you could take some of that dust out. Get it.

LMP-LM Better turn - wait ...

07 01 13 19 CDR-LM The hatch is open, Houston.

CC Copy that.

LMP-LM Okay. Okay.

CDR-LM But, Danny's [?] not out there, to hand us down the light weight PLSS's.

LMP-LM Okay. Here goes the old - whose PLSS is this now?

CDR-LM Well, look at it, if you want a memory.

LMP-LM That must be yours it's red. No, that's mine, no it's yours. Here goes the old Commander's PLSS.

CDR-LM Okay, baby thanks for doing a good job. And that was a backup PLSS too.

LMP-LM Well, that wasn't very good.

CDR-LM It walked down the ladder.

Tape 113A/22

LMP-LM It went down as gracefully as you did.

CDR-LM Look at that. Okay, what's next?

LMP-LM Well, I can give you some of these. Here hold -
okay. Everything that's in here. Okay. That's
the first thing.

LMP-LM Okay. Okay.

CDR-LM Let me.

SC-LM ...

LMP-LM Beautiful gloves.

CDR-LM Yes. Houston, I think we ought to probably just
mention, anyway. We are jettisoning a set of -
2 sets of EVA gloves. I think that's worth
mentioning. Because they did their job.

LMP-LM Just like everything else did its job. I jetti-
soned mine.

CDR-LM Okay.

LMP-LM Whoops, we didn't get them cleared.

07 01 15 17 CC Okay, we copy 2 sets of EVA gloves to the surface
for the last time.

CDR-LM They're very reluctant. (Laughter)

LMP-LM What else have you got there?

CDR-LM Is - ISS.

LMP-LM ... the other ISS.

LMP-LM Nope, one more.

CDR-LM That it?

LMP-LM Got one more thing.

CDR-LM No wait. Oh, is there something ... ?

LMP-LM Watch it. Take this, I'll get it.

CDR-LM Okay, let's get this out.

LMP-LM Okay, the old LMP's PLSS. The OPS stays where it is.

CDR-LM Okay. Okay, put your - get it down there and then put your foot against it and it'll probably go. The only geologist's PLSS on the Moon. Good boy. Have fun PLSS.

07 01 17 05 LMP-LM It'll stay there. Okay, we got everything else. Okay. - -

CDR-LM Hatch seal clear.

LMP-LM Pretty good.

CDR-LM Pretty good from here.

LMP-LM Too bad we don't have a broom.

CDR-LM Is that everything else? Nothing else here to go. Nothing behind you. Nothing here. Okay.

07 01 17 22 LMP-LM Hatch going closed.

LMP-LM ...

CDR-LM I know it.

CDR-LM Okay, forward hatch closed. Let me see if I can't lock it. Okay, it's locked.

07 01 17 54 LMP-LM Okay, CABIN REPRESS, DUMP valve, both AUTO, verified.

CDR-LM They're - all are auto and locked. Okay.

CDR-LM CABIN REPRESS, AUTO. Verify.

LMP-LM Verified.

CDR-LM At 16, CABIN REPRESS, CLOSED.

LMP-LM REPRESS going CLOSED.

Tape 113A/24

07 01 18 10 CDR-LM MASTER ALARM and CABIN WARNING LIGHT ON. There it is. Cabin's coming up. Okay, it's increased and you go to ca - cabin on the one reg.

LMP-LM One reg, Bravo.

CDR-LM Cabin - ...

CDR-LM Okay, cabin's coming it's about 5.

CDR-LM Okay, lights are off. Repress stopped. Cabin pressure stable. Okay, Houston, Challenger, we're going to take off our gloves.

07 01 19 51 CDR-LM Hello, Houston. How does it look?

CC Roger. You look stable, and stand by.

CC Okay, you're GO to unsuit there, guys.

LMP-LM Speaking of suits. These things perform super.

CDR-LM Okay, and we can get our helmets off.

LMP-LM If I can ever get unsuited. Oh, this is funny. (Laughter) That's my hand. Let me try the other one.

CDR-LM Oh, let me get it for you. I can free here - Yes, but I'm (Laughter).

LMP-LM There. The right one went easy - I think they're all really getting -

CDR-LM Oh, and the helmet is off and I'm throwing it in the BRA.

LMP-LM Well, there's no changing our minds now, the PLSSs are going to be hard to retrieve. But you could if you had to, though.

CC Challenger, Houston. From the old backup crew that followed you every step of the way, super job on EVA you guys.

LMP-LM Thank you, John. Appreciate the words José. But we also appreciate your helping us get it this far.

CC Roger; Neil.

CDR-LM Hey, you know in - in all those things you tell people - Was that Charlie? I haven't heard your voice since - you know all those good things you tell us about dust and all those other things, you know, you believe them all just like everybody else does - but you've just got to come out here and experience it for yourself to really be a believer.

CC Yes, well I take it back about it all looks the same.

LMP-LM Hey, it - it really doesn't Charlie, but all those physical things you get handicapped with - there's a lot of easy things as far as 1/6 g - but all those other things - you know there's nothing like doing it to be a believer.

CC Well, you guys did it great.

LMP-LM Charlie it may all look the same but Taurus Littrow, mark my words, has some variety.

CC Yes, we could tell that, Jack. Great job.

LMP-LM Thank you, Charlie and thank you for all the help.

07 01 23 24 CDR-LM Hey, Charlie I remember a long time ago when I said something about being down among them. I didn't know what it was until we got here.

CC Challenger we have a good word from the old program managers even though you guys were pretty piggy there in bringing rocks back, we're going to let you keep them all. You only busted the red line by 40 pounds.

LMP-LM Okay, he's a pretty good guy any way.

CC That assumes your good buddy upstairs gets a good plane change tomorrow.

LMP-LM Oh, he will and I tell you Gene and I both have lost 20 pounds apiece on this mission.

Tape 113A/26

CC We can believe that.

CDR-LM Verify safety's.

LMP-LM Hey, we're on VOX anyway - let's go to ICS/PTT.

CC It's safer that way.

CDR-LM Yes, specially when you don't know you're talking.

LMP-LM Okay, we came to the end of the EVA-3 prep and post card.

CC Roger. We're following you to the surface checklist.

CDR-LM Hey Jack and I are going to frame this - Jack and I are going to frame this page 2-3, cut it down the middle and each take half.

LMP-LM I'm going to take the front half. Gene will take the back half.

LMP-LM Okay, Roberto, we're going to manage the old batteries.

CC Okay, and Challenger we're ready to manage the old batteries.

LMP-LM The old ED batteries are 37.2 - A and B. I was just going to say I wish we had a broom.

07 01 30 18 CC Okay, we're happy with your battery management. We're ready for you guys to go to low.

LMP-LM You got - you got low.

CC Thank you.

END OF TAPE

Tapes 113B-116B/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 02 42 XX	BEGIN LUNAR REV 44
07 04 41 XX	BEGIN LUNAR REV 45
07 06 39 XX	BEGIN LUNAR REV 46

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 01 31 20 CC And, Challenger, it's Bob. I'm going to turn you over to Casper about now, and let him put you guys to sleep.

LMP-LM Bob, I'm not sure what you mean. Who's your friendly ghost?

CC I bet you can guess.

LMP-LM He doesn't know anything about the LM. He doesn't know anything about the LM.

MCC It's never too late to learn.

LMP-IM For you, I'd believe that; for a lot of people, I wouldn't.

CDR-LM Welcome aboard, Ken.

MCC You guys make a pretty interesting show to watch.

LMP-LM I hope so.

LMP-LM All I can do is hear your breathing, Ken.

MCC Yes. Just noticed that.

07 01 39 22 LMP-LM Hey, Ken. You can tell your friends off to the left there that I've turned the biomed off.

MCC Okay. Thank you.

07 01 45 32 CDR-LM Hello, Houston; Challenger. CDR's going off the air.

MCC Okay.

07 01 56 32 MCC Hey, Jack; Houston. You busy?

LMP-LM Say again, Ken.

MCC Are you busy? I'm sitting here looking at a couple of questions that they wanted to ask. And whenever it's convenient for you - I'm not sure

Tape 114A/2

just how busy you are right now - and just keep in mind I've got a few questions to ask you on the traverses, and give me a call when you're ready to talk about it.

LMP-LM Okay; we're suit - unsuiting, Ken. Let us get unsuited, and then we'll be back - be back with you.

MCC Okay. Just whenever it's convenient for you.

07 02 06 57 MCC Challenger, Houston.

LMP-LM Go ahead.

MCC Hey, how about if we hit a PRO on the DSKY and get it into POO and back into STANDBY? We're worrying about the clock registers overflowing. And we'd like to get that done before 172:50, or somewhere in that neighborhood.

LMP-LM Okay; stand by.

LMP-LM Is that what you wanted?

MCC Oh, we can't watch it, Jack. If you just tell us that you've got it into POO and back into POO.

LMP-LM That's what happened.

LMP-LM I thought you watched it the other night.

MCC No, we don't have any high bit rate now.

LMP-LM That do make a difference. That's right.

MCC I understand that - that you've completed that transition. Is that correct?

LMP-LM Which one?

MCC You did get it out of STANDBY into POO, and then back. Is that correct?

LMP-LM That's affirm. We completed that.

MCC Okay. Thank you.

LMP-LM Sorry to be so unclear.

MCC Hey, we - we also are still on your stowage. So when you get on page 7-6, where it says, "Stow Heaviest Collection Bag," down in the right-hand column towards the bottom, why don't you skip that step until after the eat period. And we're still working on the stowage locations.

LMP-LM Okay.

07 02 22 33 CDR-LM Hello, Ken. How do you read Challenger CDR?

MCC Loud and clear.

CDR-LM Okay.

07 02 39 13 CDR-LM Houston, Challenger. How would you feel about this canister being changed now?

CC Stand by. Okay; change her out, Geno.

CDR-LM Okay.

CC For your information, we're trying to negotiate some time for you here. We're about one and a half down. We know how to pick up 1 hour of it, but we haven't quite figured out how to gain the other half.

CDR-LM Okeydoke. Well, we're - we're all unsuited now, and we're about ready to talk and eat at the same time, or listen and eat here at the same time. And it won't be long and we'll be ready to hit the sack.

CC Okay; fine. Ken's trying to negotiate the question sessions for you here.

07 02 43 52 CDR-IM Canister's changed out, now.

CC Thank you.

07 02 46 04 CDR-IM Okay, Ken, we're on and ready for that debriefing. And you should be getting Jack's biomed also.

Tape 114A/4

MCC Okay. Okay. Before we start on those questions, are you prepared to copy some lift-off times in your data book, and that kind of stuff?

CDR-LM In about 10 seconds.

MCC All right, sir.

LMP-LM Go ahead, Ken.

MCC Okay. This is rev 44. Lift-off: 174 plus 13 plus 49. TPI: 177 plus 01 plus 00. Okay; I'll give you just the lift-off times. Excuse me. For rev 45: 176 plus 12 plus 19; 178 plus 10 plus 49; 180 plus 09 plus 20; 182 plus 07 plus 50; 184 plus 06 plus 20. Rev 50 is 186:04:50. Over.

LMP-LM Okay, Ken. Starting with 44: 174:13:49; 176:12:19; 178:10:49; 180:09:20; 182:07:50; 184:06:02 [sic]; 186:04:50. And what's the present rev, please?

MCC Okay; we're coming up on 40 - in fact, it looks like we're in 44 right now. Okay. And, Jack, how about let's confirm that the rev 49 was 184:06:20.

LMP-LM Oh, I did have that wrong, in the seconds - two zero seconds.

MCC That's affirmative. Okay; and we've got your biomed coming through.

LMP-LM Well, one - one - Am I alive?

MCC Just barely.

LMP-LM Ken, I'd like to believe that you read that one wrong, because I've gone through 50 copies on that without a mistake.

CC Well, I'll - I'll settle that with you when you get back.

LMP-LM 50 rev.

CC All right, sir. And - -

LMP-LM Okay.

MCC - - looks like it's about time for an eat period, and I've got these questions for you. But let's keep in mind that that's secondary, and if it ever gets in the way of eating, why holler up, and we'll just drop it right there. We're about an hour and a half behind the time line, and we're going to make up no more than an hour of that.

CDR-LM Okay.

LMP-LM Well, I think - -

CDR-LM Okay, Ken. We're cutting into the chow and go ahead.

MCC Okay. Would you like for me to just read you all the questions, and let you mull those over before you work on it, or you want to do one at a time?

LMP-LM One at a time's better, Ken.

MCC All right, sir. Number 1. Wanted to know if the blue-gray rocks at station 6 are similar to those at station 2?

LMP-LM Ken, I think they are. But I think you'll find that the ones in station 6 are much more metamorphic rock, or recrystallized rock, than the ones we had at station 2. I had the impression that the ones we were sampling at station 6 were - were really inclusions in the - anorthositic gabbro - and had - had been probably considerably metamorphosed by it being included in it; whereas, the ones we had at station 2 were a separate rock type apparently, as I recall it, anyway.

MCC Okay; that's good.

LMP-LM Ken, let me just say that I - My impression is that there was a lot more action in the rocks at station 6 than 2. I saw a lot more; a lot more was evident, the inclusions and, some of the patterns, some of the other things we saw.

Tape 114A/6

07 02 52 08 MCC

All right, sir. Let's go on to the second one, and it said: Do we understand that there were no breccias at station 8?

LMP-LM . In the one - that parent orthopyroxene plagioclase rock - was a breccia in the sense it was fractured and was injected by dark glass. But it would be what we would call a mosaic breccia, in that respect, I think, and not the - Didn't see any station 6- or station 2-type breccias there at all. Other than the subfloor gabbro, that orthopyroxene plagioclase rock was the only major rock type I think we saw, unless we picked up some in the rake sample.

MCC Okay. Okay; the third one says: What are your impressions of the distribution of the - the familiar subfloor gabbros throughout the EVA-3 traverse?

LMP-LM Well, I don't - I don't - I think we discussed that a little bit on the traverse - quite a bit, as a matter of fact. The impression I had was that most of the traverse on the plains, with the one exception of - of Van Serg Crater, were - We were in box fields or fragment fields that were almost - well, were dominately subfloor. And visually from the Rover, I had no impression of any other significant rock type, with the exception of occasional blocks of the gray variety of the subfloor gabbro. And I don't know - Gene - I don't know what Gene's impression was. He was driving a lot, but - pass it on.

CDR-LM I think - we actually even commented when we hit the breaking slope coming back out of station 6 and 7, and then back off at - coming back down at 8 - how the terrain features changed. I think that was due principally to the - to the - what we've been calling the subfloor material evident. And there again, it was, what I would say, particularly mantled, filleted, much like we have here where the LM is, with the exception of Van Serg, where we actually saw fragmental boulders for the most part, a lot less buried sitting on the surface.

MCC All right, sir. At Van Serg, some rocks were described as gray breccias, and some contained white fragments. Was there a variety of breccias present?

LMP-LM I think - I think not, Ken. My impression was that there was a variety only in their - in the degree to which they were fractured. We found and sampled, I think, the two major - one extreme - extremely fractured rock that I said was - was friable. Anyway, it broke into small pieces very easily with a hammer or in your hand, if you worked at it. And the other was a breccia that was not - was much more cohesive than that. It was not fractured or friable at all, but they both were on the rim, and I think they were just varieties of - probably of shock fracturing.

MCC Okay. Could the Van Serg breccias correlate with the blue-gray material at Cochise?

07 02 56 40 LMP-LM That's possible, I guess. But my first guess would be that the blue-gray at Cochise was blue-gray subfloor. And, well, I don't know. That's a good question. That's a good question. We - Maybe with the pictures we have, we can work out the - an attitude - approximate attitude on that contact that I talked about in Cochise, and see if it would project over reasonably to Van Serg. I wouldn't be surprised if it would. That's a good - that's a good point. To me they looked very similar.

MCC Okay. And you guys sure you're eating?

LMP-LM But - but - Ken, Ken, Ken - -

MCC Go ahead.

CDR-LM Yes, we're eating. We're fixing and eating at the same time.

CC You're mighty efficient. Go ahead. You were starting to say something.

LMP-LM You just - yes, Ken. I think from a distance we saw the blue-gray in Cochise, you couldn't

Tape 114A/8

make a definite correlation. But it's a good idea and ought to be considered as one of the possibilities. The other is that we just had a window in the subfloor that coincidentally - I mean one underneath the subfloor might be that breccia. Oh, incidentally - the Van Serg impact hit that window.

MCC Okay. Can you tell us anything about the cowpie at Van Serg. Was that a clast in the breccia?

LMP-LM Negative. It was a - excuse me; I have my mouth full.

MCC It's about time.

LMP-LM It was an ag - it was an aggregate of irregular - looked like agglutinated glass in fragments just sitting on the rim of Van Serg. And the reason I said I thought it was in place or had - had fallen there and crystallized there, is that there were four or five similar fragments arranged in a small coherent area. Not making that very clear I don't think, but it looks as if it hit and broke apart upon hitting a little bit but didn't - didn't really splatter or - or break apart in any significant manner.

MCC All right.

LMP-LM There are similar things - I tell you what it looks like. If anybody'd walked up the rim of Kilauea Iki in the ash out there, and on top of the ash, there are bombs that were fairly clearly molten when they hit, and they had just - just enough spring to break when they hit. But they - the individual pieces didn't move very far at all. And you can see that pattern on Kilauea Iki. And it was the same kind of thing, except that there was no directional aspect of it here.

MCC Okay.

LMP-LM And that's not to say it's volcanic glass. That's just the kind of pattern it was.

MCC Okay. Can you tell us if the darker material in the bottom of Van Serg was similar to the collected rim material?

07 03 00 52 LMP-LM I think so, except as Gene pointed out, the clasts were coarser. They were coarser in the bottom than about anything we saw in the rim.

MCC Okay. Are there any distinctive features, other than color, to separate tan from blue-gray breccias, such as joining, or massive nature, continuity, anything of that nature?

LMP-LM Yes, we're - -

CDR-LM Where did we find those tan breccias?

CC Challenger, this is Bob. I think we were talking about some of them, I think, at station 1 the first night. We had both natures. In fact, I think we had - Didn't we have two of those in the same rock together?

LMP-LM They were both gabbros.

CC Yes, excuse me - -

07 03 01 57 LMP-LM Bob, they were tan gabbros and blue-gray gabbros.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 03 02 52 CC Roger. Okay, yesterday, excuse me, I wasn't reading the question. Okay, the breccias - they were tan and blue-gray breccias yesterday at station 2, were not - were there not? You have the two type - types of breccias at station 2.

LMP-LM Oh well, yes, yes, that's right. And now as I think back I guess that's the main difference between the tan rocks at station 2 and station 6, but the ones at 6 appear to be - have an igneous texture or at least a very crystalline texture and inclusion-like masses of other rocks. Whereas, the ones at station 2 they - they seem to be fragment breccias, as I recall. That's right, although they may have been recrystallized or metamorphosed, they were clearly breccias at station 2. I just forgot about that.

07 03 03 00 CC Okay, copy that. Okay, and can you amplify your description going out to station 6. In particular were there blue-gray and tan-gray bands on the North Massif?

LMP-LM Rather than bands, there were lines that appeared to be the upper terminus of the - of the source of the boulders that were strewn below that line. And those lines tended to be either - show a blue-gray source or a tan-gray source, if you will.

LMP-LM Oh, those ...

CC Challenger, if you - if you think you're talking to us, you're breaking up badly.

07 03 04 14 LMP-LM I just thought you might be interested, we just had a little spurt of dust come up by the window.

CC Was there a sleigh with it?

LMP-LM Wise guy.

CC Okay. Did you see very much of dust, or was it just one little shot?

Tape 115A/2

- LMP-LM Can I - one little shot, it was actually just particles. Something we threw out must have popped.
- CC Okay, do you have any preliminary stratigraphic sequence for the plains?
- LMP-LM For the plains, huh? Well, my guess would be that the Van Serg breccias were the oldest rocks. The gabbro - subfloor gabbro's the next oldest, and the mantling material's the youngest. But that's - the only good clear relationship was mantle on top of the subfloor gabbros. I - we really don't have a good relationship of the breccias and I just - I guess I lean towards thinking that that Van Serg was a window in the subfloor rather than being a bed of some kind, on top of the subfloor.
- 07 03 06 11 CC Okay, and do you have an opinion on what underlies the Sculptured Hills?
- LMP-LM Well, I think, we said - the rake sample is probably going to tell the tale there. My guess is from the boulder - boulders and subfloor around up there that - are of gabbro and maybe the Sculptured Hills are a version of the subfloor rock. I don't think that the orthopyroxene anorthosite rock was necessarily indigenous to the Sculptured Hills. It was glass-coated and permeated by glass so I suspect it may have been thrown there by an impact somewhere else.
- CC All right sir, we've got one last thing for you to clean up. Back on page 7-6 of your checklist, it looks like we may have skipped some steps on the GAS RETURN valve, and like to make sure that you get to AUTO and the GAS DIVERTER PUSHED to CABIN before you stow the oxygen hoses.
- LMP-LM Okay, Ken, we got CABIN GAS RETURN, AUTO.
- CC Okay, understand AUTO and you got the select to CABIN?
- 07 03 08 10 LMP-LM Yes, GAS DIVERTER pushed to CABIN and we're trying the PGAs now.

CC All right, sir.

CDR-LM And I guess if - if you could go in - my feeling is if you go to the bottom of every one of those large craters like Camelot, you could examine some of these fragments on the walls and down into the bottom, I just get a feeling you'd find this - this blue-gray breccia down there.

CC All right, sir.

CDR-LM I mean in all the big craters like Camelot.

LMP-LM Well we - I think maybe that's true, however, we did not see isolated fragments of it very often, if at all, out here on the, the plains themselves, away from the craters. So if the blue-gray breccia does - the Van Serg breccia does underlie the sub-floor, the craters are not - it's far enough that the craters we have apparently have not penetrated and brought up much of that kind of material. Well that's it.

07 03 09 45 CC Okay guys, it's time to press on and finish up chow time and I've got your stowage summaries whenever you're ready for that, to get started on.

LMP-LM Okay, Ken let us finish eating, then we'll go back to work.

CC Okay, give me a call when you're ready.

07 03 10 17 LMP-LM I'll help you in just a second.

07 03 14 10 LMP-LM Okay. Okay. Ken I'd like to go ahead and hear your recommendations on stowage and I'll write it down.

CC Roger. Page 2-2. I've got some numbers to fill in at the bottom under the collection bag stowage.

LMP-LM Okay, I've got it.

Tape 115A/4

CC Okay, number 1 with the aft engine cover is bag 8. And then the second line, it's bag 7. The third line it's bag 6 left hand and 5 right hand. And the last line is bag 2 and 4. And you can disregard the max weights.

LMP-LM Okay, just so we got it straight aft engine cover, bag 8. Left hand side, bag 7. Left hand plus the right hand side; number 6 left hand and 5 right. And the ISA bags 2 and 4.

CC That's affirmative.

07 03 15 24 LMP-LM Okay.

07 03 18 57 CC Hey, Jack, the people down here watching things noticed that your SUIT ISOL valve is still in DISCONNECT if you're trying to dry the suit out you might check that. It's your option what you want to do with it.

07 03 19 12 LMP-LM I'm glad somebody is watching things. Thank you.

07 03 43 25 CDR-LM Ken we're in the process of getting all these bags in the proper places, now.

07 03 48 03 LMP-LM Ken, this is Jack, why don't you make a note that mag Bravo is empty, with miscellaneous photos since the last report on it.

07 03 48 15 CC Okay.

07 03 51 36 CDR-LM And, Ken, we're stowing mag Nancy at a reading 153.

07 03 51 44 CC Okay, copy 153.

07 04 04 15 CDR-LM Houston, Challenger.

CC Go ahead, Geno.

CDR-LM Okay, Ken we're - all we've got left to stow now is the buddy SLSS bag and that's in work. And we got all the ETB stuff taken care of. All the other bags are stowed per your recommendation. We'll be configuring the ECS for sleep and putting

up the hammocks here shortly and as soon as we can get cleaned up personally a little bit, we'll be in the sack.

CC Okay. Sounds great.

CC Hey, Geno, the guys are looking at that buddy SLSS bag and suggested you all make sure that you're going to have room to do the equipment jettison and get the hatch open and all that. They had planned on stowing it the next day.

CDR-LM That's a good thought, Ken. Thank you, Ed. The fact is that probably may think more convenient - we were going to be smart and get ahead here but, thank you.

CC The faster I run, the behinder I get.

CDR-LM Yes. I keep forgetting these checklists have been exercised a hundred thousand times.

07 04 06 50 CC Yes, we keep remembering that.

07 04 11 06 CC Challenger, Houston. If you'll just give us a call when you're ready to sack out we won't bother you and just that way we can keep track of what you're doing and when you're about ready to go to bed and we'll get you up at an appropriate time.

LMP-LM Okay, Ken, this is Jack. I guess I have the duty biomed tonight, so I'll give you a call when we're turning out the lights.

CC Okay.

LMP-LM And it won't be too long.

07 04 11 33 CC All right. You guys are doing pretty good. You're almost caught up.

LMP-LM Hey, Ken, working through this thing, we haven't been able to find instructions for the stowage of the EV gloves. Do your friends back there have any recommendations?

Tape 115A/6

CC Okay, stand by one and I'll check on that.

07 04 14 13 CC Okay, Jack, we can stick those things on the comm panel for now, and then tomorrow on page 7-14, it's going to have you stow them in the LEVA bags but for the time being if you just stick those up on the panel, set them aside - you'll use them tomorrow.

LMP-LM Okay, Ken got you. Yes, they're going to get the inside of the LEVA pretty dirty.

07 04 14 59 CC Well, from what we've seen, Jack. I think everything's going to be about the same color by the time you get through.

LMP-LM Okay, it didn't bother your - your EVA, did it Ken, to have a little dust in your helmet?

CC No, no - that's kind of nice to have.

LMP-LM Hey, an experienced fellow like you might have a recommendation on how to get my visor up.

CC Yes, give it to the CMP.

CC We were just debating down here how come you guys threw away those nice clean gloves and kept the dirty ones.

LMP-LM I wish you hadn't ask that Pete. (Laughter) We were just debating that too.

CC How long are your arms, Jack.

LMP-LM You do all sorts of things.

LMP-LM Hey, they're out on the porch as a matter of fact. That's not too far fetched.

07 04 17 08 LMP-LM I guess there's some old friends you just hate to get rid of, Pete.

CC Yes, that figures.

CC Hey, you guys have had some real winners there.
Don't change a good thing.

07 04 17 41 LMP-LM Well, they seemed to do all right for us. I
guess that's the way. We were half-way thinking,
but not thinking very well, as was witnessed in
our checklist procedures tonight.

CC Ah, you're doing outstanding.

07 04 20 08 CC Challenger, Houston. On your comm, your checklist
will call for going to down-voice backup. And,
tonight, we'd rather just leave it in the normal
voice. So if you leave the configuration you
have, rather than change it; - that would be a
good deal for us.

CDR-LM Okay, Ken, I only got part of that, I was scrub-
bing my face here. You want to save the same
comm configuration we've got right now. Is that
correct?

CC That's affirmative.

07 04 22 02 CDR-LM Okay. That's easy.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 04 36 55 LMP-IM Okay, Ken. Gene just stowed the EVA antenna.
CC Okay.
LMP-IM And I'll be off here just for a few minutes, biomed, so I'll be back with you when I turn in.
CC Okay. I may have misled you earlier when I said, we weren't going to lose any time. We can - we can get you 8 hours up to about 19 after the hour. After that, we're going to have to start rearranging things to get 8 hours.

07 04 37 38 LMP-IM Well, Gene's almost in his hammock now. And I will be shortly, so I think we're probably in pretty good shape.
CC Okay, that's fine. I just - I didn't want to mislead you.
LMP-IM That's all right, you've never misled me before. Well, let me think about that.
CC Was going to say, you catch on awful slow, if that's true.
LMP-IM Right.

07 04 39 18 LMP-IM Ken, I'm going to take off my headset here and jump into the hammock. What - what time we getting up CET - Central Time?
CC Well, it's going to be roughly 45 minutes past the time listed at 182:39. So - are you asking for it in local time?
CDR-IM Yes, I - My watch is set on Houston time. What time will it be?
CC Be about - -
LMP-IM Eight hours from when?
CC Be about 12:15, Geno.

Tape 116A/2

CDR-LM Okay, that sounds great, Deke. It won't -
 We're just cleaning up a few minor things and
 we'll actually probably be asleep in the next
 10 to 15 minutes.

CC Okay, sleep good. You had a lovely day. Hope
 tomorrow's as good.

CDR-LM Scrry to keep - Thank you, boss. Sorry to keep
 you up so late. But appreciate it very much.

CC We're enjoying it.

CC Hey, Gene, before you unplug you might --

07 04 40 25 CDR-LM Okay, I'm going off the air.

CC - - Check your - check the Suit Flow valve. Looks
 like it's not flowing, if that's the configuartion
 you want.

CDR-LM Yes, we've got them - we got them both flowing.
 And we've got good circulation in the cockpit.
 If it looks good to you down there, we're in
 good shape up here.

CC Looks fine. See you later.

07 04 40 55 CDR-LM Okay, we thank you much.

END OF TAPE

Tapes 117A-120A/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

Tape 117B/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 08 38 XX BEGIN LUNAR REV 47

07 09 05 02 CC Good morning, America. Rise and shine.

07 09 06 13 CC Hello, America, this is Houston. Over.

07 09 06 31 CMP Hey, Houston, this is the command module pilot
on the United States spaceship, America. I'll
be ready to go to work as soon as I can get
untangled.

 CC Okay. We got plenty of that for you.

 CMP (Laughter) Okay. I think I woke up just about
the time - just before you called, for some reason.

07 09 09 10 CMP VHF is OFF.

END OF TAPE

APOLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 09 11 04 CMP Well, Houston, at least it's daylight today.
Yesterday you got me up in the middle of the night.

CC Oh, this is a gentleman's day.

CMP (Chuckle) Right.

CMP Of course, I guess it's really a 2-hour day when
you go around the Moon, isn't it?

CC You don't get so tired that way.

CMP (Laughter) Right.

07 09 12 36 CMP Okay. S-BAND MODE is to VOICE, SQUELCH is - says
"OFF"; I'm want to leave it ENABLED. Crew report,
I'll get in a minute and wind your watch.

07 09 15 07 CMP Houston, America. If you happen to have a summary
report of EVA-3, I'd sure like to hear it.

CC Okay. We'll do that. Let me give you a - a quick
rundown on review of what we're going to do this
morning. We've got the extra RCS trim burn that's
going to be coming in, and I've got a pad for that
guy. And I have about 1, 2, 3, 4, 5, 6, 7, 8, 9
one-liners to go into your Flight Plan, to bring
it up to date. The general plan is to do a minus-X
RCS on the trim maneuver, in order to avoid
impinging on the SIM bay. That burn will be
about 30 seconds worth. And that's going to give
you about 9 foot per second DELTA-V. The maneuvers
have all been checked out, and it's a reasonable
time line. And so, I have both the plane change
and the trim pads for you. And that may cut into
your eat period just a little bit. So, you might
keep that in mind, that when you get a chance to
nibble; that's probably a good - good thing to be
doing. And then once we finish the plane change,
we - we're going to be back on the nominal Flight
Plan, and pressing on in a - just like we have
been. We'll be leaving the mapping camera in and
taking pictures with it still retracted, in a

Tape 118B/2

attempt to avoid increasing the number of cycles on the camera. And we'll be running the SPS PU valve in the decreased position, in order to optimize our propellant loadings.

CMP Ah ha! Okay. That sounds like it's good.

CC So, when you're ready to copy some of those things, that's - Might be a good thing to get started on. Go ahead and finish squaring away your cockpit. And, while they're putting together an official summary, I can tell you my unofficial summary of EVA-3 is that that sure is super. You've got to watch those tapes when you get down. That's really a - that's really a spectacular place, as you can probably see. And they found a lot of mighty interesting rocks there. Jack, being a true geologist, is making up new geological terms as he goes along.

CMP (Laughter) I can - yes, I bet.

CC What you ought to do is, when he gets aboard, you ought to tell him that you saw a bunch of vertical dikelets over on the north side of the massif. Tell him they were very dark, very small.

CMP Vertical dikelets?

CC Yes, I think that's the word he coined on the way down there.

CMP Dikelets? Oh, okay (laughter).

CMP Hey, I got a Update Book here. I guess it'll be good for a trim burn - trim ...

CC Okay. In general, let me tell you also that your RCS is 4.7 above the Flight Plan. And, just as a summary, unless you want to plot them, I'll just tell you that the oxygen and the hydrogen are doing good things. And you've got plenty of it. And I'm ready to give you a - The first pad will be a trim RCS burn and the second one will be the plane change burn.

CMP Okay. No, that's good on the hydrogen and oxygen. And, I'm ready to copy the trim P30 pad.

CC Okay. I'll give you the trim. RCS/G&N; 37416; GET 181:34:01.22; plus 0009.2, all zips, and all zips; roll 180, 179, 316; 0067.3, plus 0062.4; 0009.2, 0:30, 0009.2; 13, 292.3, 29.9. And at Sirius and Rigel, 118, 159, 349. This will be four jets, minus-X on the RCS. And, I'd like to just add a comment here about the attitude. This attitude is one that's computed after you've gone to the plane-change REFSMMAT. And when you call P41, you'll be getting a different set of attitudes computed out of it because of the P41 computing a plus-X burn. But, when you're in attitude and P41's called, and you get to the DELTA-V register, you should be able to put all of the DELTA-V in one axis.

07 09 20 52 CMP Oh, okay. This really is a posigrade burn is what you're saying. And I really won't be able to trim it?

CC I'm not sure I understood your comment there.

CMP Well, in other words, we're not - we're not changing NOUN 81. You know, like we do on the SEP maneuver.

CC Oh. That's - that's correct. You're going to see the numbers go to zero during the burn.

CMP Okay. Real good. We just won't - ... won't be the right attitude. We'll use the VERB 29 maneuver and use that attitude.

CC That's correct. And when you get there, that should put it all in the X-axis.

CMP Okay. Mighty fine.

CC Now I'm ready for the readback.

CMP Oh, let me read it back. Okay, it'll be G&N/RCS for the Trim burn. Weight is 37416; T_{ig} is 181:34:01.22. I'm not sure on the seconds. Is that correct.

Tape 118B/4

CC That's correct.

CMP Okay. NOUN 81 plus 9.2, and that's 00, roll, 180; pitch, 179, yaw, 316; H_A will be 67.3, PERIGEE 62.4; DELTA-V total is 9.2; burn time is 30 seconds; DELTA-V_C is 9.2. Sextant star is 13, shaft is 292.3, trunnion is 29.9. That'll be Sirius and Rigel, 118, missed the pitch align and the yaw align is 349. It'll be four jets, minus-X, and it'll be at the plane change REFSMMAT.

CC Okay. And that pitch align is 159.

07 09 23 01 CMP Okay. Pitch align, 159.

CC Okay. The next one will be the plane change, and I'll have that ready in just a second.

CMP Okay. I'm in the Flight Plan for that one.

CC Okay. Stand by for just a second.

CC Okay. LOPC SPS/G&N; 37416; plus 0.38, plus 0.92; 182:33:53.00; minus 0017.9, minus 0365.5, minus 0006.9; roll, 0; pitch, 0; yaw, 315; 0062.7, plus 0062.6; 0366.0, 0:20, 0353.8; 22, 148.9, 19.5; Sirius and Rigel and the roll, pitch, and yaw aligns are the same: 118, 159, 349. This will be four jets and 12 seconds.

07 09 25 30 CMP Okay. LOPC, SPS/G&N, 37416; plus 0.38, plus 0.92; T_{ig} 182:33:53.00; NOUN 81 is minus 17.9, a minus 365.5, and a minus 6.9; roll, 0; pitch, 0; yaw, 315; H_A , 62.7, perigee, 62.6 - that's pretty circular - DELTA-V total is 366.0, burn time is 20 seconds, DELTA-V_C, 353.8; sextant star 22, shaft 148.9 and 19.5; Sirius and Rigel, 118, 159, 349; four jets, 12 seconds.

CC Okay. It's a good readback. And, I've got a couple of Flight Plan things to give you when you're ready for that.

CMP Okay. I'm with you.

CC Okay. The first one is at 180 hours and 20 minutes.

CMP I've got it.

CC Okay. We owe you an attitude there and the attitude will be 179, 222, 359. The HIGH GAIN: pitch, minus 39; yaw, 145. Why don't you read them back, individually as we go along?

CMP Okay. Roll, 179; pitch, 222; yaw, 359. HIGH GAIN will be minus 39 and 145.

CC Okay. And that's the - that's at 180:20. That's with the VERB 49 there. The next one is at 181:35, which is on the next page, and it's going to be at VERB 49, maneuver to LOPC. What we're going to do here is two separate maneuvers. We're going to do a maneuver which is a roll, so that when you do the next one, you'll avoid the gimbal lock because of the direction that the CMC would normally maneuver you. So, this maneuver is going to be in two parts. The first one we're calling a VERB 49 maneuver to the gimbal lock avoidance attitude at 181:35. That attitude 081, 181, and 317. The HIGH GAIN: PITCH, minus 19; YAW, 227, and AUTO and NARROW for AOS.

07 09 28 50 CMP Okay, at 181:35, we'll have a VERB 49 to gimbal lock avoidance; roll 081, 181, and 317. HIGH GAIN will be a PITCH of minus 19, and YAW, 227; AUTO and NARROW for AOS.

CC Okay. Now at 181:43, you can just skip that high gain call out. At 181:45, we want to add a VERB 49 maneuver to the LOPC burn attitude.

CMP Okay. At 181:45, VERB 49 to LOPC burn attitude.

CC Okay. Now on the next page, we go over to 182:15. And, I want to add a PU VALVE to DECREASE.

CMP 182:15. PU VALVE to DECREASE.

Tape 118B/6

CC All right, sir. And I have two more to give you, but before we do that - How about let's terminate the jet monitor by calling P30 - P20, and a VERB 21 NOUN 26 to all zips, and then we can up-link while we're finishing.

07 09 30 47 CMP Okay. You have ACCEPT.

CC Okay. And you got the monitor terminated?

07 09 31 00 CMP Yes. It's terminated.

CMP I guess it went to P30 faster than it showed up down there or went into P30 not through it.

CC Okay, why don't you put the PAN CAMERA to STANDBY and POWER, ON, while we're about it and we can let them look at that stuff while we're getting the rest of our Flight Plan updates?

07 09 31 45 CMP PAN CAMERA, STANDBY; POWER is ON.

CC Okay, thank you.

CC All right. Let's go back to our updates and the next one should come at 182:44.

CMP Okay. 182:44.

CC Okay. At 182:44, I want to delete the "MAPPING CAMERA, EXTEND."

CMP Okay. Delete the "MAPPING CAMERA, EXTEND." Wait a minute. I scratched out the opening the cover. We got to do that.

CC Yes. You won't do that because we're going to the pictures anyhow.

CMP Yes. Okay.

CC Okay. Then the next thing we want to do is at 182:48 just a half inch down. I have a new attitude for you. Where it says 097, 068, 019, it's now going to be 096, 097, and 352; and the orb rate attitude is still all zeros.

CMP Okay. The attitude after the P20 option 5 plus-X forward will be 096, 097 and 252 and orb rate is 0.

CC Okay, that last angle was 352. I'm not sure we got that right.

07 07 33 30 CMP Okay. 352 for Yaw. That's correct.

CC All right, sir. And while we're about it, why don't you take the PAN CAMERA POWER back OFF?

07 09 33 51 CMP Okay. Pan cam - pan ca - PAN CAMERA POWER is OFF (laughter).

CC Okay, and as long as we're talking about pan cameras, let's go to 183:45.

CMP 183:45. Okay.

CC Okay, and after the pan camera block, want to add "V OVER H OVERRIDE to HIGH ALTITUDE."

CMP Okay. After "PAN CAMERA, STANDBY, STEREO, and POWER," put "V OVER H to HIGH ALTITUDE."

CC That's affirmative. And the last update is on the next page - 184:27. And it says "MAPPING CAMERA, RETRACT" and since we didn't extend it you don't have to retract it.

CMP Sounds logical. Okay, mapping camera, delete the "MAPPING CAMERA, RETRACT."

CC All right, sir. And let's see what else we have here - how about running your paw over most of your biomed sensors? Looks like you've got some noise on there. And avoid changing them. Why don't you just kind of rub on each one and see if we can get it to come in a good signal?

CMP Okay. I'll do that.

07 09 35 46 CC Okay. You're making progress there.

CMP Hey, it's working, huh?

Tape 118B/8

CMP Hey, there's old Hadley Rille out there. That's a pretty deep little trough. Hey, you really didn't get a perspective of that thing, at least I didn't from some of the pictures. Not until you had a chance to get up here and take a look at some of the other things.

CC Okay, I'll tell you when we get through - -

CMP Okay, that's the last of the Flight Plan things, huh?

CC Yes, sir; that was the last of the Flight Plans, and I still need a morning report from you and things like that; and I'll keep an eye on the clock down here and try to help you stay on the time line. The one thing that I see that may have to change is - I gave you a DELTA-V_C for the RCS burn that wasn't very useful, and we have to set it up to count in the other direction. There's a couple of things you do - like set it to 100.

CMP (Laughter) Yes, okay.

CC It's just a backup monitor anyhow and so it's - setting it to 100 is probably the first thing to do.

CMP Yes, I know.

CMP Okay. Let me see if I've got time to put some hot water in my eggs.

CC Okay.

07 09 38 29 CC Okay, Ron, the computer is yours when - whenever you want to go to BLOCK.

CMP Sleep last night was probably about 6 hours - kind of intermittent - but it seemed to me like when I was sleeping I was sleeping pretty good. For some reason, I woke up a couple or 3 hours after I went to sleep and I got to sleep about an hour late. Oh, and I was just itching like a son of a gun.

CC What's that, the sensors?

CMP The only thing I can think of is that - no, my arms - you know my forearms.

CC Oh, I see.

CMP From the wrist back to the elbow.

CC Okay.

CMP The only thing I can think of is maybe the old Beta cloth itch, you know. Then I looked around and there was nothing there. You know, no hives or anything like that. So I got out some of that carry [?] cream and put that on and that stopped it and went back to sleep.

CC Okay. It's coming up on time to start our - our first VERB 49 maneuver which can be running and I'll watch the angles while you put a little hot water in your food there if you want to.

07 09 40 07 CMP Okay, I've got a target load, I guess, in desired orientation. Okay ... 2, VERB 49 ENTER, VERB 25. Plus 179.00 ENTER, plus PITCH 22 - 222.00 ENTER, YAW 359, plus 359.00 ENTER. Okay, we're still saying 0.2 of a degree per second; PROCEED to ... keys - PROCEED.

CC Okay, and the HIGH GAIN to AUTO, please.

07 09 41 04 CMP HIGH GAIN is in AUTO and we'll set that at minus 39 YAW 145, just in case it breaks lock.

07 09 42 32 CMP Hey, Ken, I'm going to be off the headset here while I change back to my comm carrier.

CC All right, sir.

07 09 45 16 CMP Okay. My PRD is 15044.

CC Copy that.

CMP I got bacon bits. Those are easy to fix.

Tape 118B/10

CMP I had three jugs of water.

07 09 47 20 CMP Okay. We're going ATT 1/RATE 2. Yes. Oh. Star number 11 - Aldebaran.

CC You lucked out.

CMP Yes. That's a good one.

CMP It's a little ways off.

CMP Okay. PROCEED, it was Aldebaran. ... Dnoces. To Dnoces. 6. Dnoces is hard to recognize through the telescope. Must be it. Yes, that was it.

CC How about that?

CMP Okay. ... for some torquing angles. Plus 173.5.

CC Okay, got those.

CMP Okay, we'll torque at 30 10.

CC All right.

CMP 52 - 52 ENTER. We want to do an option 1 to the LOPC orientation. Okay? Let's see, 622, 180 - that's a pretty neat - isn't that where I'm supposed - and 8179316. Outstanding! Okay, it's dark out there, and I think I could find a star if I had to.

CC Okay, I copied the angles for you if you need them.

CMP Okay. It scares me everytime that light comes on. Ah ha! It went away. ... What the coarse align error is. ... Just barely in the sextant field of view.

CC Okay.

CMP I don't know. That wasn't a very good mark. Let's try that again. Let's try Dnoces again. Pretty logical since we're in this attitude. But we didn't gauge our -

CC Okay. And the angles I copied last time were 217 on the shaft and 33 on the trunnion.

CMP That's close. Just in the sextant again.

CMP Looks like 217 and 33's going to be it once you get it in there. I'll settle for that. There's the old coarse align error. I'll let you copy those down there, I don't want them up here.

CC Okay.

CC And you can torque any time.

CMP And let's see - Okay; we'll torque at 3430.

CC Okay; that's a good number.

07 09 55 22 CMP Ah ha! Knows exactly where it is. Okay.

CC Isn't that amazing?

CMP Yes.

CC And it shows we even know how to calculate the burn attitude.

CMP Yes. That's good. ...

07 09 56 36 CMP Okay. We're CMC, RATE 2. Here.

CMP Okay. Count -

CC And, Ron, I just noticed that in all our scribbling, I missed the line that said "Configure for the dump" on the previous column about 23. I don't know if you saw it in there or not.

CMP I missed it. I'll sure get it.

CC And when it's convenient for you, I've got - -

CMP Okay.

CC - - couple of hydrogen tank fans to change and the good docs would like to hear how you're eating and pushing pills.

Tape 118B/12

CMP (Laughter) Okay. Took a Seconal last night, and I'm by the H₂ fans.

CC Okay. And that's HYDROGEN tank 3: FANS, OFF; and HYDROGEN tank 1: FANS, ON.

07 09 59 08 CMP Okay, number 3 went from AUTO to OFF, tank 1 is going from OFF to ON.

CC Very good.

CMP Let's see, I got that done - at 40, next thing we got coming up, huh? Okay, I'll go down there and get some of this stuff configured. Oh, I ate just about everything yesterday, and then some other things on there, and a bunch of extra stuff too, so when I get a chance, I'll call that down. Okay?

CC Sounds fine.

CMP Getting ready for this urine dump.

CMP ...

07 10 06 27 CC And, Ron, we're coming up on dump time and don't forget, we want to close the covers, and that kind of good stuff before we start the dump.

07 10 06 40 CMP Okay. UV cover is clo - Let's see - UV is OFF. IR is OFF.

CMP That's. Yes, I start on old fuel cell purge here. Do this O₂ fuel cell purge. Okay. Now let's see, waste -

07 10 08 16 CMP MARK it. The old waste water dump is on.

CC Okay.

07 10 08 28 CMP DRAIN VALVE is DUMP; BATTERY VENT is CLOSED.

CC Okay, Ron, the EECOM has calculated about 12 minutes to go on your dump, and it wouldn't hurt to set your kitchen clock or whatever you do to help remind yourself because that'll be after LOS. And we've taken a look at all of the systems and everything looks pretty good there and RETRO would like

to remind you that the weight has changed on your trim pad and that has some implications to the way that computes the burn arcs and you want to be superprecise. And looks like everything is GO for a trim.

CMP Okay; sounds good. I'll set my little ding-ding here for about 10 minutes.

CC Why don't you try about 9? Charlie swears it's no more than that.

CMP I believe Charlie.

CMP Want me to configure the DSE, or are you going to set it up for me?

CC Why don't you do that one?

CMP Okay.

07 10 14 32 CC And, Ron, we've got about a minute and a half to LOS and I never did give you a summary of the EVA - just a few quick particulars. They got 7 plus 15 out of EVA-3. Got almost everything done. They had to delete station 10 in order to make up time, but that's made up for by the fact that they found some more interesting things at other stops. And there was - I mentioned the dikelets, and there's some indication that they may have seen a dike or something of that nature over on the North Massif. And Jack went out and applied all his - his physical skills to the lunar surface gravimeter and that included jumping and kicking and pounding and it still doesn't work. Guess we'll get them up about 183:45 and the only thing we've had to do on their Surface Checklist for launch day is just to scrub the P22 that was in there, and we're just going to drop that one to make up some time. And it looks like they ought to get about 8 hours sleep out of it, so looks like everybody is in good shape. And you've got just a few seconds to LOS. Keep your eye on the waste water and we'll see you.

07 10 15 51 CMP Good, - thank you, Ken.

Tape 118B/14

07 10 36 XX

BEGIN LUNAR REV 48

07 11 01 33 CMP Ah ha! Looks like we're getting you already.

CC Hello there. How's it going?

CMP Okay. Just now calling the VERB 82. It's 67.4 by 62.8. Okay. Let me give you a little burn report here - -

CC All right.

CMP - - ... reading on the burns, so you can get that off the recorder.

CC Okay.

CMP Let's see. Okay. With 30 seconds of burn time, by my stopwatch there, I ended up with a plus - no, let's see - with a minus - minus 0.5 X. I think 0 in Y and a plus 0.5 in Z. Okay, so I tweaked out the plus X and rolled right 90 degrees and burned a 0.6 in a plus-Y. Okay. With final trim of - on the NOUN 85s of 0 plus 0.1 and a minus 0.1. DELTA-V_C was a minus 110.4 but we had that - not a minus, a plus 110.4. But there's no bias check at a plus 0.9 - on the bias.

CC Okay.

CMP Okay, the NOUN 20 values - NOUN 20 values - after the 90 degree roll there and for the final trim were 270, 179, 317.

CC Okay. Sounds like you're way ahead of the game.

CMP Yes. Worked real fine.

CC Have you had a chance to get anything to eat yet?

CMP Yes, I ate some scrambled eggs and I'm nibbling on the bacon bars, and I had a - some orange juice.

CC Okay, I wasn't trying to fish for a report, I was just trying to find out if you were still eating or how things were going.

CMP (Laughter) I'm a little - I'm still eating a little bit. But we're in good shape.

CC Okay. You get a - you get a medal for not over-dumping the waste water tank.

CMP Yes. It's amazing.

CMP The old 9-minute mark was right on. I set it at 8 minutes, just to be sure, and 1 minute later it was 10 percent. Tell Charlie he figured right.

CC Well, we won't be able to talk to Dumis again.

CMP (Laughter) That's right.

CC Okay. And I don't remember if I explained - -

CMP ... star check.

07 11 05 29 CC Yes. Okay. And I don't know if you've got an explanation on why your angles changed for the P20 business after the burn, but, this - this plane change burn is going to have a little orbit shaping in it as well as the previous one. So that it - it is going to have some components that are both radial and tangential.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 11 06 01 CMP Ah ha. Okay.

CC So that meant that your REFSMMAT wasn't quite the REFSMMAT that you were anticipating earlier. And That explains the - why those angles had to change on you and also explains some of those odd-ball components.

CMP Okay. Okay. I was wondering about that but - I'll tell you - those guys in the trench down there know so much more about what's going on when they calculate that stuff than I do that I'll - I'll believe them.

CC Say, Ron, are you - are you in a place where you can spare a minute or 2? Is it convenient?

CMP Sure.

CC Okay. Got somebody that would like to talk to you for just a minute.

CMP Oh, yes.

07 11 07 04 NASA Ron, this is Jim Fletcher. How are you?

CMP Yes, Dr. Fletcher - mighty fine, sir.

NASA We had hoped to catch you last night but you were behind the Moon when the ceremony was going on. Did you catch any of it at all?

CMP Well, I - I got the briefing, or the report from it from the CAPCOM, but it sounds like it was a mighty fine ceremony and something that this nation can really be proud of.

07 11 07 40 NASA Well, Ron, there's one thing that the President wanted to make sure that you got. And I had hoped to do it last night. We've been in very close touch with the White House and the President has been following closely what - what's going on up there and, of course, it's absolutely fascinating to us down here. But he wanted to be sure that you

Tape 119B/2

understood that he'd like to wish you Godspeed as you return to Earth. And I must say I'd like to add that and also add that, from everything I've heard, this is a spectacular success.

07 11 08 24 CMP Thank you very much, there, Dr. Fletcher, and please convey my thanks to Mr. President. I appreciate that very much, and I - I also appreciate the opportunity to be able to do something for my country and I - hopefully, this is the one thing that I will be able to do. And I certainly appreciate it. Just the thoughts, themselves, really.

07 11 08 49 NASA Well, very, good, Ron. I'd just like to say that I - I've never - I've never had any idea whatsoever that things would go so well in the scientific part of the - of the orbital science. It's - it's almost unbelievable when I talk to the guys in the backroom, and I just wanted to make sure that you knew that I knew it.

CMP Yes, sir. We certainly do and they worked real hard to get the - these experiments and the equipment all squared away. I was following along with them pretty well and I had lot of confidence.

07 11 09 29 NASA Well, very good. Thanks kindly.

CMP Yes, sir. Dr. Fletcher; appreciate it.

CC And, Ron, how about the high gain?

CMP Okay. Let me reset it here, I guess.

07 11 10 16 CMP Okay. I'm in REACQ and NARROW now.

CC And how about AUTO on the HIGH GAIN when you get a chance?

07 11 11 58 CMP Okay, I'm right there, so we've got her.

CC Okay, and let's see we've got a few minutes. I had - I had two more magazine changes to go into the Flight Plan if it's convenient to give them to you now.

CMP Let me get started on the other VERB 49 here, okay?

CC Okay, just fine.

CMP 315. Plus ENTER - plus - and one more PROCEED.

07 11 13 02 CMP Okay, we're on our way.

CC Okay, Ron, just for your information, about 291 looks like the maximum yaw you ought to see on this. And we'll keep an eye on it for you.

CMP Okay. 203. Okay, why don't we take some of those Flight Plan changes here?

CC Okay. And these are real simple ones on page 283.

CMP 283. You're really looking ahead. Okay.

CC Okay, at 187:45, you've got a magazine Bravo Bravo called out and we'd like to make that Delta Delta.

CMP Delta Delta it is.

CC Okay, and a couple of lines below that you have a magazine November November which we want to change to Kilo Kilo.

CMP Kilo it is.

CC Okay, that was kind of painless, wasn't it?

CMP Yes, that was.

CC And that's all I've got. We want to remember to get the PU VALVE to DECREASE.

07 11 15 15 CMP Yes, I could do that now, I guess, couldn't I?

CC Okay.

07 11 15 22 CMP Okay, we're setting on the minus 200-DECREASE.

CMP Got a time here and let me bring you up to date on the - lookout.

Tape 119B/4

CMP Okay. Ready to go on the food?

CC Yes, sir.

CMP Looks like we're going to miss it.

CMP Okay. Day 8: sausage, grits, fruit cocktail, orange beverage, coffee, and tea, and a vitamin. Next box: ham - couldn't find my cheese until last night so I didn't have it, one rye bread, can of peaches or sack of peaches, cereal bar, orange drink, coffee, graham cracker cubes, apricot cubes, jelly candy, sugar cookies. Supper - had hamburger and catsup, vanilla pudding, grape drink; I guess that was it.

CC All right, sir. We've got about 34 minutes or so until the burn. I've got a news summary I can read if you'd like to have that or if you'd like to put it off until later I can do that too.

CMP No, why don't you go ahead?

CC I'll just read it and if I start to bother you, why just holler at me and I'll stop.

CMP Okay.

07 11 20 14 CC This is put together by a - a Mr. Jim Kokowsky [?] and it looks like he's done a pretty nice job of summarizing the news, so I'm going to read it cold. And he's given us a summary of the late news. And the weather couldn't be worse in Houston. It had to be better on the Moon or in orbit around it. This morning more cold and drizzle blanketed the Houston metropolitan area. Yesterday morning it was 32 degrees. This morning a little warmer but a lot wetter, and it's getting colder on Friday. On the national-international scene: Peace talks in Paris between Dr. Henry Kissinger and Le Duc Tho have ended - at least for the time being. Dr. Kissinger is in Washington today to brief President Nixon on the talks. The past 3-1/2 weeks, the pair of negotiators have held 58 hours of talks. Neither side is giving out

any hints. When asked about the cease-fire by Christmas, Dr. Kissinger told reporters at Andrews, "I don't want to make any predictions." The U.S. by sizeable vote has had its assessment to the fund of the United Nations reduced by a vote of 81 to 27. The U.S. will now pay only 25 percent of the cost rather than the present 31 percent. Transatlantic fares may drop beginning in February. The International Air Transport Association says all carriers will set their own prices. It appears that air travelers to Europe next year may get some real bargains. In the hotly contested and federally supervised United Mine Workers election, the insurgent candidate, Arnold Miller, has gone into a lead over incumbent President Tony Boyle. Miller has led a grass roots movement to oust Boyle who took over the union control from the late John L. Lewis. We mentioned the rather dismal weather in the Houston area this morning, but the midwest and northeast are really getting some bad weather. Ice storms seriously hampered the northern part of the nation, from Idaho to the eastern seaboard. After almost a year, troops involved in the India-Pakistani War are beginning to go back to their homelands. Truce-line maps have been exchanged and approved by both governments. Civil servants of the European Common Market, they're called Eurocrats, are on strike. The 8000 employees walked off the job due to a salary dispute.

CC On the regional and local scene: the Houston City council has vetoed a plan to build a new commuter airstrip in southwest Houston for the STOL aircraft. Residents of the area have been protesting. The community of Tomball, north of Houston, is looking for a new police force. The police chief and seven officers walked off the job Tuesday, after the City Council refused the officers a pay raise. In Harris County, the State Highway Patrol and reserve police have been called in to maintain police protection. That's maintain protection in Tomball. The project to expend the - expand the Armand Bayou as a park and wildlife refuge has been given a boost with a \$100,000 pledge. So far \$350,000 has been pledged and \$750,000 is

Tape 119B/6

needed to gain Federal matching funds. Galveston will hold a school bond election on February 3rd. The bonds, if okayed, will be used to air-condition all schools not so equipped and to improve lighting in two schools. It's a light day in sports; the head coaching job for SMU is open, being considered are North Carolina coach Bill Dooley, and Washington coach Jim Owens. George Blanda, a living testimony for the over-40 set will become the oldest man ever to play football this Sunday. Prior to Blanda, I guess, we've had some other folks, but this ought to be a new record. In pro basketball, Houston didn't play last night. Currently, Baltimore, Boston, Milwaukee, and Los Angeles lead the divisions. In pro hockey, Alberta beat the Houston Aeros, 3 to 2. The big news in Houston sports is a City Council approval of the Greenway Plaza as a site for the 10-1/2-million-dollar sports arena. And finally in - Christmas shopping is in full swing. Christmas trees are in tents, on street corners, and supermarket sites all over the area. Private homes throughout the whole area are lighting up with decorations ranging from happy Santa Clauses in sleighs to nativity scenes. It will be a Christmas world waiting for you when you come home. And that ends our summary for this morning.

CMP That's a good summary; appreciate it. Little bit of everything in there.

CC Yes, it looks like Mr. Kokowsky [?] reads a lot of newspapers there.

CMP (Laughter) He sure did.

07 11 25 29 CC Okay, Ron. We're picking up some thermal problems on the pan camera. Would you manually roll left to 30 degrees and we'll hold it until we've passed - you know the terminator - or cross the terminator.

CMP Okay.

CC And, Ron, that terminator crossing comes fairly close to the burn, so you might think about - if it looks agreeable to you, just go ahead and we'll use that as the burn attitude. You'll have to get a new P40 trim to take care of the gimbal offsets. So you may see a slight Pitch and Yaw attitude change.

CMP Okay; that's no problem. I'll just roll left and then use a P41 trim.

CMP (Cough) I hit ACCEL COMMAND to make that 90-degree roll the other day, or just a while ago. And, if you hit your stick a little too hard, you really wrapped it up to a little better than a degree a second. So, you can really get a sensation of roll, especially when you can see the Moon.

07 11 28 01 CMP How's that? Pretty good attitude?

CC Looks like we're going to have to go a little bit further. Why don't you give us 5 or 10 more?

CMP Okay, I didn't let go of the stick -

CC You're learning our tricks, aren't you?

CMP (Laughter) Used a teacup of gas there.

CC Okay, now - now, you're in good shape.

07 11 28 33 CMP Okay, we'll stop it right there, then. About 35 degrees or so.

CMP Anything to make you happy.

07 11 30 22 CMP Okay. I just made a DELTA-V check while ago and it was minus 22.2. Bias check was a mi - let's see, went from 100 to 100.9 in a minute and 40.

CC Okay.

CMP ... RATE 2; auto RCS, a little light. And let's see - Okay, we'll turn off six ... Let's see, the DELTA-V_C. 353.8 for the DELTA-V_C. Okay; SIM bay I checked it a while ago, BMAGs are RATE 2, AUTO RCS SELECTs are okay. Okay. ... 7416, that's

Tape 119B/8

pretty good. Okay, plus 0.38 and a plus 0.92. That's all right. Okay, VERB - Load my own, I guess, it looks like, don't I?

CC Yes, sir. When they gave you the up-link, they had to put in the - the trim burn.

CMP Yes, that's right. Plus 180-2 ENTER. Plus - 182:33:53 ... - -

CC Looks good.

07 11 33 16 CMP - - all right. 25, ENTER. Okay; NOUN 81s, 15.9, minus 17. Okay; Y is a minus 365.5. Z - 9 - minus 9 ENTER. Okay; 17.9, 365.5, minus 6.9, PROCEED.

CC Okay, they look good here.

CMP (Cough) Okay.

CMP The computer thinks we're going to be circular, 63.0 by 63.0. Of course, that's impulsive, I guess. 366.0 for total, that's right. Okay. 19 - on the DET. Okay, I got the DET going. I think my sextant star check's not going to be any good here.

CC Okay, we can give you another one here if you'd like that.

CC They been scurrying around here, and got you some new numbers.

CMP I don't see any reason - Oh really, I'll do it just for the heck of it.

CC Okay - -

CMP Got time here - let's see, 19 minutes - -

CC Okay - -

CMP ... I'll just let you read them to me as I get ... - -

CC All right, sir, it's a shaft of 237.2, when you get there.

CMP Okay. Plus - What did you say it was? -

CC 237.20.

CMP Shaft? 237.20 ENTER. Okay. Trunnion?

CC Okay. That's 27.480.

07 11 36 23 CMP Okay. We're CMC. Optics are - ... No, it's the wrong calculation (laughter). ...

CC Okay, well, we're off in roll - -

CMP What star's it supposed to be - -

CC - - by a degree from where he calculated it.

CMP Okay.

CC It's supposed to be good old star number 22.

CMP Oh, I can't see squat in the telescope. Hey, there it is.

CC Okay, you're passing through the right roll angle so it - -

CMP Okay; yes, that's it.

CC Okay.

CMP Outstanding!

CMP Okay, VERB 37 ENTER, 00 ENTER. DIRECT and HIGH MANUAL. ... Optics zeros. Okay. Put those things up for a minute. (Humming) Okay. There. (Cough) 358 and 314, that didn't change very much. Okay.

07 11 38 43 CMP Okay, it says we're there. Set IMU.

CMP Wrong pitch. Acts just like the simulator, you can't tell, I thought when you got in the spacecraft that if you're 180 ... it's supposed to

Tape 119B/10

flop back and forth, but it doesn't do it. Okay; 326, 357.5, and about 315.4. Let's see, align the GDC.

07 11 41 06 CMP (Cough) Okay. It's easy to see those lines. STAB CONTROL. DIRECT ULLAGE breakers are going IN. PITCH 1, YAW 1. Okay. ... and SPS breakers are IN. MANUAL ATTITUDE - RATE COMMAND. Okay, looks like about DEADBAND MIN RATE to LOW - ... is in RATE COMMAND. LM only. GIMBAL DRIVE is in AUTO. We're down to the 6-minute check. Okay, we won't have any manual starts on this one. Do not restart it. If it quits, we'll shut it down at burn time plus 1. V_{GY} only. Back to zero and then trim Y, I guess. All axis - Y and Z just a little ... trim X. Okay, we scratched out the part - we're going to turn the tape recorder on, right?

CC Yes, sir.

CMP Okay.

CMP At 12 seconds for ullage. Burn time was 20 seconds.

07 11 44 13 CC Okay, and you're GO from this end.

CMP Okay.

CMP Hey, refresh my memory on the mission rules there, Ken, could you? If it doesn't start on bank A, do we start on bank B?

CC Stand by. We're - we're making sure we're going to tell you the right thing, here.

CMP Okay. I was a little confused about the no MANUAL STARTs. That's not a manual start to me, though.

CC Okay, Ron. The rule says, "If no start on A, try B."

07 11 46 47 CMP Okay. That's what I thought. (Humming) Plenty of battery juice here. Let's go to A, ON - and B, is ON and coming up - Okay, fuel cell 3, pressure is all right in 2-A; and 2-B is okay. And HELIUM

VALVES are in AUTO, we're in DECREASE; and the OXIDIZER FLOW VALVE PUG MODE is PRIMARY. PRIMARY, DECREASED, and NORMAL. Okay. That's a lot of work. I'd like to get strapped in a little bit here.

- 07 11 48 04 CMP Okay. Bus tie - I forgot the crazy tape recorder. COMMAND RESET - here we go. Okay. Helium valves, I did that. SERVO POWER 1. Okay - number 2, back to AC.
- 07 11 48 39 CMP MARK DIRECTs are OFF. BMAGs are uncaged. Okay; no hardovers. Okay. Go to SCS. HAND CONTROLLER number 2 is ARMED. Okay. PITCH 1, got it; YAW 1, we got it. Okay. Trim is about set there; okay. Yaw is 0.9; PITCH is about - kazink, kazink, kazink, kazink. Okay; we have the trim. Okay. Give it back to the computer. Returns to zero. THC clockwise; no MTVC. Okay; PITCH 2; got it; YAW 2, got it. Ah ha! We have the trim plus 0.9 and - plus, plus, minus. Okay; give it back to the computer. No MTVC.
- 07 11 49 59 CMP Okay; 3 minutes to go. THC. Okay. On the AC, DIRECTs are ON. Cage the old BMAGs. KEY RELEASE... PROCEED for the final trim. Got a 618. D-18 says we're there. Okay; we'll ENTER that. 204. Do you want a gimbal test option? Yes. Plus 2, minus 2, 0, plus 2, minus 2, 0. 3004. Okay; we have the trim with 3 minutes to go. Okay; LIMIT CYCLE's back OFF. ... burn, we'll go RATE to HIGH (cough). DET looks good; we've got a 20-second burn. Shutdown on 21 seconds.
- 07 11 51 37 CMP Okay. DELTA -V in STANDBY. Have CMC, GDC, RATE COMMAND; LIMIT CYCLE, OFF; DEADBAND, MIN; RATE to HIGH; TRANS CONTROL POWER is OFF. DIRECTs are both OFF; CMC, AUTO. Okay. There we go; missed one. ATT1/RATE 2 on the old BMAGs. RATE COMMAND; all four GIMBAL MOTORS are ON. We're CSM on the CG. ... LOGIC, ... ROLL, ROLL; Alpha; S-IVB. PITCH is AUTO; DET is working; ARMED, ARMED.
- 07 11 52 17 CMP Okay; at 16, AUTO RCS SELECTs, ON; circuit breakers are still good (humming). Okay. I'm waiting for 30 seconds when ... the NORMAL TRANS CONTROL POWER and the DELTA-V THRUST A switch.

Tape 119B/12

07 11 53 21 CMP EMS G; EMS to NORMAL; TRANS CONTROL POWER is ON; and DELTA-V THRUST A is ON. Okay; four jets, 12 seconds. (Humming)

07 11 53 45 CMP Okay; we have ullage. Okay; 699, PROCEED.

07 11 53 56 CMP 3 - oh - okay! There we go! We got ignition about 87. Okay; number 2 is coming ON; we're up to 90 on the DELTA-V_C. Wait a minute! Okay; 913. Looking good. Okay; ROLL ERROR is OFF. That's all right; we're done. 3, 1 -

07 11 54 16 CMP SHUTDOWN - automatic! Okay; minus 9.5 on the EMS. Okay; 366.8. Let's PROCEED to stop the rates here. 6.8. Okay; man, look at those 85s! I'm a little bit off, but that's good. Okay; PITCH 2; got it; YAW 2; got it; and, number 1, got it; number 1, got it. Okay; SERVO THRUST is OFF. Well, let's see. I've forgotten what it feels like. Ha! That's pretty neat. Okay; that was okay. Somehow we got a 0.3 in there. That's in X anyhow. Y is zero; that's what I want. Z is all right, so we'll just leave it that way. I'll PROCEED with the changes again. That just changed. Okay; 00 ENTER. Okay; VERB 6 NOUN 20 ENTER. Okay; I presume you're reading the DSKY, haven't you been, Houston?

CC Yes, sir.

CMP Three. The time as near as I could tell was pretty good. V_{GX} - What did I say - 366.8, I think. DELTA-V_C is a minus 9.5; tail off is 11 or something. 12.2. Okay; let's get some more switches off. TRANS CONTROL POWER - okay - LOCKED, LOCKED.

07 11 56 36 CMP TRANS CONTROL POWERS are OFF; DIRECTs are OFF; DIRECT ULLAGE circuit breakers are OPEN; PITCH 1, YAW 1 are OPEN. Okay. EMS FUNCTION is OFF. MODE is STAND - RATE 2. Okay. We'll come and get the bus ties. (Humming) Hey, that was a neat burn ... (cough).

CC Feels more like an airplane, that way, doesn't it?

07 11 57 30 CMP Yes. Yes. It was kind of like an afterburner that time. Okay. A BAT BUS AC is OFF; BC is OFF. Not too bad. Okay; we're MAIN A. Must be - little oxidizer, yes. 0.6. Fuel is 28.4 ... and balance is minus - Now, let's see - about 460, I guess. Thing going in the right direction?

CC We don't think the PUGs really ever stabilized.

CMP I don't think it did, either. Okay; AC ROLL switches are OFF, now.

07 11 59 20 CC And, Ron, we're ready to give you some new stuff in the computer whenever you're - pass by and can give us ACCEPT.

CMP Okay. You have ACCEPT. While you're doing that, I'll do the post-SPS SIM prep cue card.

CC All righty.

CMP I'd really forgotten how that thing kicks you in the seat of the pants. I guess I must have been floating off the seat a little bit more this time than I was on the - the rest of the burns.

07 12 00 26 CMP Okay. PAN CAMERA POWER is OFF; and the old LOGIC POWER should go to DEPLOY/RETRACT. Okay, ... down is A, down is B. DEPLOY/RETRACT. Got - to inhibit all jets. Okay, we'll inhibit the - all except the ROLL, right now.

07 12 01 30 CMP On - okay. I'll just inhibit the ROLL 1, DELTA 1, and then I can start the - Yes, here's the DAP now. You through with the computer?

CC Okay. We're through. It's your computer.

CMP Okay. And - ... two, ON - OFF now. CAMERA LASER ALTIMETER, OPEN. Barber pole in the gray. 20 ENTER, 22 ENTER, 5 ENTER, plus-X SIM bay att. 2.25-2 ENTER. We are going to use a 2-1/2-degree dead band this time. Fifty is around the Moon. Okay.

Tape 119B/14

07 12 05 18 CMP 276 plus 2. ... (laughter) Different attitudes.

07 12 06 24 CMP I think I'll make a cup of coffee.

CC Ron, I've got your pan camera photo pads when you're ready.

CMP Okay. I just happen to be ready to copy.

CC Okay. T-start, 183:48:41; T-stop, 184:06:43.

CMP Okay.

07 12 10 14 CMP Ken, I'm just now remembering one of your comments from 16 that we didn't get done on this extra comm carrier cloth - there's cloth here, you know.

CC Uh huh.

CMP Don't need any extra electronics, but we sure could use another cloth hat (laughter).

CC Oh, you can wash it off. You probably do that inadvertently.

CMP (Laughter) I already have. I didn't wash it with the right thing though.

CC (Laughter) I was wondering if you would own up to that. Hey, the good Doctor over here says that your traces are flat lines. Thought you ought to be aware of that.

CMP Oh, they are?

CC You feel okay?

CMP They're kind of itching it - They're kind of itch - Yes, I'm okay. But they're kind of itching anyhow. I feel like I ought to change them so -

CC Okay. That would really make him happy.

CMP No wonder they're flat lines - It's unplugged.

CC Okay.

CMP Said something sooner (laughter).

CC All righty. We're about 4 minutes from LOS, and all systems have been looked at, and they're all looking okay. So, guess we'll see you on tother [sic] side.

CMP Okay. How's my stuff, now that I got plugged in.

CC We don't see anything, yet.

CMP Didn't, huh?

CMP Well, I needed to change them anyhow so -

CC Okay.

CMP I'll try to -

CC Looks like you hit something there when you did that.

CMP I was just shaking my coffee.

CC I tell you, it sure put life in the signal.

CMP It did?

CC How are those binoculars working out?

CMP They're working real good. I find I have a bit of a problem holding them still, though.

CC Yes, they're about the max magnification, I think, that you can hand hold.

CMP Yes.

CC Have you tried looking in earthshine at it? See if you can pick up anything there?

CMP Yes. And they just don't quite look as - let enough light through, I don't think, in earthshine. In other words, you can see better with the naked eye; but they don't - they don't let enough light through the binocs to enhance your image capability at all.

Tape 119B/16

CC Okay. I was curious because I noticed in the -
in the dark shadows in the daylight side, that
they did bring out things that you couldn't see
with the naked eye. I guess that's contrast
that does that.

CMP Yes, I noticed that too. Yes, you can look down
in the shadow of a - of a crater, where you got
the Sun down there, but if you have more backlight-
ing or something. You know, but you can - you can
see that pretty good with the naked eye, anyhow.
Earthshine, now, about all I can get out of the
earthshine, really, are differences in albedo.
And you can get some - textural - Well, not so
much textural differences, but terrain bumps and
humps, and flow fronts, and - see craters, you
know?

CC I wish I was there with you.

07 12 15 30 CMP I tell you, I had no idea how interesting and how
much fun it would be. After the first day, and
I finally got over the - I guess you could - I
don't know. You'd call it the effects of adapting
to zero g or something. But you're just a little
bit woozy. You really don't feel like doing a heck
of a lot that first day up. So, it's good that the
first day is kind of - -

07 12 35 XX

BEGIN LUNAR REV 49

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 13 00 22 CMP Is that - jets are enabled, that C-1 and C-2 for roll, OFF. Pitch and yaw are off. And, Houston, ready for PAN CAMERA to STANDBY and STEREO to POWER and all those good things whenever you are.

CC Roger, America. We're standing by.

CMP Okay.

CC Okay, Ron. You can go PAN CAMERA to STANDBY.

CMP CAMERA is - Hey! Good morning, Robert. How's it going?

CC Real fine. Real fine. Lousy weather, but we're all here.

CMP (Laughter) Okay. Let's see - PAN CAMERA - that's verify STANDBY. Okay, it's going up to STEREO. Turn the old POWER switch ON. The V/H is still in HIGH ALTITUDE.

07 13 01 44 CC You may be interested. We just woke up the Challenger, or maybe they woke us up, I guess. They gave us a song here from - from there first, and they're all fine and they're in their Surface Checklist - getting ready for ascent.

CMP Hey, great! Okay, I ought to get my prep for transfer ready here. You know, kind of last night and also this morning as I was flying across the back side of the Moon here - been thinking a little bit, and I wonder - It seems like that the Aristarcian-age craters, you know the ones that are fairly - fairly fresh, you know they're not Copernican - They don't have rays and this type thing, but they're fairly fresh in their slumping characteristics on the inside and this type thing. But they all seem to have a mare floor; you know - a flat, mare floor - a volcanic-type floor in the thing, and I wonder if there's anybody that's tried to come up with the theory at all that maybe you had a liquid mantle during the - the Aristarcian era during the formation of the Moon, you

Tape 120B/2

know. And those craters at that point in time were - were penetrating that - that liquid mantle.

CC It's a thought. Roger, Ron. That's a good thought. You get kind of the feeling like you're seeing - like out Hawaii where craters like stick up out of the ocean and you see the walls of the craters in the ocean up in amongst them. That's the kind of feeling you get?

07 13 03 57 CMP Must not be because I don't know for sure what you mean (chuckle).

CC Roger.

CMP I guess the feeling I was getting is that most the Aristarcinian-age craters all have some sort of a mound - a domical structure down in the bottom of the crater. You know, even the smaller ones, some - some of the - the 30 - 50 kilometer si - class, you know? And the - you know, the flat floor - they look - they look volcanic on the floor. Some of the bigger ones, of course, they're definitely volcanic - lava flows on the floor of these big craters. The slumping of the walls is not as fresh as a Copernican-age fra - crater, but, you know, they - It's not all beat up, either. The walls - the crater walls had a slumping coming down through there and it's still fairly fresh in the slumping, but you don't have any rays showing up on the outside of the crater. So they're kind of Aristarcinian age.

CC Roger; copy.

CMP And - and all - all of the craters that are that age have the mare fill in them, you know?

07 13 05 30 CC Roger.

CMP Like there's - there must have been some volcanic activity during that period of time.

CC I - I guess my feelings were, Ron, that - What I'm trying to say is - -

CMP 365, 3 - Go ahead.

CC If you had a - If you'd had a liquid mantle and the crater sticking up through it, you might have the mare not only on the floor of the crater, but the mare would be on the exterior walls of the crater. You'd see a high-water mark along the exterior, wouldn't you?

CMP Oh, I see what you're saying. Yes. No, you - you had to have some sort of a solid crust and then the impacts hit the solid crust and broke through the crust and got down into the liquid mantle.

CC Okay. Now I got you, Ron.

CMP That's the type of operation I was thinking about.

CC Roger. I got you.

07 13 05 35 CMP Yes. You know, but it would have to be a relatively thin crust.

CC Roger. Understand.

CMP Okay. I've got the temporary stowage bags all set. *** (Humming) From the decon bags on A-2 - got one bag of ropes in there - put those - Where can I put those? Right hand - yes, okay. That's in the right-hand temporary stowage bay.

CC Okay, Ron. You're coming up on 1 minute to pan camera T-start. I'll call you in 30 seconds.

CMP Okay.

07 13 08 08 CC Okay, 30 seconds to T-start time.

CMP Okay, I'll say we started at - excuse me, I've got a piece of candy in my mouth - *** 8:41. Camera will go to OPERATE.

CMP 40.

07 13 08 44 CMP MARK it, 41.

Tape 120B/4

CC Roger; got it.

CMP Bob, if you want to keep your eye on the clock for me, I'll - ... transfer bags - -

CC Don't sweat the camera, Ron, I'll - I'll cue you. Just forget the pan camera and I'll cue you about a minute prior to pan camera stop.

07 13 09 28 CMP Okay. This jett bag is so full of junk, I don't know if I can get it through the tunnel.

07 13 10 00 CMP Okay. Stow the old rope in the right-hand temporary - right hand, okay. That's mine. Did that. Decon bag straps from top of A-2 and hang on L-3. Okay, that's the way it's been for a long time. Remove two jett bags, vacuum bag, and the vacuum cable from A-2. Okay, the cables are already in the bag. Yes. Empty jett bag, the vacuum bag, and the cable in left-hand temporary stowage - put them in last night. Ah, yes, that's in there. Okay, let's see. Stow the empty jett - Oh, I did that, okay. Replace remaining jett bag on A-2, and load with following. Okay, A-9 is empty, so I got that. Fecal bags? Oh, those are the empty ones. Oh, and - yes, we've got some extra ones on here. Heat flow experiment - did a good job and now it's going down the tubes. Okay, it's in the bag. Okay, the helmet shield. *** WG's.

07 13 11 55 CMP Extra ones. Okay, that's all four of them. There, forgot to take that one off.

CC Okay, Ron. When you can reach up, we'd like HIGH GAIN, AUTO.

CMP HIGH GAIN to - where is it - AUTO.

07 13 14 47 CMP Oops. Just about threw away my PRD. (Chuckle). *** that, wouldn't we?

07 13 19 31 CMP Okay. Get all of that old food down in there.

CMP Keep those, I guess. (Humming)

CMP You know, that's sure good tape that they put on those food bags. It's a lot better than that roll of tape that we have.

07 13 21 37 CC Roger.

CMP (Whistling, humming)

CMP Then to number 2, small jett bags. And I can't get anything else into 1.

07 13 22 29 CC Roger.

CMP I don't need that circuit breaker handle any more, either, but I guess I'll bring it - The 277 circuit breaker.

07 13 23 12 CC Yes, we understand.

07 13 25 11 CMP (Cough)

CMP Okay. Remove CWGs and interconnects from A-8, stow in right-hand temporary stow - Okay, well, I'll put a - *** CWGs in each guy's temporary stowage bag - -

CC Okay, Ron. You're 1 minute from pan camera T-stop time.

CMP - - A-8. Okay. - *** we at.

CC I'll give you another cue in at 30 seconds.

CMP ... get that one, then. Okay.

CMP I forgot to write down T-stop. What time is it?

CC It's 184:06:43. And you - You're about 30 seconds from T-stop time now.

CMP 06:43. Okay, 06:43 we'll shut it off. Go to STANDBY.

07 13 26 42 CC MARK, T-st - T-stop.

CMP 2 -

Tape 120B/6

07 13 26 46 CMP MARK it. Stop. Okay? Hey, while I'm thinking about it, I started the - the mapping camera and laser altimeter about 3 minutes early there - on the back side.

CC Okay. We copy.

CMP Okay. Got a -

CMP *** the old vacuum cleaner.

CMP *** go. *** is.

CMP All right. Now, if I can find the cable (humming).

CMP Power cable in the vacuum bag. Ah, there's old vacuum bag.

CMP Okay. Vacuum bag here. Butch, from the sounds of things, those guys are pretty dirty down there. Probably need that extra bag.

07 13 30 05 CC Roger.

CMP (Humming) Got the pins on it. Going to unroll ... in the cable (humming; whistling).

CMP It works. Ah. Good little vacuum cleaner we got (chuckle). Does that when it starts up. Let me try it again. Okay? Watch the main bus B.

CC Okay, we'll watch main bus B.

CMP And, let's see - main bus B - 3, 2, 1 -

07 13 31 44 CMP ON. Starting - Yes, what got me - It's just the starting torque on this crazy motor, I guess. Well, it works. I'm glad I tried that out. I'd hate to have that thing while we're - Oh, I know what to expect now. Now, if this thing will fit down here between F-2 and the MDC like it's supposed -

CC Ron, we're going to think about that a while. Your starting current was a little higher than we expected on that. We're checking through the back room.

CMP Okay. I wasn't quite expecting it, either (chuckle).

CC Gets your old heart rate going a little bit. Doesn't it?

07 13 33 09 CMP Yes. Makes it kind of go pitty-pat.

CMP Okay. Let's see now.

CMP Oh, that's Hadley Rille. Just looked out the window. Okay, back to work here. Let's see. Vacuum brush - Did that. Power cable - connect the cable. Stow assembled vacuum between F-2 and MDC, okay. Oh, helmet stowage bags - I can put mine down there, but I don't have theirs. *** can bring them across (humming). I should be able to get that right there, I guess.

CMP Okay.

07 13 35 02 CMP *** can't get those darn things out.

CMP There we go.

07 13 37 57 CMP *** our time here? Let's see, 17. Seventeen. We're just barely - barely making headway, here ***. Okay to that. Close out curtain and stow in the right-hand temporary stowage bag. Okay. Good idea and then we can get in there and put them old rockboxes in those holes.

CC Hey, Ron. Do you have the - Did you write down the time that you torqued to the current REFSMMAT at 183 or right around there?

CMP Yes, I sure did. I meant to give you that. I'm sorry. Let me give it to you. Okay, I did a coarse align, and I torqued at 183:01:45.

Tape 120B/8

CC Thank you, Ron, and while we've been - -

CMP Coarse-align torquing errors were - Huh?

CC Go ahead.

CMP Okay, coarse-aline torquing erros were minus 0.439, minus 7 - 0.798, minus 0.092.

CC Okay.

CMP - - 0.091.

CC Got that. While we've interrupted you, we've got two little things down here - -

CMP What's that?

CC - - for - We could remind you on. One of them is that the - -

CMP ...

CC - - the current we saw on the - the current we saw on the vacuum cleaner was just about nominal and it tripped on the undervolt by just 0.1 of a volt, so we - it's - We wouldn't have expected the undervolt, but the current - starting torque current was just about nominal. And the other thing is - is that we're still getting kind of bad data on the EKG. If you have time, you might check your sensors. There's no hurry on either of those.

07 13 40 59 CMP Oh, okay. Let's see. Do you have a zodiacal light photo pad yet?

CC Roger. I got it right here, and I've got - off a - P24 landmark tracking pads, too, if you want to wait until 30 or take them now - any - your choice.

CMP Let me get this other stuff squared away first - -

CC Roger.

CMP - - and I'll get. Got about two more things to do, looks like, then I'll be all done. It's a good thing I did half of it last night.

CMP (Humming)

07 13 42 45 CMP (Humming) Have a sugar-cookie cube for a little energy. *** R-12's ...

CC Okay, Ron. PAN CAMERA POWER to OFF.

CMP CAMERA POWER -

07 13 43 17 CMP OFF.

CMP Bottom of PGA bag, insert the bottom flap in the top pocket. Got my suit in there. Won't come out. Take my suit out, I guess.

CMP Okay. Let's see. I guess we're ready to take our MAPPING CAMERA, OFF, huh? - What you said? ... 24. Yes. Upper - it's going -

07 13 45 05 CMP OFF.

CMP Okay. MAPPING CAMERA's going to STANDBY.

07 13 46 05 CMP OFF. Barber pole. *** ER's going OFF. TRANSPONDER is going to HEATER. Okay, MAPPING CAMERA/LASER ALTIMETER COVER - CLOSED - Barber pole. Gray. Okay. Those all three are closed. In, TANK 3 ISOLATION VALVES. Okay, we can go to POO and turn on *** 2. A-1 - down - up - down. Okay. A-2. We got coupled attitude.

CMP And, Houston; America. I am ready to copy.

CC Okay, Ron. We're ready with the zodiacal light pad. Zodiacal light at 1 - T-start time - 184:58:22.

07 13 48 23 CMP Okay, T-start, 184:58:22.

Tape 120B/10

CC Okay, and over at 185:50, we've got the F-1 tracking pad and 17-1 tracking pad and I just might add that we will not give you the tenths of a second on the T-2 time because these are high altitude.

CMP Oh, yes. We don't need those. Okay.

CC Okay. F-1: T-1 is 185:38:00; T-2 is 42:50; TCA is 44:30; T-3 is 45:18; it's north 9 - 09; north 09 nautical miles.

CMP Okay, F-1: 185:38:00; 42:50; 44:30; 45:18; north 9 miles. That's it, I guess.

CC Okay. 17-1. You ready?

CMP Yes.

CC Okay. 185:57:25; 186:02:15; 03:55; and 04:43. It's south 03 nautical miles.

CMP Okay, 17-1. 185:57:25; 186:02:15; 03:55; 04:43; south 3 miles.

CC Okay, Ron. That's the pads. I've got in front of me right now. You're up to date.

CMP Okay. Thank you.

07 13 50 38 CMP How did that plane change - the tracking work out on that plane-change burn? Is that okay?

CC As far as I know, it was beautiful. Let me check with FDO right now. It's very good. Let me - let me get your parameters -

CMP Okay.

CC They don't have a real smooth solution yet, on their track, but it is real good. No problem at all.

CMP Good, okay. Old computer comes through again.

CC That's affirmative. I guess those residuals on the SPS burn were like zero, aren't they?

CMP Yes. That's a good -

CMP ... P20. Is there a place in there where I hook up that TV camera? I think I'm going to do that now. *** look like it.

CMP Okay, let's see - it's 30 something. I can get it out, if I can find it. Old jett bag is in the way. Don't want that floating all over the place.

07 13 57 13 CMP And, Bob, will you give me a clue when we're getting ready to do that VERB 49?

CC Yes. You're right on time for the VERB 49; it's 37 in the Flight Plan and it is 37 right now.

CMP Okay, I better get busy on it I guess.

CMP Two - Interesting. 024 I guess it is.

CMP 200 ENTER. Okay 24 72 and 4. *** CMC in AUTC.

07 14 03 03 CMP Okay. Nikon, 55-millimeter ... *** 2, infinity. Mag Yankee Yankee - gives frame - let's see - ... lights and tape the old floodlights. Okay.

CC Ron, we'd like to get the H₂ TANK 2 FAN, OFF, please? I'll say again: H₂ TANK 1 FAN to OFF.

CMP *** 1 FAN is OFF. 1, 2 and 3 are all ON.

CMP Okay. It's time to run the radar check. It's been in HEATER a minute. Okay. ... closed, okay. Heater for 21 minutes. Power. Okay, A - TRANSMITTER A and she is reading 2.8. Okay.

CMP ... TRANSPONDER to TEST or - Okay, you're reading about 2.35. Less than 0.8. Reads 0.3. Same thing as it did before. *** that one. Okay. Now go to OPERATE SYSTEMS TEST. 0.4 right hand to sec - see if it unlocks. It probably won't do anything.

Tape 120B/12

07 14 09 25 CMP Looks like RENDEZVOUS RADAR TRANSPONDER SELF TEST works. Okay. Systems tests goes back to the - Alfa is still 1.2.

CMP *** to HEATER. Okay.

CMP Here we go. 290 and 0. Okay. T-start is in there.

CMP ENTER, plus 22 - Okay, NOUN 78's, VERB 24, NOUN ... ENTER.

CMP Let's see - 0.5 *** plus one-half degree dead band. Five up 50 18 2 and 4. Looks pretty good. Now, let's see. We can go ahead and -

CMP Ah, NOUN -

07 14 12 23 CC Ron, we're couple of minutes from LOS here and you're looking good. We'd like to make sure you get the DATA SYSTEM OFF and just a comment on the rendezvous transponder.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 12 49 59 CDR/
LMP-LM (Singing: Good Morning to You)

CC (Music: Thus Spake Zarathrustra by R. Strauss)

07 12 53 14 CC Good morning, Challenger and thank you for the
vocal rendition from - from the Moon, there.

CDR-LM Well, we thank you for your kind music. We
wanted to let you know we were thinking about
you this morning, Gordie.

CC You just beat us to it, but - -

CDR-LM That was a great song.

CC Decided to play it anyway, because it's such a
- such a pretty selection.

CDR-LM I think it's very apropos at the moment. I guess
I can just wait for "Hail Purdue," huh?

CC Yes, just stand by, you'll probably hear it
before you get back.

CDR-LM Hey, we've been stirring for about 15 or
20 minutes. We're in the midst of a nice ham-
burger omelet (laughter) and assorted accessories.
As a matter of fact, it's all over us. And if
you'll give me 5 minutes, I'll be ready to go
on the PGNS, unless you want to start it sooner.

07 12 54 37 CC Okay, we'll - No hurry, finish up and get cleaned
up there. And the only change, we have some change
in the timing as far as the checklist so we can
gain back the time we're behind now, which is
actually less than an hour. And the only hard-
ware change other than deletions is to - that
we'd like you to leave Demand REG A, CLOSED, at
all times. So whenever you come across a place
that says OPEN at CABIN or EGRESS, we'd like you
to leave it CLOSED.

Tape 121A/2

LMP-LM Okay, Gordie. We've got you on that.

CDR-LM And, Gordie, could I have a quick status report on - on America and Challenger?

CC You bet. America is just as good as gold, just like always. Ron got off the trim burn on the back side followed by a good plane change on the front side. In fact he - G&N cut-off was a tenth and - or less in all axes. Didn't even need to trim it. So, he's in about a 62-1/2 circular, I believe, and waiting for you to come up and join him.

CDR-LM Okay, how's his consumables?

CC Stand by.

07 12 56 21 CC Okay, America's consumables are great and so are yours. There is a possibility we may have to switch to ASCENT WATER, just prior to lift-off. Everything really is in good shape.

CDR-LM Those are good words, Gordie. Thank you.

LMP-LM Hey, Gordie. In honor of one of your comm handovers last night, and in the tradition of Apollo 8, I've got paraphrase of a familiar poem for you.

CC Okay; go ahead.

LMP-LM Well, it's "The week before Christmas and all through the LM, not a commander was stirring, not even Cernan. The samples were stowed in their places with care, in hopes that with you, they soon will be there. And Cernan -- Gene in his hammock and I in my cap, had just settled our brains for a long - short lunar nap. But out on the - up on comm loop there rose such a scatter, I sprang from my hammock, to see what was the matter. The Sun on the breast of the surface below gave the luster of objects, as if in snow. And what to my wandering eyes should appear, but a miniature Rover and eight tiny reindeer. And a little old driver so lively and

quick, I knew in a moment, it must be St. Nick. I heard him exclaim as he - over the hills he did speed. Merry Christmas to all and to all - to you all Godspeed.

CC Very good.

CDR-LM Gordo, that was the first time I heard that and I got to say - I got to say that is beautiful.

CC I agree. Did the LMP get any sleep or did he spend all night composing that?

LMP-LM People always said we ought to have a poet in space.

CDR-LM I don't think we've made it yet.

LMP-LM No, for some reason I really woke up with one of your handovers last night, and that was how I went back to sleep.

LMP-LM Gordy, that's for the kids. ...

07 12 59 24 CC Roger, Jack.

07 13 00 20 CC Challenger, Houston. One update for the postsleep procedure. I understand you brought in the LMP's camera, and we want to be sure you get that into the jett bag before the final jettison here, and by the way, you're STAY for the final jettison.

CDR-LM Okay, Gordy. It's already in the jett bag, thank you.

LMP-LM And, Gordy, you might make some notes that before I put it in there, I took another black-and-white or black-and-white window pan with mag Nancy.

CC Okay, Jack. Roger.

CDR-LM Gordo, on REQ A, that is - you interpret that is just a small leak by the reg? That it would be usable, if you had to.

Tape 121A/4

- CC That's affirmative, Geno. It's a small slow leak and it is usable if - if needed.
- CDR-LM Okay, thank you. It's coming up so far, I think that's all - all the system anomalies we've got, isn't it?
- CC That's all I can think of at the moment. I do have revised times for the rest of the Lunar Surface Checklist which, at a convenient time, I can give to you - so that you'll have a how-goes-it as you go on down the line here.
- CDR-LM Why don't you give them to us now, Gordy?
- CC Okay, turn to page 7-9.
- CDR-LM Go ahead.
- CC Okay, 7-9 LGC/IMU POWER UP, change that time from 183:04 to 184:10. The eat period time is now 184:20. Turn the page, and the 183:59 above "Park RENDEZVOUS RADAR" is now 135:05. Next page, don suits at 185:15. Go to the next page. Prep for equipment jettison is 135:50, and the same page - helmet/glove donning is 185:58. Next page, pressure integrity check, 186:04. Cabin depress is 186:08, and hatch opening is 186:12. Next page, 14, cabin repress is 186:15. Cabin cleanup for launch is 186:20. And on the following page, we're going to delete the P22 but we'd like you to go all the procedures except those from "VERB 95 ENTER," through "POO ENTER," inclusive - the center section of procedures. So you'll still be closing the rendezvous radar breakers, going to LGC, and parking the antenna and copying pad. Over.
- CDR-LM Okay, we're going to delete everything from VERB 95 through POO on P22. That's the center of the page.
- CC That's affirmative and then the next page, cabin prep for ascent is 186:45, and instead of 39 minutes we're going to have you do that in 3 minutes. And you'll actually - you should have a little more time than that, since you got up early. That puts you right back with time line, at lift-off minus 1 hour 15, at 186:48. Over.

CDR-LM Okay, top at 7-15 where we pick up - what was going to be the beginning of the P22? Have you got a time up there?

CC I guess we'll just have to work that in with cabin cleanup time. We had deleted that whole time block but you do have to catch those procedures.

CDR-LM Okay, and then the times on the top of 7-10, for P22, are not applicable, and I guess you can give us an update for our P57 lift-off time.

07 13 05 55 CC That's affirmative. We might - that might be - there's a couple more changes coming at me here but let me make sure I got them straight and I'll call you later. Go ahead with whatever you were doing.

CDR-LM Okay.

CDR-LM (Cough) Gordy, if I - if I get ready for the LGC/IMU power up, I'll give you a call even though it comes earlier but I'd like to get that started, as soon as we're ready to start it.

CC Okay. We concur with that.

LMP-LM Hey, Gordy, as far as the food, medication, and sleep goes - no medication. Gene had 5 hours of good sleep, I had probably around my usual 6, in spite of my poetic inclinations. And the food - we continued to do well, I believe. We've eaten a wet pack apiece last night. We got one this morning. We've eaten our scrambled eggs and sausage yesterday, and as we've run out of juices and tea. And which is somewhat of an inconvenience I might say. And if you've got any specific questions, I can fill you in on it but, I think, food-wise we've done pretty well.

CC Can you give us a feel on the fluid intake?

LMP-LM Well, that's what I was trying to do when I said we'd drunk all the juices and tea. Plus, Gene, in particular, takes water from the hose.

Tape 121A/6

07 13 08 13 CC Okay, Jack, fine. Sounds good.

07 13 17 32 CDR-LM Okay, Gordy, it's PGNs power up time.

CC Okay, Geno, I - and I've got a couple more items to completely clean up the checklist whenever you can get to that.

CDR-LM I'll let Jack give you a call. I'm going to start on the PGNs, if we're ready.

CDR-LM Gordy, you ready for a PGN?

CC That's affirmative, finally got you a GO to start it as per checklist.

07 13 18 33 CDR-LM Okay there's the PRO, I did get the RESTART. I got the NO ATT, the DAP, GIMBAL LOCK light, and a PROGRAM ALARM light's on.

CC Roger.

07 13 19 37 CDR-LM MARK it the gimbal operate breaker is CLOSED.

CC Roger.

07 13 19 48 LMP-LM That's the IMU OPERATE breaker. Yes. Stand by for a 90 seconds.

CC And we're ready for a POWER AMP PRIMARY and HIGH BIT RATE.

07 13 20 10 CDR-LM Okay. You got it.

07 13 27 35 CDR-LM Okay, Gordo, self test is complete and it's GO, and I'll give you an E-memory dump.

CC Okay, we're ready, standing by for it. And while it's coming, I could give you the update for the next page.

CDR-LM Okay, it's coming at you and you can go with the updates on the next page.

CC Okay. Page 7-10, your P57 lift-off time, upper right corner, is 188:01:43.85. Over.

CDR-LM Okay, Gordy, P57 lift-off time 188:01:43.85.

CC That's affirmative. And now we'd like you to delete all the steps below that lift-off time, from the A/T-3 data star info box through the VERB 32 after the last - after for the remaining data stars and after last star. In other words, just delete all between the box and up to circuit breaker AOT LAMP, OPEN. And, of course, they'll be no P22 time, over.

CDR-LM Okay. Delete all the data star information between the start of that box and after last star VERB 34 ENTER, 00 ENTER.

CC That's correct and then turn to page 7-15. We're changing - we - looking here a little closer we find that radars are already in good position, so you can delete all procedures on page 7-15, except "Copy Ascent pads, CSI pad, and LM DAP weight."

CDR-LM Okay. We deleted everything but the last three lines on that page.

CC Okay. On page 7-12, back up a couple pages. In the lower right corner there, in the blank space, you might jot down 185:58, VHF check with command module. And that'll be according to the procedures on 7-15 in the box. You might just parenthesis 7-15 to remind you where the procedure is. But the comm check will come during that time when you're preping for equipment jettison, or right around there.

CDR-LM Okay. We got that.

CC Okay. That's all we got for you, and we have the E-MOD dump okay.

CDR-LM Okay.

07 13 29 03 CDR-LM Gordy, we're in P00 and data and we're standing by for your up-link, and how long does that AOT HEATER breaker have to be open? I pushed it IN at 184:08.

Tape 121A/8

CC Okay. I'll get an answer for that, and I think we'll be coming with the up-link here shortly.

CC Gene, no time constraint on that AOT breaker; except, if it's foggy, it hasn't been in long enough.

CDR-LM (Laughter) Thank you, Gordy.

07 13 31 10 CC Challenger. Here comes your up-link.

CDR-LM Okay.

07 13 34 58 CC Challenger, it's - your computer. You have a state vector, a time increment, and an RLS.

CDR-LM Thank you, Gordy.

CDR-LM Yes, it likes - it likes the command module's orbit.

07 13 37 49 CC That's good.

07 13 54 35 CC Okay, we see that.

07 13 54 39 CDR-LM Houston, there's a NOUN 05.

CC Doesn't look like the Challenger shifted around much in the last 3 days.

CDR-LM Well, at least it always settles back to the same spot.

07 13 55 47 CC Okay. You're clear to torque those.

07 13 59 58 LMP-LM Say, Gordy, are we clear to jettison the buddy SLSS bag, now?

CC That's affirmative, Jack. We've determined you won't need it for rock stowage. And along the same line, John Young suggested that you might check your checklist pockets on your suits, when you get to that point. His were full of dirt. You might want to take those off and discard them if that's the case, so that it won't fly up and get you at insertion.

Tape 121A/9

CDR-LM Yes, we already did that, Gordy. They were a mess, and we took them off. They're in the jettison bag now.

CC Okay.

CDR-LM We're going to take time out for about 15 or 20 minutes of mandatory housekeeping here.

CC Okay, understand.

CDR-LM That's - that's prior to suit donning.

07 14 00 59 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 14 12 33 CC We're going to leave it in heater straight through until ascent because the - the LM got up late and they are not doing their P22 today.

CMP Oh, okay, okay. Understand. Okay; the old DATA SYSTEM is going OFF. And I got to configure the DSE at AOS, it looks like.

CC And we have configured the DSE and controlled, Ron. You can scratch that line of the Flight Plan.

CMP Okay.

CC And have a good zodiacal light.

07 14 13 24 CMP (Laughter) Flip, flip, push-pull, click-click, around the corner, 3 seconds, one-half, one-fourth, skip one, skip two, skip five. Ought to be fun.

07 14 34 XX BEGIN LUNAR REV 50

07 14 59 10 CMP (Humming) Thin sponge, but I guess it'll work. (Humming) Okay, now - let's see what we need. Find a new spot that's not burned. The hair is starting to grow out again. Got to take this sticky stuff off before it'll stick. (Humming) Take them along. Okay, where did the other little thing go? Okay; 20. (Whistling)

07 15 01 50 CC MARK. T-2 time.

CMP Oh, okay. Coming up - 42 - No, it's 41:50, I hope. Because I'm not there yet.

CC T-2 is at 42:50; TCA is 44:30.

CMP Oh, okay. It's on the old DAC here. Not seeing much. Maybe - 7 degrees. Okay, she's coming down now ... Ah ha! I see it. Yes, and it is pointing a long ways from it. It's 5 degrees off. Well, not that much; 3 maybe.

Tape 121B/2

CC Do you have the DAC on now, Ron?

CMP Yes, DAC's ON. Bring her down and - Okay, I guess the best thing to do is take the center of that thing - about right there. It's supposed to be 10 seconds apart. That one was a little bit off - discount that one. Beautiful. Right there. Switch - Ah ha! Both in zero phase. Got it. About to lose it. Last one - Okay, the last one may not be that good. Just lost it.

07 15 05 22 CMP Okay, the DAC is OFF. Okay, TCA P20; 20 ENTER. Time, VERB 25 NOUN 89 ENTER. Plus 20160. (Humming) I have time to load F Crater, look at that through the sextant. Right time to do that. 20 - 1 - Where an I? 15405, plus 15.

CC Roger, Ron. We'd like to make sure you configure your VHF prior to this landmark 17-1 tracking.

CMP Okay. ... Plus 2016 - is plus 15405 ENTER, 6 ENTER.

07 15 06 53 CMP Okay, configure VHF comm. B is DUPLEX. Okay; DUPLEX Bravo. MODE to VOX; I'm in. VHF AM is I/R; panel 9 - instead of RECEIVE, okay? Antenna to right, adjust the SQUELCH. I can hear myself cutting in and out.

CC Okay, you sound good to us. Just a reminder that RENDEZVOUS TRANSPONDER does not go to POWER there. We just keep it in HEATERS.

CMP Okay, thank you. Okay. Number 1, that's make sure we be sure and pick it up right - transmitter 9, we're DUPLEX. Okay, by the way, the old zodiacal light went like a charm. Amazing. They cut out enough of those things, you know, so that it's reasonable to get them done.

CC Roger. Good show.

CMP And one came smacking through the window - the Sun came smacking through the window at - 15:01, something like that.

CC Okay, Ron. You've got to load your NOUN 89s, or maybe I missed it and we just want to remind you that we'd like B/D ROLL configured and we will be using B/D ROLL for the rest of the mission.

CMP Oh, okay. You want to change the old DAP here - Did I miss that somewhere?

CC No, sir. That's a call from us.

CMP Oh, okay. Thank you.

CC Wait until 186:11 - no hurry or anything like that. Just a reminder.

CMP Okay, let me wait until after this landmark tracking here. I'll write her down though. (Humming) ... in there. 5725 - Okay, give me a call shortly before T-1 and I can start my clock.

CC Roger, Ron.

CMP And in the meantime, I can put in another little old sponge. Got to keep the surgeons happy. Besides - besides it feels better to change them anyhow. There's the spot.

07 15 11 01 CMP Okay, you ought to be getting good data now.

CC I'll go over here and nudge the - Roger. He says he is getting good data now.

CMP Okay.

CMP I wanted to be all clean shaven and - so I could be all nice and presentable for the guys, and I didn't have time to shave yet.

CC Roger. You still itching?

CMP It's not too bad, really. Right now it is kind of - just to a point right underneath the chin, you know, where - your comm carrier ties on with that little pad down there.

CC Hey, Ron. If you let it grow a little bit, you can join the backup crew.

Tape 121B/4

07 15 14 19 CMP Hey, that's right. Well, there goes old Picard right through the telescope. At this kind of Sun angle, he still has the dark halo. It looks like the dark halo is a little bit smaller. You can't notice the distinction quite as much. It only goes out to about half a crater diameter now. You can see ahead of something out to one crater diameter. You can still see the dark material, dark albedo-type stuff on the eastern side of the crater. And the demarcation between the two of them. It just disappeared.

CC Okay, Ron. You're less than a minute to T-1. I'll give you a call at 30 seconds.

CMP Okay.

07 15 16 54 CC Okay. Okay, Ron; 30 seconds to T-1.

CMP Okay. Give me another call on start.

CC And, Ron, you might be getting - They're making a VHF check right while you're doing the landmark tracking.

CMP Okay.

CC I'll call you at T-2, if you want, and you can go ahead and call - make your voice check.

CMP Okay. Man, you can't find anything - anything with that sextant. Okay, let's see - T-1 was - went. 25 - 1 minute. Okay.

CC Ron, will you give me - your LM guys a call there, please. They're calling you.

CMP Oh, okay. Hey, Challenger. This is Sea Monster. How do you read? This is America, really (laughter).

CMP Hey, read you loud and clear.

07 15 19 04 CMP Okay, I'm just transmitting DUPLEX Bravo.

CMP Okay, I'm doing great now; standing by for you. I am going to take a - do a little landmark tracking on you when I go over this time.

CMP Negative on the ranging.

CMP Hey, outstanding. I'll tell you. It's a beautiful bird.

CMP Okay, you're kind of fading out a little bit, but - Okay?

CMP Okay, we'll see you - when - just prior to lift-off then.

CMP I guess I can turn my VHF off, since their's is off.

CC Yes, it shows going off at the end of your landmark tracking.

CMP Okay. And there comes Maraldi.

07 15 21 16 CC Okay. You're coming in 1 minute to T-2 time.

CMP Okay. ... ZERO's OFF, CMC - (Humming) Okay, we're passing over the Sculptured Hills. And coming into the landing site now. I still say - I'll start the old DAC. Oh, boy, that's going to be bright.

CC Okay; stand by for a mark on T-2.

07 15 22 16 CC MARK. T-2.

CMP Long, long ways off. I was pointing up to Family Mountain.

CMP Through the telescope, anyhow, the whole area down there's a lot lighter than it used to be, and I am sure this is due to the increase of the Sun angle. However, the landing site itself and the whole valley extending on out to the Serenitatis annulus is still darker - darker than the surrounding territory, but it - the higher Sun now, it's a lighter tan than it used to be. Come on, catch up with us there. Okay, I got three good marks right in a row there. Just because I missed the TCA, couldn't catch up with it. Last one. She's gone. Okay, in this sunlight, Family Mountain looks like it is black on the top. Not black, but real dark - real dark gray on top of it.

Tape 121B/6

CC We'd like HIGH GAIN to AUTO.

07 15 25 04 CMP HIGH GAIN to AUTO.

CC Please.

CMP Back to P00 here, huh?

CMP Okay, VERB 28 ENTER. VERB 24 ENTER. 1112 ENTER, 0111 - That looks good. PROCEED, PROCEED. Okay, we will VERB 49 it.

CC Ron, you will need to select your jets for B/D ROLL.

CMP Thank you. Good point. I was diddling around, looking through the telescope, going across Serenitatis there. Let's see - where were we? 180, 244, and 12 - No, that's not the ... Okay. ... Look in there.

CC Ron, just some information for you while you are working here. The consumable status, you're above the line on everything and, in particular, you might be concerned about SM RCS here. You're 1 percent above the Flight Plan plan at this time, even after that burn.

CMP Even after the burn, still 1 percent, huh?

CC That's affirmative.

CMP That's good, because I had a little ACCEL COMMAND in there, too. Yes, I found my bright mound crater. I wish I could do P24. I could just take a mark, somewhere west. I could - I can do that, can't I? Let's see - ENTER, 37 ENTER; probably get a 409 or something. Okay, I'll take a couple of marks on it. Yes. I was afraid of that. This is fair enough. Still has the brown - the tannish ejecta off of it, and it's hit over in the - in that volcanic rille area. I got some sequence camera pictures of it, but I don't know how good that'll be.

CC Ron, did you get your mark on the crater you want?

07 15 30 56 CMP Yes, I think I got a - yes. I got a 405 alarm and I don't think it will take a mark. When you have that 405 alarm. But, anyhow, I took two marks on it.

CC Okay.

CMP Might be in the data there; I don't know.

CC Ron, I've got that P27 update pad, which is on page 3-277 of the Flight Plan at about 186 hours. It is a long one, so any time you want to copy it.

CMP Okay, I guess I had better get going on that. Let's see, let's - Okay, the magazine Bravo Bravo is down to - 50 percent.

CC Roger.

CMP I lost my pen somewhere. Pencil.

CC Okay, Ron. Now that you are in P00, we'd like ACCEPT. We got a state vector.

07 15 32 14 CMP Okay. And I am ready to start copying.

CC Okay, it's a long one. The first one is the CSM state vector. 71; GET is 188:01:42. Index is 21. The following line is all data. I'll break about every five, if you want to stop me. Opposite 02 we go - data as follows: 01501, 00002, 77563, 77431, 77517, 45633, 00013, 11736, 65021, 43762, 11131, 31244, 07624, 10720, 10043, 17330, end of the CSM state vector. Read back.

CMP Okay. VERB 71: 188:01:42; 21; 01501, 00002, 77563, 77431, 77517, 45633, 00013, 11736, 65021, 43762, 11131, 31244, 07624, 10720, 10043, 17330.

CC Good show, Ron. And you want to break here or do you want to take the LM state vector VERB 71?

CMP If you are through with the computer, I might start the maneuver to attitude here.

CC Negative. We still need the computer, Ron.

Tape 121B/8

CMP Okay. Let's go on with the LM then.

CC Okay. I'll give you the same thing. Just interrupt me about every five. LM state vector, VERB 71; GET 188:19:00. Index 21 data follows: 01501, 77775, 77472, 77201, 77741, 70163, 00121, 16227, 77273, 41206, 17767, 36400, 05052, 15405, 10051, 32120. that's it. You can read back. The computer is yours.

07 15 37 32 CMP Okay, I'll go to BLOCK. VERB 71; 188:19:00; 21; 01501, 77775, 77472, 77201, 77741, 70163, 00121, 16227, 77273, 41206, 17767, 36400, 05052, 15405, 10051, 32120. Over.

CC Roger, Ron. Good readback. I've got a DAP weight for one man for the CSM, if you want to copy it somewhere. FAO would like to get the maneuver started, Ron. Go ahead, and I'll give it - -

CMP Okay. Okay. All righty; 244 and 341 PROCEED; 50 18; CMC; caged; PROCEED. Okay, CSM weight.

CC Okay, CSM DAP weight for one man: 36032. Note 2: engine trim good as is. And a note from FAO: if mag Bravo Bravo has 50 percent, no need to change; good for docking with 50 percent. Readback.

CMP Okay, CSM weight is 36032. And that's for me alone, I guess. Packed [?] off and yacked [?] off are good as is. And there's 50 percent on mag Bravo Bravo, so we might as well use it, huh?

CC That's affirm.

CMP Don't want to run out. Okay.

07 15 41 49 CMP Houston, America. Did you all reset the surface flag?

CC That's affirmative. That's affirmative. We reset it.

CMP Okay.

Tape 121B/9

CC The only thing we got open right now, Ron, is the
OU and ascent pad or pads.

CMP Okay. If you have them, I could go ahead and copy
them. If you don't have them yet, it's all right.

CC Okay, Ron. I've got the direct ascent and the
coelliptic rendezvous ^{T_{ig}} times of page 187 - yes,
that's on time 187.

CMP Okay, just a second there, Bob.

CMP Okay, ready to copy the old direct ascent pads,
I guess.

CC Okay, Ron, the direct ascent, GET lift-off:
188:01:35.93; GET TPI: 188:55:57.00. Over.

07 15 47 08 CMP Okay, lift-off - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 14 18 18 LMP-LM Gordy, this is Jack. I just went off biomed briefly.

CC Okay, Jack.

LMP-LM And Gene will be on biomed shortly.

CC Roger.

LMP-LM Gordy, I'm back up.

CC Okay.

07 14 37 16 LMP-LM Okay, Houston. This is the LMP suited. How do you read biomed and voice?

CC Oh, we're copying your ticker loud and clear. Also your voice.

LMP-LM Okay.

CDR-LM Gordy, Gene. I'm going off the air.

CC Okay, Geno.

07 14 51 33 CDR-LM Okay, Gordo. This is CDR. You ought to have me all backup on the comm and biomed now.

CC Okay, Geno. Looking good.

CDR-LM CDR's PRD is 17045.

CC Okay; got that.

LMP-LM LMP is 24150.

CC Okay.

07 15 02 16 CDR-LM Okay, Gordo. We're ready to don the helmets and gloves.

CC Okay.

Tape 122A/2

CDR-LM Okay, Gordo. We're going to press on, but don't let us miss 185:58 for the VHF check, will you?

CC Sure won't. We're watching them.

CDR-LM Okay.

07 15 06 02 CC Challenger, Houston. We're getting close to the bottom on descent water. We're expecting to have to switch to ascent water sometime in the next hour. We'll give you a call.

CDR-LM Okay, Gordy.

LMP-LM Okay.

LMP-LM I cleaned them up for you. What more could you ask?

07 15 07 38 CDR-LM Yes. Hey, Houston. We're VOX now.

CC Okay; and loud and clear on VOX.

LMP-LM Is the recorder on yet?

CDR-LM Yes. The recorder's on, but I don't think it's going to work. (Laughter) See if I've got anymore juice in here. I owe Don Arabian something.

CDR-LM Wristlet covers. Don wristlet covers.

07 15 09 22 CDR-LM Okay; my right - right glove is on and locked. Verified.

CDR-LM Oh, I just came to the end of my grease. Probably a good time, because if everything goes the way it's supposed to, I shouldn't put on these EV clothes anymore.

LMP-LM Don't you use that in your IV?

CDR-LM No, I don't need it with my IV.

07 15 10 10 CDR-LM Mine are all on and verified. Locked. Back in SUIT FLOW.

CDR-LM Hey, we got 8 minutes to the comm check, so let's press on. Hate to get in the middle of the integrity check - Oh, we can do it. This won't take long. Need any help with your glove?

LMP-LM I will.

CDR-LM Okay. Let me. Buggish today. Turn that off.

LMP-LM Well, I did once, Gene, and I - didn't help, and I started to run out of air. There.

CDR-LM Doublecheck. You sure they're locked?

LMP-LM Yes, they're locked.

CDR-LM Okay.

LMP-LM Okay. Gloves are GO.

07 15 11 28 CDR-LM Okay; stay facing that way. Pressure integrity check. Suit shall not be maintained at elevated pressure greater than 5 minutes. Okay; SUIT GAS DIVERTER, PULL to EGRESS. Verify.

LMP-LM Okay; that's verified.

CDR-LM CABIN GAS RETURN, EGRESS. Verify.

LMP-LM EGRESS verified.

CDR-LM SUIT CIRCUIT RELIEF, CLOSE.

LMP-LM I'm CLOSE.

CDR-LM Okay; we will leave PRESSURE REG A, CLOSE.

LMP-LM Yes, sir.

CDR-LM PRESSURE REG B, DIRECT O₂, and we'll go up to 3.7 or 4.0 on the cuff gauge, and then you want to go to EGRESS on it.

LMP-LM Okay.

Tape 112A/4

LMP-LM Okay; you can go on up. I'm in DIRECT O₂.

CDR-LM Okay; suit circuit's coming up.

CDR-LM Okay; suit circuit's about 7.2 now. Should be coming off the peg shortly. I'm off the peg.

LMP-LM And I'm off the peg.

CDR-LM You can stop it on your cuff gage --

LMP-LM Yes, I will.

CDR-LM -- at 3.7.

LMP-LM That's 3.0, 3.5, 3.7.

CDR-LM Okay; go to EGRESS.

LMP-LM I'm in EGRESS.

CDR-LM Okay.

07 15 13 09 CDR-LM MARK it.

LMP-LM Okay. 3.75 and CDR was 3.75.

CDR-LM Got about 4 minutes for VHF.

CDR-LM Our suits are going to be good.

LMP-LM That's the whole circuit.

CDR-LM Yes, I know.

LMP-LM It's about the same.

CDR-LM Got about 10 seconds to go.

CDR-LM Okay.

07 15 14 24 CDR-LM MARK it. CDR dropped from 3.75 to 3.60.

LMP-LM Okay.

CDR-LM Okay; SUIT CIRCUIT RELIEF, AUTO. Hold your ears.

LMP-LM AUTO.

CDR-LM Suit circuit pressure decays to 4.8. Coming down.

CDR-LM Okay. Jack. The next thing is depress, but before we do that, I think we ought to get the VHF check. It's only about 3 minutes away.

LMP-LM Do it. I got a scratch on my helmet.

CDR-LM Okay, Gordo. We're going to configure for the VHF here. Standing by for a call from the CMP.

CC Okay; sounds like a good idea.

CDR-LM And we'll press on after that. Jack, you better make sure your volume's up.

LMP-LM You're RECEIVE B, huh?

CDR-LM I'm A, OFF - we're A, OFF and RECEIVE, B on the AUDIO.

LMP-LM Hey, what do we do once we hear him?

CDR-LM Okay; when you hear him, probably answer him is the first thing. And then - and then VHF. No. They need - You want A TRANSMITTER, VOICE/RANGE, then A to T/R, and A TRANSMITTER, OFF after conversation.

LMP-LM Okay.

CDR-LM As soon as you hear him, you want the VHF A TRANSMITTER to VOICE/RANGE.

LMP-LM Yes, I'll do it. Is he going - He's going to try to lock up on us I guess, huh?

CDR-LM They've got us VHF RANGING, so we'll have to be quiet once we get established.

CDR-LM *** like home in these suits.

LMP-LM Yes.

Tape 112A/6

CC Challenger, about 30 seconds to the comm check.

CDR-LM Okay. Thank you, Houston.

LMP-LM There he is.

CDR-LM Yes. Talking in VOX.

LMP-LM Okay; I'm going to go VOICE/RANGING, I guess.

CDR-LM Wait - No, wait until he gives us the call.

LMP-LM Hey, Houston; we're reading CMP on VOX.

CC Roger.

CDR-LM Hey, Captain America, this is Challenger. You're loud and clear. Go to T/R.

LMP-LM Okay, Ron. You're loud and clear. How do you read us? Okay; you were very good on B. On T/R, you're in the mud a little bit. On the A. Oh, okay. That's better. You must have turned away from your mike. How are you doing?

CDR-LM Okay. Okay. Are you in VOICE/RANGE, Jack?

LMP-LM Yes, I am.

CDR-LM Ron, are you going to do any ranging at all?

CDR-LM Okay. Gee, you're loud and clear. How's - how's America looking to you? Yes, we got a beautiful bird down here. We'll - we'll see you up there shortly.

07 15 19 48 LMP-LM Hang in there and keep your probe extended. Okay; we're going to go VHF, OFF.

CDR-LM Okay. Jack, you need your A TRANSMITTER, OFF.

LMP-LM A is OFF.

CDR-LM That's all you need to do.

LMP-LM Outstanding.

CC Okay, Challenger. You have a GO from us for depress.

CDR-LM Okay; stand by 1.

LMP-LM I doubt it.

CDR-LM You might be able to. It's awful glary though. He'll be well sunlit up there.

LMP-LM I doubt it.

CDR-LM Okay; we have a GO for depress, Jack. On 16 ECS, CABIN REPRESS, OPEN.

LMP-LM CABIN REPRESS coming OPEN. OPEN.

CDR-LM Why don't you watch your gage, and I'm going to - Okay. I'm going to open the forward dump to AUTO to 3.5.

LMP-LM Okay; I'll watch. You call.

CDR-LM Hey, coming down?

LMP-LM Okay; it's 5, 4.5, 4. Stand by.

07 15 21 21 LMP-LM MARK. 3.5.

CDR-LM Okay. Verify - suit circuit lockup at 4.3 and decaying. Okay; it's 4.5. Stand by for the decay. Oh, man, I got to go get that WATER SEP SELECT.

LMP-LM Pull the 2, huh?

CDR-LM Oh, boy.

LMP-LM Want me to get it?

CDR-LM No. I got longer arms, I guess.

LMP-LM I can reach back in there.

CDR-LM Okay. If you can get back there.

Tape 112A/8

LMP-LM I think. Now, they want it?

CDR-LM Yes, now. Pull the 2.

LMP-LM Okay. Pull the 2. Okay. Happy with the suit circuit. And yes, we got a decay in the suit loop.

CDR-LM Okay. Okay; verify suit circuit lock's up. I'm dumping all the way.

LMP-LM Okay.

LMP-LM Circuit is 4.2.

LMP-LM We're at 0.7 in the cabin and 4.1 in the suit.

LMP-LM About 4.0, and the cabin is 0.3.

CDR-LM Okay; let me see if I can jar it.

LMP-LM Okay; I guess we're GO for EVA-4.

CDR-LM Five, isn't it? Five this time? Oh, man, I got it open. If I could bleed that pressure. Oh, boy. Hey, hold it here for a minute. There's a lot of psi on that hatch.

LMP-LM Okay; that'll hack it. Let me go to AUTO here. Need my checklist. Make it - Oops, that's closed. That's AUTO, and the lock ... is on? Okay? Hatch is open all the way. Where are we?

LMP-LM Why is that still waving in the breeze?

CDR-LM Man, there's a solar wind in here.

LMP-LM We're on 7- something here. Still venting, are we? Houston, how's our cabin configuration? Mean there's still the - had a little breeze going out the hatch.

CC All the numbers look good here, Jack.

CDR-LM Hey, hold that, Jack.

LMP-LM Okay. Okay. Ready?

CDR-LM Okay.

07 15 25 40 LMP-LM Partially open; that's good. ... Jettison the jett bag. Here goes Santa Claus - -

07 15 25 47 CDR-LM Here you go, Santa Claus. - - Santa Claus' bag. Another bag of goodies.

LMP-LM Give it the old - -

CDR-LM There you go.

LMP-LM - - 3-point kick.

CDR-LM Right. Beautifully done. Just where we wanted it. All clear the ascent stage.

LMP-LM Need the - Okay; clear. Good boy. Now, for your next act.

CDR-LM No. Don't - don't even think about it.

LMP-LM Okay. (Laughter)

CDR-LM Okay? (Laughter)

LMP-LM Jettison bag. All items are clear of ascent stage. Ready to close hatch?

CDR-LM Looks like it.

LMP-LM Short EVA-5. Are we STAY/NO STAY for hatch closure?

CC You have a GO for closing the hatch.

LMP-LM Okay.

07 15 26 55 CDR-LM Okay. The hatch is closed.

LMP-LM Boy, is it easy to get around in here without a PLSS on. Okay; your DUMP VALVE verified in AUTO?

CDR-LM Yes, sir, and locked.

LMP-LM Okay.

CDR-LM CABIN REPRESS. Okay.

Tape 112A/10

LMP-LM Okay.

CDR-LM Verify it's AUTO?

LMP-LM It's AUTO.

CDR-LM Okay; on 16, CABIN REPRESS, CLOSED?

LMP-LM Okay; CABIN REPRESS going CLOSED.

CDR-LM And the hatch looked clear when I - sealed it.
Clear when I closed the hatch.

LMP-LM Okay. Closed.

CDR-LM There's the MASTER ALARM. And the cabin is coming
up. AUX O₂.

CDR-LM Okay; cabin is increasing, and you can go to CABIN
on PRESSURE REG B

LMP-LM It's in CABIN.

CDR-LM Every warning light will go off here shortly. And
my suit's coming down.

LMP-LM Mine, also.

CDR-LM Okay. We're just about to go to 50 percent.
DESCENT O₂. We're there.

CDR-LM Okay. Cabin's almost at regulating pressure,
and cabin lights are still on. Next thing we'll
do when it stabilizes, we'll doff our gloves, doff
our helmets; locked up.

LMP-LM Okay; 5.0.

CDR-LM Okay. You can doff your gloves.

LMP-LM Let me watch that pressure a minute. Well, it
looks like it's stable at five. Okay.

CDR-LM How's the cabin look, Houston? Looks good here.

CC Okay; it looks good here.

CDR-LM Okay. ...

LMP-LM I hope so. Physics says it should have been.

CDR-LM There's an experiment.

LMP-LM Not really, since we do that with our PLSS and everything else.

CDR-LM Okay. Take your helmet off.

LMP-LM That was painless enough.

CDR-LM Jack, I'd wrap that thing around it like that.

LMP-LM Say, man, don't we take our helmets?

07 15 30 10 CDR-LM Not yet. We - No, obviously. Go behind the engine cover.

LMP-LM Okay.

07 15 33 40 CC Challenger, Houston. Just a reminder. Before you stow the right-hand OPS on the floor, you need to attach the floor hole cover.

CDR-LM Okay; we're - Jack's down there cleaning up the floor now, and I'm working on the visors.

CC Okay.

07 15 38 53 CC Challenger, Houston. We have a copy of a - an update on the rock stowage that was given to you last night. We're not sure if they read one part of it to you, and that was concerning using some contingency webbing to reinforce the tiedown of the bag that goes on the Z-27 bulkhead. If you did get that update, forget it. We do not need any extra tiedown other than the normal tiedown. Over.

LMP-LM Okay, Gordy. That's for the buddy PLSS bag, I guess, and we did not get it. But we haven't quite stowed that yet anyway, so we will forget it.

CC Okay.

Tape 112A/12

CDR-LM Are the Rover batteries still alive?

07 15 39 47 CC I'll check with the ... Stand by.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 15 47 01 CC ... Over.

CMP Okay, lift-off, 188:01:35.93; TPI, 188:55:57.00.

CC Okay, Ron. And the coelliptic rendezvous pad below that. GET lift-off - -

CMP Okay.

CC - - 188:01:14.00; NOUN 11, CSI time, 189:01:53.81; NOUN 37, TPI time, 190:55:00.00. Over.

CMP Okay, lift-off is 188:01:14.00; CSI's 189:01:53.81; TPI, 190:55:00.00.

CC One thing's wrong in there, Ron. The GE time - the lift-off is 188:04 on the coelliptic rendezvous pad - 188:04:14.

CMP Yes, that does sound a little better.

CC Did you get that, Ron? 188:04:14.00.

CMP Okay, for the coelliptic, lift-off is later than ascent, so it is 188:04:14.00.

CC Roger. Good readback and up in that block if you didn't copy it there, that CSM weight that I gave you before is 36032.

CMP Yes, 36032. That's right.

07 15 49 13 CMP Okay, I guess you need a P52.

CMP (Singing) ...

07 15 52 38 CMP Regulus ...

CC Gave you an easy one, didn't we?

CMP Yes. But - with the Earth in the field of view, you can tell you - there's a star there, but you can't recognize the pattern.

Tape 122B/2

CC Well, we'll know when we look at the star-angle difference.

CMP (Laughter) That's right.

CMP 24 is Gienah. Okay, take me to Gienah.

07 15 54 03 CMP Has to be Gienah, I hope. Oh, that's not so bad.

CC Yes, we'll buy that.

CMP Okay. Plus 102, plus 030, and a minus 08. At 186, zap out 35, huh?

CC You can torque them.

CMP Okay.

07 15 55 03 CMP I torque.

07 15 56 04 CMP Ah ha! I tested the theory. The field of view is 1.8 degrees precisely, isn't it? And the Earth - -

CC Affirmative.

CMP - - is just a little bit inside of it.

CC Affirmative.

CMP So, this is indeed 2 degrees in diameter.

CMP ... doing here now. Calibration, okay?

CMP (Humming) And it's pretty good fishing. That's what they had in the dead band.

CMP Down this time -

CMP That's it right there.

07 16 00 49 CC Okay, I copy those numbers in your DSKY.

CMP Okay.

CC Ron, we're 12 minutes from - from LOS here and you're looking good. You want to be donning your PGA so that you're not - you're not on loop at LOS - we just - you're looking good and just be advised that' we'll be - have the S-band relay from the LM to you - will be active when you come around and it'll be a single CAPCOM loop setup for this next rev.

CMP Okay, I'll go to PTT then for that type of operation.

CC Roger. Real good. You will not be relaying to the LM; the LM will be relaying to you, but it won't go the other way, Ron. Unless we need it to set up the - -

CMP Oh, it won't? Oh, okay; I see.

CC And also we do have the dual - -

CMP That's a good deal.

CC - - desk set up here at CAPCOM, so if at any time we want to break down any relay at all and go back to split loop, we can do it, no problem.

CMP Okay.

CC Ron, just a reminder. Zero the optics when you can, please.

07 16 03 47 CMP Okay, thank you.

07 16 32 XX BEGIN LUNAR REV 51

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 16 00 58 CC Challenger, Houston. I'm standing by with a pad any time you're ready.

LMP-LM Okay, Gordy. I'll be ready in just a minute.

07 16 05 03 LMP-LM Okay, Gordy, go with the ascent pad.

CC Okay, Jack. This is the direct ascent pad. T_{ig} is 188:01:35.93; NOUN 76 is 5540.8, 0032.0 minus 000.5; DEDA 047 is plus 37430; minus 72507; plus 58669; plus 56907; plus 0032.0; plus 0535.9; and TPI time is 188:55:57.00. LM weight 10900; and H_A is 62.9; H_P , 62.2. One remark; your T_{ig} for one rev late is 190:00:18. Go ahead.

07 16 07 00 LMP-LM Okay, Gordy, here is your readback. Direct rendezvous - direct rendezvous is 188:01:35.93; 5540.8, 0032.0, minus 000.5, plus 37430, minus 72507, 58669, 56907, 0032.0, 0535.9; 188:55:57.00; 10900, 629, 622. Remark: one rev late T_{ig} is 190:00:18. Over.

CC Okay, that was a good readback. Now I have a co-elliptic ascent pad. T_{ig} is 188:04:14.00; 5539.0, 0038.0, minus 000.5; plus 37430; minus 72507; 58630; 56907; 0038.0. Rest of the pad down to LM weight is NA. Your LM weight is 10900, and the H_A and H_P are NA. Over.

LMP-LM Okay, coelliptic readback: 188:04:14.00; 5539.0, 0038.0, minus 000.5; plus 37430; minus 72507; 58630; 56907; 0038.0; rest of pad is NA except for LM weight, 10900. Over.

CC Okay, that's a good readback. Turn to page 10; I have the CSI pad coelliptic.

CDR-LM And, Gordy, I'm starting to pick up the breakers on panel 11.

CC Okay, Geno.

LMP-LM Okay, Gordy, CSI on page 10.

Tape 123A/2

CC Okay. T_{ig} is 189:01:53.81. T_{ig} at TPI is 190:55:00.00. NOUN 81 is 053.9; and DELTA-V_y is a plus all balls. 373, 0541.9, 0655.0; plus 053.9, plus all balls, and plus 001.2.

LMP-LM Okay. CSI pad: 189:01:53.81, 190:55:all zeros; plus 053.9, plus all zeros; 0541.9, 0655.0; plus 053.9, plus all zeros; plus 001.2. Over.

CC Okay. That's a good readback. That's all I have for you.

LMP-LM Okay.

07 16 14 36 CDR-LM Okay, Gordo, we're on the top of 8-4.

CC Roger, Geno.

07 16 15 55 LMP-LM Okay, Gordo. The rendezvous radar looks a little warm, it - I'm reading about 90 degrees.

CC Okay 90.

LMP-LM Okay, Gordy, are you ready for AGS STATUS to OPERATE?

CC Let me check. We're ready, Jack; go ahead.

07 16 18 32 CDR-LM Okay, Gordo. NOUN 72, R2 is not varying. I've got both shaft and trunnion, and crosspointers varying.

CC Okay, Geno. We copy that.

07 16 19 26 CDR-LM Okay, Gordy. On the radar test, everything is GO. Everything is within limits. The only anomaly is the one I just reported.

CC Okay, Geno. And 20 seconds here on the hour even, we'll have a site handover to Goldstone.

CDR-LM Okay.

07 16 24 12 CC Geno, Houston. You can go ahead and park the radar at 0 and 30.

07 16 24 20 CDR-LM Yes. It's going there right now, as a matter of fact.

CC Okay.

07 16 26 14 LMP-LM Okay, Houston. The AGS gyro calibration is complete and looks pretty good. I guess Z's a little - little - No, that - Yes, Z's a little more than you'd expect, I guess.

CC Okay, Jack.

CC Challenger, Houston. Words on the radar. When you parked it there, we saw it go to the proper places. From all our indications, the interface between the radar and the PGNS is okay. And our best guess is some kind of self-test problem.

CDR-LM Okay, Gordy. Thank you.

07 16 28 04 CDR-LM Rate gyros are good.

CC Roger.

07 16 29 28 LMP-LM Okay, Gordy. I'm going to go to AUTO on the S-BAND, if you want it.

CC Okay. We're GO. And go ahead with the check.

CDR-LM Okay, Gordy. I'll give you a call before I fire, but we're in the process of getting ready for the RCS.

CC Roger.

07 16 30 25 CDR-LM Okay, Gordo. Here we go.

07 16 31 39 CDR-LM Gordy, the AGS check looked good.

CC Roger. It looked good here also.

07 16 31 57 LMP-LM Okay; SYSTEM A QUAD 4 talkback still sticky.

CC Roger, Jack.

07 16 33 05 CDR-LM Okay. Here we go on the PGNS, Gordy.

CC Okay, Geno.

07 16 33 47 CDR-LM Looked good here, Gordy.

Tape 123A/4

07 16 33 54 LMP-LM And, you've got DATA and POO.

07 16 34 00 CC Okay. Your up-links are coming. We'll give you a vector and zero the pos/neg cells. Your RLS is okay.

07 16 36 00 CC Challenger, Houston. We'd like you to put the ASCENT BATTERIES ON according to the procedures on the next page, 8-8, just a little early because of pre-conditioning noticed in - before descent. And we checked your RGAs during the hot fire, and your hot fire itself, and they both looked good.

LMP-LM Thank you, Gordo.

07 16 36 28 CC And, Challenger, it's your computer now.

LMP-LM Thank you.

07 16 39 57 CDR-LM Gordo, did you ever get any word on the Rover batteries?

CC No. I sure haven't. I haven't heard on that one.

CDR-LM It's not important. I just wondered whether those things were going to be working back there.

CC Okay. We've got no reason to believe they won't. When you get down to parking the rendezvous radar antenna after this P57, give me a call. We're going to change the parking position.

CDR-LM Okay.

CDR-LM Why don't you just give me the numbers now?

CC Okay. Do a - as - as the checklist shows, except do a VERB 41 NOUN 72 to 0 and 30 degrees. Go to SLEW, and then delete the "manual slew for 3 seconds." They want to leave it there for temperature purposes. This will be a cooler position for it during ascent.

CDR-LM Okay. Understand. That's 0 and 03000.

CC That's affirmative.

CDR-LM And the first 01 - first 04 was 0.01.

CC Roger. We got that.

07 16 44 28 CC Challenger, Houston. We've got you on television now. We have a good picture.

CDR-LM Glad to see old Rover's still working.

07 16 48 59 CC Okay. We got your NOUN 05.

07 16 49 21 CC Go ahead and torque them.

07 16 53 14 CDR-LM Okay, Houston. P12 looks good, and the PGNS is in AUTO.

07 16 53 20 CC Okay, Challenger. There's no change to 047 and 053. I do have a K-factor for you.

LMP-LM Go ahead.

CC Okay. It's 179:59:59.82. Over.

LMP-LM Okay; 15 - 179:59:59.82.

CC That's right, Jack.

07 16 55 25 CC Challenger, Houston. I have a couple of PIPA bias updates for the PGNS.

07 16 55 39 LMP-LM Okay. Go ahead.

CC Okay, a VERB - with a VERB 21 NOUN 01, load address 1452 with 03045, and load address 1454 with 05246. Over.

LMP-LM Okay. That's 1452 with 03045; and 1454, 05246.

CC Readback's good.

07 16 57 02 LMP-LM Okay. They're in, Houston.

CC Okay. Look good to us.

07 16 58 09 CMP-CM Hey, Houston; America.

Tape 123A/6

CC Roger, America. This is Houston. You're loud and clear.

07 16 58 21 CMP-CM Okay, Gordo. Got my suit on.

CC Okay, Ron. We gave you the wrong skinny on the comm configuration last rev. We're actually, now, in a full MSFN relay mode. We'd like you to stay off of VOX. Over.

07 16 58 44 CMP-CM Can do. I'm off VOX.

07 16 59 18 CC Challenger, Houston. When you get to a break point, I have some words on what you can expect in the way of guidance steering. Over.

CDR-LM Stand by.

07 17 00 08 CDR-LM Okay, Gordy. You can go ahead and talk while we're putting our helmets and gloves on.

CC Okay. We never got around to debriefing you on PDI, but the out-of-plane indications you saw on the AGS during descent were proper. We had changed your - your vector slightly just prior to PDI, and so the AGS was navigating and indicating properly. We just ran the present ascent targets in the LMS with the half-a-mile crossrange as shown on the pad, and you're going to be steering south. That's the way the steering direction goes. That's to your left, for Geno's benefit. And the crosspointer indicated a maximum of about 13 feet-per-second out-of-plane velocity at about ignition plus 3 minutes and 50 seconds, and then came on back to zero. Over. That - that velocity was AGS velocity.

LMP-LM Okay, Gordo. That's good information to have.

CDR-LM Understand; the AGS on that one. Okay.

07 17 02 43 CMP-CM Okay, Houston. America maneuvering to attitude.

CC Roger, America.

07 17 03 00 CMP-CM Also I'll start pumping up the cabin, DIRECT O₂.

CC Okay.

07 17 03 08 LMP-LM ASCENT WATER is OPEN, Houston.

CC Roger.

07 17 04 24 CDR-LM Okay, Houston. We're at lift-off minus 17 minutes, and VERB 47 is going over.

CC Roger, Challenger.

07 17 05 45 CC America, we see your cabin at 5.5.

CMP-CM Okay, thank you.

07 17 06 04 CMP-CM DIRECT O₂ is CLOSED.

07 17 06 10 CDR-LM Houston, the DESCENT BATTTS are coming OFF.

CC Roger.

07 17 06 21 CC America, it looks like, to us here, your maneuver has stopped. Maybe you hit the stick.

CMP-CM You roll around in this thing, you knock the thing off of lock.

07 17 06 56 CC Challenger, we're recommending PGNS direct rendezvous.

07 17 07 02 CDR-LM Roger, Gordo; understand. PGNS direct rendezvous for Challenger.

07 17 07 58 CC America; OMNI Delta, please.

07 17 08 44 CC America, this is Houston; voice check.

07 17 08 46 CDR-LM Okay, hold -

07 17 09 02 CDR-LM Hello, Houston; Challenger. Circuit breakers are configured. We're on the top of 8-16.

CC Challenger, Houston. Okay; sounds good.

07 17 09 17 CDR-LM And we're standing by for lift-off minus 10.

CC Roger.

Tape 123A/8

07 17 09 35 CDR-LM And, Houston, are you in relay now?

07 17 09 40 CC We had - we lost high gain on America, so we inhibited the down-link. We're not in relay, no.

CDR-LM Okay.

CC We're actually in a one-way relay. Ron should be able to hear you, but not vice versa.

07 17 11 01 CDR-LM Okay, Houston; coming up on 10 minutes. And we're ready to pressurize the APS.

07 17 11 06 CC Okay; you're GO to pressurize the APS.

07 17 11 14 CDR-LM Okay. The MASTER ARM is coming ON. I've got two good lights.

07 17 11 22 CDR-LM TANK 1 is SELECTED. Okay, ASCENT HELIUM PRESS TANK 1, FIRE. Ready; 3, 2, 1 -

07 17 11 33 CDR-LM MARK it. We got a squib fired, Houston.

CC Roger.

07 17 11 52 CC Challenger, you're GO for TANK 2.

CDR-LM Okay, understand; GO for TANK 2. Ready? Okay. 3, 2, 1 -

07 17 12 06 CDR-LM MARK it. TANK 2. We got the squib.

07 17 12 21 CC Okay, Challenger. Both tanks look good.

CDR-LM Wonder why they didn't balance off?

07 17 12 28 CDR-LM Okay. MASTER ARM is coming OFF, and the lights are out.

07 17 12 34 CDR-LM Okay, Jack. SYSTEM A ASCENT FEED 2, OPEN. Okay, monitor your - okay.

07 17 12 48 CDR-LM SYSTEM A MAIN SOV, CLOSED. How does it look to you?

LMP-LM Fine.

07 17 12 54 CDR-LM Okay; B ASCENT FEED 2, OPEN. I can feel them in the floor when they go.

07 17 13 02 CDR-LM Okay; and B MAIN SOV, CLOSED. Check your manifold pressures. Are you happy? Okay, Houston. We got ASCENT FEED.

CC Roger. And America, can you read Houston? Over.

CMP-CM America. Roger. Loud and clear.

CC Okay, Ron. You're loud and clear.

07 17 13 35 CDR-LM Okay. We're standing by for 5. Houston, Challenger is GO for lift-off. We're at 7:54 and counting.

07 17 13 49 CC Roger, Challenger. You're GO for lift-off.

CDR-LM Roger. Understand. Challenger is GO for lift-off.

07 17 14 11 CC Challenger, Houston. We think the transducer in tank 2 has shifted. We want you to monitor tank 1 for APS helium. Over.

07 17 14 23 LMP-LM Roger. We were looking at that, and we'll monitor 1.

CDR-LM What of this do you want?

LMP-LM I need the - the big one there, with the cards in it.

CDR-LM Here you go.

LMP-LM Thank you.

CDR-LM That's all right.

LMP-LM Okay.

07 17 15 27 CDR-LM Okay. Let's go over the APS burn card.

07 17 15 29 LMP-LM Okay. My DISPLAY/ENGINE OVERRIDE LOGIC breaker is IN; circuit breakers STAB/CONTROL all CLOSED on panel 11, except AEA and DECA POWER.

Tape 123A/10

07 17 15 39 CDR-LM Okay. STAB/CONTROL breakers are all CLOSED, except AEA and DECA POWER.

07 17 15 43 LMP-LM Okay. LOGIC breakers IN.

07 17 15 44 CDR-LM LOGIC breakers IN.

07 17 15 45 CDR-LM And all of mine are CLOSED except DESCENT ENGINE OVERRIDE. LOGIC's IN.

07 17 15 49 LMP-LM Okay. RATE SCALE, 25 DEGREES PER SECOND.

07 17 15 52 CDR-LM 25.

07 17 15 53 LMP-LM ATTITUDE/TRANSLATION, 4 JETS.

07 17 15 54 CDR-LM 4 JETS.

07 17 15 55 LMP-LM BALANCE COUPLE, ON.

07 17 15 56 CDR-LM ON.

07 17 15 57 LMP-LM DEAD BAND, MIN.

07 17 15 58 CDR-LM DEAD BAND in MIN.

07 17 15 59 LMP-LM ABORT/ABORT STAGE, RESET.

07 17 16 00 CDR-LM ABORT/ABORT STAGE are RESET.

07 17 16 01 LMP-LM ATTITUDE CONTROL, three, to MODE CONTROL.

07 17 16 04 CDR-LM ATTITUDE CONTROL, three, on MODE CONTROL.

07 17 16 07 LMP-LM Okay. And you're going to be in AUTO and ATT HOLD.

07 17 16 10 CDR-LM PGNS is AUTO, and AGS is ATT HOLD.

07 17 16 13 LMP-LM Stop pushbuttons are reset, and - -

07 17 16 14 CDR-LM Reset here.

07 17 16 15 LMP-LM - - And you're in JETS.

07 17 16 16 CDR-LM And I'm in JETS.

07 17 16 18 LMP-LM Okay.

Tape 123A/11

07 17 16 22 CDR-LM Okay, let's take a swing around the systems.

07 17 16 25 LMP-LM I just did. Everything looks good. The propellant pressure is holding up. We're tied to the ascent tanks on the RCS.

07 17 16 34 CDR-LM Okay; 5 minutes and my -

07 17 16 37 LMP-LM That EC - -

07 17 16 38 CDR-LM RENDEZVOUS RADAR breaker is CLOSED.

07 17 16 45 CDR-LM And let's go to the timeline book.

LMP-LM Got it. Make sure of everything in here.

CDR-LM Okay. At 2 minutes, I'll get the MASTER ARM. We already are VOX. You'll get 400 plus 1.

LMP-LM Okay. And I'll get the camera and - -

CDR-LM Okay. At 10 seconds, I'll hit the ABORT STAGE, followed by the ENGINE ARM to ASCENT. You get the PRO. I'll backup the start. If we don't get a start, I'll go GUIDANCE CONTROL to AGS. I'll wipe out the thrusters. I'll go AGS AUTO. And if we don't get a start, we'll back off. Okay?

LMP-LM Okay.

07 17 18 02 LMP-LM Houston, we have an awful lot of noise coming up.

07 17 18 07 CC Okay, Challenger. I understand.

07 17 18 12 LMP-LM I think we can read you, Gordy. You sound pretty good now.

07 17 18 16 CC Roger.

CDR-LM That's VHF noise, Jack. VHF B.

LMP-LM Okay. I can cut it out with a high squelch on Bravo.

07 17 18 43 CDR-LM Okay, Houston. Challenger's at 2 minutes and 50 seconds.

Tape 123A/12

CC Roger, Challenger - -

CDR-LM We're GO for PGNS - -

CC Everything looks great down here.

CDR-LM - - direct.

LMP-LM I'm not going to be able to squelch him out any more.

CDR-LM Okay.

LMP-LM Turn the volume down a little bit.

07 17 19 22 CDR-LM Reading you loud and clear, America. This is Challenger. We're coming up on 02:10 from lift-off.

END OF TAPE

Tape 123B/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

[Note: GOSS net 2 not used hereafter]

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 17 19 37 CDR-LM We'll be with you shortly. Okay, Jack. Double-check your LOGIC POWER breaker.

LMP-LM Checked.

CDR-LM Okay, MASTER ARM is ON. I've got two good lights.

LMP-LM Okay. My - I've got 400 plus 1 in.

CDR-LM Okay.

LMP-LM My watch is reset.

CDR-LM Okay. You got 367. You want to pick up the camera just before I hit ABORT STAGE.

LMP-LM One minute coming up, Gene.

CDR-LM Take your final look at the valley of Taurus-Littrow, except from orbit. Okay, 1 minute, Houston. We're 50 seconds now, and we're GO.

CC Roger. You're looking good here.

CDR-LM I'll get that at 30.

LMP-LM Okay.

LMP-LM Camera - camera's not going to run without me holding it.

CDR-LM Okay. Average g, 20 seconds.

LMP-LM Oh, shoot!

CDR-LM Okay. Now, let's get off. Forget the camera.
... - -

LMP-LM Ten seconds.

CDR-LM - - 10 seconds.

MS-LM ABORT STAGE.

Tape 124/2

07 17 21 30 CDR-LM - - pushed. ENGINE ARM is ASCENT.
LMP-LM Okay. I'm going to get the PRO; 99 PROCEEDED;
3, 2, 1 -

07 17 21 39 LMP-LM IGNITION.
CDR-LM We're on our way, Houston.
LMP-LM Rates are good. AGS solid.
MS-LM Pitchover!
CC Roger. You have good thrust.
LMP-LM Okay, 30 seconds; 308 is your number.
CDR-LM Okay, coming through 1500 feet.
LMP-LM And H-dot looks good.
CC Roger. We've lost data right now, but we - we'd
like AFT OMNI, AFT OMNI, please.
CDR-LM Okay; coming up on 40 seconds. And we're GO -
coming right over the top of Camelot.
CDR-LM Awful lot of static, Jack. We break lock?
LMP-LM Yes.
CDR-LM Why don't you get it on an OMNI, or something?
LMP-LM Yes, I got it. It's on the OMNI.
CDR-LM See if you can get comm back.
LMP-LM Hello, Houston. How do you read?
CC Roger, Challenger. You're loud and clear, and
both systems look good. You're right on the line.
LMP-LM Okay. Should be about 145 and minus 47.
CDR-LM See if we can get comm.
LMP-LM I will.

CDR-LM 01:30, Houston. We're in the blind, and we're GO.

CC Roger. We'd like the AGS to AUTO.

LMP-LM Okay. I got good lock - No. Trying to hold.

CDR-LM Okay, Houston; coming up on 2 minutes - -

CC Challenger, Houston. You're GO at 2 minutes. We'd like AGS to MODE CONTROL AUTO. Over.

CDR-LM - - Challenger is GO and coming through 14K.

LMP-LM Okay. You watch the table, Geno.

CDR-LM I'm watching it. Just get comm, if you can.

CC Challenger, Houston. How do you copy Houston?

07 17 24 02 CDR-LM Okay, Houston. Challenger's GO; coming up on 02:30. We're through 19K.

CC Roger, Challenger. We need a 623 plus 10,000 in the AGS. Over.

LMP-LM Well, those are the angles.

CMP-LM How about an - an omni - -

LMP-LM I've got - I tried it. I've got -

CC Challenger, Houston. AFT OMNI, please. Would you relay, America?

CDR-LM Okay, Houston. Three minutes, and Challenger is GO. We're through 25K.

LMP-LM I tried it - I tried it, Ron, and it doesn't hold. It doesn't help.

CDR-LM Try AFT OMNI again, Jack.

CC America, Houston. Tell Challenger - -

Tape 124/4

LMP-LM All my comm breakers are in.

CDR-LM Try AFT OMNI again.

CC - - that they're right on the money on trajectory;
both systems are GO. Over.

CDR-LM Okay, Houston. In the blind, Challenger's GO;
coming up on 03:25 and at 30K.

CC Okay - -

LMP-LM There's AFT. How do you read, Houston?

CC America, would you relay to Challenger to go
AFT OMNI?

LMP-LM We are AFT OMNI. How do you read?

CMP Okay, they are in AFT OMNI right now.

CC Okay, America, tell Challenger - -

LMP-LM And we're reading Houston.

CC - - we're reading them 5 by.

LMP-LM Okay. We're reading you, Houston.

CC Okay, Jack - -

CMP Okay, Challenger, America.

CDR-LM ...

CMP - Yes, you got them.

CC - - we need a 623 plus 10,000. Jack, give us
a 623 plus 10,000.

07 17 25 43 CDR-LM Okay, 4 minutes. Challenger's GO. We're
through 37K.

CC Roger, Challenger. You're looking good here.

LMP-LM Okay, that's in.

CDR-LM NOUN 37 says we got about a 07:16 burn, Jack.

CDR-LM Okay, at 04:30, I'll be about 282 coming through 41K.

LMP-LM Okay, 04:30. 282 is great; 41K is great, 73 is good; AGS and PGNS are right together.

CDR-LM Okay, Houston. Challenger is GO. We're now through 04:35.

CC Challenger, Houston. We'd like to terminate ASCENT FEED now.

LMP-LM Okay, MAIN SOV is going ON.

CC And the reason is the mixture ratio problem. - -

LMP-LM ASCENT FEED, CLOSED.

CC - - That's just to be conservative and safe. Over.

CDR-LM Understand. And we're going 5, and we're now out of 48K.

LMP-LM Okay, the camera's stopped.

07 17 27 01 CDR-LM Okay, burn time's going to be about 18 or 19, 07:18 or 07:19, Jack.

LMP-LM Okay.

LMP-LM Okay. The AGS has us just about in plane.

CDR-LM PGNS and AGS are looking good.

LMP-LM A little bit north.

CDR-LM Okay, Houston, 05:40. Challenger's coming through 52K. And PGNS says 126 on the H-dot. We're GO.

LMP-LM AGS likes the plane.

Tape 124/6

CC Roger, Challenger. Your trajectory is right on the money. Both systems are GO.

CDR-LM Get a good shutoff time now.

LMP-LM Okay.

CDR-LM Okay, it'll be 20 - 07:20 on the shutoff.

LMP-LM Okay, we've already terminated ASCENT FEED. You got 1300 to go.

CDR-LM Okay. Let's doublecheck everything now.

LMP-LM You got that; you want - -

CDR-LM Next move is at 200 feet. ENGINE ARM OFF with 200 to go. AGS and PGNS are right together. We got about another minute to go, Houston. And we're coming up on 57K.

CC Roger. And we agree with the - -

LMP-LM 900 to go.

CDR-LM ... out nicely. Okay, H-dot is rounding right out to the target.

LMP-LM 700 to go.

CDR-LM Coming up - -

CC Okay, normal shutdown and normal trim procedures.

LMP-LM Thank you.

CDR-LM Roger. Normal shutdown, normal trim. Give me a hack at 200, Jack.

LMP-LM Okay, it's 500 now -

07 17 28 30 LMP-LM MARK it, and the ascent feeds are already terminated.

CDR-LM Okay. Very good.

CDR-LM Seven minutes, Houston. And we're passing 59K.

LMP-LM 300; stand by. 200 to go.

LMP-LM MARK it.

07 17 28 47 CDR-LM Okay, ENGINE ARM is OFF.

LMP-LM Okay, stand by for shutdown; 80, 50 -

07 17 28 57 LMP-LM SHUTDOWN!

CDR-LM Okay, AUTO shutdown - -

LMP-LM AUTO shutdown.

CDR-LM - - Houston, AUTO shutdown.

CC Roger.

CDR-LM Okay, no trim, Houston; no trim.

CC Roger. We're reading the DSKY.

CDR-LM We're showing a 50 by 9.1.

CC Roger. And MSFN confirms that orbit.

LMP-LM Okay. AGS got a little bit out of plane. First one was 0900. Okay, ENGINE STOP is RESET.

CDR-LM Get in the attitude for the tweak. Okay.

LMP-LM Okay, AGS says it's 9.1.

CC Challenger, Houston. There will be a tweak. Stand by for it.

LMP-LM 48 by 9.1; 49 by 9.1.

CDR-LM Okay, that's our attitude. We're in attitude for the tweak.

CC Okay, Challenger. Here is your tweak. Ignition is at 12 plus 12; V_X is a minus 4.0; Y, minus 9.0; and Z, plus 1.0. That's at 12:12; minus 4; minus 9; and plus 1.

LMP-LM Roger. That's at 12:12; minus 4; minus 9; and plus 1.

Tape 124/8

CC That's a good readback.

CDR-LM Okay, that's out of - Okay, at 12:12, Jack, we'll do the X, Z, Y. I'll do minus 4. Then I'll do plus 1; and then I'll get the Y. That's going to be aft, forward, and left. At 12:12, another minute.

LMP-LM Okay.

CDR-LM We're in the attitude; let me get - -

LMP-LM Say again. You're going to do X and then - -

CDR-LM - - X, Z, Y.

LMP-LM X, Z, Y. All right. AGS is ready.

CDR-LM Okay, we've got P47. Standing by for 12:12.

LMP-LM Okay, it's 10 - 20 seconds away. Okay.

CDR-LM Okay, I'm going to do X first. Okay, let's do it.

LMP-LM Okay, you want 4. Little more. Okay?

CDR-LM Okay, and 1 forward.

CDR-LM Here's 1 forward; I'm going 9 left.

LMP-LM Okay. Keep her coming, keep her coming, keep her coming, 9 left. That's it.

07 17 32 54 CDR-LM Okay, Houston, I re -

LMP-LM Now that's it.

CDR-LM Let me get this in.

LMP-LM Good, good.

CDR-LM Okay, Houston; 4.1, 9.0, and 1.1. - -

CC Okay, that's good.

CDR-LM - - minus, minus, plus. Okay, 47.7 by 9.5.

CC Roger.

CDR-LM There's those mysterious noises.

LMP-LM Yes, that's right.

CMP Okay, Challenger; America. I'm going to try to get the VHF ranging reset.

LMP-LM Go ahead. We'll keep quiet.

CMP Okay, reset - now.

CMP That wouldn't quite do it. Let me try it again.

CC Challenger, Houston. We'd like FORWARD OMNI.

LMP-LM ... Okay; you've got it, Houston.

CC Okay, you're loud and clear.

07 17 34 39 LMP-LM That sounds good on the AGS, Ron. Gene's getting lockon yet.

CMP Okay; great.

CDR-LM Okay, that was me, Jack. I just reset the MASTER ARM.

LMP-LM Okay.

CDR-LM No functions left on it, anyway.

LMP-LM How you coming, Gene?

CDR-LM Coming good.

LMP-LM P20 going, huh? 26.6 breaking - -

CDR-LM That's not supposed to take those updates. Until I tell it to.

LMP-LM The AGS likes the tweak.

CDR-LM Shaft and trunnion look good.

CC Challenger, Houston - -

Tape 124/10

LMP-LM We've gone 127 miles in - 430 feet per second.

CC - - that 616 should be plus four balls 5. Over.

CDR-LM Okay, Gordy. I'm s - good - good call.

CC Thank you.

CDR-LM Okay, America; Challenger. We've got you at 126 miles locked up hard.

CMP Okay, I got you 125.2 miles now.

LMP-LM You want that relay still on, Gene? We're getting a repeat on Ron.

CMP I tell you what, I'll - let's turn the VHF off.

CDR-LM Up to you, Ron.

CMP Okay, I'm just going to turn the VHF off.

CC Challenger, Houston. There will be no vector update, no PIPA update. The NOUN 49s you're seeing are what we expect. You can go ahead and accept them.

LMP-LM Okay, Geno. You can - RANGE/RANGE FATE, shaft and trunnion are all GO - -

CDR-LM Roger, Gordo.

LMP-LM Okay, you like everything?

CDR-LM You can start taking your marks, Jack.

LMP-LM Okay - -

CDR-LM The DAP is changed.

LMP-LM -- - 122. AGS like the range.

CC Challenger, Houston. Also you're GO for APS TPI.

CDR-LM Roger. GO for APS TPI. We're looking good on board.

CC America, Houston - -

LMP-LM Okay.

CC - - the NOUN 49 you have there looks good to us.

LMP-LM Okay, I checked the inverter. You can pull INVERTER 1 breaker.

07 17 38 27 CDR-LM INVERTER 1 breaker PULLED.

CMP I'm going to ... Okay, you want me to - you're not going to ship me a vector?

CC Negative. No up-link for you either, Ron.

CMP Okay.

07 17 39 21 LMP-LM Houston, you happy with the omnis from the Challenger?

CC That's affirmative. Keep it like it is.

LMP-LM Okay. Terminator's coming up, Geno. We got lights and everything we need?

LMP-LM AGS looks good.

CMP Challenger, America. I don't see you in the sextant yet. But it's probably because of Sun shafting or something.

LMP-LM Okay, anytime you want them. Okay, ready? 188?

CDR-LM Hello, Houston. Challenger has a visual on America at about 112 miles.

CC Okay, and America's just called. I don't know if you heard him. He hasn't got you in the sextant yet. You might check your light on. He is getting a VHF mark. Over.

CDR-LM Okay, light is ON.

LMP-LM Okay, 55 and 5700. That's good. That's right.

Tape 124/12

LMP-LM The AGS saw that out of plane, Geno.

CC Challenger, this is Houston. I have a MSFN TPI for you.

LMP-LM Go ahead.

CC Okay. DELTA-V_X is a plus 74.0; Y, plus 3.9; and Z, plus 9.0. DELTA-V total is 74.7. And, for once, they didn't give us the braking, Jack.

LMP-LM (Laughter) Okay, plus 74.0, plus 3.9, plus 9.0, and total 74.0.

CC That total is 74.7.

LMP-LM Sorry. Okay, 74.7.

LMP-LM I'm working on my third mark.

CDR-LM And, Houston; Challenger. I still have a visual on America.

CC Okay. I'm sure Ron's problem is he is looking into the Sun.

CDR-LM That's right because he's sunlit up there.

CMP Oh, you are correct, Houston.

CC Challenger, we'd like AFT OMNI now.

LMP-LM Okay, going AFT.

07 17 44 56 CDR-LM America, how do you read Challenger?

LMP-LM He's not - he's turned his VHF off. You want it on?

CMP I'm reading you relay now, Challenger. This is America.

CDR-LM Okay, that's fine, Ron.

CMP Let me know when you want a voice - VHF voice check, there, and we'll make sure we go to VHF.

LMP-LM Okay. And we're holding you at 93 miles right now.

CMP Roger. That'd be about 92.7, which is probably the delay.

CDR-LM Okay, and you just went into darkness up there. I lost you.

CMP Should be able to see you now, then.

CDR-LM Yes, we're also in darkness.

CMP ... You sure you got your tracker light on?

CDR-LM That's affirm. I can see it flashing. We do have our tracker light on.

LMP-LM See it flashing?

CDR-LM Yes, I see a reflection on - -

CMP Oh, I see it. Hey, I can't see you in the telescope, but I got you right in the sextant.

CDR-LM Good. Outstanding, Babe.

LMP-LM I got it. ...

CC Challenger, Houston. No update on your LM weight.

CDR-LM Okay; understand. No update on the weight.

CMP And, Houston, I'm going to accept that because he was about 1 degree - almost to the edge of the sextant.

07 17 47 25 LMP-LM Houston, can you tell Challenger what's wrong with our high gain?

CC Stand by, Challenger. For America, go ahead and accept that one.

CMP Okay, brought him right in - This is America - brought him right into the center.

CC Challenger, Houston. Jack - -

Tape 124/14

LMP-LM Okay, Houston - -

CC - - if you have a free moment, you might try the steerable again: PITCH, 120; YAW, minus 70.

LMP-LM Okeydoke, Gordy; 120 and minus 70.

LMP-LM And - Okay, Houston, that's AUTO on the HIGH GAIN. How do you read?

CC Jack, you're loud and clear. Looks good.

07 17 49 57 LMP-LM Gordy, I don't know what broke lock. Did you read us all through ascent? We had some up-link signal strength.

CC That's affirmative. We read you loud and clear all the way. We haven't figured it out either.

LMP-LM Okay, we had a loud up-link squeal - -

CC Roger.

LMP-LM - - on all - on omnis - on omnis as well as high gain.

CC Roger.

CDR-LM That's steerable.

LMP-LM Excuse me.

CDR-LM Okay, Gordy, Challenger's state vector is locked in with the raw data. We've got 12 marks going for us now.

CC Roger.

CDR-LM And, Houston, could we have an LOS time, please?

CC Yes. Stand by.

CC Challenger, LOS should be 188:51:15.

CDR-LM Roger. 51:15.

07 17 52 18 CDR-LM America, Challenger. We got you now just under 72 miles, and we're 279 feet per second closing.

CMP Okay, got you 71 miles.

CMP Hello, Challenger; America. You still there? I lost all my noise.

CDR-LM Affirmed. We're still here. And, Ron, that ... is coming right up the pike.

CC Challenger, Houston. For your information, the out-of-plane difference that we - that you probably saw there during ascent was - we think - in the PGNS. The ACS is okay. There's probably a slight ... in the PGNS.

CDR-LM Okay, Gordy. Understand.

CC Challenger and America, Houston. If that noise, which is due to low signal strength on America, is bothering anyone, we could break down the relay and let you talk to each other VHF. Over.

CDR-LM Yes, sir, Houston. This is Challenger. Let's break down the relay. And, America, let's go VHF.

CC Okay.

CMP Okay, America. I'm on VHF.

CMP Okay; good.

CDR-LM Okay, Houston. We have America on VHF.

CC Roger.

CMP I still got your echo there, Challenger. This is America.

CDR-LM Okay.

LMP-LM Gordy, you want to give us an explanation of the ascent engine mixture ratio problem.

CC Let me get that story myself. We're still looking at the data. I'll try to have one for you before we lose you - at least the next time around, we will.

Tape 124/16

LMP-LM Okay. Yes. Go ahead. Go ahead. How many marks you got? 35.5. Okay. Go ahead. Go. Go.

07 17 56 30 LMP-LM Well, not very in Z; 15 feet per second difference. But it agrees with the AGS, if that makes you feel any better.

CDR-LM Hello, Houston. You were looking at our NOUN 81s on the recycle. That's 17 marks.

CC Roger, Challenger. And what it was on the APS there, we saw an indication, probably due to a temperature shift, which was a possible indication of unbalance in propellant usage there. And it was sort of confirmed by an increase in the roll moment offset, so we just played the conservative thing and terminated ascent feed.

LMP-LM Okay, Gordy. Thank you. I was just curious exactly what it was.

CC Okay, and it's no problem for our TPI on the APS.

07 17 57 56 LMP-LM Understand.

CMP Okay, Challenger; America. I got the NOUN 81 for you to recycle.

LMP-LM Okay.

CMP I agree with you pretty well.

LMP-LM Outstanding.

CMP Well, I say TPI is about 4.9, off 5 feet per second.

CC America, Houston. Let's try the HIGH GAIN: PITCH, 0; YAW, 30; MANUAL and WIDE and leave it in MANUAL.

CMP Hey, relay to me. I can't hear then, Challenger. Can you do that?

CC Challenger, Houston - -

CMP That's all right. I'll get them.

LMP-LM Go ahead, Houston. This is Challenger.

CC Okay, would you relay to America to try the HIGH GAIN: PITCH, 0; YAW, 30; MANUAL and WIDE.

LMP-LM You want PITCH, 0; YAW at 30; MANUAL and WIDE. That's pitch, 0, yaw 30; MANUAL and WIDE.

CC Yes, that's affirmative.

CMP Okay, I got them.

LMP-LM Okay. He's working at it.

CMP It doesn't work. B is better than that. There's OMNI A; how's that?

CC Challenger, Houston. Over.

CMP Houston, America. How do you read me?

07 18 00 54 LMP-LM Go ahead, Houston. This is Challenger.

CC Okay. Stand by, America. We just barely read you. Go ahead.

CMP Okay, just a second. I can read you loud and clear now.

CC Okay, you're readable. For Challenger, the MSFN Z was kind of weak. We're expecting more like a plus 20 for the DELTA-V_Z solution for TPI, and that's what all the airborne systems seem to be converging on. Over.

CDR-LM That sounds right. We prepared that way up here. Glad to hear that. Thank you.

CC Roger.

CMP ...

LMP-LM And, Houston, Challenger. We're plotting them right on the black line. Coming right up the pike.

Tape 124/18

CC Okeydoke. Sounds great.

CMP Okay, Challenger; America. I got you 49 miles now. Okay?

CMP Okay. I'll check it again pretty quick, but I had the running lights and the rendezvous light on.

CC Challenger, this is Houston. If you lose the steerables ... blockage, go to AFT OMNI.

LMP-LM Roger.

07 18 03 43 CMP Okay, Challenger; America. They're both checked on. I'm going to check the circuit breakers.

CDR-LM Yes. They are both IN, and I - I just started picking you up in the telescope.

CMP (Laughter) You're going to sleep with them. They're too big.

CMP (Laughter) I don't care what you look like; come on back. I was going to shave and look nice for you, but I didn't have time to shave either. So - (laughter)

CMP Yes, I heard you lost a couple fenders or something.

07 18 07 10 CMP I'm with you. I'm already in final comm.

CDR-LM Okay, ...

CMP Your what?

CMP Well, let me doublecheck it. 188:55:57.00.

CMP We're lucky. (Laughter)

CMP That's right.

CMP Okay, you ready to copy my NOUN 81s?

CDR-LM Go ahead.

CMP Minus 75.9, minus 4.8 - -

CC Challenger, Houston. We'd like AFT OMNI now.

CMP - - and Z is a minus 17.6.

CMP Okay, copy correctly. I'll maneuver to TPI attitude.

CC America, Houston. We'd like NARROW and REACQ on the HIGH GAIN.

CC Challenger, Houston. We see you heading toward gimbal lock. Over.

07 18 10 06 CDR-LM No, you don't. I'm just rolling - yawing.

CC Okay, let me check back on that call; sorry.

CDR-LM Yes, this is just normal procedure. I'm rolling 180.

CC Okay, we're about 2 minutes to LOS. All the solutions look good to us. I guess, if we apply the voting logic, we go with the PGNS. Over.

CDR-LM Okay, we've already decided that we are going to go with the PGNS. All the solutions look good on our onboard comparison, Gordo.

07 18 10 43 CC Roger.

07 18 31 XX

BEGIN LUNAR REV 52

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 18 56 09 CMP Okay, Houston; America here.

CC Roger, America. You're loud and clear.

CMP Okay. Do you have him on the tube?

CC Not yet, Ron. I'll let you know.

CMP Okay.

CDR-LM Okay, Houston, we're reading you loud and clear. We're at 1 mile and I just broke into 30 feet per second. TPI was nominal.

CC Okay, Challenger. That's good news.

CDR-LM Okay. And the midcourses were all less than 1.6 feet per second, and we're at 0.8 miles now - 5000 feet.

CC Roger.

CDR-LM Okay, our next breaking gate is at 3000 feet.

CDR-LM Ron, I've got a platform. I can see the command and service module now.

CMP Okay.

CDR-LM We're at 4200 feet - 30 feet per second. And inertial line of sights are both zero.

CC America and Challenger, this is Houston. We've got a good picture of the Challenger coming up from the surface of the Moon.

CMP (Laughter) It's coming straight up, all right.

CDR-LM Okay, Ron. Coming up to 3000 feet. I'm going to brake off to 20.

CMP Okay.

Tape 125/2

CDR-LM Hold on; here we go.

CDR-LM And we're 2500 feet and 20.7 feet per second.
Fifteen on 110.

07 18 58 33 CDR-LM Got you centered in the needles, Ron.

CMP Okay. You're looking good.

CDR-LM Coming up right at - you at - under 114 -
116 degrees. 1900 feet, 20 feet per second.

CMP Okay. Quarter of a mile, I got you.

CDR-LM I can see your thrusters firing now, Ron. We're
at 1500 feet braking.

CMP Okay.

07 18 59 31 CDR-LM Okay, Ron. We're at 1200 feet and 8.8 feet per
second.

CMP Okay, that's about right. Concur.

CDR-LM Yes, you do have a stub of an antenna out there
on the same side that the VHF antenna's on.

CMP Yes, how far is it sticking out?

CDR-LM I can't tell yet, but about - from where I am,
about a third of the way - a third of the length
of the VHF antenna.

CMP Oh, that's not very far.

CDR-LM No. Okay, we're at 970 feet.

CDR-LM 800 feet and we're at 8.8 feet per second.

CMP Looks like Challenger's in good shape. I don't
see anything hanging down or anything.

CDR-LM She's in excellent shape. Okay, we're at 650 feet
and 8.8.

CMP Okay.

CDR-LM God, you look pretty. Yes, you just got a small stub, Ron. Probably not more than a couple of feet.

CMP (Laughter)

CDR-LM 600 feet, braking to 5. Okay, I've got 5.0, and I'm at 520 feet.

CDR-LM Ron, I'm closing at 5 feet per second, 440 feet.

CMP Okay.

CDR-LM Good to see you.

CMP Good to have you all back up here.

CDR-LM It's been a good trip. Okay, I'm at 5 feet per second and 350 feet.

CDR-LM Taking off a couple. I'm at 3 feet per second, 280.

CDR-LM Just great. Okay, Ron, 240 feet and 3 feet per second.

CMP Okay, keep her coming. Nice and easy. Getting a lot of pictures.

07 19 02 14 CDR-LM 200 feet and 3 feet per second. I got 2 feet per second and I'm at 170 feet.

CDR-LM 140 feet and 2 feet per second. About 3 feet of that antenna, Ron, and we'll get a better look at it when you pitch over.

CMP Okay.

CDR-LM Everything else looks clean.

CMP Man, that Challenger's a beautiful vehicle.

CDR-LM You bet you.

CMP One little strap flopping on the top of it, and that's all.

Tape 125/4

CDR-LM Okay, I've got 2 feet per second; I'm at 100.

CMP Hey, Houston, you can see that strap flopping up there now on the TV, but that's the only thing.

CC Okay, Ron. We haven't picked it cut, but we do have a perfect picture.

07 19 03 35 CDR-LM Ron, I'm sneaking in at about - a little over 1 foot per second.

CMP Okay, I'm trying to keep you on the - the tube here, so - How come you - how come you guys do everything upside down?

CDR-LM Okay, let's let it drift in like this slowly.

CMP Okay. You still have it.

CDR-LM I've still got it.

CDR-LM Ron, I'm going to stop it here, and you can do your maneuver.

CMP Okay.

CDR-LM Okay, I'm stationkeeping on you.

CMP Okay; I'll do my VERB 49.

CDR-LM Seem okay, Jack?

LMP-LM Yes.

CDR-LM Okay.

CMP Oh, I got to get a picture here, too.

CDR-LM Okay, will do. Stand by.

CMP Just another couple of pictures here. Got them. 25 - and a 319, 254, and 0 ... Okay, you ready, Jack?

CDR-LM I'll ... that; Jack.

LMP-LM ...

CM CMP Okay, here we go.

07 19 05 07 CMP MARK it. ... a minute.

CDR-LM Yes, I'm going to get the radar out of the way, but I'm not going to. I'll lose him here as soon as his transponder get out. I'm going to just stationkeep. Ron, your probe looks good. I can see it extended.

CMP Okay; great.

CDR-LM The radar holds you - well, we don't hold you anymore.

CDR-LM ... Radar's being stowed now, Ron.

CMP Okay.

CC America, we'd like OMNI Delta, please.

CDR-LM Houston, America and - -

CMP OMNI Delta?

CDR-LM Houston, America and Challenger - are ... a good tight Navy formation.

CC Roger, Geno.

CDR-LM Hey, Ron. I may have to take back what I said. That thing I thought was an antenna is nothing more than your EVA light out there.

CMP (Laughter) Okay.

CDR-LM From where I was, it looked like - looked like it was coming out the other side - -

CMP Yes.

CDR-LM - - but I think you're clean.

CMP Okay. Now the one I'm concerned about is on - is on the other side from the EVA antenna - EVA light.

Tape 125/6

CDR-LM No-uh uh. You were clean over there.

CMP Oh, okay.

07 19 07 18 CMP The bottom of your vehicle's got a bunch of tinfoil on it. It's a little bit scorched; but it's all intact, as far as - as much as I can tell.

CDR-LM ... this bird is good enough to fly again.

LMP-LM ...

CDR-LM Yes, sir. I'll even move left. How's that? We got 60 percent left. ... I like to fly.

07 19 08 05 CDR-LM You in your maneuver, Ron?

CMP Yes. It's maneuvering now.

CDR-LM Okay, I'm going to go out and take a peek at your SIM bay up here. Yes, I know.

CDR-LM See him okay, Jack? See him okay?

CMP Okay, we're getting pretty close now. About another 5 degrees of roll is all. Can you see it?

CDR-LM Yes.

CMP How does the mapping camera look? Should be all covered up.

CDR-LM Stand by.

CMP Okay.

CDR-LM ... fly over there and take a look at it.

CMP Okay.

CDR-LM Sun's shining right in it.

CDR-LM Okay, Ron. It looks intact here. There's one cover - -

CC Challenger, Houston. Over.

CDR-LM ... cover on the right-hand side. Go ahead.

CC We'd like you take a special look at the pan camera and see if you think maybe the lens is not completely stowed. Over.

CDR-LM No, I'm looking at this thing upside down. There's the Sun - give me the location again of the pan camera, Houston.

CC It's a round, barrel-type object, approximately right in the center of the SIM bay.

CMP It's just - if you were standing in the shoes, the pan camera would be right in front of you.

CDR-LM It's stowed; it's flush. There's one door open, Ron. If you were standing in the shoes, it's at the bottom hand - bottom left-hand side of the SIM bay.

CMP Bottom left-hand side, if you're standing in the shoes.

CDR-LM Yes. It looks like two covers open there. Doesn't it, Jack?

CMP Yes. Okay; well, that's part of the mapping camera - bottom of that door that pushes open by itself.

CDR-LM Okay. Well that's the only thing that's open. Everything is flush.

CMP Okay. You think - is that a door that extends - if you're standing in the shoes - that extends out the bottom of the SIM bay or one that extends out - if you're standing on the shoes - it would be one the - extending on the left side of the SIM bay?

CDR-LM Yes. It extends out the left side towards the front of the spacecraft down in the bottom left-hand corner, if you're standing in the shoes. So you don't - -

Tape 125/8

CMP Yes. Okay. Yes, that's the one that the camera pushes open by itself.

CDR-LM Okay. Well, that's good. I can't see anything that's abnormal down there. Everything's covered; everything's flushed.

CC Challenger, Houston.

CMP Okay.

CC Challenger, Houston. Over.

07 19 12 11 CMP Houston, were you calling America?

CDR-LM Go ahead.

CC Some more words on identifying whether the pan camera is stowed or not. The pan camera, as Ron said, is right in front of the shoes. And, if it's stowed - well, if it's not stowed properly, you should be able to see the lens or probably part of it. And if it's fully stowed, there'll be just a plan-faced barrel facing outward - silver colored. Over.

CDR-LM It's stowed, Houston.

CC Okay. It sounds good.

CDR-LM It's got to be - there's nothing - It's stowed. ...

CDR-LM The only thing abnormal is the service module plates, just forward - plus-X - of the SIM bay, are all blistered. It's forward of those EVA handholds.

CC Roger. We copy that. Our concern - or the reason we're asking about the pan camera is - we have a higher than normal temperatures in the pan camera, and we were concerned whether it was either not completely stowed or maybe there's a heater stuck on. We'll check the heater out later on here.

CDR-LM I'm going around the other side here a little bit, but it's - Yes, the long barrel, through the center down - X-X axis, deep into the SIM bay - then you have a little barrel - oh, about 3 inches - 2 or 3 inches - like about a 500-millimeter lens on a Hasselblad - sticking straight up, perpendicular to SIM bay, and it's well flushed. It's inside the box that it's next to.

CC Okay, Geno.

CDR-LM Yes, it's normal. There's nothing that's unstowed in that thing.

CDR-LM ...

CC Challenger, America. That's good on the inspection from questions from here anyway. Clear to continue and proceed with docking.

CMP Okay.

CDR-LM It is unbelievable. This is the greatest flying in the world, Ron.

CMP (laughter)

CDR-LM Can you see me?

CMP Yes, I can see you. Right in there. Yes.

CDR-LM Reach out and tickle your probe.

CMP (Laughter) Okay.

CDR-LM Okay. Let's get - let's get this business going. Let's get in a docking attitude.

CMP Okay; we'll maneuver to the docking attitude here.

CDR-LM Ron, I can also see where your - where your HF comes out on this side, and - and it's flush with the box. It's completely stowed.

Tape 125/10

CMP Okay. Well, that's the one that we think is, the one on that side. The other side is the one that we are a little concerned with. We don't worry about it.

CDR-LM It's stowed too.

CMP Oh, okay.

CDR-LM We were over there.

CMP Okay. And I'm maneuvering back to the docking attitude.

07 19 15 43 CDR-LM Your high gain is not pointing at the Earth, though, I don't believe.

CMP Oh, we're not using it yet. It's pointing where the Earth will be when we maneuver back around.

CDR-LM Okay.

LMP-LM Another one from there?

CDR-LM I'd try 11 and 8. That's what I'm doing.

LMP-LM Right.

CDR-LM ... Guess I ought to pull my radar breakers, now that it's stowed.

CMP Okay, Houston, can you see my logic yet? Or you want to wait until the high gain? This is America.

CC We can see it now, Ron. We can do it now.

CMP Okay, LOGIC 1.

07 19 16 43 CMP MARK it. LOGIC 2.

07 19 16 46 CMP MARK it.

CC Ron, you're GO for PYRO ARM.

CMP Okay.

CDR-LM Backing off here a little bit, Ron. Give you a chance to maneuver.

CDR-LM Hey, Jack, what are we forgetting? Let's see the high gain was - or the rendezvous radar is stowed. Okay, as soon as he gets his attitude, I'll get to mine.

CDR-LM Looks like you've been flying well up there, partner. The spacecraft looks good.

CMP Oh, you bet you.

CDR-LM How far you got to go on your maneuvers?

07 19 18 22 CMP About another 60 degrees of roll yet.

CDR-LM Okay.

CMP And about 10 degrees pitch.

CC America, give us OMNI Alfa.

CDR-LM Hey, Ron - -

CMP Omni ... Oh, no, there we go.

CDR-LM Okay, Ron, I can confirm your other HF antenna is stowed.

CMP Okay, good. Thank you.

07 19 19 32 CMP Okay, the PYROs are ON. Sorry, but I am out of film in the DAC. You guys will just have to - -

CDR-LM No problem.

CMP - - be on TV (laughter).

CDR-LM No problem. Let's just get in attitude and get those capture latches in that drogue.

CMP Okay.

Tape 125/12

CC Ron, the high gain angles look good. Go NARROW and REACQ, and we should have you.

CMP Okay. I'm in attitude, Gene.

CDR-LM Okay, let me position so I can get in attitude.

CC And, America and Challenger, we've got a beautiful picture once again.

LMP-LM Very good, Gordy. We're happy to give it to you.

CDR-LM This worked out great, Ron.

CMP Yes, it sure did.

CDR-LM Null PGNS, and then I'll give it to you shortly.

CDR-LM Okay, Ron, you've got it.

CMP Okay.

CDR-LM Okay, you've got it. I'm going into my maneuver.

CMP I've got it.

CDR-LM And that's the landing site down there. We pitched right through the landing site.

CMP You did?

CDR-LM Yes.

CMP Hey, good (laughter). Your - -

CDR-LM Hey, don't - don't hit that hand. It's ...

LMP-LM Yes (laughter). Well, the drogue is still in there.

CDR-LM Okay. I've got you right out the overhead, Ron. Now I'm going to yaw.

CMP Okay, yaw her around.

CDR-LM Okay, here we go. What a super flying machine!

CMP Still looks kind of tinny to me.

CDR-LM He's not going to have to do anything but thrust right into the - I might even get your roll angle zero for you by - by this maneuver. Okay, it's all yours.

CMP (Laughter) Okay, I've got her.

CDR-LM Should be looking - I'm looking right up your window.

CMP Well, I got to translate through the - sideways a little bit here.

CDR-LM The trouble is I'm looking right into the Sun.

LMP-LM Yes. Change these focus to 6 feet.

CDR-LM Okay, Jack, let's go over that thing again. We got anything else to do?

LMP-LM Well, you're at the attitude. We're waiting to confirm capture, and then you flip MODE CONTROL, OFF.

CDR-LM Wish the Sun would get out of the way.

07 19 24 46 CDR-LM Looking good, babe. Keep it coming.

CMP Okay. She's looking all right.

CDR-LM Command module looks just as good as the day they put it on the pad.

CMP And, you know, so does Challenger, by gosh. You're missing some of the pieces.

CDR-LM Yes, one big piece we left behind.

CMP Yes; right.

Tape 125/14

CDR-LM Ron, I guess I'm estimating you about 12 or 15 feet.

CMP Yes, that's about right.

CDR-LM Got my reticle coming right in the rendezvous window.

CMP Okay. She ought to be coming right in there.

CDR-LM Looking good. You're stable as a rock.

CDR-LM Bet I'll be able to get with that. Give me a little warning on capture, Ron, so I can go FREE.

CMP Okay; try to.

CDR-LM I can see all your docking latches - or I can see half of them now, but they're all looking good.

CMP Okay.

CMP Coming in nice and slow; no problems.

CDR-LM Okay, you're looking good, babe. I got you on my COAS right up in the middle of the window. Looking good.

07 19 28 33 CDR-LM Looking good.

CMP Okay.

CDR-LM Must be a couple of feet away.

CMP About 2 or 3 feet is all.

CDR-LM Stand by, Jack.

CMP Stand by. Should be getting about the same size.

CDR-LM Looking good from here, Ron.

CMP Stand by.

CDR-LM ... to have it here.

CMP Okay; I didn't get it. Let me plus X it.

CDR-LM Okay. You didn't get it.

CMP Didn't get it. Okay. Might have been a little bit slow.

CMP Stand by.

07 19 31 25 CDR-LM You got it! CAPTURE!

CMP Barber pole, capture go FREE.

CDR Good. Start here; we're FREE. All you needed was - -

CMP Okay, we're FREE over here. Let me check your rates. Okay, I'm squared away with the rates here.

CDR All you needed was a little more DELTA-V.

CMP Yes, a little more.

CDR That looked good though, Ron. Very good.

CMP Okay. That's a good one.

CDR Okay, Houston, we have capture.

CMP Okay, you ready - -

CDR ...

CMP A little bit - Not lined up here.

CDR What did you say, Ron?

CMP Well, we're not quite lined up here. Kind of drifted off a little bit.

CDR Okay; we'll stand by for you. Take your time.

CMP Okay. Will do. Okay, she's coming back around.

CDR Take your time.

Tape 125/16

CDR We're still free, Ron.

CMP Yes, I know. Okay.

CMP Yes, when you're free, you know, you create a little bit of rates on the thing, too.

CDR I know it. I can see that. Just take your time. When you're satisfied, go. But don't go until you're satisfied.

CMP Okay, I'm not.

CMP Okay, she's coming back around now.

CDR Okay. Give me a call when you start to retract.

CMP Okay; will do.

07 19 34 48 CMP Crazy thing.

CDR Say again.

CMP (Laughter) I get the right ... and then it goes around the other way. I think you're bouncing around up there, too, you know?

CDR I know it. I'm just swinging free.

CMP Yes.

CDR ...

CMP I think you're going to have to go to attitude 0. You're bouncing around more on the probe. See, I'm not moving at all.

CDR Okay. Stand by, Ron. Okay?

CMP Okay.

CDR Okay. I'm stable now.

CMP Okay. Now let me come up to you.

CDR Okay, when you're happy, I'll go free.

CMP Okay, stand by.

CDR Looking good now.

CMP Looking good, yes. See that's what we needed.

CMP Okay, she's looking good. Why don't you go to FREE, and we'll go to RETRACT 1.

CDR Okay -

07 19 36 53 CDR MARK it. I'm FREE.

CMP Okay, RETRACT. Here you come.

07 19 37 03 CMP Bang; I got all - two barber poles.

CDR You got what?

CMP Okay. (Laughter) Two grays, I mean.

CDR That's better.

CMP (laughter)

CDR That's better. Okay, sounded good, in here.

CMP Yes, sounded good in here.

CDR Okay, Houston. We're hard docked.

CMP Okay, SECS PYROS - LOGIC is coming OFF.

CC Roger. Understand two gray.

CMP Circuit breaker is OPEN. Two gray; that's affirm.

CC Challenger, Houston. We'd like to bring up the steerable there. PITCH of 155; YAW, plus 40.

LMP Roger. 155 and plus 40.

CC Affirmative.

Tape 125/18

CDR Say again, Gordy. 155?

CC A PITCH of 155; and YAW, plus 40.

CMP Okay, Gene. You still free?

CDR That's affirm. I'm still free.

CMP Okay. I'll take control of it.

LMP Okay, Gordy, there's the high gain.

CC America and Challenger, I'd like to - -

07 19 40 07 LMP Hey, Gordy, we're not - -

CC - - I'd like to take a minute of your time here to read the following statement by the President of the United States of America. "As the Challenger leaves the surface of the Moon, we are conscious not of what we leave behind, but of what lies before us. The dreams that draw humanity forward seem always to be redeemed, if we believe in them strongly enough and pursue them with diligence and courage. Once we stood mystified by the stars; today we reach up to them. We do this not only because it is man's destiny to dream the impossible, to dare the impossible, and to do the impossible, but also because, in space, as on Earth, there are new answers and new opportunities for the improvement of and the enlargement of human existence. This may be the last time in this century that men will walk on the Moon, but space exploration will continue, the benefits of space exploration will continue and there will be new dreams to pursue, based on what we have learned. So let us not mistake the significance or miss the majesty of what we have witnessed. Few events have ever marked so clearly the passage of history from one epoch to another. If we understand this about the last flight of Apollo, then truly we shall have touched 'a many splendored thing.' To Gene Cernan, Jack Schmitt, and Ron Evans, we say God speed you safely back to this good Earth."

CDR Gordon, those are beautiful words by a great American President. We're very honored to receive them; we're very honored to be able to serve our country in a way that we believe in. And we thank you.

LMP Thank you very much, Gordy and Mr. President.

CMP Mr. President, this is America. And we appreciate it very much. Thank you, sir.

CDR Say, Houston; Challenger.

CDR Ron, would you give us a call, when the tunnel's pressurized?

CMP Okay. Stand by.

CDR And also, we'll need a call when you get to attitude.

CMP Okay. Will do.

CMP Okay, your DUMP valve is in AUTO?

CDR Yes, sir. It's in AUTO.

CMP Okay. CABIN FANS are ON for the first time in the flight.

07 19 43 12 CMP I got to get down there and turn the tunnel leak.

CMP Okay, EMERGENCY CABIN REGS are OFF.

LMP Houston, Challenger.

CC Go ahead, Challenger.

LMP Roger. Give us a call when you want us to go through the comm configuration. And we're going to leave the cabin fan on a little bit, keep airing out - filtering the cabin. And don't let us forget it.

CC Okay.

CMP Okay, Houston. I'm going to open the PRESSURE EQUALIZATION VALVE going into the tunnel. Can you keep an eye on my cabin pressure?

CC Roger, America. Will do.

CMP Okay.

Tape 125/20

CMP Okay, there's 2. DELTA-P of 2. ... closed; we'll see if it stays.

CC America, Houston. You need a PRO to get the VERB 49 maneuver to jett attitude started. Over.

CMP Oh, sorry. ... stick again, huh?

CC Ron, while you're down there, there's a couple switches on the SIM bay to check out this pan camera heater. Over.

CMP Sure; go ahead. Just waiting for the DELTA-P to stay steady ...

CC Okay. PAN CAMERA MODE switch to STANDBY. And the PAN CAMERA POWER switch to POWER.

07 19 46 26 CMP Verify. STANDBY. PAN CAMERA POWER is going to POWER now.

CC Okay, that's good. We'll take a look at it awhile and let you know when we want power off.

CMP Okay.

CMP Okay. Looks like pressure is holding good there.

CC Challenger, Houston.

CMP Cabin pressure is okay. We'll go ahead and take her on down.

CDR Go ahead.

CC Okay, when you get ready to transfer an OPS, we want you to transfer the commander's OPS. Over.

CDR Okay; will do.

CDR Hello, Gordy. Were you able to see the lunar surface lift-off?

CC Yes, sir; we certainly were. It was a beautiful picture, and Captain Video stayed right on you. We saw you up to about 2 minutes into the burn. We could see the plume.

CDR I'll tell you, if Challenger hits that South Massif and you're anywhere pointing in the right direction, you ought to have a spectacular shot.

CC I'm sure of that because that camera is as good as any I've seen in a - in a television studio.

CMP Okay, I've got about 2 - point 2 on the DELTA-P. And the equalization valve's wide open, so it must be about right.

07 19 50 10 CMP Okay. EMERGENCY CABIN PRESSURE selector's going to BOTH.

CMP Okay, I'm ready to open the hatch.

CDR Ron, do you read?

CMP What? Yes, go ahead.

CDR Okay.

LMP ...

CMP Yes, I still got about 5 on the cabin, I think.

LMP ... Is the tunnel pressure up?

CMP I got the hatch out. Yes, it's pressurized.

LMP Okay. Just pull it open then.

CMP Okay

LMP ...

CDR Okay, Ron, it'll be a minute or two before we open that hatch. We got a little work to do in here.

LMP ... egress. LEVA bags.

07 19 52 50 CMP (Laughter) I don't know what it's like.

LMP ...

CMP (Laughter) I guess it's great. Let me check the old docking latches.

Tape 125/22

LMP ...

LMP Okay.

CMP Okay, I hear you. And, Houston, every latch has - worked perfectly.

CC Roger.

CMP Okay. Let's get the probe out of here.

CMP I was just bleeding the nitrogen out of the probe.

CC Roger, Ron. And when you get back in the cabin next, we'll take PAN CAMERA POWER, OFF.

CMP Okay. The probe's loose in there.

CC Sure sounds like it.

CMP Is there any hurry on that, Gordo?

LMP What did you say, Ron?

CMP Houston, this is America. Is there any hurry on that pan camera thing? If not, I'll take the probe out.

07 19 56 03 CC Negative. No hurry; we have plenty of time here till LOS - 14 minutes. We want to see it before then.

CMP Oh, okay. I'll get it out before then.

CMP Ouch.

LMP ... over here.

CMP Don't lose those (laughter).

LMP They might be in the data file.

LMP ...

CMP There comes the old probe.

LMP ...

CDR ...

LMP Gene.

07 19 58 41 CMP Okay. The probe is out.

CC Roger, Ron.

CMP Hey, does that - Do you want the probe right away, Jack?

LMP What?

CMP Do you want the probe right now?

LMP ...

CMP Okay.

LMP ...

07 19 59 34 CMP Okay, Gordo. PAN CAMERA POWER is OFF.

CC Okay, Ron. And before you pass the transfer list out of the Flight Plan Supplement, we have two small changes to page 1-11.

CMP Okay. Wait 1 and I'll get it. Okay, I'm on 1-11.

CC Okay, Ron - -

CMP No, that's it.

LMP ...

CC - - item 17. Just change the last part of the statement "stow on A-1" to "stow on A-7"; and, on item 19 there, change from "stow on A-7" to "stow on A-1". That's it.

CMP That's it? Okay? We can do that, I think.

LMP ...

CC Okay.

Tape 125/24

CMP Hey, hey! Here they come, by gosh. How you
doing? (Laughter) Beautiful. ...

LMP ...

CMP ...

CDR Good show. Boy, is it cold up there. It's hot
as heck down here. It's stuffy.

CC America, advise we're reading all of you on Ron's
VOX.

CMP (Laughter) Okay.

CDR Let me just doublecheck all ...

CC Jack, if your handy to it, we'll take the S-band
reconfiguration now.

LMP Okay, I'll do that.

CDR ...

LMP Okay, Houston, how do you read on the aft omni?

CC You're loud and clear, Challenger, on the aft
omni.

CMP Here's your old vacuum cleaner (laughter). You
... No, it's not on. Want it on? (Laughter)
Great.

CDR Hey, let me know when you turn it on; it cost me
a ... MASTER ALARM.

CMP Okay, I'll turn it on.

CDR Turn it on. You got the switch.

CMP Okay.

CC America and Challenger, both vehicles may get a
program alarm on the computers due to the W-matrix
overflowing. A VERB 93 will fix it in both cases.

07 20 03 48 CMP Oh, okay. Should we just do a VERB 93 now for the heck of it anyhow?

CC That's affirmative. VERB 93 on both spacecraft.

CMP Okay, I got my -

LMP Okay, Houston. I'm on the steerable, and I'll start tweaking to the best signal strength I can get.

CC Okay, Jack.

CC Jack, we think you've got the steerable up as good as it's going to get.

LMP I think you're right.

07 20 06 42 LMP Okay, and I verify I am in SLEW and not in AUTO.

CC Okay; thank you.

CMP Yes, are you going to leave us? Oh, okay; I got it. Okay? Okay, I'll get ... take care of this. Man, you guys got a lot of dirt up there.

LMP It's clean now.

CMP Oh. (Laughter)

CMP One OPS, stowed.

CC Challenger and America, about 2 minutes to LOS now, and both spacecraft are looking good.

LMP Roger, Gordy; thank you. We'll see you coming around.

CMP Okay, Houston, this is America, and we'll see you around there.

CC Okeydoke. Adios.

CMP Hey, Jack, you want a jettison bag?

LMP Not yet.

Tape 125/26

CMP Okay. Let me know when you want it. ...

LMP Not yet.

07 20 09 38 CMP Okay.

07 20 30 XX BEGIN LUNAR REV 53

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 20 54 48 CDR Ron?
LMP Yes.
CDR Got a good ISA bag - -
CMP Okay.
CDR -- and stow on top of A-2 ...?
LMP Darned if I know (laughter). I've been sleeping floating around in the tunnel.

07 20 55 06 CC America, Houston. We hear you talking.
IMP Hey, okay, Houston.

07 20 55 16 LMP Hello, Houston; Challenger's up also.
CC Okay, Challenger. Keeping busy up there?

07 20 55 23 CDR Yes sir, Gordo. I think we're moving right along with the - with the transfer and stowage. And we'll give you a hack here. We got the ISA bag over for A-2. We got the - two of the sample return bags stowed and a DECON bag, and they're over and a lot of miscellaneous stuff.

CDR Jack?
CC Okay.
CMP It's my page, probably, yes.
CDR Jack, is that -
CMP ... did it come loose, there? Yes, my whole book came loose.
LMP You got something on your - -
CMP (Laughter)

Tape 126/2

LMP - - ...

CMP Thank you. I'm checking some of this stuff off.
Yes.

LMP Okay.

CMP That was a good one.

LMP I didn't like that ...

07 20 58 07 CMP Okay. Are you going to put the Buddy SLSS in
the DECON bag and stow it on A-1?

LMP Yes. That's in there now.

CMP Okay. - Okay, the ISA has got the - (Sneeze)

LMP You just took the ISA bag, - the big ...

CMP Okay, but it had a lens brush, 16-millimeter mags,
three of them?

CDR No, we can't have ... like that.

CMP Okay, so I got those in - -

CDR The lens brush is there ...

CMP Okay, those - those 16-millimeter mags are in R-13.
Yes. Extra sample collection bags? You got two
of those in there? In the I - in the ISA?

LMP I need another -

CDR Yes, there's two collec - -

CMP Okay.

LMP I need another decontamination bag.

CMP Got one for the - that's got a metal plate in it
somewhere.

CDR That's it right there. That's got a metal plate.

CMP Yes, that goes in the PGA bag, I think.

CDR Huh?

CMP That goes in the PGA bag.

CDR Yes.

CMP (Laughter) I don't know. I had a pretty nice little home here by myself.

CDR You got any more bags or what?

CMP I'm out of bags, I think.

CDR ... what are you going down there? ...

CMP Yes.

CDR ... bags ...

CMP Yes.

CDR We've got to tie that ...

CMP I'd - I don't even know what's going on in the Flight Plan. Let's see.

CDR This.

CMP This, I think. Isn't it?

07 21 00 11 CMP Yes. What time is it? Let's see, 191:40. Let me check. One hour from now.

LMP ... What?

CMP One hour from now.

LMP No, no. We have two revs.

CMP At 1 hour from now, it's supposed to be - Okay? Okay, let me get some out.

CDR Let me work with this ... Jack.

CMP Guess it doesn't make any difference which one goes where, does it?

CDR Hey, Jack - -

Tape 126/4

LMP Hey, Gene.

CDR Yes.

CMP You're tangled up in the vacuum cleaner cable.

07 21 01 27 CC America, Houston. We heard you talking about the time there. As near as we can tell, you're right on the timeline.

CMP Right on the timeline, huh? Aren't we supposed to be closed out in about an hour?

CC Well, let's see - -

CMP That right? Or not?

07 21 02 22 CC Ron, it's about an hour and a half until you're supposed to close up the LM hatch.

CMP Oh, okay. An hour and a half yet. Yes, we should get it by then, I hope.

CMP Hey, Gene. Do those SRCs have numbers on them, or weights, or anything like that?

CDR Both weigh the same ...

CMP Both weigh the same?

CDR Yes. Almost.

CMP Okay. Won't make any difference where I put them then.

CDR No.

CMP Yes. Okay. Switch.

CMP Oh, that's all right. Yes.

CMP Well, it's serial number 1007. It's in the B-6 rockbox area. I don't know how you tell which one's the number, which number's what.

CMP Just a second, I can't get the other one closed. No. I - I don't mean that one. I mean the B-5 rockbox.

CDR Okay. That's good

CDR I have to think about it. They are in the ISA, I should say. Did you want the ...?

CMP Oops, I got the B-6 back again (laughter).

CDR You ready for a ...?

CMP Yes, I'll take it. Okay -

CDR ... on the back side of ...

CMP There's a neat way to pass things back and forth. Okay. That's all right, we'll keep - -

LMP Don't have room for it down here yet.

CMP Okay.

LMP How's the rockboxes ...?

CMP Let me look.

LMP I've got one, but ...

CMP No.

07 21 06 41 CMP Have you guys still got your PGA pockets on?

LMP No, we threw them away.

CMP Oh, okay.

SC ...

CMP You didn't want any of the stuff that's in them?

SC No, we ...

CMP Oh (laughter).

07 21 08 33 CMP You guys you got any - sample bags you can put in A-9?

LMP Say again.

CMP You got a sample bag for me to put in A-9?

Tape 126/6

LMP No.

CMP You don't.

LMP Oh, wait a minute.

CMP Okay.

LMP Do you have a bag for it?

CMP No, I just got an empty box.

LMP Oh, okay.

CMP No, it just goes in a lithium hydroxide canister.

LMP Okay.

CMP You want the canister? It's easier to just put the bag in the - in the thing over here. I think.

LMP Okay. I'll send it over.

07 21 11 33 CMP What's that? That's okay. That's all right, I'll get it (laughter). Doesn't look like it's going to fit.

LMP It may not. You may have to ... put one in the ...

CMP Yes, it's number 7, huh? Well, maybe it will fit.

SC ...

CMF Oh, it fits!

LMP ...

07 21 12 16 CMP Sample bag number 7 is in A-9.

CMP You know, from the looks of this dirt, no wonder it looks dark down there at that landing site. No, we're going to keep them all. We're taking them back.

LMP Okay.

CMP What do you mean? Unused ones?

LMP I don't know what this is all about. I -

07 21 13 10 CMP Okay.

CMP Have you found the - waist tethers yet?

LMP Yes. I got them - for you.

CMP Okay.

CMP Yes, it's right here in the tunnel.

CC Hey, do we need any toothpaste up there?

CMP Yes, this one's about three-quarters gone, or half gone. Oh, okay. Here

LMP Hey, Ron, ... that?

CMP Ah.

LMP What?

CMP We can probably always use that, you know.

LMP Okay, I'll send it over to ...

CMP Yes.

07 21 15 48 CMP Hey, Houston. How was the quality of America's TV camera? That's the first time - first chance we had to use it on this flight.

07 21 15 56 CC I don't think it could have been any better. We had a real nice picture.

07 21 16 03 CMP Hey, okay. Good.

SC No. It's in the ...

CMP Okay. Forget it.

CMP Never did find that one set that you were talking about.

SC ...

Tape 126/8

07 21 18 52 CMP Send the tape over here. You want it?
SC ...
CMP Yes.
SC Here's your -
CMP Okay.

07 21 20 00 CMP Okay, coming up.
CDR I found a med kit. Did you say ...?
CMP No, we - we only have about six more sleeping pills left, or seven, or something. I don't know.
LMP How many more nights are you going to sleep?
CMP Well, I like to - sleep about one more, probably.
LMP Empty your jettison bag if you could get ...
CDR That would get me out of the way.
CMP Okay, just a second. Okay.
CMP (Laughter)
LMP How about the jettison bag?
CMP You want it?
LMP Yes.
CMP One jett bag. Oops - Oh, the big one. You got to have a bigger hole than this to get it through.
LMP Okay. Let's wait for Gene, then.
CMP (Laughter) Okay.

07 21 22 01 LMP Okay, Houston, this is Challenger. I think we're getting close to being able to take your up-link.

07 21 22 07 CC Okay, Challenger. We're ready when you are.

07 21 22 15 LMP Okay. You've got POO and DATA.

07 21 22 18 CC Okay, and I've also got the pads ...

CMP Is that the book that's down here in R-2?

LMP Yes.

CMP I don't think I will ever find it in here.

CDR You'll never find it in there, Ron; I just stuck ...

CMP What does it look - is it a small book or what?

LMP Some P30 pads and stuff.

07 21 23 00 LMP Hey, Gordy. It looks like we've gotten - -

CDR Get one from the command -

LMP -- We've got our Data Card Book - -

CMP What do you need? A P30 pad?

CMP - - stowed away. Can you read each of the items, and I'll copy down the pad that way?

CMP Hey, wait a minute and I'll tear you one out of here, Jack.

CC Sure enough, Jack. No problem. It's not that complicated anyway.

LMP That's right, this is an easy one. Go ahead.

07 21 23 24 CC Okay. It's a LM deorbit pad, and NOUN 33 or T_{ig} is 195:38:13.00; NOUN 81: X is a minus 0224.6, Y is a plus 0056.9, and Z is a plus 0167.7; the apogee and perigee are NA, perigee is going to be minus; and DELTA - VR is 0286.0; burn time will be 1:58; and the FDAI attitude - for what it's worth - here is 048, 138, and 075. Go ahead.

LMP Okay, here's the deorbit pad. T_{ig} 195:38:13.00; DELTA-VR's are X, minus 0224.6; Y is plus 0056.9, Z is plus 0167.7.

Tape 126/10

CDR Ron.

CMP Yes.

CDR ...

LMP Total DELTA-V is 0286.0; burn time is 1:58; and FDAI angles 048, 138, 075.

CC Okay, that's all correct.

LMP Okay, Gordy.

CC And you'll need a LM weight for the DAP; if you want to write that one down, it's 5185.

LMP Okay, 5185 is the LM weight.

CC That's affirmative.

CMP I never did get the purse back over here yet.

CDR It's in here. You don't need it.

CMP Okay. Okay. Yes, will do. Yes.

SC ...

CMP I think that's all the stuff - think that's all the junk.

07 21 28 02 CMP Well, the - you know, we have more than enough to eat every day - the only food that's left is the - you know, the food that's to come up.

CDR You got yellow pills?

CMP Yes. We got more yellow pills than we know what to do with.

CDR You do? Okay.

CMP But that food that we didn't eat, it's gone.

CDR What did you do with it?

CMP It's in that big bag.

CDR Okay.

CMP (Laughing) Well - -

CDR They must consider that you are the judge of that.

07 21 29 54 CMP Okay, Jack, you still got your helmet over there, right?

LMP Yes.

CMP Okay, because I've only got two helmets here.

07 21 30 37 CMP Okay. You guys say you got the LCG plugs with you, huh?

LMP/CDR Yes.

CMP Okay. I want to make sure you got those. Okay.

07 21 31 04 CC Challenger, Houston. It's your computer, now.

CMP How about the monocular?

LMP Yes. I've got it in my pocket.

CMP Okay. It's in your pocket.

07 21 31 32 CDR You got that?

07 21 33 36 CMP You need that?

CDR What is it?

CMP Just a big bag.

CDR No, I don't need it ...

CMP Okay.

CMP Tape? Okay.

07 21 33 22 CDR Okay.

07 21 36 07 CMP Well, if you br - if that's a good one; you just need one.

CDR It's a good one.

CMP Okay.

Tape 126/12

07 21 36 40 CMP Houston, America.

07 21 36 44 CC Go ahead, Ron.

CMP Is it a mag Dog Dog for IM jett on the 16-millimeter?

07 21 36 56 CC I'll check that. One other thing. We'd like H₂ Tank 1 FAN, ON now to start getting it set up for the sleep period.

CMP Okay. Just a second here. I'm stuck, can't get this - (laughter). Oh, Mr. Clean. You guys are so dirty. I'm going to make you sleep in the tunnel. Let's see. H₂ -

CC H₂ Tank 1, FAN.

CMP Which tank? Tank 1?

CC That's affirmative. Tank 1 FAN.

CMP Okay. To ON?

CC That's right. ON.

07 21 37 47 CMP Okay. H₂ Tank 1 FAN is ON.

CC And we've got a vector for you, if you want to give us ACCEPT.

07 21 37 58 CMP Okay. The old CMC - let me get a big hatch right there in the middle of things. Let's see. There it is. Okay, you've got ACCEPT.

07 21 38 16 CC Roger.

07 21 39 39 CMP Yes, you guys keep the bag up there. And I get the - I get the rest of it.

LMP We keep the bag?

CMP Yes.

07 21 39 50 CC Ron, Houston. The answer to your question is yes. Mag Delta Delta is the one.

CMP Delta Delta. Okay.

07 21 40 06 CC And, it's your computer, Ron.

CMP ... Thank you. Get in there in a minute. Let's see.

07 21 40 27 CMP Okay? Apparently, you're stuck on something. Okay. Got it.

CDR ...

CMP Okay, I got it. You want the tape? The tape. Gene wants the tape.

CDR Yes. I'll need it.

07 21 41 11 CC Ron, Houston. If Delta Delta is more than 50 percent finished, then use Charlie Charlie.

07 21 41 23 CMP Okay. I don't think I've used Delta Delta, have I? I'll have to look at it and see.

07 21 41 53 CC Ron, one other thing to bug you; we'd like you to do the VERB 48 load as shown in the Flight Plan. It'll collapse the dead band so we can check and make sure the LM steerable is right on the money.

07 21 42 08 CMP You want to do that now?

CC That's affirmative.

CMP Okay, why don't you read it to me, Gordo? And I'll get it, in the LEB DSKY down here.

07 21 42 20 CC Okay, it's a VERB 48, R-1, you want 61101.

07 21 42 54 CMP Okay, Houston; this is America. That should have collapsed it there.

07 21 43 18 CC Okay, Ron. That caught what we wanted.

CMP Okay.

CMP Yes. The jettison suited. Okay, Houston, mag Delta Delta looks like it's full. I was just going over the list of stuff here I've got. And I think you've got everything.

07 21 49 01 LMP Okay, Houston, I guess we're GO or NO/GO for your LM closeout.

Tape 126/14

CC Okay, stand by 1 on that.

07 21 49 57 CMP Yes, we're in a jettison attitude now.

07 21 50 07 CC Challenger, you're GO for closeout.

CDR Okay, we're proceeding then.

07 21 50 36 CMP No, I'm NARROW DEADBAND now.

CDR MIN DEADBAND ATT HOLD.

07 21 50 40 CMP That's right. MIN DEADBAND ATT HOLD.

CDR GUIDANCE CONTROL, PGNS.

07 21 51 00 CDR AGS MODE CONTROL, ATT HOLD.

07 21 51 17 CDR ... OFF and RECEIVER, ON.

07 21 52 16 CDR Hello, Houston; Challenger.

CC Go ahead, Challenger.

CDR Gordo? How soon is AOS?

CC Okay, LOS is 16-1/2 minutes.

CDR That's what I meant - LOS. Thank you.

CC America, Houston. I have a couple updates to go in the Flight Plan.

CMP Yes?

CDR Did you hear it?

CMP What's that?

CDR They have an update for ...

CMP Oh, okay.

CMP Houston, I'm ready for the Flight Plan update.

CC Okay, what it is, is the CSM and LM weights for the DAP at 192:10.

CMP Okay; go.

CC The CSM weight with three men, assuming you're going to have three men from here on out, is 36545 (laughter). And the LM weight is 5185. And you might jot down a couple trims for three men aboard. Pitch trim will be plus 0.60 and yaw plus 0.81.

CMP Okay, CSM weight is 36545, LM weight is 5185, pitch is plus 0.60, yaw is plus 0.81.

CC Okay, that's a good readback. The LM jettison numbers are nominal as shown down the LM jettison time for T_{ig} and attitudes.

CMP Okay, wait a minute.

CC I realize there is no ...

CMP 194:03:30.

CC Okay. That's right for CSM sep, and the LM jettison time is on a page before there, 193:58:30.

CMP Okay.

07 21 56 32 CDR Okay, Houston. Challenger is going off the air.

CC Okay, Challenger. It's been a pleasure talking to you the last few days.

07 21 56 52 CDR It seems like an unfitting finish to a super bird, but it's got one more job to do.

CC Roger that.

LMP Take care, Gordy, and thank you.

CC Sounds like you're planning to stay there.

07 21 57 18 LMP (Laughter)

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 21 57 17 CC Steady there.

CMP (Laughter) I speak for the Challenger.

CC Say, one final thing. And sometime in the next 30 minutes, Parker will be coming on to take over here and, just for your information, today is his birthday.

CMP Ah-ha. Okay, thank you much.

07 22 00 00 CMP Yes, I can just barely hear you.

SC I need the hose. I need ...

CMP Want a hose, yes. What, the suit hose?

SC Yes.

CMP Well, I was thinking of comm. That's Jack's.

SC ... one here.

CMP Okay. There you go. Let me put the - ... connect on. Yes.

07 22 01 09 CMP Think we ought to put this thing on there.

07 22 07 1 CC Okay, America. You're about 2 minutes from LOS, and everything's looking fine right now.

CMP Okay, it looks like the majority of the stuff is completed, so we should see you, ready to go, on the other side.

CC Okeydoke.

07 22 29 XX BEGIN LUNAR REV 54

07 22 53 03 CMP Okay. DIRECT O₂ is OFF. The other day, mine went up to 45. No, it just goes that high; doesn't make any difference what you do.

Tape 127/2

CDR I am, too.

CMP So am I, right now. No, not yet. We got to wait until the O₂ flow stops. Yes, it'll increase on up to - should be 4.1 to 4.5. Well, she's still going up. I'm reading 4.2 on the cuff gage.

CDR 4.1.

CMP Well, we'll go on up to about ... Well, there's the total suits.

CDR Yes, it's got 8 - ... 9.

CMP 8.9?

CDR - - 0.

CMP Yes, it ought to stable off there. It's to about 4.3 - 4.4 on mine now. Houston, America. How do you read?

CC Loud and clear, America.

CMP Okay, we're in the old suit circuit integrity check at the present time.

CC Roger, we're copying you live.

CMP Okay, DIRECT O₂ is coming down now. I mean the O₂. Okay, O₂ flow's coming down.

07 22 54 28 CDR And, Houston, the tunnel's closed out. We're still at TUNNEL VENT, and the hatch integrity is CO.

CC Okay, we copy that.

CMP And O₂ flow's down to 0.5, now. Yes, that's right. The - the suit integrity check will pump you up that high.

LMP It's a - it regulates through the Delta over cabin.

CMP Yes. Yes, maybe she might make it down to 0.4. Yes, it's going down. Well, it means you guys' suits are still on tight.

CDR What do you mean? There's so much dust in the joint, they couldn't be anything else but tight.

CMP (Laughter)

LMP They're tighter than they were when we started.

CMP Oh, yes?

LMP But that lubing is just so it collects dust to make them tight.

CMP Uh-huh.

CMP Well, I was down to 0.4, now it's up to about 0.5, 0.4 and a half. All we need is less than 0.8. Well, I hadn't been timing it. I guess it's about 30 seconds, though.

LMP Oh, yes. ...

CMP Yes, I'm happy; let's go to DEPRESS. ... Don't go to OFF, yet.

CDR Okay.

CMP There we go - DEPRESS.

CC And, America, Houston's also happy with what we see down here.

CMP Yes, it looks like you've been staying around - -

CMP Okay. Speaking of happy - Happy birthday.

CC Thank you, Ron. Found out you guys plan far ahead.

CMP ... Parker ... (Laughter)

LMP What was that?

CDR Bob, we'll - we'll drop Challenger right on the South Massif for you - for your birthday present.

CC Thank you, Gene.

07 22 56 48 CMP Okay. LM POWER's OFF.

Tape 127/4

LMP Are you going to let the suit down or what?

CMP It's going down. It's going down slowly.

LMP Yes, it is.

CMP We'll take it down real fast if you want to, but that's kind of hard on my ears. Okay, SECS PYRO ARM circuit breakers - I wonder if I can reach those. Yes. There's BAT A and BAT B are in.

CMP And, Houston, America. I guess we're ready for LOGIC ARM if you are.

CC Roger. We're ready to watch.

CMP SECS LOGIC. Okay. Here goes LOGIC 1 -

07 22 57 27 CMP MARK it. And LOGIC 2 -

07 22 57 29 CMP MARK it.

CC Okay, America. You're GO for PYRO ARM.

CMP Okay. We - we'll wait awhile to do that. We're actually a little ahead of time.

CC Okay. And, America, can you report - -

CDR Houston, how does Challenger - -

CC - - LM/CM DELTA-P?

CDR - - look to you?

CC Okay, Challenger looks good, but we'd like the LM/CM DELTA-P.

CDR That's affirm. I - I'm seeing DELTA-P is off scale high, and I'm on about the sixth minute of my 10-minute tunnel vent, following 3.5 DELTA-P.

CC Okay, copy that.

CMP Yes, it does; doesn't it? (Laughter)

LMP That's right.

CMP Yours come down faster than mine?

LMP Oh, you opened the old suit circuit relief. We're tough, though, us guys that go to the lunar surface.

CMP Yes, yes. You guys got to be tough.

LMP Yes. (Laughter)

CMP We got a tough position here too, you know, if you want to try it. Just go to off.

LMP Bet you life you do.

CMP Okay.

LMP I imagine they had you humping.

CMP Yes, a little bit.

LMP Now we're back to screw up your routine.

CMP Yes, that's right, you know.

CDR Don't let us bother you, Ron. You just go about and do whatever you want to do. We'll just get clean for the next 3 days.

CMP Okay.

LMP Oh, we - we're down to 7 now.

CMP Lower limit. You know, I can't even see my EMS for that Sun shining in here. That'd be a great LM jett attison [sic].

CDR Ron's ears apparently are bothering him is the only thing I can decide.

CMP (Laughter) Oh, we're about down, aren't we?

07 23 00 18 CDR Couple of more pounds and we'll be there.

CMP Couple more pounds? Okay.

07 23 00 20 CMP Tunnel light are off.

Tape 127/6

07 23 00 54 LMP We didn't hurt this end of the LM much.

CMP Yes, it looks real good. I got some pictures of the bottom of it, too, I think. When you guys were going around there. And that looks real nice.

LMP Well, you always were a bottom mar.

CMP Okay, let's see.

07 23 01 59 CMP Okay, suit circuit integrity check. We've already done that. Okay, I'm loading the EMS to plus 100 and making a null bias check right now.

07 23 02 51 CDR Okay, Houston. I've been in TUNNEL VENT now for about 11 minutes after 3.5 on the DELTA-P, and I'm going TUNNEL VENT valve to OFF.

CC Okay, we copy that, Gene.

07 23 03 16 CMP Houston, the null bias check, I've got plus 100.9, starting out at 100, in 1 minute and 40 seconds.

CC Okay, we copy.

CMP (Laughter) You all done? You'll have to stay inside. Okay, align the old GDC; I just did that awhile ago. ... done again. Good.

CMP In the LM? ... in there.

CMP Okay, we're right down here now, and I can't see that very well. Can you - do you want to read the - read the checklist?

CMP Okay, uncage the BMAGs. RATE to LOW; DEAD BAND, MIN. Okay, wait a minute. We won't do that as late as 45. Let's see. Okay, might as well, I guess. Okay. And SCS. Oh, I don't use that anyhow, really. That's just - well, I really don't use that this time, anyhow. TRANS CONTROL POWER is ON.

CMP Okay. I don't either. You're looking right into the Sun. We're looking right into the Sun so we won't be able to see it. Okay. Yes, I got this one going over here, but - it might still have something.

LMP Twelve frames a second.

CMP DIRECTs, MAIN A, MAIN B. Well, I'll wait awhile on arming those.

CMP Let's see, we ought to go ... the old SUIT TEST valve to OFF now, okay?

CMP Okay.

CMP That's both of them. That's both the ascent stage and the - Yes, we'll change that, too. O₂, okay. That's good.

CDR B/D roll.

CMP Yes; okay.

CMP Everything's going to be P30 and, boy, we get out of here. Turn the page over there and then you can see what the - See, we'll do the jettison burn and then we'll VERB 49 to a new attitude so we don't zap the hot exhaust into the SIM bay. And then we'll do a P41 for separation, see? At that new attitude. That's all over there in this thing. So, we'll do all that as soon as we separate, then we'll go into the preseparation - or as soon as we jettison, we'll go right to the pre-SEP checklist.

07 23 08 41 CMP About 10 minutes to SEP - I mean to jett. Ten minutes to jettison.

CMP Oh, that's all right - It won't work anyhow, see? So -

07 23 10 23 CMP Okay, plus 110.00, ENTER. Plus 7.000, huh? Plus 349. Okay, that's the NOUN 22s for the VERB 49.

CMP Yes. Got arm controllers in, that's all. We'll use this for time, jett effect [?] 55.

CMP Yes.

LMP Okay.

Tape 127/8

07 23 11 57 CMP Those two, but not the ones next to them; here.

07 23 14 21 CMP Okay, PYROS are coming ON. There's A and B. And all breakers are IN.

CC Okay, America, we see the PYROS ARMED. Looks good.

CMP Okay.

CMP Get the - 47? Okay.

CMP (Humming)

CMP ...

CMP Yes, must be. 193 hours. I don't know what day this is, really. Okay, I can go into P47 now. Hey, could I dump him, or do you want to get to dump? Yes, that was your Challenger. Okay, you can dump him. I brought him up here, though. He was - he was a good Challenger. Okay.

07 23 18 08 CMP AGS ON. Is it running? Yes, it's running. Okay, 55. 55, 56, 57, 58, 59 -

07 23 18 33 CMP MARK! There she goes! Yes. Well, yes, it's holding out. Hey, that's firing.

07 23 18 42 CMP Hey, there goes all the docking latches!

CMP Yes, everything else's right there. Beautiful. I hope this thing's working.

CMP You know, Houston, this is America. I guess in the terms of some of the Grumman people down in Florida, the LM is a "wop-off."

CC Okay. We copy that.

CDR And, Houston, I think the last few days have proved that they really did save the best until last.

CMP This a - I need you to get the maneuver in here, Gene.

CDR Okay.

Tape 127/9

CMP No, that's all right; I'll get it. Okay, go ahead. Good. Ready. CMC; RATE 2. Okay. (Humming) PROCEED. Boy, it's just stable as a rock out there. That's a STANDBY? Let me get some more pictures of it here.

LMP I think you might take - I'm going to change the setting down to about a 2.8, get to the bottom part of it there for a little bit. Right, well, it's not quite at the bottom. He's right on the side, but -

07 23 20 39 CMP Okay, 16: up, MAIN A, MAIN B.

CDR Yes, we're maneuvering.

07 23 20 54 CMP Okay, SAFE the PYROs. LOGIC 2 is OFF, LOGIC 1 is OFF.

07 23 21 02 CMP PYRO ARM, BAT A, BAT B, BAT A are OPEN.

CC Okay, we copy them SAFE, America.

LMP Okay, Houston.

CC And your cabin looks good. LM also looks good.

CMP Hey, great!

07 23 21 31 LMP Okay, Houston, the preseparation checklist is complete, except for completing the maneuver and going to P41.

CC Copy that.

CDR And the LM is holding attitude very well.

CMP Okay, we're going to get there at 194:03:30. Okay. So T_{ig} will be - well, it's 03:41 - we can start - we can - got so excited with watching the LM that I forgot to get going.

CC Hope you guys remembered to take roll call before you let it go.

CMP (Laughter) Say again, sir?

Tape 127/10

CC And, America, we'd like HIGH GAIN to AUTO, please.

LMP ... got it.

07 23 23 00 CMP ... Yes. We're there. Yes. Okay, there's average g.

LMP Okay, Houston. How do you read on the Alfa?

CC We read you on the OMNI Alfa.

07 23 23 31 CMP Okay, trans CONTROLLER's ON. Let's see, what's next? Need to time. ...

LMP Hey, you called Alfa, did you not?

CC No, we want HIGH GAIN to AUTO, but I'm not sure we can do it right now. Stand by.

LMP That doesn't make any difference on the S-band.

07 23 23 44 CDR We're burning now.

CMP Ahhh, well, come on. (Laughter) ... Okay, there we go. - 0.1 to plus - well, keep the change. You can read it. Press on.

CC 17, we're not reading the NOUN 85s. Would you read them to us?

CMP Okay. NOUN 85s were minus 0.1, a plus 0.1, and plus 0.2.

CC Okay, copy.

LMP Okay, Bob. You want me to get the high gain back?

CC Stand by.

07 23 25 14 CMP Okay, DIRECTs are OFF. Locked - locked it. We go into - we go into SIM bay configuration?

CC Okay, Jack, OMNI Alfa is just fine, right now. You've gone past the scan limits, anyway.

Tape 127/11

07 23 25 47 CMP Okay. Okay, we got SIM bay jett configuration.
CDR Give them a mark though, Jack, from the - when we extend the antennas.
LMP Right.

07 23 26 32 CC Okay, 17. We're ready for you to start that P20 maneuver, please.
CMP Okay, Bob. We're getting it there. Plus 90 52 ...
CC Okay, 17, we'd like to hold the extension on the HF antennas until we get the high gain reacquired. We'd like you to go to P20 at the time we see that.
CMP Okay. Will do.
CMP ... ENTER. Yes, that's when we can get there.

07 23 27 50 CMP Yes, it's supposed to be the slow rate. Now, we're going ... fast rate.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

07 23 28 01 CC And, Jack. Sometime at your convenience, I've got an update for the Flight Plan. It's pretty much your next rev. So sometime during this rev, give me a call, and I'll read it up to you. It'll be - it'll start just about the time the next rev starts.

CMP Okay. We'll give you a call on that, Houston.

CC Okay, Ron.

LMP Houston, America. Magazine Dog Dog is 40 percent remaining.

CC I copy that.

07 23 31 23 CC Okay, and, America, we've got a pitch of minus 67 and a yaw of 300 for the high gain.

LMP Okay, Bob. Let me have the old Flight Plan changes.

CC Okay. At page 195, excuse me - time 195:15 - that's page 304.

LMP Go ahead.

CC Okay. It says, "Set HIGH GAIN MANUAL, WIDE" and the new angles will be pitch of minus 5 and yaw of 315. And the time will be 196:30 instead of 21:30.

LMP Go ahead.

CC Okay. You might also at that point write in "Verify all command module VHF OFF." I'm sure Ron will understand what that means. He's been doing it all along anyway.

LMP Yes.

CC Okay, and then over at 195:31 -

Tape 128/2

LMP That just means you want the VHF off, doesn't it?

CC Right. All of these, I think - three switches over there along the side. And BEACON, RANGING and -

LMP I think I understand that.

CC Okay. I thought even an LMP would understand that. At 195:31, we're going to move "LUNAR SOUNDER OPERATE to OPERATE." The new start time there will be 195:31:38. Over.

LMP Okay. "LUNAR SOUNDER OPERATE" will be done, new time will be 195:31:38.

CC Okay. And then next page at 196:20 which was the original lunar sounder stop time, we will move all that block which starts with "LUNAR SOUNDER OPERATE STANDBY and T-stop" - that will all move over - and goes down to "UV ON." That block will move over to the 196:30 time of the next column and the T-stop time there will be 196:30.

LMP Okay. I'm going to move the "LUNAR SOUNDER OPERATE/UV ON" block from its present position to 196:30:00.

CC Okay, Roger. And the "VERB 22 NOUN 79" that was originally starting at 196:30 will be done following that block of "LUNAR SOUNDER SIM bay" stuff.

07 23 36 32 CC And, Jack, there - -

LMP Okay, Bob. Is there anything else?

CC Okay, in the middle of that section that we moved, it says "Acquire STDN," says "High gain angles," and those will again be changed to minus 5 and 315 which is the same change we made on the earlier page.

LMP Okay.

CC Okay. And that is the extent of the update.

LMP Okay, thank you.

CC And, America, we're GO to extend the HF antennas.

LMP All right, stand by - about 30 seconds.

LMP Okay, Houston, HF ANTENNAS - going to EXTEND, number 1 -

07 23 38 55 LMP MARK it.

CC Mark.

CDR Houston, did you - was that mark for OFF?

CC Negative, that was a mark that we copied you going ...

CDR Going to have to square a new guy away, here.

LMP Okay, I'm sorry, I'll tell - I'm going to turn it OFF - going to EXTEND again -

07 23 39 40 LMP MARK it.

CC Okay. Marked it again.

CDR Bob, it was OFF for about 5 seconds, while I asked you that question.

CC Okay, America. We copy HF 1 extended. You're GO for switch OFF there, and we're ready to extend HF 2.

CDR Okay, Bob, and that's gray, now. And HF ANTENNA 2 -

07 23 41 30 CDR MARK it.

CC America, Houston. We're observing CMC in FREE instead of going through the P20. We wonder if you accidentally hit a switch.

CDR Okay, Bob. I think we've got it now. Thank you.

CC Ccopy.

07 23 46 25 LMP How's that antenna looking - -

Tape 128/4

CC Okay, yes. We're just going to tell you, it's probably not quite out yet according to indicators, that I guess you see. I would like to go OFF, though, to keep the motor from heating up. We'll come back on it a little bit later.

LMP Okay, it's OFF and the talkback went gray, with it going off.

CC Roger. Let's see, it was barber pole up until then, right, though?

LMP That's affirm, Bob.

CDR Houston, America.

CDR Houston, America.

CC Go ahead, America.

CDR Okay, Robert, I just want to tune you in on our mode of operation here, for the next few hours. We're getting Ron out of his suit, so that he can operate more effectively and efficiently the SIM bay. And, then Jack and I are going to start getting out of our suits and trying to clean up a little bit, and that's going to probably be a long and tedious operation but we're just going to have to take that time.

CC Okay. We copy that. And, Ron, HF 2 is the one - -

CDR No, we'll be - -

CC - - that we're not quite sure if it's out and you might check a visual on that - I think you've looked at it before - when it's fully extended and - and give us a clue whether it's 99 percent extended or not. Go ahead, Gene; I think I cut you off.

CDR Stand by 1.

CDR Yes. Wait until sunrise, Bob, and he can look at it.

07 23 48 26 CDR Bob, you're probably going to have to wait until sunrise to get a good verification of that.

CC Roger. Copy that. I just looked down the Flight Plan and saw you going into darkness.

CMP It's easier with us.

CDR And, Bob, during this LMP and CDR suit doffing and CWEG [?] changeout and so forth, the LMP will be off biomed until he gets a new set and gets cleaned up and gets them on. So I just want you to understand all that.

CC Okay, yes. We understand.

07 23 49 18 CDR Okay.

CDR Bob, what's the LM impact time?

CC Okay, stand by on that. Okay, 195:57:20. So it's 57:20.

CDR Okay, that's about an hour and 20, then right?

CC That's right.

CDR Okay. Of course, we're interested in the whereabouts of Challenger, so when the time comes up, give us a holler, will you?

CC Oh, Roger. We will do.

07 23 51 33 CDR We're still very much interested in her performance.

07 23 59 49 CC Okay, America; Ron, we'd like you to go on HF 2 there which we've got, apparently, most of the way out; but we're apparently stuck a little bit. We'd like to get the HF 2 to RETRACT for 10 seconds and then go to EXTEND for 20 seconds. Over. And we'll be watching here on the ground.

CMP Okay, that's HF 2. And we'll go to RETRACT and, let's see - I need three hands here - VOX, let

Tape 128/6

me get VOX. Okay. HF 2 going to RETRACT: 5, 4, 3, 2, 1 -

08 00 00 40 CMP MARK it. Okay, we'll stay that way for 10 seconds, we've got a barber pole - and -

08 00 00 51 CMP MARK it; okay. And it's OFF now. Now you want to go to EXTEND for 20 seconds, huh?

CC That's affirm.

CMP Okay, 5, 4, 3, 2, 1, -

08 00 01 11 CMP MARK it. Got a barber pole.

CMP Okay, 21 seconds and it was OFF. Hey, you said - somebody just told me about looking at HF 2. That's the one I can't see.

CC Okay; we copy that, too, Ron. Thank you.

CMP Yes.

CC Okay, Ron, we'd like you to do that same cycle one more time. RETRACT for 10 seconds then EXTEND for 20 seconds again.

CMP Okay. And HF number 2. 3, 2, 1 -

08 00 02 14 CMP MARK it, RETRACT.

CMP Okay, 9, 10; it's OFF. Okay, 3, 2, 1 -

08 00 02 32 CMP MARK it; it's EXTEND. Yes, it was stuck right in there. Oop, okay, that's 2 - 23 seconds before it went to OFF.

CC Copy that, Ron. Okay, we think it's starting to clear up, Ron. If you'll put it in EXTEND and leave it there, we'll give you a call - or else until it goes gray.

CMP Okay. 3, 2, 1 -

08 00 03 24 CMP MARK it. It's going to EXTEND.

Tape 128/7

CC Okay; OFF, please, Ron.

CMP Okay, OFF. And it was OFF at a minute and 8 seconds.

CC Okay, and I gather it was still barber pole, right?

CMP It was still barber pole, yes.

CC Okay, America, you're GO for LOS; and we'll be picking up on the HF path as per the checklist. Ron, we'd like to have you look on the back side - see which or any antennas you can see out there, just to give us a status when you come around the horn. Over.

08 00 06 01 CMP Okay; we'll give her a try.

CC Okay; thank you.

CMP I can see the one out window 1. Window 1 is the only one I can see.

CC Copy that.

CMP And that happens to be HF number 1.

08 00 07 14 CMP Yes - Oh, here's a little - The electrical covers? Oh, they're - each one of them is in your bag here. Yes.

08 00 28 XX BEGIN LUNAR REV 55

08 00 51 45 CMP Okay. There we are at OMNI Charlie.

CC Roger. America, Houston. We read you loud and clear.

CMP Okay. Houston, this is America. Okay, for your planning purposes there, - I got a little tied up and started the RECEIVE ONLY, TAPE RECORDER at 195 plus 24.

CC Okay; I copy that, Ron.

Tape 128/8

CMP Okay, Houston. HF number 1 is sticking out where it should stick.

CC Okay, we copy that and - Stand by. Okay, go STANDBY on the LUNAR SOUNDER, please, Ron. Somebody is worried down here. STANDBY on the LUNAR SOUNDER.

CMP Okay, what's - STANDBY. Okay, STANDBY.

CC Okay, and, Ron. We're going to do this one in VHF. Apparently they're still too worried about your HF antennas. So if you'll take your MODE switch to HF when we get ready to go - come out of STANDBY, we'll do it in the VHF MODE.

CMP Okay. We're - we'll - we'll stand by on your call then. Or I'll go to VHF now, if you want. Or would you rather have HF receive? I'll stand by on your call to go to VHF.

CC That's affirm, Ron. You can go to VHF now, and stand by on our call to come from STANDBY to ON.

08 00 54 56 CMP Okay, MODE's in VHF.

CMP Houston, America. What - Is somebody kind of afraid that maybe the antenna isn't all the way out? Is that what the problem is?

CC That's affirm. They're worried about HF 2 not being all the way out, and they think that they won't get much - if it's partially extended. So we'll see what we can get with VHF instead. And, right now, we're going to STANDBY to warm up the film cassette. It's too cold.

CMP Okay.

CMP I don't think I ever told you down there that mag Kilo Kilo was on frame 99 at the end of the rendezvous - and the picture-taking sessions there.

CC Okay; copy that.

Tape 128/9

CC Okay; and, America, we'd like to bring up the high gains since we're going to be using VHF. And we'd like PITCH of plus 25, YAW of 200, NARROW and REACQ.

CMP PITCH of plus 25, YAW, 200; and REACQ and NARROW.

CMP Pitch of plus 25. Okay. Okay.

CMP Okay. ...

CC Okay; and, Ron, we'd like H₂ tanks 2 and 3 FANs to ON.

08 00 58 43 CMP Okay - 2 - H₂ tank 2 is ON; tank 3 is ON.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 01 01 25 CMP That end might stick. It might stick there. The back won't stick to anything. It's the wrong kind of stuff. If that won't, this will.

CMP That's the vacuum transfer to the ECS. I can put those away.

08 01 06 24 CMP What? We're just -

08 01 08 18 CMP We're coming across Crisium.

CMP With three guys in here, it fogs the windows up all the time.

08 01 12 21 CC Okay, America. Stand by, 5 minutes to Challenger impact.

08 01 12 26 CC MARK.

CMP Roger; 5 minutes to Challenger impact, huh?

CC That's affirm. I don't know if you guys can see it out the one window or not -

LMP We'll do all right.

CMP Let's see - we should be what? - behind it, aren't we?

CC Say again, Ron.

CMP Shouldn't we be behind him?

CC I should think he'd be a little bit behind you, right? Ron, I'll take that back, I think he is in front of you.

CMP That's kind of the way I thought it would be. But, unfortunately, we're looking behind us.

CC That's affirm. And, 3 minutes to impact.

CMP Okay, 3 minutes to impact.

08 01 16 24 CC MARK, 1 minute to impact.

Tape 129/2

CMP Okay, 1 minute. Yes, we're right over Vitruvius A, now.

CC 10 seconds.

CC Okay, we had LOS LM. And we don't believe we saw it down here, fellows.

CMP What do you mean, you don't believe you saw it?

CC That means that we didn't see it - on the TV.

CMP Oh, on the TV, I see - I see.

CC We are picking up the signal on the seismograph, though, the geophones.

08 01 20 08 CMP Okay. Hey, Houston, I can see a bright spot on the South Massif - on the top of the South Massif.

CC Okay, go ahead again there, guys.

CMP Okay, this is America. I can see a bright spot on the top of the South Massif and - let me see - from the west you got the first hill or the first part of the mountains, then there's the valley, and then - there's a valley that kind of goes into a Y - it's a Y-looking valley. I guess, if you come from the east, it's the second ridge from the east, and right on top of that ridge is a bright spot. I don't know how big - I don't know how big a crater it should make.

CC Okay, we copy that and we'll take a look at the maps and see what we can find.

08 01 21 25 CMP And, I'll put a spot on my map, if I can do it here. Just a second.

CC Okay, thank you.

CC And, Ron, this is Houston. You ready to copy an update in the Flight Plan, please, for me.

08 01 22 17 CMP Okay, do you need it right now or should I mark this on the map first?

CC No; oh, no. Go ahead and mark the map first.

08 01 29 57 CMP Hey, Houston; America.

CC Go ahead, America. This is Houston.

CMP Okay, Bob, I don't have a map with South Massif on it. You know with the meridian interval on the thing and it looks like the only thing I can use is in the visual observations book here - landing site 204. And, if you draw a line - Do you have that one?

CC Okay, I've landing site 204 in front of me.

CMP Okay. If you draw a line from Shorty to that Reseau mark that's on the top of the South Massif -

CC Copy that.

CMP And then, extend about a little better than one-eighth of an inch toward Shorty from that Reseau mark. Have you - Yes, somewhere right in there. I'll look at it again the next time I come over. But, that's a bright spot on the top of the Massif that I hadn't noticed before in any of the observations going by there.

CC Okay, I've got it marked down. We'll also see if we can find it on some bigger map.

CMP Okay. You know that bright spot might already be there; but I don't think so. I don't remember seeing it.

CC Okay, copy that. Okay, and, Ron, we'd like to press on with our Flight Plan update here for you.

CMP Okay.

08 01 31 59 CC Okay. Number 1, we'd like to go HF 2 to EXTEND for 3 minutes.

CMP When? Now?

CC Roger; now.

Tape 129/4

08 01 32 14 CMP Okay, 5, 4 - okay, countdown - 3, 2, 1 -

08 01 32 25 CMP MARK it! EXTEND, barber pole, still.

CC Ron, stop the antenna, please. My mistake.

CMP What?

CC Okay, Ron, let me read through this one for you. They are anxious to extend that, but they want the DATA SYSTEM, ON, so they can see it first. Why don't you go to 196.20 in the Flight Plan? You're probably sitting there looking at it, anyway. And run through that block that's there. It starts at about 196:19. We told Jack to move it but since we're aborting this lunar sounder pass, let's go to 196:20 and carry out the steps in there with the following exceptions: Do not turn RECORDER or RADAR to OFF. Okay. And, we want LUNAR SOUNDER left in STANDBY.

08 01 33 31 CMP Okay. Let me read those through.

CC Okay, and don't move the HIGH GAIN. The HIGH GAIN has been taken care of already.

CMP Okay, I'll do that. LUNAR SOUNDER is verified in STANDBY. DATA SYSTEM is coming on. HIGH GAIN is already working. SM/AC power. Jack, could you turn ON the SERVICE MODULE AC? I'll get it. Yes. Okay. SERVICE MODULE AC POWER's ON. LUNAR going to STANDBY - -

CC Okay, and, Ron - -

CMP - - and we'll leave the RECORDER, ON, and RADAR, ON.

08 01 34 27 CC And, Ron, while you're putting those last three on, let's start the HF 2 to EXTEND. They'd like to get it before it gets too cold again.

08 01 34 35 CMP Okay, HF 2 is going to EXTEND - 3, 2,

08 01 34 41 CMP MARK it.

CC Okay, we'll time it for 3 minutes for you while you get the IR and so forth.

08 01 34 50 CMP Okay, IR is going ON. SELF TEST is going to HEATERS. UV is ON.

CC Okay, copy that. Okay, Ron. We see the talkback. You can go to OFF.

08 01 35 31 CMP Hey, it did. Okay, it's OFF.

CC Okay, I guess we'll try and probably work that in some other time, now that we've got the antennas out. And, we'd like to go HIGH GAIN ANTENNA to AUTO and 2-1/2-degree deadband now that we're not doing the lunar sounder.

CMP Okay.

CC Okay, Ron, and did you get the HIGH GAIN in the 2-1/2-degree deadband?

CMP Affirmative. Yes, I got that.

CC Okay. We got that and I got a TEI-65 pad, when you get ready for it.

CMP Okay, let me pull out the old book.

CC Okay, and, Ron if you'll give us the computer, we're ready to up-link some loads for you. You'll leave the jet-on monitor and state vector.

08 01 37 53 CMP You can have the computer.

CC Okay, thank you.

CMP Okay, I'm ready to copy the TEI.

CMP Got it all dirty. Houston, America, I'm ready to copy the TEI pad.

CC Okay, America; Houston. I'm ready to read the TEI pad if you're ready. It's an SPS/G&N, which is a surprise, I'm sure. And, it says: 36541; plus 0.60, plus 0.81; 216:45:48.23; plus 2754.5, minus 0146.9, minus 0009.0; 179, 103, 359. The rest of the pad is NA. GDC align stars are Sirius and Rigel. I guess they picked some bright ones for you for a change. We have alignments of 136 - -

Tape 129/6

CMP Hey, they're good ones.

CC - - 160, and 034. Ullage is four jet, 12 seconds, and we're using lift-off REFSMMAT. Over.

08 01 41 06 CMP Okay, TEI - I've forgotten what rev it was.

CC 65.

CMP SPS/G&N, 36541 - 55, okay?

CC 65, 65.

CMP Oh, 65 it is. Okay, now on 47, the weight - 36541; plus 0.60, plus 0.81, 216:45:48.23; plus 2754.5, minus 0146.9, minus 000.0, 179, 103, 359. Sirius and Rigel, 136, 160, 034. Jet, 12 seconds for ullage. And we use lift-off REFSMMAT, which is what we have right now.

CC Okay, Ron, and you dropped out there at 2 momentary seconds. One, the DELTA- V_z was minus a 9.0. Ullage was four jets.

08 01 42 17 CMP Okay, that's right. DELTA- V_z is minus 9.0 and four-jet; ullage, 12 seconds. Lift-off REFSMMAT.

CC Okay, you had a momentary dropout when you read those two figures.

CMP Okay.

CC And, America; Houston. Do you fellows think you have any chance, or would have any chance next time to take a picture of that possible impact point - with the handheld Hasselblad - or something?

CMP Ah, sure can. You bet you. I think the best way to do it is with the 250 lens on the Hasselblad.

CC Okay. It might be something worth getting just in case we don't hit it with the pan camera later on.

CMP Okay.

08 01 44 33 CC Okay, Ronald. The computer is yours and you can turn the LUNAR SOUNDER RADAR switch OFF. Leave the RECORDER switch ON.

CMP Okay. The RECORDER's staying ON and we'll turn the - RADAR, OFF?

CC Roger; RADAR, OFF - RECORDER, ON and the computer is yours.

08 01 45 03 CMP Okay, RADAR's going OFF and the RECORDER is still ON. And - we have ...

CMP Yes, shaved there one time. Haven't shaved today; I'm going to do it later on.

CMP How about getting the recorder going there?

CDR What?

CMP How about turning the recorder on? - Huh? It's right in here.

08 01 47 53 CMP Yes. It's time to eat.

08 01 50 16 CMP I don't care. Okay, WASTE to PURGE LINE HEATERS. They're ON. Then VENT.

CC America, Houston. Ron? Over.

CMP Roger; go ahead.

CC Okay, one, while I'm talking to you how about flipping up and turning H₂ TANK 3 FAN, OFF?

08 01 53 03 CMP Okay, TANK 3 is OFF.

CC Okay, and then, how about you three guys giving us - giving some consideration the next 2 or 3 minutes to the following proposal? One, we totally aborted that lunar sounder pass because: One, we couldn't get the HF antenna out; and, two, because the temperature in the film cassette was too low. Those things are both taken care of now. And they're talking down here about essentially starting over at 197 hours, which will be the top of the next page, and pretending that that's 195 hours and running through that 195-hour page, beginning

Tape 129/8

at 197 hours. The only problem with that, of course, is that it runs into your eat period and destroys that, which essentially means that you're going to get to bed 1 hour later. And I guess what we're saying is, if you're going to get to bed 1 hour later anyway, we might go ahead and ask you to do it, if you're agreeable. If you're clean-up - cleaning-up companions there have progressed far enough that you think you're going to get to bed on time and don't want to do it, then that's another story. So, how about chewing it over there and letting us know?

08 01 54 16 CMP

Okay, let me talk to the guys here for 1 minute, but I think we'll probably do it. Stand by.

CMP

Hey, Houston; America. Let's press on and pretend like I'm eating between when I'm turning the LUNAR SOUNDER, ON, and OFF - Okay? In other words, let's get the lunar sounder pass.

CC

Okay, well, you're saying, well - well, we don't want you to have to do that in the middle of your eat period and destroy ... that, Ron. That's another concern we had here.

CMP

Don't worry about that. I - I can throw those switches on and I think the other guys can mix the food and I can eat it at the same time. No problem.

CC

Okay, we've got that recorded on tape there, Ron. Okay, what we're going to do is essentially - -

CMP

Okay (laughter).

CC

- - start at the 195-hour page and we'll just mechanically add 2 hours to everything on that page and run through it as - on the page. Okay? The change that we originally had in the Flight Plan, which I read - I don't know whether it was to you or to - Jack, which moved the group from 196:20 over to 196:30 - will still move over to 196:30. So, that will stay as is. And, again, that will be, of course, at 198:30, then. Do you understand what I'm saying there? Over.

CMP Yes, I think what you're saying is, we'll just do the Flight Plan like you - like we're starting at 195.

CC Roger - -

CMP - - like we'll be 2 hours later on the mission timer.

CC Roger; you might call it miniclock update.

CMP Okay. Sounds good. Lunar sounder operating time will be 197:31:38 then, right?

CC That's affirmative.

08 01 59 02 CC Okay, Ron, and two comments on that. Let me make a couple of other amendments to that. One, the lunar sounder operate time, instead of being 31:38 will be 32:51. At that 195 - top of the right-hand column on 195 there - be 195:32:51. Over.

CMP And, Houston. These waste water dump and fuel cell purges - that doesn't foul up the lunar sounder, as I recall. I don't think, does it?

CC Oh, we can go ahead and do those in parallel, right.

CMP Okay, good. That's what I thought.

CC And, Ron, one other - Did you catch my one - my 32:51 update, there on that start time?

CMP Did you say cancel it? I'm sorry.

CC No, do you copy. I gave you 195:32:51 as the start time, instead of 31:38. Did you copy that?

CMP Yes, I copied, I'm sorry. Used to working in VOX all the time and I forget to push the button.

CC Okay, and the other thing we'd like to keep you aware of, if you hadn't noticed it, and that is that this thing, of course, Ron, is originally ... to a 196:30 plus, which means that you're going to be running 198:30 plus, which kind of looks like you're going to be eating at least a half an hour into your sleep period, at the very least. Over.

Tape 129/10

CMP Yes, we understand that.

08 02 02 38 CC Okay, Ron. We'd like to have H₂ TANK 2 FAN, OFF,
now please.

08 02 02 49 CMP H₂ TANK 2 is going OFF.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 02 27 XX BEGIN LUNAR REV 56

08 02 51 49 CC Hello, America. This is Houston. One minute to
LUNAR SOUNDER, OPERATE -

08 02 51 53 CC MARK.

 CDR Okay, 1 minute to LUNAR SOUNDER, OPERATE.

08 02 52 00 CDR MARK. This is your friendly commander, clean and
happier, back up.

 CC Roger, Geno. We're glad to hear you're clean
again.

 CDR Well, I'm not really clean but it's a major step
in the right direction.

08 02 52 25 CC 30 seconds.

 CDR Okay, 30 seconds.

 CC Okay, and -

08 02 52 48 CC MARK on LUNAR SOUNDER, OPERATE, now.

 CDR Okay, ...

 CC And, America, a question here. Did you get an
ISS alarm on the back side just a few minutes ago?

 CDR No, sir.

 CC Okay. We lucked out. We'd - Since we'd had the
jet monitor program operating and it hadn't been
killed, which had originally been planned to come
after the lunar sounder, there was a possibility
that we'd get an alarm but looks like we don't have
it. Good enough.

 CMP What was going to cause that to come on?

 CC The possibility, Ron, was when you were reloading
NOUN 79, getting a smaller dead band - it depends

Tape 130/2

upon where the vehicle was at that time within the old dead band, EMP 523 might have suddenly found you outside the dead band and been unhappy.

CMP Okay, I'm with you. Thank you.

CC Okay, looks like we lucked out though.

CDR Say, Bob, do you know - -

CC Go.

CDR Do you know any more about the demise of Challenger?

CC We know that it was within 15 kilometers of where it was supposed to be, Gene. We could not get a visual on it. It was quite obvious that the geophone saw it and all that - there's no question about that, it's just that, as it turned out at the last minute it was pretty hard to pick out where exactly it was going to be in order to have the TV camera there.

CDR But everything appeared to function properly, huh, the ALSEP and you - you're pretty happy with it?

CC Roger. Everything except the TV and, of course, that's just an extra goodie.

08 02 55 46 CC And, America, if you guys are interested in trying to take a couple of 250-millimeter shots of that tonight, we've got a little camera pad here for it we can pass up - if you're interested.

CMP Hey, you bet I'll take it - I want to try it.

CC Okay, let me know when you get a piece of paper there, Ron.

CMP Okay, go ahead.

CC Okay, it's a LM impact TCA and it's time is 197:56:35 and the camera data is CM5, EL, 250, CEX, f/5.6, 1/125, infinity. And magazine Kappa Kappa or Kilo Kilo, and you can use up to 10 frames on it. Over.

CMP Okay. I think I put Kappa Kappa back, I've got Oscar Oscar on there. How about it if I use that, okay?

CC Okay, that's fine, Ron. And, we'd like to get H₂ tanks 2 and 3 FANs back ON.

08 02 57 26 CMP 2 and 3 are ON.

CC Okay.

CDR Hey, Bob. A quick summary on that rendezvous as far as LM performance was concerned. Handling characteristics were outstanding and pretty much the same as they have always been on LMs in the past. The APS burn - burn went nominal; the residuals on that one were actually quite big, about 744, that's feet per second - and we nulled those out and after that the midcourses were max of 1.3, then a max of 1.6 on the second one. But, after the TPI, we were coming up - up the pike right - over - right - all the way in the line-of-sight rates - actually both out of plane as well as in plane were - were zero - basically zero for out of plane and, as predicted, on a nominal curve for in plane. And it really ended up to be pretty much a storybook rendezvous.

CC Okay. You want to give me that TPI again or did you already pass that down to ground? I didn't copy the residuals there?

CDR No, I didn't tell them that. And we didn't get a chance to copy them down because I wanted to get them all down on tape. It surprised me after the APS burn because they were relatively large. They were 7 feet-per-second in X, 4 in Y, and 4 in Z. And that was, I guess, just short of a 4-second burn somewhere around 4 seconds.

CC Okay, copy that.

CDR And one other little thing, we put, I think, two marks, three marks - two or three marks in the AGS - manual marks, after the last midcourse, as we'd been doing in the simulator - three marks, and Jack tells me that the range rate came right up to - right up to the actual radar-range rate - right up to 100 feet or so.

Tape 130/4

CC Okay, copy that.

08 03 02 17 CDR Bob, we're all just eating away here, anything interesting in the world news that's worth commenting on?

CC Okay; stand by. Let me find out. Did you guys get any news this morning?

CDR No, sir; we were busy otherwise.

CMP Yes, I did.

CC Okay, well, stand by and let me get hold of the people and see if we can get some news for you.

CC Okay, Gene, we're working on that, it may take us a while to get it. And - but we ought to have it for you before the end of the pass. From my own experience in talking around here, although none of us hung around much to read that stuff today, we don't think anything much did happen in the world today. There is a report that something happened in outer space, and the moon vehicle, we believe, had a lift-off this afternoon, a rendezvous, we'll try and see if we can track down any further news of that. Over.

CDR Okay, we're pretty much up on that one. Just wondering, you know, Mr. Truman's been pretty sick and so forth, wondered about some of those things, but no big deal, we can - we can wait.

CC Okay, we'll get with you shortly.

08 03 06 07 CC And, America, did you fellows do your hydrogen purge on the back side?

CMP That's affirm. Hydrogen purge, an O₂ purge, and, would you believe we forgot to turn the H₂ purge line HEATER, OFF?

08 03 06 21 CMP OFF, now. Thank you (laughter). ... EECOM there.

CC Old EECOM was watching the currents there. He had you pinned down.

CMP (Laughter) Good.

CC Okay, and, America, I presume you guys are sitting there looking at page 195. Is that affirm? So I won't bother to tell you all - you all these other things that are going on on that page, presuming that you're not looking at page 197.

CMP Yes, we're on page 195, yes.

CC Okay, good enough.

CMP Really it's the hour 195, you know.

08 03 09 10 CC OMNI Bravo, please, America.

08 03 09 22 CMP Okay, you have it.

08 03 18 44 CMP Houston, this is America. That was frame 145 to 150 on magazine Oscar Oscar.

CC Okay. Copy 145 to 150 on Oscar Oscar. And if you guys are starting to sort out film mags for the next day, which is called out about 198 hours, it'll be magazine Kilo Kilo instead of November November in that. So it'll be Kilo, Quebec, and Romec for tomorrow.

CMP Okay; Kilo, Quebec, and Romeo.

08 03 27 33 LMP Houston, 17.

CC Go ahead.

LMP A little historical note. Passing over the Hadley Apennines sites from Apollo 15 we notice that at their landing point, there's the same slightly or distinctly brighter albedo area as there is at Taurus-Littrow site.

CC You mean down on the plains of Taurus-Littrow, like where the LM landed? Or do you mean where you think the LM impact was?

Tape 130/6

LMP That's affirm. It - in spite of the - no, no, no, where the LM landed. In spite of the - As we walked along the surface, and this was true at Hadley also, you stirred up a darker zone, albedo-wise. When you look at it from orbit, the area around where the LM landed - it's a distinct bright spot on the surface of a - of a fairly uniform gray albedo plain. And both sites look just alike.

CC Okay, we copy that.

LMP In that regard, anyway.

CC We copy that.

CC And, America, you might be interested to know that the latest SPAN status report still lists all the LM ECS parameters as normal.

LMP Beautiful. SPAN's up to their old tricks again, I see.

CC I guess it depends upon how you define normal.

LMP Somebody must have spilled coffee on their console.

08 03 30 10 CDR Listen, Bob, the way - the way it was performing, I wouldn't doubt it.

08 03 41 15 CC America, this is Houston. Over.

CMP Go ahead.

CC Okay, okay; I'm keeping track of you guys here on the lunar sounder offtimes. It'll be just slightly less than 198:30, and I'll give you some hacks on that as we get down to it. And we're ready to go to H₂ TANKS 1 and 2 to OFF, and TANK 3 to AUTO.

08 03 42 03 LMP Okay, Bob, that's got it. 1 and 2, OFF, and 3, AUTO.

CC Okay, and you can delete the - When you get to your presleep checklist, you can then delete the cryo stirring.

LMP Okay.

Tape 130/7

CDR And Bob, what time is AOS?

CC Stand by. You want AOS or LOS? LOS, stand by.

CDR Yes, LOS.

CC We have LOS at 198:45:37. About a little over 22 minutes from now.

CDR Thank you, Bob.

08 03 46 56 CC Okay; 2 minutes to LUNAR SOUNDER, STANDBY.

CDR Roger. Two minutes to LUNAR SOUNDER, STANDBY.

08 03 47 43 CC Okay; 1 minute mark at 28:43.

CDR Roger 28:43.

08 03 48 33 CC 10 seconds.

08 03 48 43 CC MARK; STANDBY.

08 03 48 50 CDR It's STANDBY.

08 03 50 33 CMP Okay, Houston; America. All those things in the little box are done.

CC Okay, we copy. You're down as far UV, ON. Now we'd like to have IR COVER, OPEN; and UV COVER, OPEN, also.

CMP Okay. Stand by. Did you want 2-1/2-degree dead band for the night?

CC Roger. I was just going to say we can also go to VERB 22 for the 2-1/2 degree dead band.

08 03 52 20 CC Okay, and, America, another thing down here 196:47 there are the two comm callouts, the DSEA motion and setting the HIGH GAIN to MANUAL before LOS, and we'll want to catch those before you go around the back side. And ... - yes, as you around at LOS, and after that we're then ready for you guys to skip to 198 and the presleep sys - presleep checklist.

Tape 130/8

CMP Okay, we can do that.

CC Okay; and, America, if you have time, I have a few news items to read up to you here.

CMP Go ahead, Bob.

08 03 53 30 CC

Okay. Dateline Washington, the United States today threw its support behind the Christmas Peace package proposed by South Vietnamese President Nguyen Van Thieu, who accused North Vietnam of using high-pressure tactics in an attempt to impose an incomplete peace settlement. American representatives at the Paris peace talks, told the Communists it was futile for them to continue clamoring for the signature of the cease-fire agreement drafted in October by Kissinger and Le Duc Tho. In Kansas City, the condition of former President Harry S. Truman weakened to, quote "very serious" Thursday. His doctor says vital signs are stable, but former President Truman was unable to speak; his lungs were filling with fluids still, and his kidneys have been impaired. In Mexico City, the International Federation of Airline Pilots, meeting in Mexico City this week, has promised a worldwide stoppage of all transportation industries if the governments do not take action to stop hijackings. In New York, the United States won an apparent victory in the United Nations when the General Assembly voted an approval of a cut in U.S. contributions to the world organization. Vote was 81 to 27, and reduces the U.S. budget assessment from 31.5 percent to 25 percent, starting in 1974. Here at home in Houston, the city council voted to locate the new proposed sports arena in the Greenway Plaza. The vote, however, stipulates that the Mayor find a way to finance it without using city tax funds. Council indicated that if the Mayor can't do this, the city will abandon plans for the 10-million-dollar, 18-thousand-seat facility. On the lighter side, in Jersey City, only one of 51 - that is one of 51 women who took physical exams for the police department, passed. Police Director Frederick Stevens said 24 of the women were too short, seven were underweight, and four did not have eyesight that could be corrected. In sports, the Alberta Oilers, that's Alberta and not Houston Oilers,

these are the hockey ones, skated past the Houston Aeros for a 3-to-2 victory here in Houston. And the Minnesota Vikings, in the city of Minneapolis, came to terms on a lease agreement to play their games in a proposed stadium up there in the north, or I guess it's building a stadium to keep it from being too cold, instead of being too muggy like it is down here. And that's the news; as you can see, it's a slow news day and things are still moving very slowly down here.

08 03 56 27 CDR Thank you, Bob.

08 03 57 12 CDR Bob, we realize it's - it's tomorrow down there but this still might be appropriate.

MS (Singing: Happy birthday to you, happy birthday to you, happy birthday, dear Bob, happy birthday to you)

CC Well, all I can say, it might be appropriate, but it's not very musical.

MS (Laughter)

CC Thank you, guys.

CDR Epic, Bob, epic. At least you know it's from the bottom of our - hearts.

CMP (Laughter).

CC And just to let you guys know that I'm not easily swayed and made soft by such shows of sentiment, I want to remind the CDR and the IMP that they're going to start collecting their urine from now on, and you shouldn't have been dumping it since 197:00.

CDR Okay, we're in the process of changing over.

CC Okay, and COVERS are OPEN on the UV and the IR, so we won't be dumping it anyway right now, tonight, right?

CDR That's right.

Tape 130/10

CC And, Jack, you're going to be on the biomed tonight?

LMP Whose side are you on? Of course, I am. Bob, I'm hooking up right now. I sort of rested my - my own personal sensors and I'm putting the mechanical ones on - electrical ones, I guess.

CC Okay, I tell you what. If you wait 6 minutes until after LOS to finish that, you'll leave the Surgeon in suspense until you come around on AOS. That'll help keep him awake.

LMP Okay, I'll see what I can do one way or the other.

LMP Not according to Flight Plan.

CDR Hey, Bob.

CC Go ahead.

CDR Would you say what you said a little while ago a about the waste - not waste dumps, but urine dumps?

08 04 00 42 CC Okay, as per the checklist, it says at 19 - 197 hours, "CDR and LMP collect urine in UTSS until 208 hours," so that's until tomorrow morning. And I was just reminding you that we don't want to be hosing it overboard right now because the UV and IR COVERS are OPEN, and we presumed that, since you'd already done the waste water and the H₂ purge on the back side, that - that sufficient time has passed to open them. And I guess that we sort of presumed that you weren't in the mode of dumping urine overboard.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 04 01 17 CMP Okay, that's fine. I - I was thinking of the bus collection system - that's fine.

08 04 02 19 CC Okay, and, America, once you fellows finish your presleep checklist, you're GO for sleep. You're GO for LOS and we won't be saying anything to you when you come around the front side next time around, in case you've nodded off. Call us if you want to and we'll just let it be as if we're finished with you for the night.

CDR Okay, thank you, Robert. We're hastening to finish the checklist and get to sleep, and unless we have some problems or questions, we won't talk to you until tomorrow.

CC Okay, talk to you tomorrow night.

LMP Hey, here, Bob, - Bob, on the biomed LMP, if it doesn't show up to my normal standards, it's because maybe the sensors have come off. I'm - I've put a little of the bacterial salve on them and they probably won't stick too well. But I'll do the best I can.

CC Okay.

08 04 03 26 LMP Preventive medicine, Bob, not curative.

CC Okay, that'll make the Surgeon happy.

CDR And before we fade out of sight, you might look at the biomed.

LMP Whoops, I got one left.

08 04 05 01 CC We're in LOW BIT RATE. We can't see you right now.

08 04 25 XX BEGIN LUNAR REV 57

END OF TAPE

Tapes 132-136/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 06 24 XX	BEGIN LUNAR REV 58
08 08 23 XX	BEGIN LUNAR REV 59
08 10 22 XX	BEGIN LUNAR REV 60

REST PERIOD - NO COMMUNICATIONS

Tape 137/2

CC No, we've got Neil back there and a whole new team since you went to bed.

08 13 05 01 LMP Oh, that's right. Very good.

LMP Who selected that song, Joe Allen?

CC No, that's - that's Neil's special. You've got Neil Hutchinson to blame on that one.

CC I must say he had a lot of accomplices on that, too, so -

LMP Yes, Bob, I think maybe that's one of the best songs that's come out in the last 10 years, if you ask me.

08 13 06 45 CC Roger.

LMP But then, you didn't ask.

CMP Hey, Houston; America.

CC Go ahead.

CMP I think mag QQ is all gone. Shall I use the RR?

CC Hey, Ron, at 208 - -

CMP ... or something - -

CC - - 05 there, we're going to delete that solar-corona pass anyway. I've got a Flight Plan update I'll give you at 208 there, and we're going to have to delete that solar-corona pass. So, forget it.

CMP Okay.

08 13 09 15 CC In case you guys are wondering, it looks like we finally might see the Sun down here in Houston. It is clearing off, except it's extremely cold. The temperature must be hovering right in the low 40's, or maybe even the high 30's, or even lower.

LMP Well, my goodness. I should have been watching the weather for you, Bob. We'll come and warm things up for you before long.

Tape 137/3

.08 13 09 45 CC

Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 13 21 25 CC America, Houston. We've got the Flight Plan update and a pan camera photo pad for the Flight Plan.

CMP Okay, Houston. Stand by 1, here I've got my hands full of - *** PRD thing.

CC Okay, the only thing we want to tell you is don't do the solar corona, and we've already told you that. We'll get back with you later on that. If you want, I'll read you the morning news.

08 13 22 16 CMP Hey, okay. Go ahead.

CC Okay, there's been a temporary halt to the peace talks in Paris, and, as we mentioned before, Henry Kissinger is in Washington and has conferred with President Nixon. A cease-fire proposal suggested by South Vietnamese government officials has been rejected by the U.S. White House News Secretary Ron Zeigler has declined to characterize the present Paris peace efforts, but say - did say there are still some obstacles to overcome. And we had another hijack attempt. A youthful Canadian, who hijacked an airliner in northern Canada was talked out of his escapade by his father. The youth had held 62 persons aboard the plane for a short while, then retained only four hostages for 10 hours. It appears that the United Mine Workers may have a new president. Maverick candidate Arnold Miller retained a strong lead over Tony Boyle in the government-supervised election. The transatlantic airfare price war that seems imminent, promises to be a real boon to the vacationer. It is now estimated that airfare may be as low as \$136.00 for the transatlantic fare in some special categories. Juan Peron has ended his month-long visit to Argentina. An attempt was made to nominate him for the presidential election while he was there, but the move was declared illegal and he returned to Paraguay. A few other news highlights - the village of Rhonda, Switzerland, is threatened by a half-million-ton portion of a glacier moving down a mountain. Willie Brandt has been sworn in as Chancellor of West Germany for his second term.

Tape 138/2

Former President Truman remains seriously ill. Chicago Mayor Daley has made an effort to halt further commercial development along Chicago's Lake Michigan waterfront. Comedian Bob Hope is set again for his annual tour of U.S. overseas military bases. His first Christmas show in the Far East is December 21.

Now, in the local news, here, there's a good chance that Texans may soon legally put a bet down on a horse race. A state senate's studying - study committee has heard some heavy opposition to parimutuel betting in Austin, but the proposal appears to have a good chance of approval. And if you follow the Tomball police force, who quit in masses a couple of days ago - Tomball has rehired three of the officers who quit, and two more of the police who walked out are seeking to be rehired. And just a note here - there was a little beautification of Houston. Some of the thousands of billboards that line main highways around Houston will be coming down after the first of the year. All signs must be licensed by the state and a fee paid after that time. Some of the sports news: Johnny Bench, the Cincinnati Reds catcher who had a benign spot removed from a lung Monday, is recovering nicely at Christ Hospital in Cincinnati. The star baseball player will remain hospitalized for about 5 more days. Brad Van Pelt of the Michigan State University defensive star won the Maxwell Club trophy as the year's top college football player. The Washington Redskin's Larry Brown took top honors as the top professional player of the year. Southern Methodist has apparently chosen a new football coach to succeed Hayden Fry, but University officials say an announcement won't come until next week. Mark Spitz and Shane Gould, both top Olympic swimmers, were honored as top athletes in the world by European sports writers - for this past year, of course. There was no action last night in college basketball. The University of Houston is getting ready to play California tomorrow night. Joe Paterno, Penn State coach, has won the Walter Camp Football Foundation award as coach of the year. And it appears that Mike Tillamen of the Oilers may play out his option this year and this - Coach Bill Peterson says that it upsets his draft

plans this coming year. And I've already updated the weather to you. I just might add a little parenthetical thought that it's really not that much in the news and all the news around here anyway has been Apollo 17 and your lift-off. We picked up the lift-off last night from the Moon and carried it live TV for about 2-1/2 minutes as you went out of sight like a star, and then, of course, live TV picked up your docking and - rendezvous and docking. A very spectacular picture, I might add, of the lunar surface as the Challenger came up to meet America. Over.

08 13 26 58 CDR

Very good news summary, Bob. Thank you. I didn't realize Tomball had five policemen (laughter).

CC

America, Houston.

CC

America, this is Houston.

CDR

Go ahead.

CC

Hey, you can probably tell by the comm that this is Jerry. This is - the Gold Team has been handed over to the able hands of Neil. Before things go too far, I'll be around watching for the rest of the flight, of course, but before things got too far I wanted to pass my comments on to you guys that - boy, this has really been super. You guys have - between the performance of you guys and the performance of the hardware, it's been a piece of cake down here. I hope it's staying that same way up there, and we're really looking forward to finishing this thing up and getting you on back home. And my hat's off to you.

CDR

Okay, Jerry, I appreciate those words, but any performance of ours, and certainly that of the hardware, has to go all to the performance of you guys down there, because, you know, you are the guys that make it happen and we do appreciate it. And I guess this is sort of a semiretirement for you then, is that right?

CC

Well, I don't know whether to call it semiretirement. It's - it's a relaxed feeling, I'll tell you that. But I'm anxious to do it again and hope I get a chance to do something more like this.

Tape 138/4

CDR You bet you. We're all going to keep doing it; and, listen, you couldn't have left it in a more able set of hands than Neil's down there. We'll have to celebrate your 3-day or 4-day rest period when we get back.

CC Roger. Talk to you later.

CDR I didn't - I didn't realize we wore you out.

08 13 29 49 CC I will throw one thing right quick, you know the activation descent day, that was the third one I had handled, and including all the simulations and all the three of the actual flights, I think it's the first time we can say that we really did it all right. For one reason or another, it really turned out to be a fairly easy day and I was really surprised.

CDR Jerry, that spacecraft that we were working with was undoubtedly the best vehicle along with America that I've ever flown.

CC Okay, well I'll be talking to you later.

CDR Still ... babe.

LMP Jerry, this is Jack. Thanks a lot, boy.

CC You bet.

08 13 33 34 LMP Okay, Houston; America. Would you like us to start charging battery Bravo?

CC That's affirmed if you - if you're there, we'd like it.

LMP I'm here.

CDR Okay, Houston, we're going to do the pan camera; stand by.

LMP Okay, say again, Geno.

08 13 34 27 CDR Mode is STANDBY and Houston -

08 13 34 32 CDR MARK. POWER -

CC Roger.

CDR And if you're curious V/H is HIGH ALTITUDE.

CC Roger; copy that.

CMP Okay, Houston; America here. I've got some medical logs and food.

CC Okay. Stand by 1.

CC Okay, go ahead. We're listening.

08 13 35 27 CMP Okay, I'll start out with LMP medical log. PRD is packed down there with the suit; so, we'll have to get it later. He had 6 hours of good sleep. Took a Seconal. Fluids - he had lots of fluids - but they weren't logged. Okay, LMP's - okay day 10, I guess, meal Charlie. Had turkey and gravy, and I need to start writing - No. I had a citrus beverage, coffee, fruit cake, meatballs, lemon pudding and lemonade. Hey, Houston, instead of a turkey and gravy that was really a beef and gravy.

CC Okay.

CMP Okay, we'll go over the CMP. Meal A had bacon squared, scrambled eggs, orange juice, and coffee, vitamins; Meal B - need some light (laughter) meal B is chicken and rice soup, meatballs with sauce, butterscotch pudding, orange drink, carmel candy, apricot cereal cubes, brownies - I guess that was it. Meal Charlie, potato soup, beef and gravy, the ambrosia peaches there - about half of it - four brownies, and an orange drink. Okay, on the medical log: PRD is 15047 and I had about 6-1/2 hours of sleep in, oh, catnaps I guess - some of them were a couple hours long. And had two sniffs of nose drops on each side prior to going to sleep and five cans of fluid. Okay, for the Commander's menu - how did we get to day 10 - it was only day 9 yesterday wasn't it?

CC Ron, excuse us. Would you have somebody turn the PAN CAMERA POWER to OFF, please?

08 13 39 42 CDR MARK it. It's off.

Tape 138/6

CC Roger; we'd like the IR COVER, CLOSED, and the UV COVER, CLOSED, at this time.

CDR Okay. I'll improve, Ron.

CMP Well, it takes a little training.

CDR Takes a little training once you get back from the lunar surface.

CMP Okay, Houston, UV COVER is CLOSED - and gray. IR COVER is CLOSED and gray.

CMP Okay. Ready for the commander's menu, day 9, meal Charlie?

CMP Houston, America. Are you all set to copy?

CC Yes. We're ready to copy, Ron.

CMP Hello, Houston. How do you read America?

CC Read you loud and clear. We're ready to copy.

CMP Okay, here we go. For the commander's day 9 meal Charlie, meatballs, butterscotch pudding, beef and gravy, orange-pineapple juice, citrus juice, chicken stew, apricots, and gingerbread. Okay, his medical log. He had 7 hours of very good sleep, no medication, and drank lots of fluids but nothing was logged on that part of it, and his PRD is also at his suit - down at the bottom of the suit bag so we ought to get it out here, shortly.

CC Roger; copy.

08 13 42 33 LMP Bob, in lieu of the solar corona photography, I watched - Gene and I both watched it set and there are two bands which I still can see now - a zodiacal light, I guess, going out symmetrically on either side of the plane in the ecliptic and they make an angle between themselves of about, let's say, 70 to 80 degrees. I can still - knowing they're there - I can still pick up the bands, streamers, I guess would be a better word. And last night when I watched one set, there was a strong linear

streamer going out - oh, maybe 3 or 4 or 5 diameters - I'll have to get my directions straight. Well, I'll figure out which side of the ecliptic it was. That was not nearly so strong when I looked this time - now partly - that may be dark adaptation, I don't know, but I'll try to keep track of that one. But these two streamers today are about an equal strength and they're still visible as zodiacal light.

CC Okay, Jack, we'd - quick break, we'd like the HIGH GAIN to AUTO and we'd like to get on with this Flight Plan update, please.

08 13 44 12 LMP Okay, you've got AUTO.

CC Okay, and this is a real-time Flight Plan change. This real time right here, and right now if you'll go MAPPING CAMERA COVER, OPEN, and MAPPING CAMERA, EXTEND, and give us a mark, we'll time the extend time on it, please.

CDR Okay, Bob, the MAPPING CAMERA COVER - Ready?

CC Jack, will you go back to REACQ on the HIGH GAIN?

LMP Okay, we're in REACQ.

CDR ...

LMP No, Gene, wait a minute.

CDR Oh, okay.

CDR No - no - okay, Bob. MAPPING CAMERA is going OPEN.

08 13 45 14 CDR MARK. And it's gray. And you want to extend the mapping camera, huh?

CC AUTO on the HIGH GAIN, first of all.

LMP Okay, that's what they said - they wanted. Okay, going to AUTO again.

CC Okay - -

Tape 138/8

CDR Houston, America. You say you're going to extend the mapping camera, now?

CC That's affirmative, we're extending it early because we want to time it, and extend it now, please, and give us a mark when you start it.

CDR Okay.

08 13 46 58 CDR MARK it.

CC Okay, and might as well finish up the Flight Plan updates if you don't mind. The next one is at 209:01.

LMP Okay, go ahead; 209:01.

CC You're going to delete the "MAPPING CAMERA/LASER ALTIMETER COVER, OPEN," and "MAPPING CAMERA EXTEND," at that position, because you've just done it. Just scratch them out.

LMP Okay, Bob. I got that.

CC Okay, and at 209:03, add - after "PAN CAMERA POWER" - add "V/H OVERRIDE, HIGH ALTITUDE."

LMP Okay, I got that: V/H high alt at 209:03.

CC That's affirmative, and - -

CMP Hey, Houston; America.

CC Go ahead, Ron.

CMP Okay, let me interrupt here a minute, Bob. Can we go ahead and dump with the mapping camera extended?

CC That's affirmative, Ron.

CMP Okay. Mighty fine. Thank you.

CC Okay, we'll just show a full extend at 209:40, Jack, in the Flight Plan where it says, "Lift-off time update is not required." At 209:40, we'll not do a lift-off time update.

LMP 209:40. You're not going to do a lift-off time update, huh?

CC That's affirmative. And I've got a pan camera pad while you're on that page. The pan camera pad which is opposite 209:15 - 209:15.

08 13 48 21 LMP 209:15, pan camera photo pad. Go ahead.

CC Okay, T-start, 209:14:44; T-stop, 209:27:36, and that covers all of it. We can settle back to the Flight Plan, now.

LMP Okay, we - I will do that.

CC Okay, sir, and if you'll give us ACCEPT, we've got a state vector at this time for you.

08 13 49 07 LMP Okay, you have it.

CC Okay, and, Ron, you may be interested, we had a nominal extend on the mapper.

CMP (Laughter) Hey, great. I guess once - once the door stays out of the way, it'll come out all right, huh?

08 13 49 52 CC Roger.

CC America, Houston.

CMP Go ahead.

CC Okay, Ron. Just for - first of all - the computer is yours, you can go back to BLOCK. Just for your information, at the beginning of the next rev, we're going to have a Flight Plan update. Or actually, we'll have a pan camera pad at the beginning of the rev and then into the rev after the orbital science visuals, we'll have a Flight Plan update. What we're going to be doing is - we're going to be doing an extra ultraviolet-scan program and we're going to do some antenna calibration on the HF - lunar sounder antenna so we get quite a lengthy Flight Plan update and, after that, it'll just be flying the Flight Plan. The thing with the lunar sounder is that we're getting a lot

Tape 138/10

of noise from Earth that we don't see on the back side of the Moon in the HF and we'd like to calibrate this out.

LMP Okay, you want to give us those updates now or are you going to - -

CC Negative; we'll wait until next rev, they're not that extensive - we just have a number of them though. Just want you to be aware that they'll be coming up. They will not interrupt your orbital-science visual targets there at Mare Smythii or at the landing-site visual.

08 13 52 23 LMP Okay.

08 13 57 42 CC America, Houston. You're about 2 minutes from LOS here. We've got two items - the America is looking great and as you go around the horn there's no problems open on it. If you do - We would like the LMP - Jack, if you'd push on your EKG sensors a little bit - we're - the data isn't too good - the EKG sensors. And on your H₂ tank configuration, Ron, we'd like you to take H₂ TANK 3 FANS to OFF and H₂ TANK 2 FANS to ON.

CMP Okay. TANK 3 is OFF. Number 2 is ON.

CC Roger.

LMP Okay, Bob. First - first break I have I'll change - have to change those sensors. I - I needed to put that salve on and I guess - that's probably the same problem as on the way out.

CC Roger. Don't change them, Jack. The CMP is due to come on before too long so just press on them and see if we can improve the data a little bit but don't change them out. And you're looking great, and we'll pick you up again at 209:23.

LMP Maybe that ratty data is me.

Tape 138/11

08 13 59 02 CC No, no, it's not that way.

08 14 19 XX BEGIN LUNAR REV 62

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 14 46 49 CMP Okay, we've got you OMNI D. Somehow we got off attitude here -

CC Okay, Ron, understand you're on OMNI D. You're coming up on 30 seconds away from PAN CAMERA T-stop time, and I have another pan camera pad I'd like to give you before we get into the orb science visuals.

CMP Okay. Geno will get the pad. ... 27 36 - 27 36, Jack.

CDR Go ahead on the pad.

CC Okay, the pan camera photo pad is at 209:30 - 209:45 are you read for that one?

CDR Standby - PAN CAMERA to STANDBY. Okay, pan camera is STANDBY.

CC Roger, we got it.

CC Okay, the PAN CAMERA photo pad T-start time: 209:49:04, T-stop time: 209:51:01. Over.

CDR Okay I've got T-start of 49:04 and T-stop 51:01.

CC Roger, and we'll hold off on the other pads until after your visuals, here.

CDR I don't have much to do anyway, Bob. Why don't you go ahead.

CC Rog, if you want, we're standing by to copy the visuals.

CDR Okay. That's right ... Okay, we're coming across Mare Smythii. One of the - first things I'm concentrating on is the - slope of the - we're out of comm, it looks like. Got some high gain angles?

08 14 49 17 CC Roger, trying to get one.

CMP Okay.

CDR Okay. Okay.

Tape 139/2

CC Ron, if you'll do a standard REACQ for the HIGH GAIN pitch minus 10, yaw 25, we'd appreciate it.

CC Sounds great.

CMP How do you read, Bob.

CC Loud and clear.

CMP Okay, Houston, how do you hear? Okay.

CC We'd like REACQ on the HIGH GAIN until we call AUTO, please.

CMP Reacq in there. Okay.

CC Ron, we're standing by.

CMP Okay, Houston on the - the craters is to the north of the Wright Brothers. The slope of the walls is steep - probably 45 degrees on the inside - it's a gradual slope on the outside slipping away from the crater. There is no apparent albedo differences in the ejecta or patterned annulus around the crater itself and we're looking specifically at the one to the northwest of the Wright Brothers, now. There is a definite mare flow that is undated [sic], and it's a different color and, you know, that you have a light albedo to it now, it's kind of a grayish tan. It's a light grayish tan material that has flowed - and I can't tell - it almost looks like it's flowed down to the crater. There is an impact crater right in the breach of the crater - which has nothing to do with the flow itself. The material in the - I'm almost out of sight of it already. I was going to say the material in the inner crater in these boulder ring structures down there - the material all the way in the center of it is comparable to the hummocky, bumpy looking type stuff that is not really the mare - not the smooth mare of Smythii - but the other part of the mare of Smythii.

CC Are there any differences in the craters, Ron?

CMP Yes, some of the craters, though, you can't see the boulder-ring structures on it. And some of them that are definitely impact craters, you know, that

have the ejecta rings around them. I've got to study them a little bit more. This is really the first chance I've had to look at Smythii, on this pass, but I want to take a look at him a little bit more. Some of the boulder-ring basins there - the walls are not delta shaped at all. The one to the north and let's see, as you look to the Wright Brothers there's one directly north, and then the next one, and then the next one. The one directly north we'll say is 12 o'clock; the other one is 1 o'clock; and then a 2 o'clock crater. The 1-o'clock crater looks to me there is a high lava mark around the outer basin, the outer ring of the crater, itself. The one at 12 o'clock is the one I was talking about, has the breach on it with the later impact - the small impact crater on it. And without the binocs I couldn't tell flow direction, whether they were flowing into the boulder-ring basin from that mare patch on the outside or vice versa, so I'm going to try to check that out the next time around.

CC Okay, Ron, we're standing by for any comments along your ground track here and we're following you. We would like to - when you get up on the landing site, we'd like you to concentrate on Stoney and F Cra - F Crater for those textural differences we noticed the other day.

08 14 54 57 CMP Okay. Shorty. I think - right, I called the Stoney the other day too I think but -

CC Yes, Shorty, I'm sorry. - -

CMP The one out on the landslide.

CC - - And we would like you to mark - Right. Will you mark - like you to mark the breach that you see on the photo, please. Or on the map.

CMP Okay. That's - that's the breach on the - in Mare Smythii.

CC That's affirm, Ron.

CC And Ron, if you'll ask Gene or Jack or somebody to get your PAN CAMERA to MONO now, please.

Tape 139/4

CMP Okay, PAN CAMERA's going to MONO.

CMP Okay, go -

SC ...

CMP Yes. I don't need any support, just a place to stick them. I got the binoc's.

CC And Ron, we're still standing by for any calls you might want to make en route to the landing site, there.

08 14 57 22 CMP Okay.

CMP Well, again you can speak of test - or color differences on the thing. And the Sun angle now looking west - you get the same streaked - well, the verticle streaks that I talked about before that you see on the backside at the high Sun angle - higher Sun angles again. And that seems to show up more and more, I think, at the higher Sun angles. And these are the - what I call - radial - radial streaks down in the fresh craters that essentially start at the top of the crater rim and go down inside of them. If you take a look at these streaks, I don't - I don't see how they could be due strictly to the Sun angle on them, I think, because they're all the way around the crater.

08 14 58 39 CC Roger, did you have a particular crater in mind along the - -

CMP Yes. On the - Well, I'm trying to find the name of it right now. It doesn't make any difference which one it is. It's in all of the - all the craters, all of the valleys, and everything. It looks like the Sculptured Hills around the landing site.

CC Roger. We understand that, Ron.

CC Coming up on Apollonius. That area now is that correct?

CMP Yes.

CC Is there any significance or difference between the contact of Crisium to the Highlands or at Picard in that - or at the area where you're flying over in the Mare Tran - Fertility and, the Highlands right there in between. Is there any difference between these two contact points?

08 15 00 17 CMP No, the Highlands look essentially the same as you - as you pass from Crisium on across to Fertility, and, again, they look so much like the Sculptured Hills, it's ridiculous, you know. It's all the high Sun - high Sun angle again. You got the streaks and the highs and there - there are masses of Highlands, though, on the border of Crisium here, though that - although they look like the Sculptured Hills, the sculpturing seems to be radially upslope and then downslope from the center of Crisium and just in small local areas of the Highlands.

CC Roger, Roger. Do you see any radial Fra Mauro - like lineaments?

CMP In that way, I think you can see ... the Sculptured Hills.

CC - - Fra Mauro ...?

CMP No, Bob. What I'm referring to is on the Highlands bordering Crisium, but in about all of them you do see a definite radial pattern upslope and downslope. From the center of Crisium, but none of the lineaments like you're talking about like at Fra Mauro.

CC Roger, copy.

CMP What kind of film we got? Oh, I got the wrong film in the mag. Right - Let's see, there's Yerkes, and then on the side of the slope, come Yerkes and then there's about a 50-kilometer crater, then there's a subdued crater, and right on the western rim of Crisium - in the western edge of that subdued crater, it's almost a 70-degree slope down there, and it's a square straight slope on the thing. There doesn't seem to be any ejecta piled up in the bottom of it at all, but within the slope - and it must be 50 - about - yes, 50 kilometers long, and

Tape 139/6

there's a bright impact crater on the top of the hill, top of the rim, right below that bright crater, you have the tannish brown streak that goes through the whole slide. The rest of the slope itself is the bright, light - real light, light tan, I call it. I'll find the name of that crater on the map in a minute, but - -

CDR I think the circumference of that crater right there ceases to be round - -

CMP Yes.

CDR - - It just is squared off with a linear break about oh - at least 20 percent of the circumference of the entire crater.

CC Now, are you talking about a crater on the Mare of Crisium or are you talking about up near Proculus P in that area ... Hills?

CMP Yes, it's right - no it's right on the mare. Okay. We got it. I think we got ... - -

CMP A subdued crater right on the Mare of Crisium just below Yerkes. Jack, where's the -

LMP ...

CMP Oh, the film? ...

CMP Window 3 is going to - The landing site is going to be out of window 3. Let's see, about $f - f/8$ and $1/250$.

CC Very shortly you should be coming up on the mare prior to the landing site across Tranquillitatis and then to the landing site. Is that affirm?

CMP Oh, yes, that's affirm, we should, I got Proculus at the window number 3 now.

08 15 04 54 CMP Yes. Yes, the landing site really shows up - even from this distance right now. We're right over Proculus and looking off across down through the hills there, you have that definite dark - and now the albedo or the colored texture of the thing to me is turning more of a gray than a tan-gray.

In the early parts of it, I thought it was a dark grayish tan, I guess, or something like that. Now it looks to me like it's more tan - I mean more gray, I'm sorry, more gray. It has essentially the same - -

CC I think if you use the binoculars on the landing site - -

CMP It has essentially the same - Ah, not yet.

CDR Yes, this is Gene. I've got it on and the streaked albedo changed differences very definitely. One is the dark mantle on the floor. One is the South and North Massifs and the other is the Sculptured Hills. And the Sculptured Hills are at a light gray albedo between the Massif and the dark mantle. This line is very evident and there's a definite break in slope that you can see between the South Massif the, I won't call it the slide, but the white mantle is out on the valley floor. And from here, Shorty stands out like a sore thumb.

CC Okay, we're interested in all three of you on that color texture difference up at Shorty and then we'd like to have a comparison of Shorty to F-crater if it is possible.

CMP Okay, that crater is harder than a son of a buck to find. F-crater is right on Family Mountain, and there's one to the north of Family Mountain, a little ways there's a darker crater and then there's also one to the south of it. I can't find one on Family Mountain at all. I couldn't the other day so I'm going to see if I can find it today.

CDR Bob, to me the Sculptured Hills incorporate the albedo, both of the North Massif, or the massif and the mantle area and combine them to give you a generally in-between gray albedo, but the sculpturing is produced by the darker albedo that looks like the mantle, and the lighter albedo that looks like the massif.

08 15 07 49 CC Roger. And for Ron, the F crater is just to the south of Family Mountain. It's the one that you mentioned south of Family Mountain.

Tape 139/8

SC ...

CMP Ohhh, okay. That's the one I saw the other day. It looks about like Shorty.

CC Is there a cone associated with that crater?

CDR From here Bob, they're both very dark -

CC Is there a color associated with that crater?

CMP Have to check that just a second.

CC Okay, and we're about 30 seconds from the T-start time on the pan camera, please.

CMP Can't see that far. Stand by.

CMP There is a definite bright spot up on the side of the hill - It's almost an extension of that slide area from Shorty.

CC Okay, you guys, we're about 10 - -

CMP See it?

08 15 08 52 CC - - 10 seconds from T-start time on the pan camera.

CMP Okay, Jack's getting the T-start. Okay I still get a -

08 15 09 03 CC MARK. T-start time.

CMP It's on.

CC Go ahead, Ron.

CMP Okay. On Shorty, I still have the - that light orangish-tan-type material - it's essentially perpendicular to the line of the slide area there in the northern semicircle of the thing. I see F-crater. Boy, I can't hold these crazy glasses still enough.

CC Okay, let me read you some questions about F-crater, if you will. If you'll direct your attention to F-crater. We'd like to know the shape of the crater profile, the rim crest, and probable or possible

breaching, the smoothness and distribution of rim deposits, and the superposition-relationship with Family Mountain or Family Hill.

CMP Okay. Get all of those. It is a - by golly, there is a raised rim to it. It's light color down inside the crater, though. And I can't hold the glasses close enough to see if it's breached or not.

08 15 10 35 CDR Bob, I can't see it any more but let me add to it what I can remember real quick. The inside is white.

CMP Yes.

CDR The outside is rimmed with a - It's as if the rim itself, was just dark, very dark. There's some white to the south about a crater diameter, sort of a - small distribution radially to the south, and then there is a - sort of a, what I would call, a free-patterned dark-like ray about 2 crater diameters, maybe 3 crater diameters, to the south just slightly to the west of this light area I was talking about, but to the south, another definite one to the west and another definite one to the north, but none to the east.

CC You just past pan camera T-stop time, guys. Jack, PAN CAMERA to STANDBY, please. Go on Gene, sorry to interrupt.

CMP He's got it.

CC Go ahead, go ahead with your description. We're listening.

CMP I'm going to draw a picture, here, while I'm thinking of it.

CC Okay, good show. Okay, guys, that completed the orbital science visual pass. Any other comments you'd want to make about the landing site.

CDR Yes. It's an interesting place.

CC No, not that. From a geological standpoint from orbit.

Tape 139/10

CDR Yes. And I've got - well, my white spot, there, is ... the same spot. There are two white spots I'm talking about, now. The one I'm talking about primarily is the one I saw right after landing, on the thing was a lighter - lighter grayish area that was evidently blown up from the LM landing. And that's still in the same spot. You can still see that all right.

08 15 12 59 CC We'd like PAN CAMERA POWER to OFF, now.

08 15 13 08 LMP It's OFF.

CC Okay, Ron, anytime you're ready now, I've got a - that whole series of Flight Plan updates and I've got a few words of explanation with each one; so, maybe you might want to take these.

CMP Okay. ...

CC Okay, HIGH GAIN to AUTO.

08 15 13 40 CMP HIGH GAIN's in AUTO.

CC I got one more question. How large is the bright zone you were talking about, Ron?

CMP Right between Sherlock and Camelot there are two small craters there and I'll have to get my map out to look for the name of them for sure.

CC Okay.

CMP They should have been behind the LM - right behind the LM. And the bright spot is about the same size as those.

CC Okay. - -

CMP And it makes I would say an equilateral triangle with those two craters.

CC Okay, fine. I would recommend one of you go on to the "configured camera" while we start the Flight Plan update. We'd like to get the Flight Plan update all read prior to that P52 that you've got to do there, and somebody will be taking those terminator photos.

Tape 139/11

CMP Okay, soon as Gene - Gene's drawing in the flight plan, there. That crater - Okay, ready for a Flight Plan update.

CC Okay. Who's going to take the terminator photos. You want me to give you call about 2 minutes before the photo time?

CMP Yes. Jack will.

CC Okay, well, here's the Flight Plan update, then. At 210:30 - 210:30, add the following - -

CMP Okay.

CC - - MAPPING CAMERA, OFF; wait 30 seconds; MAPPING CAMERA, STANDBY; IMAGE MOTION, OFF; LASER ALTIMETER, OFF; select POO, POO; VERB - -

CMP Okay.

CC - - 49 maneuver to UV scan attitude. The angles are as follows: 167, 125, 354. Over.

CMP Okay. MAPPING CAMERA, OFF - this is at 210:30, MAPPING CAMERA, OFF. Wait 30 seconds. MAPPING CAMERA to STANDBY, IMAGE MOTION to OFF, LASER ALTIMETER, OFF. POO. V49 to UV scan attitude. Roll 167, pitch 125, yaw 354.

CC Good call, Ron. The next one is at 210:35 and this is a P20 maneuver that's going to set up a rotation about the X-axis for a UV scan. Ready to copy?

CMP Okay.

CC P20, option 2, UV scan. NOUN 78 - -

CMP Okay.

CC - - NOUN 78 all zeros; 0, 0, and 0. NOUN 79: minus 0.4000, plus 000.50; NOUN 34: 00210, 00042, 019.00. Over.

CMP Okay, P2- at 210:35 will be P10, uh, P20 for UV scan option 2. NOUN 78's are all zeros, NOUN 79 a minus 0.4 of a degree per second. Is that right?

Tape 139/12

CC That's affirm.

CMP Minus 0.4000.

CC Okay.

CMP Okay, then dead band is at 0.5 a half-degree.
NOUN 34 is 210, 42, 19.00.

CC That's affirmative, Ron. Okay, at 210:41.

CMP Okay, 210:41.

CC Add the line, the standard line, verify DSE tape motion, HIGH BIT RATE/RECORD/FORWARD/COMMAND RESET.

08 15 19 02 CMP Okay, at 41, verify tape motion, HIGH BIT RATE RECORD/FORWARD and COMMAND RESET.

CC Roger. At 210:57, we've got another P20, Ron. And this P20 will set up the orb rate - -

CMP Okay.

CC - - minus sight on the horizon. Okay, here's the P20, option 5. NOUN 78, plus 162.01 - let me read that again, plus 162.01 - plus 040.76, plus 184.78; NOUN 79, plus 000.50. And we're going to orb rate around the Moon, so NOUN 70 will have a 50 in it for the Moon.

CMP Okay, at 57, it will be P20, option 5. Orb rate to minus sight on horizon; NOUN 78s are plus 162.01, plus 40.76, and plus 184.78; NOUN 79s are half a degree; and it'll be an orb rate around the Moon 50. Okay?

CC Roger, Ron. Okay. Stand by.

CMP Bob, while I'm standing by there, oh, that's all right. Must be my other map.

CC Okay, Ron. We're ready with some more if you are.

CMP Okay, go.

CC Okay, at 211:02. Add the following at 211:02:
UV cover CLOSED, and, in parentheses, put
211:02:09. Configure DSE - -

CMP Okay, we're going to close - Oh - That's all right,
go ahead.

CC Configure DSE STOP/COMMAND RESET. Select P00.
Manual roll left to a roll angle 039 by 211:05.
Over.

CMP Okay. UV cover CLOSED at 211:02:09. Configure
the DSE STOP/COMMAND RESET. Whip her into P00 and
manually roll left to 039 by 211 plus 05.

CC Roger. And just the prediction from the simulator,
you might want to use ACCEL command for a rate of
about 1 degree per second to accomplish that. And
that - The purpose of that is to get the Sun out of
the mapping camera.

CMP Okay. Can do, ACCEL command to 1 degree per
second.

CC Okay, at 211:08.

CMP Just a second, ...

CC Roger.

CMP Hey, Jack on here it shows the little circles on
the map, which part should be taken for each, rev 2
or whatever it is.

CC We're in rev 62.

CMP Except for some reason, on my map D it doesn't
have - Yes - on map Delta. I must have got the
backup map or something, I didn't have any of the
photo - the camera settings on it. (Laughter)
Terminator photos -

CC Ron, we can break from this now, we're pretty well
ahead, and we can come back to it, if you want to
do the photos.

Tape 139/14

08 15 24 02 CMP Hey, yes. Do you have the - Do you have the options, there, on the La Hire Rille? And Mount La Hire - which - what the photo settings are.

CC Roger, I've got them, and I can read them - I'll read them to you right off the mop [sic] - map.

CMP Okay.

CC Okay, if you're looking right at the map - -

CMP Okay, I see them.

CC - - draw - draw a circle around La Hire Bravo. And that is f/32 - -

CMP Oh, I've got the circle on it.

CC - - 1/500.

CMP Yes. f/32, 1/500. Okay, start with that one, Jack.

CC Got the circle around Mount La Hire? It's f/11.

CMP 250-millimeter lens - f/11, okay.

CC At the next circle up, which crosses - which encompasses the La of La Hire Rilles, you want f/8 at 1/250.

CMP Okay.

CC And the one that crosses - the circle that covers across the terminator there at Diophantus is f/5.6 at 1/125, 1/125. Get the wrong - -

CMP Okay, we got them all, Bob. Thank you.

CC Okay, just a question for some other period. Will we have to update your map for P66 and P74 revs?

CMP Yes. I don't have anything on this map.

CC Okay, we'll schedule that in prior to those revs, Ron.

CMP Yes. Okay.

CMP Okay, we're coming up on Timocharis, now. Start at Lambert and get the - right along the La Hire Rille, see - Yes. Take six - six - six shots you know, kind of each area at that - You know, north and south. Yes, you know point them every which way, or whatever's interesting on the thing. Okay.

CMP Okay. Mount La Hire, you can get in there at f/11 at 1/500.

CC Hey, Ron. Just - Just a point. -

SC There's Euler coming up there. Okay, go ahead, Bob.

CC Do you have two copies of the maps on board? And if so, did the - would the other copy of "D" have the updates on it? Or have the settings?

08 15 27 47 CMP Have 2 copies? I didn't know we had two copies. Okay, and then next to Euler, we've got f/8 at 1/250 - north of Euler. There's - well we're just - Okay, we're just about at the - on the terminator line. Yes. No, f/8 at - at 1/250. Okay. Yes, north and south along the terminator. You're getting close to it. Then, change to - right on the terminator - change to f/5.6 at 1/125. I was wondering when you guys were going to say that. (Laughter) Okay.

CMP (Laughter) Yes, that'll be a good one. I'll tell you, it goes a lot easier when you're by yourself.

CMP Okay, yes, we're on mag 55. I mean frame 55 and mag Romeo Romeo.

CMP Yes, we didn't get some of the ones up around La Hire. We'll get those next time around.

CC How's the pictures going, Ron?

CMP Okay, we got - The pictures are over. And that's Lunar Orbit Chart Delta. It doesn't have anything on it, you know - -

CC Okay, we'll - -

Tape 139/16

CMP - - It's the circles on it, but it doesn't have any of the - -

CC We'll - We'll schedule it up - all the fli - all the updates on that. After you go LOS we'll figure out some convenient time to read them up to you on there, Ron. I've got a - I've got the Flight Plan - -

CMP Okay, and we're ready to continue the Flight Plan.

CC Okay. 211:08, 211:08.

CMP Okay. We're all set.

CC Ron, just one comment before we start the Flight Plan. You've got a 52 coming up and we want to make sure that gets done prior to the VERB 49 maneuver at 210:30. And there is no slack on that VERB 49 maneuver at 210:30. So you'll have to get on to the 52 at about 20, but we should have enough time to get the rest of these updates up.

CMP Okay.

CC Okay, Ron, at 211:08 delete the lines: Mapping camera - OFF, wait 30 seconds, mapping camera - STANDBY, image motion - OFF, and laser altimeter - OFF. Delete those lines.

CMP Okay, they're deleted.

CC Okay, at 211:11, change the RECEIVE ONLY ATTITUDE to the following: roll, 039, pitch 159, yaw 300.

CMP Okay at 211:11, VERB 49 will be to 039, 159, and 300.

08 15 31 52 CC Okay. At 211:26 we're going to do a P20 maneuver. It's going to be a rolling P20 which will roll about the OMNI Bravo line-of-sight to the Earth. We'll need high bit rate during that time. That's why we need the - line of Bravo. And we're doing the Earth study of - with the - with the lunar sounder to determine the polarization of the noise from the Earth so we can subtract it out of our data. And during these maneuvers, you're going

to see a middle gimbal angle of plus or minus 65 degrees. We saw that on the - on the simulator, but a word of caution on that. You'll see a middle gimbal angle of plus or minus 65 degrees.

CC The P20 maneuver is as follows: at 211:26, P20 option - -

CMP Okay.

CC - - P20 option 2, HF scan, NOUN 78, plus 270.00, minus 039.30; NOUN 79, minus 0.3000, plus 000.50; NOUN 34 is all zeros.

CMP Hold it there, Bob.

CC Okay, Roger.

CMP Let me get - I got your NOUN, - I got fouled up in the NOUN 78s. Option, I'm going to need two of those, so it's NOUN 78 is plus 270.00 and a minus 039.30. Okay, your NOUN 79's now are - are say again.

CC Minus 0.3000. And now for other NOUN 39 - -

CMP Okay, 0.3 of a degree per second.

CC Rog, and 0.5, 0.5 - half a degree dead band.

CMP Okay.

CC And, NOUN 34s are all zeros.

CMP Okay, so you're going to PRO at 211:26 then, right.

CC That's affirmative.

CMP Okay.

CC Okay, Ron, this next one - actually we're calling it 212:20, but the simulator came out at 212:18:40, just for information. And it's the following: Stop scan at roll 039.

CMP Okay. Stop scan at roll 039.

Tape 139/18

CC Rog. VERB 49 maneuver to lunar sounder RECEIVE ONLY attitude. Roll 142, pitch 286, yaw zero.

CMP Okay. VERB 49, lunar sounder RECEIVE ONLY, roll 142, pitch 286, yaw zero.

CC Okay, and then the last one is 213:03. Configure the DSE high bit rate RECORD/FORWARD/COMMAND RESET.

CMP Okay. At 213 - was that 03?

CC 03, that's affirm.

CMP Configure DSE high bit rate RECORD/FORWARD/COMMAND. Okay.

CC Okay -

CMP For the high bit rate, RECORD/FORWARD/COMMAND RESET.

CC Ron, we'll be - No more Flight Plan updates we promise today and we'll be working - -

CMP (Laughter)

CC - - map Delta and getting that updated to you, but everybody here thinks there's two maps on board and I think you're right. I think there's only one, isn't there.

08 15 36 52 CMP Oh really. Is that so?

CC FAO thinks there are two - -

CMP - - Oh, wait a minute. Jack said they put an extra one - Okay, well, there were two. Jack just said he had one put on for him.

CC Okay.

CMP I must have picked his up or something.

CC Roger.

CMP Mine must be in there then, somewhere. We'll look for it.

CC Okay, if you'll check that and tell us if we need to update you. We'll still plan to update, but if you've got it, fine.

CMP Okay.

CC And it looks like you ought to be getting in your P52 when you get a chance here.

CMP Yes, I'll get her down here. (Humming) Can't tell about these geologists. They put on extra maps in your spacecraft and things like that, you know. Yes, I get - I gave you the last frame number on that Romeo Romeo, but I think I forgot to tell you the one after the - the other one. Oh, by the way, on the other one, Agassiz was completely in the darkness and there was no crater rim at all to shine down on Agassiz so we didn't get him at all.

CC We copy that.

CMP Oh, are we in P20? Go to FREE. We use to be in 20 - P20 - We'll get back into P20. Not much, but that's all right.

CMP They go right along here. I have them right along here and shove them down over there is what they used to do with them. They haven't called. Get into AUTO now, CMC AUTO.

08 15 39 30 CMP Okay, are we at - that's going and everything. Okay, go CMC FREE now. Okay. That's my fault, Gene, I should have gotten it. (Laughter) That's right - number 12 Rigel. Hey, I can find Rigel I bet you. There she comes. There's Orion. Man, oh man, I've done P52 only, and it's within the - within a half of a crosshair width. Come on, Alphard. Ah, ha! There's Alphard - for rev 62. Come on in there, baby. Well, up to my usual tricks (laughter). Ah, 12 and 21 - stars 12 and 21. Star angle difference, 5 balls.

08 15 42 21 CMP Okay, Houston. There's the NOUN 93s.

CC Roger. We copied them down.

Tape 139/20

CMP Okay, and we'll torque them at 22:45.

CC We copy.

CMP Okay.

08 15 42 56 CMP Okay. Give us the AUTO now.

CMP Okay.

CMP Okay, just a second, Gene, let me look at it. See resolve - Power is OFF. Do the old optics? Yes. I think - (Laughter) Outstanding idea - having a great drink. (Laughter) Okay, 24. Done that. Doesn't matter. Okay.

CMP Houston, America.

CC Say - say again.

CMP Okay. Hey, Bob, how many frames of mag RR do we have to diddle with? Kind of our own, or are there any?

CC That's in work right now.

CMP Okay. Aha, here's another chart D.

CC I do owe you a consumables status yet, and - -

CMP Who knows - It's got all stuff in it. Hey, do we - we have a good chart Delta.

CC Okay. Good. Great. I owe you a consumables status, and when you woke up, you were right on the Flight Plan line, and you had 58 percent remaining of RCS. And, all other consumables are on the line or above.

CMP Okay.

LMP Hey, Bob. Sorry we didn't let you get that in. We're not moving too fast for you, are we? (Laughter)

CC Ron, you have zero spares on RR. No - no film available for yourself on RR.

CMP Oh, okay. We'll - -

LMP Hey - hey, Bob, this is Jack. If you could possibly swing it, I would strongly recommend that we let Ron redo that last terminator sequence if we can work it in the Flight Plan, because Gene and I may or may not have done what you wanted there, and I know we missed the first couple of them.

CMP I'll - I'll use the 35-millimeter. I still got about 8 or 10 frames on the 35 - -

CC Okay, we'll take that word under advisement, and we'll evaluate it.

CMP (Laughter)

LMP Thank you. We may have to send you to the U.N. with that diplomacy.

CC Thanks a lot for your confidence, Geno [sic].

MS (Laughter)

08 15 47 45 CDR Glad to hear your voice down there, boss - Admiral.

08 15 49 54 CMP Okay, Houston. Mapping camera is OFF.

CC Roger, Ron.

CC Okay, we sug - suggest you start that VERB 49 maneuver at 210:30, or you'll be behind the eight-ball there on time.

08 15 51 26 CMP Okay, image motion is coming OFF. Laser altimeter is coming OFF.

CC America, Houston. You're looking real good here coming up to LOS, and we'll see you at 211:22. You're looking good.

08 15 54 26 CMP Okay. Will do.

08 16 18 XX

BEGIN LUNAR REV 63

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 16 42 51 CMP (Music) Hey, Houston; America here.

CC Hey, America; Houston here.

CMP Hi, Gordo. Good morning.

CC It's afternoon - right, afternoon.

CMP Well, we want to PRO on that at 26. - 20 roll about OMNI Bravo.

SC Oh, that's ...

CMP Yes, that's Earth study ... lunar sounder and the middle gimbal - -

SC ...

CMP - - plus or minus 65.

SC ...

CMP No.

SC ...

CMP Oh, okay.

CMP Yes. How's the weather been there today, Gordo?
(Music in background)

CC America, Houston. I missed your last, if that was for me.

CMP Yes. Just checking to see how the weather was doing there in Houston before you came into work.

CC Oh, it's kind of - bunch of high clouds - cirrus, I guess, - but it's down around 35, I'd say, and

Tape 140/2

and pretty windy. So it's nippy when you're outside.

CMP And, Houston, how's my biomed looking?

CC About 10 seconds to your PRO.

CMP Okay; thank you.

CC America, we'd like the IR COVER, CLOSED - -

CMP Oh, and away we go.

CC - - and I think there might be a chance the Sun will get in it there.

CMP Okay.

CDR Okay, Gordy. And we're rolling ... - -

CMP Barber pole, gray.

CDR ...

CC Okay.

CC Ron, your EKG looks good. The Surgeon wondered how the irritation that you had mentioned, because of the sensors, is - is it getting any better?

08 16 47 12 CMP Well, it's - yes, it gets better when you take them off and leave it off for a while and I put the cream on it. And looks like it lasts for about a day. You know every time I put it on. I put it on at a different spot. And it takes about a day for it to get red and irritated.

CDR And, Gordo, for information, that's not unique; we're all having that, and taking them off is the best relief for it.

CC Okay.

CC America, I've got some words about what you might use for optional cur [?] optional photographs. Over.

CMP Okay, yes, let's write it down there in the - why don't you write it on the back page, or something like that, so we'll know where it is.

CMP Okay. (Music in background) Ready to copy.

CC Okay. Magazine RR has no spare frames. So if you want to take any photos, we are suggesting using the DAC and the 75-mm lens and using JJ which is very high-speed black and white. Ninety-eight percent of JJ is unscheduled. Here are some settings you might use for terminator photographs over mare. Use T2.8, 1/500, and infinity. For terminator over highlands, use T4, 1/500, and infinity. And for Tsiolkovsky on rev 74 that's GET of 232:58; that's sometime in the future here - we're suggesting using T5.6, 1/500, and infinity. Over.

08 16 50 23 LMP Okay, Gordo, what was the f-stop for the highlands terminator?

CC Okay, the highlands terminator would be T4. I guess that's the far-side terminator, and the near-side terminator is over mare. That's the mare setting.

LMP Okay.

08 16 53 19 LMP Hello, Houston; America. Is today Friday down there?

CC America, Houston. I'm sorry. Say again, please.

LMP Just wondering, Gordo, if today is Friday.

CC That's affirmative. It's Friday.

Tape 140/4

LMP Okay, thank you.

08 16 53 50 CC Happens to be pay day. It's the 15th.

CC Jack, Houston. We see no need for you to wear any of your biomed sensors; if you'd rather take them off, give your skin a rest, feel free.

08 16 58 49 LMP Okay, Gordy. I've done that. And I'll wait till my next time and put them on then.

CC Okay.

08 17 01 36 LMP Gordy, how do you read LMP?

CC You're loud and clear, Jack.

LMP While we're in a relatively quiet period, we're going to make a few comments about some of the things that cross the two big basins that we're getting very familiar with - or, actually, three: Smythii, Ori - Smythii, Crisium, and Serenitatis - and the degradation of the balls of the major ring and the lack of any obvious blanket structures, I think, in contrast to Imbrium and Orientale, which we've also had a pretty good look at - Orientale and Earthshine, on the earlier revs - is quite striking - that contrast is quite striking - to me, at any rate. Also, within Orientale, the - at least at the southeast - on the east-south-east portions of the mare floor, the wrinkle-ridge system is not nearly as well developed; but there is a wrinkle-ridge system that roughly forms an inner floor ring, at any rate.

CC Roger.

LMP The fronts of the major ring in Crisium are strikingly different than those of the Apennines just in their general slopes; sharpness of topographical features; and in any appearance of having even a hint of boulder fields on their slopes like we observed, say, on the South Massif, anything like that. At least Serenitatis massifs seem to locally show fairly major boulder fields on their flanks. And I haven't seen any around Crisium yet. Maybe

Ron's already talked to you about that, but I haven't seen any.

CC Okay.

LMP Yes. The craters now. I'm speaking of the, Ron, of the front faces themselves, the rim - the face of the ring itself.

CMP Oh, I see. The face of the ring itself - okay; that's what you're talking about.

LMP Yes, yes. No it - a crater - a fresh crater in the mare or a fresh crater in the blanket area - rim area - will have boulders, Gordy; don't misunderstand me. But the front faces - the ring front face does not have boulders - that I can see. And I think boulders are pretty obvious when they're there. We've seen them well defined on the central peaks of Tsiolkovsky, and I think any time you have a major boulder popu - field, you can see it with the monocular - with the 10-power monocular.

CC Roger.

08 17 05 28 LMP Getting into areas that resemble, in their surface texture, the Sculptured Hills of the Taurus-Littrow landing area, here we're just passing - Now where are we? - that would be (laughter) I got disoriented all of the sudden. Proclus is there, so it's in the ray-excluded zone of Proclus where there is a mare surface projecting up into terrain that looks like Sculptured Hills. And that mare has a distinct bluish-gray color, in contrast to the regolith associated with the Sculptured Hills - between the Hills at least - which is a brown - let's call it a tannish gray. Quite a sharp color hue contrast to my eyes, at any rate.

CC Roger.

08 17 06 55 LMP Okay. That was a projection of Fecunditatis Mare, I guess, up into there. Sculptured Hills tend to have both a regional distribution and a

Tape 140/6

structurally controlled distribution, the structurally - structural control being apparently related to the rims of - of old craters. For example, there are some Sculptured-Hills-appearing topographic materials that - again, in the ray-excluded zone, but out in Fecunditatis - we find the rim of a fairly large flooded crater - in Fecunditatis. And all of this may tie in with the possible - possibility that we saw at the landing site, that Sculptured Hills are composed of an igneous gabbroic rock. And these may represent local intrusions controlled by the structure of an old impact crater - extrusions controlled by the structure of the old impact crater.

CC Roger.

LMP I've noticed - now I'm getting a good view of where in Fecunditatis there is a tannish - or let's call it more of a brownish-gray mare in contrast to bluish-gray mare in Fecunditatis itself.

CC Roger.

LMP And in the walls of some - of a large crater - I'll try to figure out which one it is in a minute. It's near the large crater that the Sculptured Hills define you can see in the east wall - or maybe northeast wall of that crater - an area of bluish-gray - material that is streaking the normal tan-gray of that crater wall.

CC Roger.

CC This is a kind of one-sided discussion. I wish I was there so I could take a more active part.

08 17 10 12 LMP That's all right. I just thought I'd fill in a few things. This isn't a good viewing attitude at all, and we get a few isolated views that may be worth commenting on. The contrast, in my eye anyway, between the three color units around the landing site is a - let's call it a medium bluish gray to gray for the dark mantle; a light blue-gray

for the annulus around Serenitatis; and, then, a tan-gray for the Serenitatis Mare proper. And, in Dawes, you can see - I think you can see that the overturned - or the - the rim materials are made up of the brownish-gray material, and the walls underneath those rims are the bluish-gray, which is the age relationship suggested by topography. That'd be the over - lower unit is forming the rim with inverted stratigraphy.

CC Roger.

LMP The light blue-gray annulus is also the locus of most of the circumferential grabens, that Serenitatis is noted for, is in that area. And that's nothing new. But, in one place, there's a very subdued, flooded crater which seems to control a - a - arcuate projection - or, let's say, a circular projection - of the light blue-gray out over the tan-gray mare. Most of the major wrinkle-ridge system of Serenitatis, of course, is outside the annulus of blue-gray, except locally, and one of those places was in the - to the west of the Taurus-Littrow site. Although that wrinkle-ridge system does - I can see now, as we look south of Seren - in the southern portions of Serenitatis that wrinkle-ridge system does cross the contact between the blue-gray and the tan-gray. That's the light blue-gray and the tan-gray.

CC Okay.

08 17 13 15 LMP The impression I've had in looking at all the mare where the wrinkle-ridge systems are developed is that they're a late feature. They - at least at low Sun, and sometimes even at high Sun - they have a very - very sharply defined ridges with steep slopes on either side that seem - that, in general, give me the impression that they're constructional, possibly associated with some thrusting movement.

LMP In the vicinity of Sulpicius Gallus, there are several small craters that look like impact craters that, believe it or not, have - in my eye, anyway - orange ejecta blankets.

Tape 140/8

CC Roger.

LMP Yes. Ron says that he - that he already commented on those, and they're - and they look very obvious to me. No, I - I don't - no. I don't think you can with those windows. We'll get a good view of them again in one of the other attitudes.

LMP It's a light orange, obviously, not a - that it but it's in contrast to the brown-gray of the dark mantle in the vicinity of Sulpicius Gallus. There's a good one right down there. Now, that one looks like a constructional cone that's orangish. And that's right out on a raised projection of the - of the brown-gray dark mantle out onto the - out onto the light blue-gray annulus material.

08 17 16 06 LMP This southern and southwestern portion of Serenitatis has a general appearance of the Sculptured Hills, although the individual hills seem to be more widely spaced than around Taurus-Littrow. Once again, historically, we're passing over the landing site of Apollo - or near the landing site of Apollo 15.

LMP Tell Dave Scott that the north complex looks just as interesting as it ever did. It's going to remain with Emory crater as one of the unknowns of the space program for a while, I guess.

CC Roger.

CDR Hey, Gordo, I've been looking at the landing site off and on the last few revs, and I'd like to get - now that we've been there and back - your best guess of the exact position of what you think we landed, because I think I've got it pinpointed pretty much so from here.

CC Okay. Stand by 1.

LMP This is one of the first opportunities that I've had to look closely at Archimedes, which is one of those craters that, in the early days of the lunar

mapping program, helped establish some of the fundamental age relationships between the various units that were visible in the Earth-based photography. In this particular case, it related to the sequence of events that created Imbrium, cratered it, and then flooded it with mare. And Archimedes is a completely circular - closed circle as a crater, and it is filled with mare. And it, in itself, is superimposed on the - one of the main benches of the Imbrium crater. Now, to have mare filling that crater and actually filling all the depressions of approximately the same level in the vicinity of a mare - of a large mare region, it's one of the things that's suggested to many people that rather than single sources for mare lavas, you have a multitude of sources in a very fractured lunar crust. The ultimate source in depth, though, is still certainly a subject for controversy.

08 17 20 37 LMP

Some of the ridge and valley structure of the Archimedes impact blanket is not covered by mare and extends to the southeast out onto the Imbrium bench. That was also one of the pieces of evidence used in those early days of photogeologic mapping of the Moon. You'll have to excuse the reminiscing, Gordy.

CC Roger.

CMP And, Houston; America. Frame 150 - 151 and 152 were taken of the Sulpicius Gallus region with a 250 lens. 154 was taken at D-Caldera, and that's magazine Oscar Oscar.

CC Okay, Ron.

08 17 23 01 LMP

Gordy, I guess it was the crater Bessel in Serenitatis that Ron and I were looking at last night. And I think he had commented on being layers in the ledges that were visible in the walls, and I certainly concur with that. Although we could not trace layers - individual layers from ledge to ledge, within a coherent ledge the layers were traceable; and, in one case, I'm sure I could count six or seven ledges - sub - well, layers within single ledges. Reason it reminded me of it is looking at Timocharis, and I cannot do that

Tape 140/10

with Timocharis. It looks like it's - those ledges - any ledges that may have been present as a result of the Imbrium Mare have since disappeared by weathering. That's lunar weathering, of course. Of course, down here in the Imbrium - southern Imbrium - is one of the better regions of the Moon to observe the wrinkle-ridge systems or mare ridges, sometimes they're called. And it's purely that. They're fairly sharply defined - quite sharply defined ridges that are wrinkled in their pattern - sinuous would be another term. And with sharply defined slopes on either side of the ridge. Sometimes they are flat-top ridges; sometimes they are more like spines. And occasionally you see them that almost appear to have vertical slopes on one wall or the other. The whole impression that I have, anyway, is that they - there may be a combination of structure and folding of the surface of the mare - construction on the surface and folding of that surface. They're particularly interesting that they tend to - wherever there has apparently been an old sub - flooded crater - Yes, did you want to get that stuff? They seem to be controlled by the shape of flooded old craters within the Imbrium basin. And I think that's a safe conclusion, because you get the standard outlines shown by the rille - the ridges; excuse me. Some of them are polygonal, and some of them are quite circular.

08 17 26 25 LMP Ron, did you want to get these ridges, these rilles south of Euler here?

CMP Yes.

LMP Okay. They're coming up.

CC America, Houston.

LMP Go ahead.

CC Okay. I guess the last team promised you no changes to the Flight Plan, but they didn't say anything about changes to the changes; and I've got one. At 15 minutes from now, 212:20 - -

CDR Can you stand by a minute?

CC - - in the Flight Plan. Might get that out, and I'll give you a change.

CMP Keep talking, Gordo.

CC Okay. At 212:20, you're to stop the roll at 39 degrees and then do a VERB 49 to 142. And we want to change the PITCH to 268 and zero. That would be 142, 268, and zero.

CDR Okay. I got that change. And you want that about 18 - 212:18?

CC I - have to check back here. Yes, I guess that's when it is.

CDR Okay.

CC Also, as long as you've got the book and a pencil, let me give you a few other one liners.

CDR Yes, I'm ready to copy them.

CC Okay. Let's see. The first one is at 214:55. And they want to add after that other stuff just above there "UV COVER OPEN" and "IR COVER OPEN."

CDR Okay. At 214:55, you want UV and IR COVERs OPEN.

08 17 28 27 CC Roger. Turn the page. At 215:37, - 215:37, change magazine November November to Kilo Kilo.

CDR Okay.

CC And the reason I'm so slow with an answer on that landing site position is, all I've got it in is latitude and longitude; and I assume that you want it in good coordinates, for your reference. One suggestion here was, you tell us, and then we'll confirm your guess. I just ran across an other couple updates, too. Back to 213:15 in the Flight Plan, I can give you the lunar sounder pads - the two of them on that page.

CDR Okay. I'll get them. Go ahead.

Tape 140/12

CC Okay. T-start on the left-hand one there, is 213:20:10, and T-stop is 213:24:20. Then the next one is T-start of 213:41:40, and a T-stop of 213:59:54. Over.

CDR Okay, Gordo, got them all. They're all at 213 hours. Start is 20:10; stop, 24:20. Start is 41:40, and stop is 59:54.

CC Okay. Good readback.

08 17 30 19 CDR And, Gordo, I guess my best guess after looking down there from here is - I've got a - the north-east chart of the lunar surface traverse ... And about 84 point - correction, about 83.3 and about and Delta ... point 5. We're right on the top of the "o" in Poppy. Looks to be about where we landed.

CC Okay. We got that.

CDR And, in thinking back about what my intentions were, that looks like probably a very reasonable - reasonable suggestion. And the first thought I had about being close to Trident, I didn't think I was anywhere near that close. And, of course, when you look out there and see a big hole, you don't know how big is big when you're down there. That big hole out there might very easily could have been Poppy out at 9 o'clock.

CC Okay, Geno, from science we finally got it to where it converted to your map coordinates; and their guess was close. Their best guess, with all the data considered, is 83.2 and DN 0.1 - Delta November 0.1.

LMP That would definitely make sense, Geno ... - -

CMP That's pretty close to where the old CMP said it the first rev after landing, isn't it?

LMP - - north of where we put the ... Remember, that was a little ways away. You were at the edge of the depression, and it would - move it a little.

08 17 32 11 CDR Yes, I'll buy that. That's in my scatter. And then that crater, as I looked out at 9 o'clock, we landed next to was actually Poppy. Pretty sure that's that large crater.

CC Okay.

CMP And, Houston; America. On mag Yankee Yankee used frames 31 through 35 at that last near-side terminator there.

CC Okay, Ron. Got that.

08 17 35 22 CDR Gordo, I'm just going to stop this maneuver this time around at 39 degrees.

CC Okay, Gene. Say, we've got one question for Ron. We've got large teams of engineers trying to locate the missing scissors, and we haven't asked you in a while whether you might have found them. That might save them a lot of effort down here.

CMP No, I haven't found them yet. And there's a lot of room underneath these CO₂ absorbers I found out the other night because I lost my flashlight. But it kind of floated out, and I saw it every once in a while. And we found the flashlight and got it back, but I still haven't the slightest idea where the scissors are.

CDR Gordo, you might have someone hide them in the CSM and send a backup crew down to the Cape and see how long it takes them to find them.

CC Okay. I'll get an airplane scheduled up right away.

CDR I just missed 39 degrees. I'll wait for it next time around.

LMP By the way, Gordy, you working on next week's airplane schedule?

CC Yes, what do you need? You mean the one from Hawaii back or something like that?

Tape 140/14

LMP Yes, you might have some 38s waiting for us in LA;
we can pick them up there.

CC Okay; but we'll have to work a three-way swap with
some Skylab troops that will be out there. And
then Deke will meet you in Albuquerque halfway
back; and I'll let you know how it all works out.

08 17 37 09 LMP That sounds great. That sounds like easier than
usual.

08 17 43 29 CDR Every commander has the right to change his mind.

CDR And, Gordy, I'll watch the cranapple.

08 17 44 13 CC Okay, Geno.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 17 48 52 CC America, Houston. We're starting to get to the margin on signal strength to get the data back. We want you to improve that by turning S-Band MODE, - S-Band NORMAL MODE VOICE switch to OFF, center, for about 5 minutes.

LMP Say again.

CC Okay, Jack. We'd like you to turn the S-BAND NORMAL MODE VOICE switch to OFF, center, for about 5 minutes to improve our signal margin as you approach the termin - the LOS here.

08 17 49 32 LMP Okay. OFF, center, for 5 minutes.

08 17 54 09 CC America, Houston. Don't bother to answer, but we'd like H₂ tank 2 FANS-OFF. That's hydrogen tank 2 FANS, OFF.

CC America, Houston. We'd like OMNI Bravo. America, Houston. We'd like OMNI Bravo.

CC America, Houston, you can turn the voice back on now. Have about a minute and a half to LOS for a final goodbye.

CMP Okay. This is America with a goodbye for this pass.

CC Okay. I guess the real reason for having you turn the voice switch off there is so the secretaries that are transcribing the air-to-ground here can catch up with Jack.

08 17 56 26 LMP (Laughter) I don't believe it. Yes, I do. Okay. That's all you ever hear from me again.

08 18 17 XX BEGIN LUNAR REV 64

08 18 42 06 SC Yes.

Tape 141/2

LMP Hey, Ron, do you want me?

CMP That's right. There are a lot of those with a flat floor. Got to be a lava-type thing down there.

CMP Houston, America.

CC Roger, America. Hello once again. You've got about 1 minute to T-stop.

CDR Okay. We're right with you, Gordy.

CMP Okay. T-stop isn't it - -

CDR ... 24:20, Ron.

CMP 24:20?

CDR ... operation STANDBY.

CMP Standby. Okay.

CMP Okay. We're coming up on 24:20. The visual of Tsiolkovsky is hopefully pretty much recorded on the recorder.

CC Roger.

CMP 18, 19.

08 18 44 23 CMP MARK it - STANDBY. ... in standby. I guess the somewhat - a very small summary, anyhow, of the visual of Tsiolkovsky concentrating primarily on the flow up in the northeast corner. To me, that particular piece that's fallen down in the crater there - and it's on one of the pictures - Tsiolkovsky, 4 or 5. The piece that is down in the crater is on the right-hand side of the page. And that portion, you know, is somewhat of a molten state. It looks like it is a landslide that has slid down the wall of the crater and detached from the - well, the molten state of material, rough - rough-looking material that's on the rim of the crater Tsiolkovsky.

CC Roger, Ron.

CMP There seems to be high lava marks around the western and northern sides of the central peak. For some reason, it's not evident or visible on the south side of the central peak.

CC Okay.

08 18 46 21 CMP

Also, there seems to be the high lava marks on the raised portion of the floor in the contact between the dark material on the floor and the lighter, - oh, rough-looking ... - on the northern side of the crater. In the first observation, of the mass of material that goes out into the crater Fermi, the - It looks like there is a whole bunch of craters in there that have - or are essentially rimless craters. However, on close examination with the binocs, I couldn't see any that didn't have at least a slight indication of a rim. The rims that were on them were essentially very subdued. They extended out to about - oh, a half a crater diameter; and these are on the craters in the 500 - to 1000-meter size. I didn't get a chance to look at them, looking straight down the craters, to see if there was any depressions or any domes or any type of a structure in the bottom of craters. But I get the impression that they're - primarily all look - just of cones with no flat bottoms at all. And I'll look again at those things when we go by there next time. The flow that goes down into Waterman - if we look at the pictures, Tsiolkovsky 5 of 5 - the shadow is just about in the same area on this one as it is on that one, and I didn't take a chance to look in that one until I got to the west of it. So I'll have to look, when I'm passing it from the north side of Tsiolkovsky looking south, to see what's down in the shadow area there. But when you're on the west looking back across it, you can't see into the shadow. But the material that's in the floor of the crater Waterman is the same type of material that the little flow on the northeast corner has broken off and slid down into its own little crater.

Tape 141/4

CC Okay. Roger that.

08 18 49 24 CMP So I guess what I'm saying is that essentially whatever molten material that's up around on the rim of the crater Tsiolkovsky has been - well, I want to say extruded - not extruded but pushed out, I guess, away from the crater and has been in a semiliquid or semimolten state in its period of deposition. I'll reserve judgement on some of the flat-floored, flat-mare filled depressions that are around the crater until I get a chance to look at those the next time around.

CC Okay.

08 18 50 50 CDR Say, Gordy, something that struck me, - something maybe everyone else has thought about, but I hadn't before. At the southeast corner of Smythii, there was a relatively large - several large somewhat subdued craters but with relatively steep sides to them. And next to this one was a very small, white, bright-haloed crater. And I watched the rays of this crater; and the southeastern rays draped over the slopes of this much larger subdued crater - draped over the walls, all the way down onto the floor. And as they draped over the walls, they obviously gave me a very good albedo change from the darker wall to the very much lighter colored. But as they hit the floor of the crater, they form patterns that are not only not unlike, but actually very, very similar, to the light-mantled area that we have been referring to as a possible slide back at Taurus-Littrow. The patterns as they drape down the inner slopes of the crater and onto the floor, I would be willing to bet if we went down there we'd probably find the same type of things we found at Taurus-Littrow.

CC Okay.

CDR By that I mean albedo changes that we can see here versus to what we can see down there.

CC Roger. Very interesting.

CDR I looked for these type of - looked for these type of ray patterns, where the rays just went out on

a more horizontal plane. You can - you can find them if you look hard, but as they drape over the slopes and onto the more level floor, they're very obviously alike.

CC Roger.

CMP Hey, Houston.

CC Go ahead.

CMP Okay. That crater, if you look at Smythii 1 of 1, and the crater that's right above the rev 62 there, you can see a bright spot on the northwest portion there. And that's the breach zone of that particular crater. The thing that's intriguing about that to me is that if you look at the inner ring, it's a gradual slope from the center - the center of the crater is lower than the secondary - the secondary ring around the thing.

CC Ron, let me interrupt here. Say the name of the crater you're looking at again in Smythii.

CMP Okay, in Smythii. And - Mare Smythii, 1 of 1, that - that picture - -

CC Roger. I - have got it.

CMP And right about where it says rev 62. Okay?

CC Okay; gotcha.

08 18 54 21 CMP Now, there's two - there's two rings in that picture. Okay. The inner ring, the central portion of that thing, is lower and slopes outward, - radially outward - to the first ring. And then it drops off; in other words, it's a gradual slope, maybe - oh, somewhere in the 15 to 20 degree slope upward to the first ring. And then it's a steep slope on the outside of the ring, at about, - oh, 45 degrees, dropping down into the annulus.

CC Okay.

Tape 141/6

08 18 55 21 CMP Yes, color? With 250 lens. Yes, all along. I just took it today, two of them, - three of them. Yes. Yes. Yes. I took three of them the last rev.

LMP Gordy, this is the LMP. While we're waiting for the site to come up again here, which seems to interest us every time we go over it, I think we sort of came to a general concensus on the problem of the smaller cone-shaped craters on the far side that have the little pool-like concentrations of material in the bottom. If you look at the freshest of those craters, the - that seems to be contiguous with the streaks of very dark material that cover the walls and the rim of the fresh cone-shaped craters. As the crater gets older, that material - that distinction becomes less obvious; however, the pool remains, and all you lose is the dark streaks on the rim and on the walls of the crater. I think we sort of feel - suspect that that pool in the bottom of the fresh craters is just the concentrated impact melt that - some of which is - stayed there during the impact and other which drained back - that drained back after the impact from the - drained from the walls. And then, with time, that pool may be subdued some. The structures in it, the swirls and little domes in that pool are subdued possibly not only by the impact but by debris, slides, and avalanches off the walls of the crater.

CC Okay, Jack.

LMP It's getting to be a very consistent pattern when you start piecing several of them together.

CC Roger.

08 18 58 49 LMP That black streaking on the walls and the blankets, - Ron may have already told you, but it is characteristic of only the very freshest of those cone-shaped craters, - and - or pool craters, whichever you want to call them. And it seems to be very logical that it just represents a thin veneer on the rim and the walls of the impact-generated

glass. And it's darkest, presumably, where it's quenched; and the pool itself is somewhat lighter gray than the black streaks and mantles.

CC Roger.

CMP You know, Jack, I get the impression that these bright ones, - see the bright one right down there in front of us there, - if you look at those with the binocs or with the - I get the impression of a dark greenish-black or blackish-green. In other words, I get a green - -

LMP Green cast to the rocks?

CMP Yes, green cast to the rocks. To the big blocks, you know, that are laying around there - around the crater and also the ones that are down - down in the bottom.

SC Greenish cast.

CMP That greenish cast to them.

CMP Yes, it is; isn't it. I can see that with the naked eye. That's a bright one. What's - I'm saying, where is the crater, though? Oh, that's the - that's Yerkes and - okay. You're in VOX.

08 19 00 54 LMP Hey, Gordy, we got another orange-rimmed crater. And we'll spot it. I think everybody agreed. And this one very clearly looks like an impact crater that has it's - let's see, we decided you're looking north?

CMP Yes.

CC Roger.

LMP It's north, east, and west quadrants - -

CMP Let me describe it. It's Yerkes and ...

CC Hey, you got the T-start time coming up here shortly on the sounder.

Tape 141/8

CMP Okay (laughter).

CC About 10 seconds.

LMP Quit interrupting. Okay. We'll get it.

CMP What time is it?

LMP We'll hack it up here, Gordy.

CMP VERB 41 ...

LMP Thanks, Gordy.

CC ... now.

CMP Okay.

08 19 01 43 LMP Sounder is OPERATE.

CC That was close.

CMP (Laughter)

CDR That was a very good call. Thank you.

CMP Thank you.

LMP No sweat. At any rate, in the north, east and west quadrants of that little crater - and we'll spot it for you on the map, is a - very clearly an orange pattern - an orange color to the ejecta. The other quadrant is a lighter color - a light gray.

CC Okay.

CMP If I had a map - . Let's see, what did I do with my map? Wait a minute; I got a picture of that, I think.

LMP Right here.

CMP No, go ahead I can't see the landing site, anyhow, I don't think.

08 19 03 43 LMP Gordy, my impression from Shorty the other day, and also from seeing these craters that seem to have orange - that are - around them, that look very much like impact craters from orbit, at any rate - it may be that the - if that is an alteration phenomenon, - that it's being localized around the structure created by the impact. But in this latter case, it looks as if the impact itself penetrated into a zone of that color.

CC Okay, Jack.

CMP (Laughter) yes.

08 19 05 35 CMP Are we going to use your -

CMP Here, take it - take a look at it. Okay.

CMP Doesn't show up that way today.

CMP Here. The color -

CMP I know. That's the spot.

CMP Yes.

08 19 08 19 CMP Can't see it anymore.

CMP Yes. That's a good view...

08 19 10 19 CMP They're between Tacquet and Mel-Mel-Melanes [sic], aren't they? Yes. I see them ... Okay. Yes, little bitty ones. They're about - oh, a little bit bigger than Shorty. Yes. Those are - those are the ones that I called the other day. It was a very, very light tan. I guess you can put an orange tint to them.

LMP Gordy, to put orange into perspective, at least as far as the LMPs eyes are concerned - from orbit, I would say that it's a orange-gray. It's still a gray, with an orange hue to it. And when I use any blue or tan or anything, it's a hue on gray; and I'll usually try to say gray in there. But to say something's orange, I think, would be misleading. It's really an orange-gray, but it's clearly a distinct hue.

Tape 141/10

CC Okay. Kind of like dirty beach sand with a little orange in it, huh?

LMP Well, we can't use that term anymore. That's copyrighted.

CC Roger.

CMP Yes. That's right. There is. That's the one. That's the area where I was trying to talk about. That's just north of, - oh, that's Sulpicius Gallus. No, there's a gouge, just - yes, northwest of Sulpicius Gallus Crater. Yes, bet I didn't doubt - I didn't talk about that thing. That's a - I thought - I was talking about the little orange crater. Now you can see all the colors down - down in the gouge itself.

LMP Hey, Ron. We'll spot this one on the map, too - or Gordy. But there's a large gouge just south of the Sulpicius Gallus ridge. The gouge, - it's a rimless depression - and streaming down from the upper portion of that depression are not only our old friend the orange-grays, but some would be a red-brown gray. Very, very clear coloration in this light, in, - I think, - My goodness. There's another crater we'll have to look at.

CMP Yes. There's a whole bunch of them down there.

08 19 14 45 LMP Yes, but that's something in the wall of it in that area. Yes, it's starting - (chuckle) Man, we're seeing an orange Moon now. This - this whole dark mantle in here around Sulpicius Gallus, - they are - they are scattered craters with variety of orange to red-brown hues. And they all, except for that large rimless depression, which looked, - looked as if was exposing some layers which were streaming those color, - that color debris down its walls - All the other craters seem to be small impacts that apparently are penetrating just far enough into the dark mantle material to tap this zone of orange to red-brown material.

Tape 141/11

08 19 15 44 CMP

And just north of that elongate depression, there is another circular crater. And it also is penetrating down through this mantle stuff. And it had the reds and the browns and oranges dipping down it, too.

END OF TAPE

APOLLO 17 AIR-TO-GROUND TRANSCRIPTION

08 19 16 06 CDR Hey, Gordy, just so you're fully aware, we're not sort of just leaning and getting color blind up here, I tell you, last one Jack was talking about was not even subtle. It's entire ray pattern was this same color material, and definite contact between it and the dark material around it, and it had that orange-brown hue to it, without any question at all.

CC Okay. Very interesting.

CDR It really is. You know I saw that dirt day before yesterday at Littrow, but, and I really haven't seen too much from orbit that I'd call really very distinct in color, until this one. But, boy, there's no question about this one.

CC Roger.

CDR And we pick up the lunar sounder at 59:54.

CC Okay, I'll try to watch it a little and give you a little more warning, too.

CMP Yes, I want to get - I think it's right in that ...

CMP Let me see.

CMP No, here's the Sulpicius Gallus. No, you're up too far, you're up too far. It's closer to Sulpicius Gallus. Right in that ridge basin, right in there on the red line.

CMP And, we'll get a picture of it.

CMP Yes.

CMP Yes.

CMP Okay. Sorry, Houston, we turned that one OFF at the - minute early.

CC Okay.

Tape 142/2

CMP We'll pick up an extra minute on the next one.

CC Roger.

08 19 20 01 LMP Okay, Houston. RECORDER's going OFF.

CC Okay.

CDR Hey, Gordo. I better make this note now. What Jack and Ron were talking about apparently was an elongated depression. I was talking about in the same area, and I'm trying to mark it approximately on the chart. But it was a classic, small, bright-haloed crater. The classic with a classic ejecta and everything. Except it was this orange-hued crater. It was not bright-white. But it was very classic. And, as I said earlier, not subtle at all.

08 19 20 47 CC Roger, Gene.

CC America, Houston. I have a TEI for rev 72 pad. No hurry, maybe you want to wait until sunset.

CMP Yes, we'll wait until sunset. Okay?

CC Okay.

CMP Houston, 160 and 162 of the mag Oscar Oscar were taken from the north, viewing the central peaks of Copernicus.

CC Okay, Ron.

08 19 23 42 CMP It's a long ways away. I don't know if it'll show up or not. It might.

CDR Houston, this is America.

CC Go ahead.

CDR Okay, Gordo. I'm looking ahead - I'm trying to stay ahead and see what's happening today and tomorrow in the Flight Plan. And although this has come up in the past, we haven't said anything about it. You know, Ron put his biomed harness

on a couple of hours ago, and he's going to end up wearing it a total of 6 hours. Then, all of a sudden, when we make a change-over again, and I put it on and - for a 12-hour period, and then we change again. And one of the problems up here is putting these things on, and you'd like not to leave them on too long, but once you get them on, you like to make use of them. And it's a problem, it's time consuming. I'd like you to consider down there letting Ron wear those until tomorrow morning, having me change over then. And when EVA time comes, we'll take special consideration to whatever requirements there are.

CC Hey, you just got a thumbs-up on that from the Surgeon.

08 19 28 27 ODR Okay, very good thank you.

CMP Okay, Houston. Just took whatever the three were before 39 on mag Yankee Yankee of Euler, Tobias Mayer, terminator stuff.

CC Okay, Ron. And for Jack, the Surgeon says he's getting occasional erratic trace from Jack's biomed. He would be happy if Jack wants to take it clear off.

LMP Gordy, I don't know how to tell you this, but I haven't had my biomed on for about 6 hours.

CC Okay.

LMP As a matter of fact, I haven't even had the sensors on.

CC Well, we must be copying the heartbeat of the America or something, then.

LMP How does it look. Maybe we ought to use it instead of mine.

CC America's ticker is doing fine - along with everything else.

ODR Okay, Houston. This is America. I've got a Flight Plan change for you if you're ready to copy.

Tape 142/4

CC Okay, ready to copy.

CDR Okay, if you'll turn to page 3-26 at 217:52.

CC Okay, go ahead.

CDR You can delete - you can delete both those steps.

CC Okay. I've got that.

CDR Okay. If you'll turn to 230:40 - you can cross out LMP and put CDR.

CC Okay. We got that.

CDR Okay, if you'll turn the page - turn to 230:29.

CC Okay.

CMP You can change the first line, cross out LMP and put CDR. And on the second line, you can cross out CDR and put CMP.

CC Okay, I must be on the wrong page - did you say 230:29? Must be 231:29, okay, got you.

CDR 231:29. Cross out LMP and put CDR on the first line. Cross out CDR and put CMP.

CC All right.

08 19 31 54 CMP Okay, and we'll further update you as the mission progresses. I know you're pretty busy, and we'll hold any Flight Plan updates down to you to a minimum from up here.

CC Okay.

LMP Okay, Gordy. You want to give me TEI pad?

CC There's nothing I'd rather do. Ready to copy?

LMP Go ahead.

08 19 35 53 CC Okay. It's TEI for 72, SPS/G&N; 36477; plus 0.61, plus 0.83; NOUN 33 is 230:42:59.17; NOUN 81, plus 2887.4, minus 0339.4, minus 0050.3; 179, 095, 356; rest of the pad is NA. GDC stars Sirius and Rigel; 136; 160; 034. Ullage is 4 jets, 12 seconds. Remarks: Assumes ascent REFSMMAT. Over.

LMP Okay. TEI72, SPS/G&N; 36477; plus 0.61, plus 0.83; 230:42:59.17; plus 2887.4, minus 0339.4, minus 0050.3; 179, 095, 356; Sirius and Rigel; 136; 160; 034. Ullage is 4 jets, for 12 seconds, and it assumes an ascent REFSMMAT. Over.

CC Okay. That's a good read-back. Say, have a little summary of - both the surface and the orbital scientific equipment's working. It's probably about 5 minutes worth. If there's some handy time, I'll be glad to read it to you.

LMP Right now, Gordo. We'd love to hear it.

08 19 38 35 CC Okay. Let me start with the America's gear there. The - on the UV spectrometer, well, actually having to do with UV. During - back during rev 38, they sent an Aerobee sounding rocket from White Sands, up, and it carried a UV spectrometer above the atmosphere and successfully acquired solar UV calibration data. Farside terminator shows there is a hydrogen atmosphere, but it is much less than had been predicted. The PI is very happy with the mode 4 maneuver. On the IR scanning radiometer, it's still performing beautifully, and the PI is getting lots of high-quality data, and I understand is ecstatic about it. On rev 33, the crater Kepler C showed up as a 132-degree Kelvin anomaly on a 94 degree Kelvin background after 11.6 days of lunar night, the crater Reiner was a similar anomaly on that revolution. In low orbit on rev 9, Kepler A showed a broad hotspot corresponding to its ejecta blanket with a sharp spike corresponding to the crater in the center. One coldspot anomaly seems to correspond to a cinder cone-like feature in Mare Orientale near the crater Hohmann. On the lunar sounder, telemetry monitoring of the sounder's average reflected power indicates that the mare and highlands exhibit markedly different reflectivity, both HF and VHF.

Tape 142/6

The data is consistent with distinct layering in the mare, as would be expected, where the mare flooded by successive layers of lava, although, they say other explanations are possible. They don't see that layering - indication in the highlands. Predicted topographic signatures over features such as craters and mare ridges have been confirmed in principal. Of course, as you know, until they get the film back they don't have - they can't really reach any definite conclusions. On the cameras - the cameras, both cameras and the laser altimeter all appear to be performing very well. And everybody's especially happy with the solid laser altimeter performance. Okay, that kind of sums up SIM bay. Do you have any questions, that I could chase down, or should I go on with surface stuff?

CDR No, why don't you press on.

CMP That sounds good Gordo, press on.

08 19 41 46 CC

Okay. On the surface, the heat flow. These are - these are little short summaries, each written by the PIs or co-Is (sic) on each experiment. Mark reports that the entire heat flow system is working perfectly. The probes have cooled down to a temperature of -16 degrees C at a depth of 2.3 meters, and are nearly at their final temperature. for comparison, at Hadley Rille, we found a -20 degree C at 1.5 meters depth, we had - to refresh your memory was minus 16 at 2.3. Both probes show an increase of temperature with depth, and it is clear that we will get a valid heat flow measurement. The LEAM is functioning properly, responding to calibration, and sensors show a low noise figure. The LEAM will be off until lunar afternoon, and on, with sensors covered, until after sunset. Otto Berg ask that you accept his thanks and appreciation. On the LSG, the sensor beam cannot be nulled at this time, in spite of Jack's efforts. We are still studying the problem and hope to find a workaround. In any case, the instrument does function to some extent, as a vertical seismometer, and may be useful in a search for a gravitational radiation from pulsars. The LSPE is fully operational, LM

ascent clearly recorded on all four geophones. And apparent seismic velocity measured across the geophone array was 100 meters-per-second. Regolith velocity was very close to that measure at the Apollo 16 site. The LM impact was clearly recorded on the geophones, and the estimated distance was 10 kilometers away, in the South Missif, actually very close to the targeted point. Although, I guess you've discussed this, we didn't see it on the video. The first charge went off while you were on the backside, last rev, and it's very apparent on the tracers which I'm monitoring right now. I think the next one's due sometime within the next 2 hours. Okay, the lunar mass spectrometer - the low voltage circuits of the LMS have been operated briefly. All monitors indicate the proper performance of the instruments, but application of high voltages will await lunar sunset, when both the analyzer and the site has had time to outgas. Temperature of the radiator plate is slightly above nominal, but not so high as to be even important. That was from Dick Hodges. Okay, here's a little summary from Dave Strangway on the SEP. He starts out by saying, "Water, water everywhere and plenty to be found," because you didn't get behind the time line. The SEP transmitter was confirmed to be working well at the correct power level, using the lunar sounder. The receiver heated well above predictions during the whole mission, as I'm sure you are aware, but the two prime data legs were operated within the temperature limits of the recorder, and we have no reason to doubt that we got good data. There is also a good chance that the legs on station 4 to the LM was within the temperature limits. Your procedures were performed excellently and we look forward to processing the DSEA tape. Okay, now to - let's see, we got TGE, which is considered a spectacular success. The Earth-Moon gravity transfer indicates the value of - won't read the numbers, in milligals - at the - at the Tarrus-Littrow base. But the value will be used to obtain a revised value for the lunar radius at this landing site.

Tape 142/8

08 19 45 58 CC

Gravity measurement made during the three EVAs showed a large negative anomaly of about minus 38 milligals at the base of the South Massif. A similar negative anomaly of about minus 30 at the base of the North Massif. Preliminary conclusions of the traverse gravimeter meas - TGE measurements indicate that the material under the valley floor of Tarrus-Littrow is much denser than that of the North and South Massif. The gravity values will support the hypothesis that the valley subfloor consist of dense basaltic rocks, perhaps as much as 3 or 4 kilometers in thickness. The extra measurement between stations 2 and 3 will be of great help in determining the nature of the boundaries of this basaltic layer and the varied extension of the massif. The cosmic ray detector - actually, you know as much as we do about the data return from it, of course, but the - we did - recover it earlier in EVA 3, as you remember, and that was due to a minor increase in low-energy solar protons and heavier particles detected here. And a reduced exposure will not offset the scientific results.

08 19 47 21 CC

The neutron probe was exposed to the surface for 49 hours. PI estimates that the distance from the RTG to the probe is 40 meters, which will mean that the background count will be low, and he thanks you kindly for those few extra steps. And the last one was - to be summarized - was the field geology and they asked for a very short summary, so Walt Berger came through with three typewritten pages. So, we're just going to skip the whole thing, except the last line, which was to say that you guys did an outstanding job. Over.

LMP

Thank you Gordy. We're just pleased that so many things are working well, and happy that the PIs are satisfied. That was our objective, and we came up here to meet it - and those things that are done, I hope we met it, well - and we've got a few more things to do yet.

CC

Well, I can assure you you're not the only ones that are pleased.

CDR Gordy - Gordy, and you know it's satisfying to have put that much time in and - and come out with some meaningful results. That makes us all feel good. Have you been able, or did you see that first charge on the video?

CC I forgot to mention that. No, we sure didn't see a thing. We had the camera aimed over there, but it was almost a kilometer away. That was 1-pound charge, and we played it back several times, but nobody saw a hint of anything.

CDR Okay. If you got - if you got a few more going off here in short order don't you?

CC That's affirmative. I don't think we're up to the next one yet, but we'll keep - keep you posted on whether we see anything, or how they're doing.

CDR I might also say that we appreciate the time and effort the PIs put in with their experiments and with us also.

CC Okay. I'll make sure that gets to the backroom.

LMP Gordy, this is Jack. What did they see over next to the Sculptured Hills on the gravimeter?

CC Well let's see, Jack. They kind of - let me turn back here. They actually included - when they mentioned the negative anomaly of minus 30 milligals at the base of the North Massif. They said stations 6 and 8, parenthetically there. So evidently they're including the whole area there as the negative anomaly. I'll try to get a more amplified answer to your question.

LMP Now, could you see if you can verify with them that they were unable to - or there was no distinction between the measurements of the Sculptured Hills and the North Massif?

CC Yes. I'll - I'll work on that.

Tape 142/10

08 19 51 33 LMP Or better yet, what was the distinction between the Sculptured Hills and the subfloor area?

CC Okay.

CC You may have to wait until next time around for your answer.

LMP Oh, there's no hurry. You can wait until tomorrow or even a (laughter) week if you want to. I was just thinking about that problem.

CC Okay.

LMP By the way, Gordy, you might tell Bob Walker, if he's around, that the cosmic ray, as far as I know, was untouched by human hands, at least on the Moon. And it looked very very clean when I put it in the - put it back together.

CC Okay, Jack. We'll pass that along.

CC America, Houston. One more question from the Surgeon on this mysterious trace on the LMPs biomed. Do you have anything plugged in to the - is the biomed still plugged in and laying over on Jack's umbilical, or is there, is there anything plugged in to - to Jack's that could explain the funny trace here? It's kind of a sporadic-looking - looks like somebody with a heart in a pretty bad shape. (Laughter) Over.

LMP Gordy, my heart has always been in bad shape, for other reasons than the one the Surgeon's thinking about. It turns out that I am still plugged together. I just don't have the sensors on. I will remedy that situation, so he doesn't have to worry anymore.

CC Okay, that solves the mystery. Thank you.

CC Say, America, about 30 seconds to LOS. See you next time.

08 19 54 40 CDR Okay, Gordy. Thank you very much, and we'll see you coming around.

08 20 15 XX BEGIN LUNAR REV 65

08 20 41 02 CMP Houston, America.

CC Hello, America. Do you read Houston?

CMP Houston, America.

CC Yes, America, loud and clear.

CMP Okay, Houston. America here. The mapper - when we took the image motion from OFF to ON and then the MAPPING CAMERA switch from OFF to ON also, I think - maybe it was STANDBY to ON - but anyhow, as soon as it went up to ON, we had a barberpole on the talkback. Went back to STANDBY, and just before AOS, or just about AOS there, at - to 215 - 20, about 215:20, then we got a gray on the talkback with the MAPPING CAMERA switch to STANDBY. Then we went back through the cycle, and it worked okay. So it's working now and it's ON. What I'm saying is I didn't start working until about 20.

CC Okay, Ron. We got that.

CMP Must have been too cold, huh?

CC We'll look at it now.

CC America, would you select WIDE on the HIGH GAIN and then NARROW?

08 20 43 54 CMP Doesn't seem to make any difference. I'll try a REACQ position again. MANUAL - and WIDE.

CMP AUTO or NARROW, it doesn't seem to be working very good.

CC Let's try REACQ, Ron. You're in a skin reflection zone there, is probably the problem.

Tape 142/12

LMP Gordy. This is the LMP. How do you read?

CC Jack, you're loud and clear.

08 20 47 35 LMP Okay. Add to that little discussion of the pool-bottomed, cone-shaped craters that I had, I think, the last rev, that the one place there seems to be some variety in the freshest of those kinds of craters as in Mare Smythii where - the ejecta blanket of many of those kind of craters has some small dark halo craters - -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 20 48 32 CC Roger.

LMP They're superimposed on the bright ray or ejecta blanket and/or ejecta blanket system of the - of those cone, or fresh cone craters.

CC Okay.

08 20 49 41 CC America, Houston. We've got some words for you to - a request for a little visual observation at the landing site area, having to do with orange material. If you're ready for about a 5-minute briefing, I'd like to give it to you now, so you can get set up.

CMP Okay; go ahead there, Gordo.

CC Okay, what we want to do is see if - This was triggered off by your observation of orange material last rev, I guess, and possibly earlier. But the idea here is to look for some craters that we've identified on photographs that are in similar geologic setting to Shorty Crater and see if we can see orange material around them. We're trying to determine if the orange material at Shorty is a one-time special occasion or whether possibly it's common to the area and just never been noticed before. And we think you'll be able to determine this visually, better than any other way. So, if you can get out the orbit - the orbit charts; the orbit photographs; let's see, the Lunar Landmark Maps for the CSM, and turn to the landing site number 2 or 4 picture. Let me know when you get that, and I'll show you where we think a likely point is to see craters that are similar in setting to Shorty, to look for orange material.

08 20 51 31 LMP Okay, Gordy, we'll do that. I've made a couple passes with the binoculars over the dark mantle around Littrow already, and have seen nothing comparable with what's around Sulpicius; but let's have the examples, and we'll make a special effort on it.

Tape 143/2

CC Okay. Have you got the site photo number 2 or 4?

LMP Here it is. Stand by just 1.

LMP Tab on it.

CMP Which one is that, Gordo?

LMP 204.

CC No. Number 2 of 4 of the site photos.

LMP Oh, 2 of 4. Okay. Okay, we got her.

CC Okay. You can see the landing site there at - down about 4 o'clock, and the 7-kilometer crater in the - on the centerline of the page, about a third of the way down from the top, the large bright crater there is - is Littrow B is the name of it.

CDR Got it.

CC And on the southern half of the ejecta blanket from that crater, they're several dark halo craters, which we think are in similar structure as Shorty. We think that would be a likely spot to look for orange material. There's a - Farouk has circled about four or five. They show up, say, at 4 o'clock, 7 o'clock, 8 o'clock, and 9 o'clock out about - from the center - about a crater diameter. In other words, a crater radius beyond the lip, roughly. We suggest that you utilize the best window in your attitude which you should be maneuvering to now, if you - if I haven't completely interrupted the Flight Plan. Is - at that attitude, window - let's see - 1 is the best, and 4 should point up that way also. We suggest you get somebody on the binoculars at 1. And use the same camera setup, with the exception of using the 250-millimeter lens, if you can, that you're going to be setting up for as per the Flight Plan for the orbital science photos. If you can put the 250 on there; use KK as shown; and f/8, 1/250, and infinity - I'll repeat that when you get to it - for the pictures, if you see anything. What we're looking for is orange material.

08 20 55 03 LMP Okay, Gordy. We're working on that now, and we'll get KK out.

CC Okay. We were thinking you might be able to get the guy on the camera in window 4 and the binoculars in window 1.

08 20 55 35 LMP We're coming up on the edge of Crisium now.

CC Roger.

LMP Okay. I think maybe you're right about window 4 possibly being the photography window. If I can get oriented right. I thought you - No. There you go. Yes. It's all set, right here. And, Gordy, I'm going to try to also shoot, if you'll let me, two pictures on KK of that depression - colorful depression we saw near Sulpicius Gallus, if I can see it. Is that okay?

CC Okay. I'll give you a unilateral GO on those two frames, and we suggest you use two or three frames on this area we've been talking about, also, in addition to the scheduled 28.

LMP Okay.

CC If we get short of film or something, Farouk says the last part of this orbital science photos, after you get to the end of the run and change to 1/125 of a second, is kind of marginal for photography anyway.

CMP (Laughter) Right.

LMP Okay. Gordy, you want the pictures whether we think we see orange or not, huh?

CC That's affirmative.

LMP That's very strange. May have to pass you the camera in a hurry, Geno. I looked.

Tape 143/4

08 20 58 00 LMP You know, Gordy, the craters we're seeing around Sulpicius that are orange or - orangish are very clearly orange - orangish gray and the whole, or at least most of the crater is that way. We looked at Shorty today, and Ron said that even the little bit of orange that he saw the other day is not visible, and I'd have to agree with that. The amount of orange we saw on the surface certainly would not be comparable to what we're seeing around Sulpicius Gallus.

CC Roger.

LMP And in a couple of quick scans, on previous revs, of the area, the dark mantle, near Littrow, I could not - I did not notice any obvious orange-gray craters.

08 20 58 57 CC Okay.

CC Just to make - to be sure we're clear on this: We suggest that area to look for them only as a likely spot; but any evidence of craters with orange material, in the whole dark-mantle area around Littrow and the edge of Tranquillity there, is worth noting and getting a picture of, if you see it.

08 20 59 44 LMP Okay. Yes.

08 21 05 58 CMP I don't think there's anything there.

LMP Why don't you take a couple of pictures, then.

CMP Wait a sec. Yes, I've got a few.

CDR Can you take a picture?

CMP Yes.

CDR Did he take a picture ...?

CMP Okay. 5.6 at 1/250, huh?

CMP No, I don't either. I don't see anything comparable at all. You know, the ones that we've been seeing the - definite orange or the light-tan stuff around are pure light ejecta blankets around them, not dark.

LMP Houston, I guess none of us see anything comparable to what is down by Sulpicius.

CC Okay.

LMP And no obvious color either.

CC Roger.

CMP Well, they're comparable to Shorty, but they're not comparable to - they're not comparable to the ones that we've been seeing the obvious orange - -

CDR Yes. The craters are comparable to Shorty, as Ron points out, and - but the color is not there.

08 21 07 44 CC Okay. We'd like to give you a couple of spacecraft chores - like to terminate the charge on battery B, and turn H₂ tank 1 FANs, ON.

LMP Hand me the camera.

08 21 08 04 LMP H₂ tank 1 FANs going ON, and I'll get that charge in just a second.

CC Okay. And just a reminder to go back to f/4 - -

CMP Are you going to be able to get that?

CC - - at 1/250 when you get ready for the orbital science photos. Also, the 80-millimeter lens, if you happen to be - have the 250 on there.

CDR What's the setting for the ...?

LMF Oh, f/8.

CMP Well, we're getting a little close to the terminator. Change to 5.6, Jack, I don't know. No, maybe not.

LMP We're looking down zero phase.

CMP That's right. It's almost zero phase, okay. See. It's just beyond that, I changed to f/4.

Tape 143/6

LMP Yes, but you're going to be looking at the nadir, aren't you?

CMP Yes, that's right. Are you sure we want the - Yes, that's right; 8-second intervalometer for looking at the nadir with the 80 millimeter. Right?

LMP Yes.

CMP Okay. Let me take a look down at the - that mare floor and Dawes. No. That's not Dawes, that's Bessel. Doesn't look like Dawes. Dawes has got a bunch of little - depressions that look like rimless pits in the bottom of it. Bessel doesn't have any of those. It looks - like a bunch of debris.

08 21 10 22 CMP There you go, Gene.

CMP Yes. Yes, yes, I see it.

CMP Yours is on - I see yours, Gene. It's on up there a little farther. Isn't it? But all of these are in the - this is not out in the mare floor of Serenitatis. It's on the hills there, the Haemus Mountains. It's just to the west of the Sulpicius Gallus Rille, and it's an elongate feature than runs kind of north-northwest by south-southeast. Yes.

CDR ... was yours ...?

CMP No, it's not in the mare floor at all. It's up there in the edge of the Haemus Mountains. But that was the same type of material; it has the same color difference as the - the material around the Tacquet Rilles back there. There now, see all those bright orange craters right in the - in the Sulpicius Gallus Rille, up at the north end of it? Jack calls them an orangish-gray; I call them an orangish-tan.

CDR ... out in the mare that's got this - all that -

CMP No. No. Jack, did you get the pictures, good pictures? Because I can take it. See that one - oh, yes - see that one on the mare?

LMP Yes. Good one on the mare.

CMP Yes.

LMP Did you get that one - -

CMP Oh, lost my - -

CDR Okay, here's my orange crater - -

CMP Here, take it.

LMP Let me take a look at it.

CMP Yes, that's it. Yes, I can, too.

08 21 13 27 CMP Yes, Gene, yours is out on the - I got a picture of it.

CDR Are you sure?

CMP Yes, yes, I know. It's got a - -

CDR Okay. It's just inside, just in the foothills.

CMP Yes. Just in the - Wait a minute. Okay, I've got one out in the mare itself. It's got a - strip - -

CDR ... foothills, and I can't take any ...

CMP Well, when we get to - when I see one out there, I'll get it. Yes, I better have because they're getting close to - As a matter of fact, I need it just about right now. Okay?

08 21 14 15 CDR Well, Gordo, we're going - we're going to get set up for Ron's orbital science, but that little classic crater, I could see it again with the - -

CMP ... 1/250.

Tape 143/8

CDR - - with the naked eye. I don't think it's the same one that Ron and Jack were talking about, but this is so classic. It's just out of the mare into the foothills to the - right along our orbital track.

CMP And we're starting with mag 109 for the orbital science on Kilo Kilo, and I don't know what the number was before we started taking all of our (laughter) -

LMP ...

08 21 14 53 CC Okay. We copy that; 109 on a key - on KK.

CMP Okay.

LMP ...

CMP (Laughter) Fortunately. Oh, what? Okay, there's the old Apennines. Where are we heading for on this, Gordy? Can you give me a clue as we go along?

LMP South Imbrium.

CMP Well, yes; south Imbrium's a big thing. Oh, the stupid thing doesn't work. I got that one.

CMP Huh?

CMP I got that one. I took it.

LMP Oh, I don't think you did.

CMP Yes, I did.

LMP Gordy.

CDR Just a little bit on it. This one is -

CC Go ahead.

08 21 16 03 LMP This is Jack. My impression on that rimless, V-shaped depression that had the striking talus on it - that it - it also - there was a spotted,

mottled rim area that has the orangish-tan, or orangish-gray color as the spot. And it looked as if the - in this first - in this pass, and I'll try to verify it if we have another opportunity; it looked as if the more red-gray, red-brown-gray, if you will, material was lower in the section within the walls of the depression. This is a very steep-walled depression, by the way. It has talus streaming down the sides of it, and the coloration streams in this same direction. It looks as if there may be layers or roughly horizontal zones that are - have the coloration that we're seeing, which are forming the talus slopes down below them.

08 21 17 17 CMP Break, break. When do I change to 2.8?

CDR I'll give them to you.

CC Okay, not until you get on up the line, Ron, to Lambert.

CMP Oh, okay. Lambert? Okay.

08 21 12 29 CC And your pictures are pretty much right along the nadir.

CMP Okay.

08 21 20 06 CMP Now I got it. Okay. Yes. It's La Hire Rilles.

CDR Is that Timocharis we're coming up on?

CMP Yes, Timochar - We're over Timocharis now, and then La Hire Rilles are coming up.

LMP Okay. There's Lambert up there - -

CMP Yes. Lambert's right up there, coming up. I'm not sure - well, I don't know what the - just to the south of Lambert. What is that? No, just on the map.

LMP Well, Pytheas, but it's -

Tape 143/10

CMP That way. Remember it's right with the La Hire Rilles. There's one rille that goes right through it almost, and then another one - see, goes northeast-southwest. Oh, I see, okay.

LMP Gordy, getting a good oblique view of Copernicus on this trip. And some of the dark-halo craters that we mapped originally on the north portion of the ejecta blanket, which were similar to Copernicus H, are very clearly darker halo than the - or have darker blankets around them than the ejecta blanket from Copernicus.

08 21 21 45 CC Roger. And Ron should be due to change to 2.8 about now.

CMP Okay.

LMP And this is a good view of the central peaks, although from some distance; and, as Ron and I were discussing earlier, it's not at all clear that that - in fact, that dike does not come through as a - the so-called dike - as a - as a unit that is clearly defined.

CMP Yes. I was looking at it through the binocs last time, and I couldn't really see anything that was really defined as coming on through there.

CC Okay.

LMP There's still a very - there's a very clear distinction between the dark floor material of Copernicus and the hummocky floor material, the dark smooth being in the northwest quadrant.

CMP You know, if Lambert is an impact crater, it's sure awful smooth ejecta around that thing. It only goes out about a half a crater diameter, maybe a crater diameter in some spots, at the most; but it's not rough, it's blocky looking. You know, it's smooth - smooth, undulating -

08 21 23 31 CC Ron, your next camera change is at Euler, which you change to 1/125 of a second.

CMP I think we just croaked. We did.

LMP You out of film?

CMP Yes.

LMP You want that other mag?

CMP Let's load Oscar Oscar in there to see if it will work.

CMP Need the - dark slide. Here. Okay. Where's Oscar Oscar? Whoops. VHBW. There's a -

08 21 24 24 LMP We've got a good oblique view of the Hortensius Domes, and with their nice little central pit craters.

CMP Did we hit the stick, or something? Huh? Looks like we're changing attitude. Well, I'll be darned. I put Oscar Oscar on there and I got but one picture. (Laughter) And it's empty. Well, that's probably right. Those won't come out too good there, anyhow. Too close to the terminator for this kind of film.

08 21 25 28 CC Yes, we agree with that, Ron. Farouk was mentioning that was kind of - beyond Euler was pretty marginal anyway.

CMP Yes.

08 21 26 03 CDR Gordo, that classic crater that I talked about last rev, I picked it up again this rev with the naked eye, and then I also looked at it again with the binocs. If Ron was talking about the same crater, and I have my doubts, he got a picture of it, he said. But the interior - I won't say there's a change to black; it's just dark. I'd say it's probably about the size, to put it in the right perspective, of Shorty, or just a little bit bigger. The inside is dark. By that, I don't mean it's black or anything inside; I just can't really see inside of it. But the - it's a rust-colored blanket that comes out and overlaps on the rims and then has the classic ejecta. And I'm going to take a shot at trying to get a picture of it next rev or sometime when we're in an attitude, because it's too good to miss.

Tape 143/12

08 21 27 03 CC Okay. And, commander, if you can send one of your subordinates over there to terminate the battery charge, we'd appreciate it.

CDR (Laughter) Okay, that's in work.

CMP Seven Bravo. It's 1 point - it's coming up just a little bit. Well, not much, 1 point - well, 1.25.

08 21 27 52 LMP Okay, Houston. Battery charge on B is terminated, and we got 1.25 on 7 Bravo.

CC Okay, thank you.

CMP Here's November November; it may have three or four pictures left. It's on 160. ... me set one up. Oh, we've got Papa Papa for opportunity, huh? Yes. I'll get it.

LMP Houston, are you ready for LASER ALTIMETER, ON?

CC Stand by.

08 21 29 53 CC America, we're seeing some higher than normal temperatures on fuel cell 1. We'd like you to go to panel 226 and check the FUEL CELL 1 PUMPS circuit breaker and also the switch on panel 5. Over.

LMP Well, don't ask me how it happened, but your switch on panel 5 is OFF. Going to AC1.

CC Okay. I guess that's the best news that we could have had on that. And we're ready for the laser altimeter - -

LMP Okay. Hey, Gordy - -

CC - - whenever you get to the attitude.

LMP - - Gordy? Here's one you can explain to me. When I turned that on - well, I guess that - I got a sudden drop in H₂ flow; and then it went up, overshoot a little bit, and now it's steady. I suspect that's what your EECOM friend there will say should happen.

08 21 31 07 CC Yes. That's right, and we see indications that the pump started up.

LMP Okay, that was a good call. I can't - How long have you noticed that, Gordy? Do you know?

CC Well, it's been about 3 minutes, Jack.

LMP Okay. I guess I'm to blame then; I don't know how it happened.

CMP Hey, Houston; America. Do we have any more orbital science photos?

CC Stand by.

CMP I think that was it, but I'm not sure.

08 21 33 32 CMP Okay, Houston. LASER ALTIMETER is ON, and IMAGE MOTION is barber pole plus 4.

CC Okay. Thank you.

08 21 38 00 CC Say, Ron, this is Houston. And there's no more scheduled orbital science photos. We can't seem to run down Farouk to see if he has anything up his sleeves. There are a couple of passes with black and white coming up; one next rev, and then a couple just prior to TEI.

CMP Okay. Looks like what we've got left here, as far as I can tell anyhow, is just - we've got all of magazine Papa Papa, and maybe four or five of them on November November.

CC Okay. And we'll come back to you if there's anything we got in mind to schedule on - on either of those.

CMP Okay. We'll want to save some for after TEI to - shoot back at the Moon.

CC Roger.

LMP Hey, Gordy, that's TEI-1, not TEI-2 he's talking about.

Tape 143/14

CMP Okay, I see what he said.

CC Roger. TEI, period.

CMP That's right.

CDR These guys can call it what they like, but I know what it's going to be and when.

CC America, a little human interest stuff here. We just watched the second charge go off; not just watched, it's been about half hour ago or so. Second charge went off, and we caught it just in the lower left corner of the TV view. It looked like a - to me it looked like a flashbulb went off - flashbulb laying on the ground went off, just a kind of a quick flash. No big shower of dirt or anything that I could tell.

CDR How far away do you expect that one was, Gordy?

CC That one was 600 meters away. And it was a half-pound charge.

CDR Yes, you're still pretty far away over that - yes, you're still pretty far away over that - that terrain that those things are sitting in over there. You're going to probably see something when you look at those that are placed by the end of the SEP and back to the east there.

CC Roger.

08 21 43 51 LMP Houston, America.

CC Go ahead.

LMP Do you need the cryos stirred at all today?

CC Let me see here. Stand by. No. I guess you've been bouncing around there enough. We don't need to stir them.

LMP It won't hurt them, will it?

CC No.

LMP Okay.

CC Showing about 115 beats per minute on the CMP.

08 21 46 38 CC America, we'll take AUTO on the HIGH GAIN.

LMP Okay, you've got AUTO.

08 21 54 20 CC Okay, America, we're about to LOS in 40 seconds. Everything looks good as it always has. See you next time around.

CDR See you Gordy, and thanks for keeping an eye on us.

CC One last frantic reminder to configure the DSE per the Flight Plan after LOS.

08 21 54 56 CDR Okay, we'll get it.

08 22 14 XX BEGIN LUNAR REV 66

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

08 22 40 19 CMP Houston, America. Looks like we're with you again.
CC Okay, America.
CMP ... We've been taking its picture just as we came up.
CC Roger. You're loud and clear.
CMP Okay.
CC America, Houston. I have three one-liners for the Flight Plan.
LMP Is this the same Flight Plan we've been working on up here?
CC I think it is.
LMP Okay, Gordy. Go ahead.
CC Okay, at 218:09, delete MAPPING CAMERA - RETRACT. At 218:30, delete MAPPING CAMERA/LASER ALTIMETER COVER - CLOSED. And at 219:59 - next page - in addition to IR and UV COVERS - OPEN, put in LASER ALTIMETER - ON.
LMP Okay. At 219:59, LASER ALTIMETER - ON; and at 218:30, delete MAPPING CAMERA/LASER ALTIMETER - OPEN; and at 218:09, delete MAPPING CAMERA - RETRACT.
CC Okay, that second one was deleting a COVER CLOSED, but I'm sure that's the one you got. MAPPING CAMERA/LASER ALTIMETER COVER - CLOSED. And that laser altimeter, we'll just leave her run through the sleep period.

08 22 45 03 LMP Okay.
CMP Can't see it, sorry.
CMP May have. Smythii may have, on the thing. I still want to talk a little bit about these polygonal craters and Smythii. The one right above rev 62 picture on the thing, there's definitely kind of a, an undated (sic) old depression there with a

Tape 144/2

mare, very smooth mare floor on the thing. With two, - two old craters. And, that is definitely a younger flow than whatever made the polygonal craterlike depression. Right above the rev 62 number. The thing that bothers me about that is that they, they almost - oh, looks like if you threw a rock in the mud, you know - made a mud pie, and you get a wave or a ripple going out from there. In other words, you've got a high wavefront going out from a circular direction with a slightly sloping up to that wavefront. That's on the inner ring on the thing. The outer ring, of course, is a typical-type ring that you get from an impact type of an operation. It looked like the rough-looking floors of those rings, ring basins, essentially have the same albedo, the same characteristic, as the rougher looking floor in the Mare Smythii itself.

08 22 49 17 CC

Okay, Ron.

CC

We'll take HIGH GAIN to AUTO.

08 22 49 30 CMP

Okay, you have it.

CMP

And, I took a picture of that one in Smythii - is frame 160 on mag November November, and the reason I took the picture is really because on the western edge of the big basin it looks like there's a small impact crater, but it's only been dished out in the more recent flat dark-gray mare material. (Music in background) And looks like when it comes to the edge of the original basin ring, that part is not ejected out at all. So, essentially, you have a cone-type depression with an impact crater. The material's only been excavated in the - in the newer mare material.

CC

Okay, understand that. Say again, where that one is?

CMP

Yes, that's the one above rev 62 or directly north of the Wright Brothers(?), in the 12:00 position from the Wright Brothers.

CC

Oh, okay.

CMP You know, Houston, we're just passing over a little polygonal crater that's maybe 15 kilometers in diameter - 15, 20 kilometers in diameter. It may be 10 to 15 - and down in the basin of it is a kind of a polygonal fill. It, again, has that dark greenish-black rock that is collected down at the bottom of it, and you also see it streaking down the side of it. But, I think one of the most significant features about the crater itself is that it has a swirl, and these are honest to goodness - they look like swirls rather than rays. It has a swirl pattern around there - it's radial, from that most recent impact.

08 22 53 44 CC

Roger, Ron.

CC

America, Houston, we haven't got data right at the moment because we are in a skin reflection zone. We'd like you to hold the pan camera to STANDBY until we call you.

LMP

Thank you.

CMP

Okay.

CMP

It's near - just see Yerkes. Come down from Yerkes. Yerkes is the subdued crater up there. Come down from Yerkes, and then there's a little one about 10 kilometers in diameter; and, then a big one that's about 50; and, then there's a bright one. Okay, and then - -

CMP

Yes, and then right - let me see, kind of north-west of that bright one, about a crater and a half diameter from it - is an orange-ringed crater, again.

CMP

See it - right, right, just a - bright one just about a crater and a half diameter from the bright one. See it? See, it's an orange ring on it, isn't it? That's the one we were talking - - I'll get it. Yes.

CMP

Yes, I know it. That's right. It's not a classic, but it's another example of an orangish-tannish - Say what? See that bright crater down there. Just about a crater and a half diameter to the north of it - f/8 at 250 - that ought to set it. And Houston, that was frame 162.

Tape 144/4

CC Okay, Ron.

CMP Yeah, we - -

CDR And, the frame just before that - I took of a ridge just on the southern edge of Crisium, - the pattern of the massifs in that area were very impressive, but two frames just before that.

08 22 58 38 CC Okay.

CMP Houston, just one other question. I was looking around here at my film, and I got mag Victor Victor, which is VHBW for the Nikon. And looking through the Flight Plan, it doesn't look like we're going to be able to use that anytime. I just wonder if we might be able to use it for some of these terminator photos?

CC We'll check on the film. We'd like you to go WIDE for 10 seconds and then back to NARROW.

08 22 59 50 CMP Okay. There's WIDE. Looks like that did it.

CC Okay, Ron. The HIGH GAIN looks good; and, on the film - it's your option on that magazine. There's no scheduled usage.

CMP Oh, okay, thank you.

LMP Okay, you want PAN CAMERA POWER, ON, now?

CC That's affirm. We're ready now.

08 23 00 45 LMP Okay, it's ON.

SC ...

CMP You want to get it, or I'll get it?

CC Okay, America. We'll take PAN CAMERA POWER OFF, now.

08 23 03 17 LMP Okay, it's OFF.

CMP The landing site?

CMP No, the optics are up in the air all the time on this SIM bay stuff.

- LMP Houston. Areas in the landing site where we now know there are extensive blocks of the subfloor material, particularly in the walls of the larger craters, I have the impression that those block fields, from this altitude, give a light bluish-gray appearance.
- CC Roger, Jack.
- LMP I don't know how far we could extrapolate that in other craters, but we might start trying a little bit.
- CC Roger.
- LMP Following that a little bit farther, looking into Dawes, the lower talus slopes of Dawes have about the same hue and are overlaying the first by a zone that's producing - or several ledges that seem to be producing white talus and then above that is the - or make that very light-gray talus - and above that is a tan-gray talus slope that carries right up to the rim of Dawes. So, there are three distinct major stratigraphic units showing up in the talus slope in Dawes that I can see.
- CMP Jack, can you see any holes in the - square holes in the floor of Dawes, there?
- LMP Wait a minute. No, I was, I guess I was talking about the crater northeast of Dawes - Let me check Dawes with the same sequence.
- CMP No. Dawes is the little one down there. That other one is - -
- LMP Okay, take it back again. That was Dawes I was talking about.
- CMP Yes.
- CMP Jack, you using the binocs?
- CMP Yes, I talked about Dawes already but - No, those aren't holes down there, those are just great big - great big blocks that have fallen off the side of the mountain. Side of the - Okay.

Tape 144/6

- LMP Okay, between the tan gray and the very light gray there may be another thin and possibly intermittent zone of a - just a plain, apparently gray unit forming in the talus slope.
- 08 23 08 16 LMP And the crater to the southeast of - southwest - excuse me, of Dawes - large crater, I'll get the name in a minute, you see the lower bluish-gray unit and - and the next white unit or light-gray unit up, but the brown-gray unit is not nearly so evident at the top. In fact, I didn't really say I could recognize it there at all. I'll have to check that one, though. Put a query by it.
- CC Roger.
- CMP That's Bessel you're talking about. The top of Serenity?
- LMP No, no the one back.
- CMP Oh, Plinius.
- LMP Plinius?
- CMP Plinius is that rough-looking one. Yes.
- LMP Yes. That was Plinius I was talking about.
- CMP Oh, Yes. ... the oranges. Yes.
- LMP And, the next large - well, it's not large - not as big as Dawes, it's a reasonable-sized crater that to the west, the talus is largely just white debris on the slope of it. But, it doesn't look like it penetrated nearly as deep as the other two we're talking about.
- CMP Ah, Menelaus Tacquet is the one that is out - right underneath us right now. And then Menelaus is right on the edge of the Serenitatis Basin before you get to the Haemus Mountains.
- LMP Okay, looking at Menelaus, you can see where the dark - the edge of Serenitatis goes through the crater. And, the north wall is quite distinctly grayer to - let's say, bluish-gray, than the south wall, which is light - very light gray in the talus. My guess is that it's a very nearly vertical contact at that point.

CC Roger.

LMP At least that's the way the talus suggests it, but talus does move vertically. Looking at the depression with all the color streaking in the talus on the walls - there - I'll say again, that the more red-looking unit, or talus, is coming from below the orangish-gray material. But it is not a continuous horizon, at least not so far as the talus indicates. It's local spots that are giving the reddish color.

CC Okay.

LMP Gordy. That particular depression doesn't look like it's an impact-generated depression at all.

CC Roger.

08 23 13 02 CMP You know, we sure got to look and see if those things still look orange tomorrow. Because, yesterday, Stoney looked kind of orange there - on the northeast rim: but, it sure doesn't today - Shorty, yes. It pays to learn the names of all those craters you guys named down there.

CMP Oh yes. I know quite a bunch of them.

CMP Hey, we'd better, hadn't we. Black and - D-Caldera is what I called it.

LMP Yes, Ron's D-Caldera - I'm just correlating apparent colors now, or hues. And, the lighter-colored material there is comparable in hue to the subfloor color at the landing site.

CMP The first one's f/32 at 1/500. Tobias Mayer.

CMP ... A window.

LMP Window 5.

CMP Window 5? Okay.

LMP What's the frame count ... surface?

CMP Count is 55 now on Romeo Romeo, Houston. No, not until we come up to Tobias, just before Tobias Mayer.

Tape 144/8

CDR Be able to pick that up there about - -

CMP On the other side of Copernicus.

CMP Right after 218. Okay.

CC Roger that, Ron.

CMP (Cough)

CC Ron, this is Houston. Do you want any help from me calling the f/stop changes on this P66 run? Or do you want to do it on board there?

CMP Why don't you give me a little help there. Just kind of reminders? So to f/11 about Tobias Mayer, I guess, and, then -

CC Okay. Then f/8 and a 1/250 is at Brayley D.

CMP Yes, right.

CC Are you shooting pretty much straight down or out in front, on this one?

CMP Let's see. We're pretty much straight down on this one.

CC Okay, I've got a real-time plot of your longi - yes, longitude here. So I can call right on longitude.

08 23 17 59 CMP Oh, okay. Yes, I started before Tobias Mayer.

CMP There goes - What's there? Eratosthenes, okay.

CMP Yes, about right in here it's a good place.

08 23 23 14 LMP Okay, Houston, back to talking about colors a little bit. It looked as if lower talus is more - -

CC Hold 1, Jack. It's about time for f/11 - -

LMP Go ahead.

CC ... Ron.

CMP Okay, f/11 at 1/500.

CC That's affirmative.

LMP Euler is - lower is blue-gray and the upper is a very light gray, from the talus slope up to the rim.

CDR Houston, I can just start to see the peaks of Euler now - exposed in the central peak - the tops of them exposed in the sunlight, and it looks like there's massive quantities of large boulders on the - on the peaks.

CC Roger, Gene. Okay, it must be about time for f/8 and 1/250.

CMP f/8 at 1/250, okay? That's my little sea - crater chain down there. Looks like a cinder cone chain. Right (cough) between Tobias Mayer and Euler.

CC Roger.

CC Okay, try f/56 and 1/25.

CMP 56 at 1/25. Is this the last - -?

CC Last setting, right, and you should finish up there at Tobias Mayer W.

CMP Okay.

CC Or a little beyond.

08 23 26 34 CDR Houston, the MAPPING CAMERA is coming OFF.

CC Roger.

CMP Okay, Houston. We ended up on frame 80, magazine R R.

CC Okay, Ron.

08 23 27 27 LMP Okay, Houston, MAPPING CAMERA - STANDBY, now. IMAGE MOTION is OFF and LASER ALTIMETER - OFF.

CC Roger.

Tape 144/10

LMP Houston, what do you read our GLYCOL EVAP TEMP as? I tapped the gage up here and got a little bit of upward jump in temperature. Just curious how much a hang up it was.

CC Stand by. Okay, we show 66 EVAP out TEMP.

LMP That's exactly what it jumped to. Okay.

CDR Gordo, I'm interested. How have you been reading me most all day today? I've been on lightweight headset, all the time.

CC I'd say you're fine, since I've been on. Let me check you the rest of the day.

CDR No, it would be the same all day. You're - you're as good a data point as any. I haven't really tried to make any effort to talk into the mike or anything, I just been talking around it, and if you're satisfied, I'm happy.

CC Okay, sound gooded [sic] all day. No cutout or anything - no problem.

08 23 31 43 CDR Okay.

08 23 37 25 CDR Houston, America. The canister's changed.

CC Okay, Gene.

CMP I think you can stand by for some small torquing angles on this one. Right within the center of the sextant.

CC Okay.

CMP Well, I did get 5 balls that time; but, that's not bad.

CC We'll buy that. Well, the Z-axis here looks pretty good, anyway. You're clear to torque.

CMP (Laughter) Okay. We'll torque at 21 - I missea 30 - Let's go to 21:45.

08 23 41 40 CC Okay.

Tape 144/11

CC America, Houston. Request the H₂ tank 2 FAN, ON.
Over.

08 23 46 25 CMP Okay. H₂ tank 2 FAN is ON.

CC Okay, and the waste water dump that you'll start
after LOS should take 11 minutes, if you want to
set your kitchen clock. Also a reminder, this
time after LOS we go to REACQ. Over.

CMP (Laughter) Okay. Thank you. Will do. We'll go
to REACQ.

08 23 49 04 LMP Houston, the IR/UV COVERS are CLOSED.

08 23 49 05 CC Okey-doke.

09 00 12 XX

BEGIN LUNAR REV 67

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 00 37 47 CDR Hello, Houston; America.

CC Hello, America; Houston. Glad to have you back.

CDR Well, we got a good one for you, Bob. Not too good, but - In the midst of other things, we let the waste water go to zero on that dump. As a matter of fact, it went past zero. And the ... is starting to fill up again, and the best we can tell onboard, that - it shouldn't disturb anything, but you might take a good look at it.

CC Okay. We've got our moon beside me taking a look at it.

CDR Okay. How are you doing tonight?

CC Not too badly. I'll have you know, it's clear down here. We saw the Moon for the first time since launch day. It's getting bright. It looks like you must be somewhere over the terminator on Imbrium.

CDR Is that right?

CC First time we've seen the Moon since launch day.

CMP Oh, we just - Oh, it's beautiful. Your weather has been that bad, huh?

CC That's affirm. Fog and drizzle and rain and rain and rain.

LMP How much older do you feel, Bob?

CC About 1 day. Okay. And, America, we'd like H₂ TANK 2 FANS, OFF. H₂ TANK 2, OFF.

08 00 39 15 LMP They're OFF.

Tape 145/2

CC And, America, as you can tell from the Flight Plan, we aren't expecting too much from you guys this rev. And we aren't expecting to send up too much to you guys either. A reminder that we won't be asking Gene and Jack for their PRDs tonight, but we certainly would like them in the morning. So you might take that into consideration. And we'll be sending you a few up-links there for the Flight Plan at 220, both the state vector and the EMP 523. We also have a clock update for you - that we'll send up, and it's a 0.04 seconds; so it's another biggie.

CDR Okay, Bob. We'll make an effort to get those PRDs. We can get one of them, probably, without too much trouble. But it's a case of restowing both those suits to get the second one, we're not going to get it until EVA day. I'm sorry, but that's it.

CC We copy that. I guess they're back stored in the L-bag, huh?

CDR Yes, sir.

CC Okay. And we'll want the onboard read outs there at the bottom of the page, just before you go LOS. And I might pass up one little piece of news - very local news here - concerning us members of the Orange Team. We're all extremely proud that you and Jack chose to call the soil you found the other night, while we were on shift, the Orange soil because we take it as an obvious honor for the Orange Team to have been on shift at that point.

CDR Bob, you know our intent was certainly well meant. We certainly are glad you appreciate it.

LMP I detect a certain amount of skepticism whether it's really orange, though.

CC It looked orange on Ed's TV.

CDR Did it really? Could you see the color and all?

CC Well, so did the blue ocean on the Earth, and so did the white suits and everything else; but they looked orange on Ed's TV anyway.

LMP Is Ed on tonight?

CC We don't have any - No, we've seen the two - only two charges for the day. We don't have another charge for, I guess, about another 24 hours or so.

09 00 42 22 CDR I think I understand.

CC Roger. Ed is on the Orange Team, however.

CDR Bob, I would like a word from you, though, as to whether or not you think there is going to be any problem with that waste water dump to zero as I said. We don't, after looking at it.

CC No, we aren't expecting any problem. They're looking at it. They're kind of amused, but they're looking at it. And I'd like to pass up to you fellows, it's - -

LMP ... an interesting.

CC Go ahead.

CDR All right. Nothing, Bob.

CC Okay, I might also tell you fellows, in case nobody told you yesterday, that we tracked the LM on ascent for 30 seconds. Beautiful pitchover. And we saw you going away from us after pitchover for 30 seconds. It came out quite well.

CDR Yes, sir. We heard that. Good. I guess I was able to find 102 at 0.1

CC In fact, Ed calculates that you were 480 feet-480 feet - from the lens. As they say, too far is better than too close.

CDR Well, I was just going to say I cheated a little bit. I made two stops and backed up a little bit out there.

Tape 145/4

CC You backed up, huh? That's another first, isn't it?

CDR No, I didn't back up that time. But I did back up.

09 00 44 54 CC We heard that one at station 7 - yes, 7, wasn't it?

CDR No, that was somewhere during EVA-2, I can't remember where.

CMP Houston, fram numbers 40 through 43 are timed sequences of the waste water dump as we were in the sunlight.

CC Okay. I copy that one.

CDR And, Bob, just give us a call when you want the computer.

CC Okay. It's about another half hour or so, I guess, when we're ready. It will be about 220. And, a reminder, we got - at 220 there we're going to go LASER ALTIMETER, ON and the IR and UV COVERS, OPEN as per your Flight Plan there.

CDR Yes, sir. I got LASER, ON and IR and UV, OPEN.

09 00 47 24 CC Right.

09 00 55 27 CDR Hey, Bob, while it's sort of quiet, anything of a news worthy - or noteworthy news happen today?

CC Okay. Stand by on that. From my recollection this evening, there really wasn't anything; but I'll check. Did you guys get a news briefing this morning?

CDR Yes, we did.

CC Okay. We got some news coming over, and we'll have it here before you go around the horn. Might just, while things are quiet also, pass up to you that, if you run out of the command module film

there, you do have two - You've got some LM surface film left, as I'm sure you're aware. And two mags in particular, which look fine to us, are mag Barabara and mag Karen. Barabara has 500 frames of CEX, and Karen, 100 frames of black and white. Excuse me, 50 frames, not 500, of CEX. And 100 of black and white. These mags have never been fit checked - on the command module cameras; but we believe that they will, along with - as long as we take precaution because the locks don't work the same, ... on the command module on the LM cameras, number 1. And number 2, the focus won't be quite as good as on the - with the LM cameras. However, it will be satisfactory. So there's 150 frames there you might want to take advantage of in those two mags. We think those are in Romeo 2 - stowage Romeo 2.

CDR Yes, yes. We've already inventoried those. And we've got our hands on them. However, we - Bravo is empty. We used it coming up in the rendezvous and docking.

CC And just in case you got some left over, I want to shoot some of that black and white on the Moon. We got some instructions for you, which we can call up in real time, if you want to do it - different exposures. The CEX will be the same, of course, as the CEX that's in the command module.

LMP Okay. Bob, what factor on the black and white would you use?

09 00 59 23 CC Okay. Jack, if you use them, use them, use the same sort you have onboard for the CEX, but you cut the shutter speed by a factor of 2. So it's - for instance, you'd use a 1/500 instead of 1/250 - and so forth. Over.

LMP Okay.

CDR Say, Bob, I don't think - At least I haven't heard anything concerning the home front for about 4 days. You haven't, by any chance, had any contact, have you?

Tape 145/6

09 01 01 42 CC

As a matter of fact, I haven't. And Gordy didn't talk to them tonight. And - in fact, Gordy and I talked about it on one of your - when we were doing the changeover, and I thought, well, it doesn't look like an opportune time to call up and find out right now. If you like, I can. I'm not sure whether they're still up or not; or I can leave instructions for Overmeyer in the morning to round people up and see what's going on. Oh, I'll make sure Overmeyer does it in the morning.

CDR

No. Don't worry about it, Bob. I was just curious. I - No news is as good as good news.

CC

Yes, that's my presumption. I kind of thought the daytime people would have taken care of that. It's not the best time in the morning to call up right now. I'll make sure Overmeyer calls in the morning and checks on it.

CDR

Gordy gave us a briefing on the SIM bay and on the lunar surface experiments. And it sounds like all that good liaison work you did paid off. Sounds like most everybody is pretty satisfied.

CC

As far as I can tell, that's right. We - we try there, fellow.

CDR

We thank you.

09 01 03 19 CC

What can I say? We thank you guys, too.

09 01 19 21 CC

Okay, America; Houston. We're ready for a little action there in the SIM bay.

CMP

... is on.

CC

Copy that. You just beat us by a minute. And if you guys will give us - -

CDR

It's already on, Bob.

CC

Roger. And if you guys will give us the computer, we'll send those updates to you.

Tape 145/7

CMP Okay, you have the computer.

CC Okay. And if you guys want to sit and listen, I'll broadcast you what's possibly the world's shortest newscast.

CDR Both covers are open and gray, Bob.

09 01 20 56 CC Okay. We copy that.

LMP Go ahead, Bob, on the news. We were waiting for you.

09 01 21 09 CC Oh, okay. I was waiting to see if you guys were ready to listen to it. The first item - which has been a continuing item here during the flight - In Kansas City, former President Harry S. Truman's condition continues to deteriorate as doctors are unable to restore his vital kidney functions. On the Paris peace talks scene, there has been essentially no apparent further developments today. It continues about the same. And in New York, police are red-faced, it says, when it was learned that more than 50 pounds of heroin originally seized way back in 1962 - this is part of the French Connection business - has been stolen from the police building where it was being kept as evidence. And a last local news item. Three prominent Houston men are missing. They were last seen in person at Cape Kennedy in Florida on December 6 but were apparently lost among the 500,000 people who watched the launch of Apollo 17. The following appeal, it says, is issued in case they are listening: "Gene, Jack, and Ron, - come home. And if you pass a fellow with a bushy white beard and crimson suit, advise him you'll be home before Christmas." That's the extent of the news.

LMP We saw him the other morning briefly, Bob. And all four of us will be around at the right time.

09 01 22 37 CC That's good news. We'll pass it on.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 01 25 38 CDR Bob, I've got some onboard readouts if you want them.

CC Okay. We're ready to copy.

CDR I'll just give them to you - okay - I was going to say - I don't know if you've got - yes, in order - 36.7, 37, 37. RCS is 68, 61, 65, and 66.

CC Okay, we copy that, and we'd like a battery manifold pressure reading. That's 7-A on the selector down there. Seven Alfa.

CC And, America, the computer is yours again.

LMP Bob, 7 Alfa is 1.4.

CC Copy, 1.4. And did you copy the computer is yours?

CDR Yes, sir. We got it.

09 01 38 09 CC Okay, and, America, we'd like to configure our H₂ tanks for the night. TANK 1 to OFF, TANK 2 is already OFF, and we'd like TANK 3 to AUTO.

CMP Okay, Houston, you've got - TANK 1 is OFF, TANK 2 is OFF, and 3 is AUTO.

CC Okay, thank you.

LMP Houston, 17.

CC Roger, 17. Go ahead.

LMP Roger. As you - we approach having earthset, you might be interested to know, being an astronomer, Bob, that we're getting a very bright specular reflection off the Earth now from the Sun that produces - reproduces the Sun's image quite well.

Tape 146/2

09 01 43 03 CC Very good. And we're about, between 4 and 5 minutes from losing track of you guys tonight, and you're GO for LOS and GO for sleep and we won't be saying anything more to you coming around the horn, but we'll be up listening to you though. But we'll consider you guys as going to sleep on the back side. Over.

LMP Okay. Well, we're moving in that direction, partly to get the cabin cooled down. And we'll probably talk to you in the morning, before very long.

CC Okay, well then, open the windows to get it cooled down too much, there.

LMP By the way - Okay.

CC And while you guys are sleeping tonight, you might be glad to know that the old Orange Team will be sitting around the fireplace here and they'll all be singing Christmas carols.

CDR That I believe.

LMP Is Stan serving coffee to you?

CC We're holding out out for egg nog tonight.

CDR Well, good night, Robert.

CC Good night, Geno.

LMP Well, that would be appropriate, I don't - you know - I think it's about time they treated the MOCR to something.

CMP Good night, Robert.

CC Good night, Ron. Say good night, Dick.

CDR Good night, Dick. And we'll see you in the morning, I guess, Bob, if you're still around. If not, we'll see you tomorrow about this time.

CC Okay, and by then you'll be headed home.

Tape 146/3

CDR Yes, sir. And if my homefront's listening,
I just want to say good night and sleep tight.

09 01 46 47 CMP Bob, that's the most beautiful crescent Earth I've
ever seen.

09 01 46 55 CC It's a nice place to come home to, guys.

09 02 11 XX BEGIN LUNAR REV 68

END OF TAPE

Tapes 147-150/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 04 09 XX	BEGIN LUNAR REV 69
09 06 08 XX	BEGIN LUNAR REV 70
09 08 07 XX	BEGIN LUNAR REV 71

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 09 30 51 (Wakeup music: "Light My Fire")

09 09 33 58 CC Good morning, America.

CC Good morning, America.

CC Good morning, America, and we'd appreciate HIGH GAIN to AUTO so we could talk to you all the way through LOS.

09 09 35 49 CDR Okay. We've got to get the guy on watch up here in a minute.

CC Time to put your feet on the floor and a smile on your face and face another day in lunar orbit. The last one.

CDR They're there, but our fellow on watch is still asleep.

CC Roger. Would you like to play the music again to wake him up?

CDR Apparently it has no affect. Good choice, though.

CC We're going to light your fire today, babe.

CDR Okay, let me try to get AUTO without waking him. Stand by.

09 09 38 54 CDR Hey, you better play the punch line of that song again. Nobody believes you did it.

CC Gene, just before we get the lunar sound - Say again - before we get the recording going again, just remember you'll have to go MANUAL then WIDE in a normal acquisition at AOS. And the angles on the dial are correct.

CDR Okay.

CMF Hey, good morning.

CC Sound a little groggy.

Tape 151/2

LMP Good morning, Robert. How are you doing this morning?

CC Things are great. Stand by.

LMP A little Navy ~~groggy~~, I think's what you mean.
(Music: "Light My Fire")

CC That's for the CMP. Do you believe it now?

CMP Yes, I heard it that time.

CDR Beautiful, Bob. We're going to get your picture as you set this time. Right out number -

CC Is that from on board?

CDR Say again, Bob.

CC Did you have that tape on board or is that just a back - But we've got the song again in our background here. Or do you all have that?

CDR No, we had it; and I think it's very appropriate for today. And that's exactly what we're going to do.

CMP No, we didn't play it back to you.

CC Okay, it's just ... comm - -

09 09 40 51 LMP That was those other guys.

CC America, Houston. You've got about 3-1/2 minutes until LOS, and you're looking good. All systems look good to us. And have a good breakfast, and we'll see you on the other side.

09 09 45 12 SC Okay, Houston, ...

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 10 06 XX

BEGIN LUNAR REV 72

09 10 33 14 CC

America, Houston. Realize you're eating and don't want to interrupt you, but if you get your headsets on, we'll give you some news.

CMP

Sound great, Houston. We'd appreciate that.

CDR

Go ahead, Bob, we're listening to you.

CC

Okay, let's give you the really important news first. Went around the horn here, and over in Nassau Bay, everybody's doing real fine, and it looks like Tracy's going to go out and visit one of our bigger amusement centers around the country and going to have a great day. And everybody just looking forward to the EVA and the deorbit and the splash. Out in El Lago - everybody's fine out there, Ron. And John's out selling Christmas trees today and Jaime's going to go out shopping with her aunt sometime today and - a little Christmas shopping - it's getting near that time of year. And one of your friends from Phoenix is due in today, for the rest of the mission, I guess. And out in Tucson, it was a little early this morning, Jack, but everybody's up and about and I talked to your mother, and everybody's fine. She's getting anxious to go back to Silver City and see all the celebration. I guess those people out there are really enjoying it and really getting wild about it. But everybody's fine all the way around, all the way around.

CDR

Thank you, Bob.

CC

Okay, we'd like REACQ and NARROW.

LMP

We're fine up here and I'm sure you told them that.

CC

Oh, I didn't have to tell them that. They're listening. They heard everything already this morning - at all three places.

Tape 152/2

CDR Well, we send our good morning on our last wakeup day from the Moon.

CC Okay. Here is a summary of the late news as compiled in the MSC Public Affairs Office. If you'd like it, we're ready to go with it.

LMP Okay, we'd love to have it. Go ahead.

CC Okay, everyone - everybody is talking about the success of the Apollo 17 mission here in Houston, and the weather. It was cold this morning. Some thermometers in the Houston metropolitan area were in the mid-20's. The lowest official temperature for the city of Houston was 31. I might add Ellington had a recorded 29. A huge high pressure system is dominating the midsection of the nation. Barometric pressure reached a high of 30.7 in the Houston area this morning at about 5:00 a.m. With strong gusty winds, the chill factor was a 5 above in Houston, and about a minus 10 degrees in Galveston. Man, that's cold. The national Christmas tree was lighted last night in Washington by Vice President Spiro Agnew. A small crowd, braving cold and rainy weather, watched as the Vice President threw the switch to light up the 70-foot spruce that came from Medicine Bow, Wyoming. During the ceremony, Mr. Agnew said we must remember the many servicemen who are missing in action or prisoners of war in Indochina and pray for them this holiday season. North Vietnamese peace talk negotiator Le Duc Tho has told newsmen he is very optimistic about prospects for an early cease fire in Vietnam. Before leaving Paris, Le Duc Tho said he will remain in very close contact with Dr. Henry Kissinger. Dr. Kissinger is in Washington. A Paris radio station has said a peace pact signing is imminent, but the report has been denied in Washington. Former Treasury Secretary John Connally says he expects to get a call from President Nixon shortly to carry out some foreign visits this coming year. One assignment may be a visit to Moscow. John Scali, a former newsman from ABC and a special consultant to President Nixon, is expected to be the next U.S. Ambassador to the United Nations. A formal

announcement from the White House is expected in a few days. An explosion has taken the lives of 21 men in West Virginia. The blast occurred at a steel-making complex near Weirton, West Virginia, on the Ohio River. President Nixon has given the green light for a pay raise for all Federal employees. The across-the-board increase of 5.14 percent will benefit both civilian and armed forces personnel. A 747 jumbo jet, while taking off out of Miami International yesterday, went through a flock of birds and reportedly lost - had an engine go out. The pilot turned the aircraft around and went out over the Atlantic and burned down some fuel and landed at Miami, but skidded off the runway, hit a concrete culvert, and sheared the nose gear. A few passengers fainted, but only 4 were injured when they went down the slide.

09 10 38 12 CC

The unexpected always deserves some attention. The small community of Westwood, Kansas, a suburb of Kansas City, will send back a check it has received from the Federal government in the Federal-revenue-sharing program. Major Joe Dennis said Westwood just didn't need the money. On the regional and local scene - I just might add - I see it's not here, that President Truman's condition seemed to deteriorate some last night, but he is still not listed on the critical list, he is serious. Miss Ima Hogg, the 90-year-old founder of the Houston Symphony, was honored at a gala birthday party last night and cake-cutting ceremony at the symphony. And little Tomball, Texas, has had police trouble, but nearby Pasadena doesn't seem to have any. Thirteen new pretty policewomen have just joined the suburban police force out in Pasadena. And Jack, here's a special for you. If you ever get tired of cracking rocks, why not try politics? A geologist, J. Leonard Davidson, is going to run for mayor of Houston during the 1973 election. And we also received word this morning that an elementary school in Silver City, New Mexico, is being renamed for their most illustrious graduate. It will now be the Harrison H. Schmitt Elementary School in Silver City, New Mexico. A couple of new college coaches have been named. Dave Smith has been named the new coach of Southern

Tape 152/4

Methodist. Up in West Lafayette, Indiana, a veteran coach has been named to improve football fortunes at Purdue. Alex Agase, former head coach at Northwestern, will take over the Boilermakers. Kent Nix is expected to get the nod as starting quarterback for the Oilers against the Cincinnati Bengals in the final game of the year. Pastorini is still out with a pulled hamstring muscle. The Houston Rockets dropped their basketball game with the Baltimore Bullets last night by a score of 94 to 91. Purdue beat Western Kentucky last night 91 to 75. Friendswood High School was eliminated last night in the Class II-A semifinals as they bowed to Boling at Rice Stadium 33 to 7. And a final in the news today, Marian Rice Hart, the 81-year-old American aviatrix, says she has at least two more years left for flying. Mrs. Hart is currently flying around the world in a single-engine Beechcraft Bonanza. She is presently in Katmandu, India. That's all from Editor Jim Kukowski here. A special hello from the Spaceflight Tracking and Data Network crew around the world.

CDR Thank you, Bob, and our hello and thank you to the tracking team. We sure have been able to work well with them, and communications have been super.

CC That's real great. I'm sure those words will be appreciated up at Goddard, and around the world, of course.

CDR Well, like a lot of other people - you know - you can't do it without them.

09 10 41 36 LMP Bob, this is Jack. My appreciation and thanks, for an unnecessary honor, to Silver City.

09 10 41 42 CC Roger, I'm sure they're listening out there, and just glad to do it.

09 10 48 20 CMP Hey, Houston; America. How do you read now?

CC Read you loud and clear, Ron.

CMP Okay, I've got the commander's menu for you.

CC We're listening.

CMP Okay, day 10, spiced oat cereal, mixed fruit, cinnamon toast and bread cubes, instant breakfast, tea, grape juice, and bacon squares, vitamin. For lunch, frankfurters, two pieces of bread, catsup, orange drink, and a package of pecans. Okay, for meal C, turkey and gravy, orange juice, and lemonade. Okay, for the medical log - commander's - 17052, 5 hours of very good sleep, no medication, and three cans of water. Okay, for the old LMP. Food, cinnamon toast and bread, instant breakfast, coffee, fruit cake, grape drink, peach ambrosia. Meal B, frankfurters, one piece of bread, orange drink, sugar cookies, grape drink, and coffee. Meal Charlie, turkey and gravy, caramel candy, and orange juice. Okay, LMP medical log - the old PRD is still at the bottom of the sack down there. Had about 5 hours of sleep, no medication, and two cans of water. Okay, the command module pilot had to eat: spiced oat cereal, mixed fruit, instant breakfast, coffee, grape punch, cinnamon toast and cubes, brownies, vitamin. For lunch, four frankfurters, two pieces of bread, catsup, chocolate pudding, grape drink, coffee. Meal C, turkey and gravy, chocolate bar, orange beverage, and pork and potatoes. Okay, CMP medical log - 15050, about 5 hours of sleep, pretty good - once I got to sleep. For medication, two sniffs of nosedrops, each side, prior to retiring, and four cans of water. Over.

09 10 52 43 CC Roger, Ron; we got all that.

CMP Okay.

CC Ron, could I jog your memory a minute back to the HF antenna extension period after docking?

CMP Go ahead. We'll try.

Tape 152/6

CC Roger, Ron. We've been chasing a data dropout glitch and we just wonder - trying to cover all bets. When you were extending HF ANTENNA 1, could have you gone to operate on the immediate switch next to it, which is the LUNAR SOUNDER switch which was right next to 1? Could you have gone to OPERATE for a minute or 2 without realizing it while your hold - holding 1 to EXTEND?

LMP Stand by, Bob. Which extension anomaly are you talking about, the one prior to rendezvous?

CC No, the one after rendezvous and docking when we were putting them - they're out now and when we put them out - when we were putting them out and were extending HF ANTENNA 1, the LUNAR SOUNDER OPERATE switch is immediately next to it, and I realize HF ANTENNA 1 is a momentary switch. When you were holding it there, could you have gone to OPERATE on that LUNAR SOUNDER switch?

LMP Bob, I don't think so. I - no. No, I don't think so.

CC Okay, we'll keep track of that.

LMP I would have had to - I would have had to been gone - I would have had to been gone to the - OFF position too, I guess, right after that, and I think I'd remember that.

CC Yes, that's affirm. You would have had to go to OFF, there. And I didn't feel it, but Joe needs - you know we got a data glitch - it's nothing serious - no problem - but they're just back there trying to track down all little glitches and that - that seemed to be the only thing that could add up right now.

LMP Sure, I - I understand. I understand. Yes.

CDR Hey, Bob, have you had any more charge firings on the surface?

CC I don't believe so. When I came on shift, they mentioned that the LCRU wasn't working right, now, and they were trying to work it.

CC Okay, just for an update, we fired 6 and 7 last night and we'll be firing 1 at about 1 o'clock this afternoon.

LMP They all went off okay, huh?

CC Yes, and 4, 1, and 8 go off today. And we're seeing good results, Jack, on all the data.

LMP Okay, has Bob Kovach gotten any depth to the debris cover or to anything below it yet?

CC Let me check that out before I give it to you, piecemeal here. We'll check it out.

09 10 56 32 LMP I realize that's pushing a little bit, but I'm curious.

LMP Bob, how do you read 17?

CC Read you loud and clear, Jack.

LMP Okay. I'm looking right down the slope of the South Massif, above the slide right now - right down at the - just about the angle of the slope. And there's a very slight indentation in the slope, just opposite the maximum - the point of maximum extent of the dark - light mantle. Opposite other portions of it, though, it - there's no clear indication of any change in the direction of the Massif - front. It's very, very slight, and I'd say you'd have a hard time saying that it is a source area for the light mantle but it's - there's a slight indentation.

09 11 01 11 CC Roger.

LMP Bob, just north of the - of the bright-rayed craters in the Littrow area, there are five craters - oh, probably in the thousand-meter-diameter class range, 500 to 1000, and all five of those have the sequence of colors in the walls, from rim down, of a brown-gray - blue-gray and then brown-gray. They are all identical in that sequence and quite clear.

Tape 152/8

CC Roger.

LMP And that blue-gray is comparable to the blue-gray that's visible in the craters such as Sherlock in the landing area. And along the graben, in the vicinity of those five craters, there is a series of very black spots, I'm going to have to look at again on the next pass, if we can. I don't have any idea what those spots are, but I'm looking very obliquely now to that graben and it's extremely - black spots along that graben.

CC Roger.

09 11 10 42 CC Ron, NOUN 26 doesn't require a sign.

CMP Thank you, Bob.

CDR I've heard more about this P20 on this side of the tunnel this mission than I ever could have.

CC Roger. Looks like you guys are ready to go to work.

CDR Well (laugh). Yes, we are. We're ready to do anything you want to do.

CC Okay, we need ACCEPT. Got you a CSM state vector.

CDR Okay, sock it to us.

09 11 11 39 CC Okay, it's on its way. Going down the Flight Plan, we've got a Flight Plan update if you're ready to copy. It isn't too awful long, although it's not the easiest one.

CDR Go ahead, Bob.

CC Okay. At 230:20, 230:20, add the following:
"LASER ALTIMETER, OFF; LA, OFF."

LMP Just keeping pressing on, Bob. I'll get them and let you know if I get them all.

CC Okay. At 230:20, "LASER ALTIMETER, OFF." At 230:29, add "Verify all VHF, OFF." At 230:31, delete "WASTE WATER DUMP." At 230:40, scratch out "LMP" and put "CDR don biomed harness." Just put "CDR" in place of "LMP."

CDR Hey, that was a Flight Plan update we passed on yesterday. I've got those.

CC Okay, just keep going down the line here. At 231:29, change "Check LMP biomed" to "Check Commander biomed." And change "CDR doff" to "CMP doff." Okay. And the computer's yours, by the way. You can go back to BLOCK. And this is the one important one here. We want to make sure, and I'll explain a little bit. Over at 232:27, 232:27, "If LUNAR SOUNDER, OPERATE, talkback flag goes barber pole, switch LUNAR SOUNDER, OPERATE, to STANDBY." The situation here is that it might run out of film during this lunar sounder HF target on Hertzprung. If it does, we need to go to STANDBY immediately, and we - It'll probably require somebody monitoring that panel during that 5-to-6 minute pass there. Our best guess is -

CDR Okay, Bob.

CC Our best guess is we've got a 5-minute pad on that film, but this is just a precaution. And at 233:13, after "PAN CAMERA, POWER," add "V/H OVERRIDE, HIGH ALTITUDE." Okay. That ends the Flight Plan update. I've got a lunar sounder pad.

CDR Okay.

09 11 15 28 CC Okay, Lunar sounder pad is at 230:55, 230:55. T-start time, 231:00:00; T-stop time is at 07:58.

CDR Is that everything, or you got a couple more sounder pads?

CC That's the only sounder pad for now.

CDR Okay, if - Let me just run it back through you to make sure I got them right.

Tape 152/10

CC Go ahead.

CDR Okay. At 230:21, you want the LASER ALTIMETER, OFF. At 230:30, you want to verify all the VHF is OFF. And we want to eliminate the waste water dump at 230:31. The sounder pad on that page is 231:00 and 231:07:58. At 232, following LUNAR SOUNDER, OPERATE, for that pad, if the OPERATE talkback goes barber pole, we want to switch the LUNAR SOUNDER, OPERATE, to STANDBY, and we'll be monitoring the panel during that time. And at 233:12, following PAN CAMERA to POWER, you want V/H to HIGH ALT.

CC That's a good readback, Gene. I have a TEI-75, preliminary TEI-75 PAD for your Update Book.

CDR Stand by a second.

CDR Go ahead, Bob.

09 11 18 22 CC Okay, that's preliminary TEI-75, SPS/G&N; 36372; plus 0.63, plus 0.86; 236:42:08.58; NOUN 81: plus 3040.3, minus 0183.3, plus 0080.4; 180, 000, 000; HA is not applicable; plus 0023.0; 3046.9, 2:25, 3029.2; sextant star is 06, 109.5, 30.0; boresight, and that is not applicable. NOUN 61: minus 17.89, minus 166.00; 1047.2, 36172; GET of 05 G is 304:18:36. Over on the comments line, Sirius and Rigel; 136; 071; 035. Four jets, 12 seconds on the ullage. I've got two assumptions or rather two other comments. This pad assumes TEI REFSMMAT. Comment 2: With the lift-off REFSMMAT which you have in, it'll be roll, 179; pitch, 088; yaw, 359. Over.

09 11 21 18 CDR Okay, Bob. TEI-75 preliminary: SPS/G&N; 36372; plus 0.63 plus 0.86; 236:42:08.58; plus 3040.3, minus 0183.3, plus 0080.4; 180, all zeros, all zeros; HA is NA; plus 0023.0; 3046.9, 2:25, 3029.2; 06, 109.5, 30.0; boresight is NA; minus 17.89, minus 166.00; 1047.2, 36172; 304:18:36. Sirius and Rigel; 136; 071; 035. Four jet, 12-second ullage. Assume TEI REFSMMAT. If lift-off REFSMMAT, attitude is 179, 088, 359.

Tape 152/11

CC Real good readback. No problems. Got a consumable update here for you on RCS update. We're right on the Flight Plan: we've got 56 percent remaining. And the O_2 and H_2 are basically right on the Flight Plan and we've got plenty remaining - no problem on that. And for the Jack - for Jack, for the LMP, I've got a special Flight Plan update on your crew option photo target on Tsiolkovsky. Would you like to copy that?

LMP Stand by 1.

09 11 23 48 CC And we'd like HIGH GAIN to AUTO.

09 11 24 07 LMP Okay, Bob. What's this update?

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 11 24 31 LMP Go ahead.

CC Okay, they're recommending CM-5 to EL 80 or 250 - I guess your option. HBW - maybe that should be VHBW. I'll check that out, but HBW is what they've got here. Exposure from crew option photo chart as listed, except change 1/250 to 1/500 for the 80-millimeter lens. Change 1/125 to 1/250 for the 250-millimeter lens. Recommend use lunar surface mag Kilo Kilo. That's use lunar surface mag Kilo. Record frame number for start-stop.

CC Okay; and I've been corrected. That is HBW. That's one of those surface mags that I guess I don't know anything about. And we would like cryo tank configuration, H₂ TANK 3 FANs to OFF; H₂ TANK 2 FANs to ON. Over.

09 11 26 17 LMP Okay, you've got that. And the photo pass on mag Kilo, be the 80- or 250-millimeter lens; HBW exposures as per chart except change 1/250 to 1/500 for the 80 and 1/125 to 1/250 for the 250-millimeter lens.

CC Roger, Jack.

LMP And record the frames.

CC Good show.

09 11 29 38 LMP Bob, just had a good view of the sunset and the corona and there are two strong, bright streamers just right at sunset, one parallel to the plane of the ecliptic and the other - oh, maybe 10 degrees to the south of the plane. And they form two of the major, longer, du - duller streamers that are streaming out from the Sun now. There are some other linear streamers that are still visible, but those were the major ones. Once you get out about to the position of Mars, they all have about the same intensity - which is very low.

CC Roger.

Tape 153/2

LMP The pattern is distinctly different from the one I believe I mentioned to you yesterday, sometime.

CC Roger.

LMP It was right at sunset at any rate.

LMP Still have a very strong glow visible at the sunset point.

CC Roger.

LMP And that glow - the - the general glow visible to me now - and of course I'm not very well light-adapted - dark-adapted - but extends about to a position - oh, let's see - about the same distance from the Sun as the apparent distance of Venus - between Venus and Mars right now. Well, let me - let me start over on that. The apparent distance from Venus to Mars is about the same distance as from Mars to the limit of the strong solar glow.

CC See the NOUN 05 - -

LMP Bob, when I'm talking about streamers, I'm talking about lin - Say again.

CC I said, "We see the NOUN 05." Go ahead, Jack.

LMP Okay, I just - when I talk about streamers, I'm talking about each time - very linear bright lines that extend - oh, maybe two or three crate - solar diameters out. And then they merge quite sharply into these very long much duller - streamers that - I guess presumably are zodiacal light.

CC Roger, Jack. We see the NOUN 93; you can torque.

09 11 33 48 CDR Okay, we're torquing at 45, now. Bob, we'll go ahead and torque at 230:14.

CC Roger.

09 11 43 06 LMP Okay, Houston, are you through with the high gain now?

Tape 153/3

CC Stand by on that. We've just gone around the horn and you're looking real good. Looks like we'll have AOS at 231 about 8 or 7 - right in there. And we are now through with the high gain - -

SC ... we are - we're reconfiguring now. Okay.

09 11 44 43 CC America, Houston. We didn't see the mapping camera go off. Did you get that one off?

CDR That's affirm. We've got MAPPING CAMERA OFF, Bob.

CC Okay. Thank you. And your AOS time is updated a little bit - -

CDR We've got them all now. We're coming up - -

CC - - it's 210:11 - 230:11. Try another one, 231:11.

CDR What's at 231:11, Bob?

CC That's your AOS time. It's a little bit later than what the Flight Plan shows.

09 11 45 34 CDR Okay, fine. Thank you.

09 12 04 XX BEGIN LUNAR REV 73

09 12 31 31 CMP Houston, this is America.

CC Hello, America. You're a little scratchy down here. We'll pick you up there shortly.

CMP Okay. We'll stand by until then.

CC Oh, that's all right. Go ahead. We can hear you.

CMP Okay. That last lunar sounder pass got an extra 40 seconds on the film - 40 seconds on the last end of it.

CC Okay.

LMP Okay, Houston. This is America.

Tape 153/4

CC Go ahead.

LMP Okay, Bob. I was over there on the right side and I hit the FUEL CELL 1 REACTANTS switch for about half a second and got a ... It looks okay here.

09 12 34 44 CC Roger. We copy that.

09 12 37 53 CC America, Houston. If you're reading us loud and clear, I'd like to give you a lunar sounder flight - sounder pad here at 231:21.

CDR Okay, Bob. Go ahead.

CC Okay; it's at 231:21, the lunar sounder T-start time, 231:26:18; T-stop, 50:33.

CDR Okay, I got that. Thank you. You happy with the biomed on the CDR?

CC We won't know until we get the high gain here at 21.

09 12 38 58 CDR Okay.

09 12 41 03 CMP Houston, America.

CC Go ahead, Ron.

CMP Okay, here. I was just looking at the Wright Brothers [?] Crater as we were going through there again. And the outer - crater rims on that thing are kind of like the one - ... about rev 62 in the picture, but the outer rim - is sloping in the opposite direction from the normal crater, or something. In other words, the steep slope is on the outside of the rim, and you have a gradual slope up to the - you know, from the center of the crater, you've got a gradual slope up to the rim, and then it drops off to the steep slope on the outside. And the steep slope on the outside is maybe - oh, 35 to 45 degrees. The slope on the inside is probably - somewhere around 20 degrees I would guess. And there is one portion of the rim - kind of on the western portion of the one that I was looking at, anyhow - it's almost a delta-shaped ring.

CC Roger, Ron. We're ready for the high gain. If somebody can bring it up, we can read you better.

09 12 42 39 CC How do you read, America? You're sounding great now.

CMP Okay; looks like we've got you.

CC Real good. Go ahead, Ron.

CMP Okay. I was just kind of reminiscing a little bit about the - my mud puddle craters there in Smythii. I guess that's what I can term them or call them - that's what they always kind of looked like to me. But - they slope up. But the rims of those craters and even the interior rims on ones that are multi-ringed, they slope upward from the center of the crater toward the rim, and a gradual slope, and then they drop off on the outside of the crater rim, sloping down from the outside crater up to 45 degrees. And then at some points on there, it almost looks like it's a real classic delta-shaped rim on them, where you have the same slope on the inside as well as the outside of the crater.

CC Roger, Ron.

CDR Houston, you ready for mode VHF?

CC That's affirmative.

09 12 44 19 CDR VHF.

09 12 45 27 CMP Okay; 50 seconds to LUNAR SOUNDER OPERATE, okay? RECORDER is ON; RADAR's ON; we're in VHF, okay. Be a VHF pass. And what time? 26:18. Okay; 13, 14, 15, 16, 17 -

09 12 46 39 CMP MARK it. SOUNDER to OPERATE.

09 12 47 21 CC America, be advised. Gene, your biomed looks good.

CDR Thank you, Bob.

Tape 153/6

09 12 49 16 CMP Okay, Houston, frame 163 and 164 and 165 were taken of the mud craters and Smythii. And 166, I guess, was taken of the great slopings - side of the crater in Crisium. That's just south of Yerkes.

CMP That's mag November November. Oh, wait a minute. That's Gene's crater, isn't it?

CC America, Houston.

CMP All right, go ahead.

CC Ron, we did not get the HIGH GAIN to NARROW. We have sequence for you which is important to go through so that we do not break lock and lose this lunar sounder VHF data. We would like you to dial in PITCH, minus 45; YAW 5. Go to MANUAL and WIDE. And when you get the signal strength, go to REACQ and then step to the BEAM, NARROW, MEDIUM, and WIDE, or, say again, WIDE, NARROW, MEDIUM.

09 12 51 12 CMP Okay, I'm with you. Okay, I got minus 45 on the PITCH, plus about 5 on the YAW - -

CC That should be minus 45 on the PITCH.

CMP Isn't that what I said? That's what I got. Minus 45. And plus 5 on the YAW, right?

CC Affirmative. And we're ready for you to do it. Go ahead.

09 12 51 37 CMP And we're going to MANUAL and WIDE.

CMP How's that?

CC That's great; we didn't drop any. That's great.

CMP Okay.

CDR Hello, Bob.

CC Go ahead.

- CDR Okay, this is Gene. I've got a - a very interesting crater out in Tranquillity I'd like to pass some info on for you - to you on. It's about in the central part of Tranquillity. It's got a very sharply raised lip, and it's got some very dark - rough rimmed deposits. It's got a - a very, very obvious ... furrow, looks like it's elongated, basically to the - generally to the east and to the west. I can't tell, but because of the shape of it, and because of those a ... darker rim deposits I'm sure there must be a vent there somewhere, but it's too dark down in there. I can't really see for sure whether there is one or not. But, if there is, I imagine it's pretty big. And I can't tell, it's only sort of intuitive, but I imagine the elongation was produced during the thrust of the initial dynamics, the formation of the impact.
- CC Roger, Gene. Do you have a scale on the size of the crater?
- CDR Stand by I and let me look.
- CDR Bob, yes. I may have said Tranquillity. I meant Fecunditatis. I did not mean Tranquillity.
- CC Copy.
- CDR Bob, I'll have to give you an estimate on the - on the relative size of it, but the length-to-width ratio is probably about 2 to 1, and it - it's certainly bigger than the Camelot size range.
- CC Roger. That's good. Just wanted to pin it down for you.
- CDR ... might be able to pick it out. Okay.
- CC And whoever's got the Flight Plan in their hand, I've got a lunar sounder pad which is at 232:20 and a pan camera pad which is at 233:20.
- CDR Okay, Bob. I'm keeper of the left-hand side plus the manager of the Flight Plan here, so pass it up.

Tape 153/8

09 12 55 23 CC

Okay. Lunar sounder pad. T-start time,
232:26:11; T-stop time, 34:18.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 12 55 50 CDR Okay. 26:11, 34:16.

CC Okay, pan camera photo pad, which is over at
233:20: T-start time, 233:24:07; T-stop, 38:42.

CDR 233:24:07, 38:42.

CC Roger. Good copy.

09 13 01 00 CC 17, just for your information, it's Miami 3,
Baltimore 0 - they're about - Baltimore 0 - they're
about midway through the first quarter, and Miami's
making an effort to go undefeated today.

LMP It's the last game of their season, isn't it?

CC That's right. This will be the undefeated season
if they hack it.

CMP Houston, America. I think I mentioned - a couple
or 3 days ago that - however, when we first got
up here - that I had a heck of a time seeing that
Tycho ray that goes out across Bessel. And I for-
got to tell you that yesterday - kind of for the
first time - it really started showing up when
we were getting up in the higher Sun. And today,
it really shows up quite vividly. It's just a
ray that takes off from the edge of Crisium and
goes right across Bessel and goes out to about the
middle of Crisium - I don't mean Crisium, I mean
Serenitatis, I was talking about Serenitatis all
the time.

CC Right.

LMP Say, Bob. Those craters on the south-western side
of Serenitatis still have got that orange hue at
this Sun angle, and that's with the naked eye.

CC Roger. These are the ones right in the Sulpicius
Gallus region?

LMP Yes.

Tape 154/2

09 13 04 43 CMP And, Houston; 166 and 167 were taken of a crater that looks like it's got a reddish dike in it and it's on - in the - again in the Haemus Mountains to the west of Sulpicius Gallus.

LMP Houston, a little more on that. It's an impact crater with a line essentially across the diameter in a east-west direction, maybe a little bit north of west direction and the ejecta to the north of that - just went under us - the ejecta to the north of the line is the orange - actually more red-brown than orange, although there are both hues in it - -

CC Roger, Jack. Can you give us some scale on that crater?

LMP - - looks similar to - Yes, it's about a 600-meter crater. And it looks very much like - in it's geologic pattern to the - that crater out in the Nevada test site on Buckboard Mesa that had an explosion along a contact between two very sharply contrasting rock types. In this case, however, the line does not go completely across the crater, and that's why we feel it may be a dike or a vein which fortuitously has been hit by that impact.

CC Okay; can you give me a little relationship with respect to Sulpicius Gallus, the crater?

LMP Yes, I'll try to spot it in a minute.

CC Okay, why don't you just mark it on your map so for pre - postflight we'll have it.

09 13 07 40 LMP On the - somewhere around - I'll try to spot it more exactly - on the 20 north latitude line and about 7 east on a ridge. It's right on top of a ridge. I think it's that ridge. I'll try to spot it more exactly later.

CC Okay.

CC Ron, you're less than a minute to LUNAR SOUNDER STANDBY T-stop time.

CMP ...

CC And, America, just a reminder. When you're powering the SIM bay, up here again, the mapping camera laser altimeter cover is already open and the mapping camera is already extended.

CDR Okay. Thank you.

CDR Okay, Bob. We'll just eliminate those last two steps, is that correct?

CC That's affirmative.

CDR Okay. You still want MAPPING CAMERAS, STANDBY, up there in the fourth step?

CC That's affirm.

09 13 12 04 CDR Okay, Houston. The SIM bay is powered up. We eliminated the last two steps.

CC Roger. Thank you, Gene.

CDR Okay, Houston. I guess you saw those - we got through those procedures and you probably saw most of the switching. Sorry; I should have been in VOX.

CC No problem.

09 13 15 38 LMP Houston, this is 17.

CC Go ahead.

LMP One of the questions we asked ourselves years ago, when we mapped the Copernicus area, was were we really seeing dark mantling deposits on some of the massifs of the Carpathians, and looking at it obliquely here, it - some of those areas that we've mapped as dark mantling are distinctly brownish gray versus the normal tan gray of the - of most of the Carpathians. It looks like - and it's about the same color as - extrapolating - as the dark mantle around Sulpicius and Taurus-Littrow.

CC Roger.

LMP Also, the north boundary of the Carpathian Massifs has a very sharply defined high lava marks - and if

Tape 154/4

that's actually what we're seeing. And in - I'll mark the place on the map, but it looks like it extends about a sixth to an eighth of the way up the highest peak. It's quite a striking and obvious mark. There's a major textural change - below the mark of a little scarp that defines it, the texture is very smooth. Above that it has the lineated and typical mountain front texture for the Apennine - for the Imbrium range.

CC Roger.

LMP Bob, I might summarize my impression of the rilles in the vicinity of Euler and their relationship to the mare ridges. I've been able to, over the last day - just generally searching it out, I've been able to find rilles that clearly cross and separate portions of ridges. And ridges that clearly cross and partially bury rilles. And in another third case, a rille that appears to be levied - that is, have banks of - flat banks on either side, but near the end of it, it transitions into a mare ridge, very clearly. It looks as if, to me, that the rille and ridge problem in here is just one of repetitive compression and extension within the surficial flows of the Imbrium Basin. And that possibly during the compressive stages, there were extrusions locally along the ridge system, but in the main part, the ridge systems represent, I think, a doming it looks like just a doming of the mare surface except for these local ridgelike extrusions.

CC Roger.

LMP I might also add that the rilles, to me, seem to be made up of zigzag straight line segments rather than being truly sinuous. They appear sinuous because of the rounding of the corners, but in - my impression is that they're really made up of straight line segments.

09 13 22 43 CMP

And, Houston, on mag Victor Victor - Oh - well, I'm on number 28 now, and the last ones before 28 there were taken of the spacecraft sunset terminator.

CC Roger, Ron. Jack, we just had a feed-in to your answer to your question from ALSEP. The PI has not seen enough data at this time to draw any conclusions regarding the depth of the mantle in the landing area. And we've got another bomb charge due to go off here in about - a short time; let me check it.

LMP Okay, I'll wait until we get back. Thank you.

CC Roger.

CC That next charge goes off in 15 minutes, Jack. I don't have an exact GET yet.

CDR Bob, is the LCRU still working?

CC Say again, please.

CDR Bob, this is Geno. I was just wondering if the LCRU and the TCU were still working?

CC They think the LCRU failed last night.

CC Gene, they are going to try it again today, but they could not get a - raise it last night and they think it failed.

CDR Okay.

CC We'd like AUTO on the HIGH GAIN, please.

09 13 34 54 LMP Houston, 17.

CC Go ahead.

LMP Has Mark come up with a preliminary heat flow number yet or is he still equilibrating?

CC We'll check that, Jack.

CC Jack, nothing on that - the heat flow yet. It's still stabilizing. It'll be awhile before they get any data. But we're watching the data play out here on the TV screen. They just had another one of those charges go off and it really does rap the old heaters.

Tape 154/6

LMP Excellent.

09 13 38 50 CDR Houston, MAPPING CAMERA is OFF; and the IR's OFF;
PAN CAMERA SELF TEST, OFF; UV is OFF; and the DATA
SYSTEM's OFF; and SM/AC POWER is OFF.

CC Okay, we - I think we copy that configuration change
there. We're about 6 minutes to LOS. Just - on
the next pass, just be advised, we're going to
change the HF antenna retract times to let them
warm up a little bit more. We'll call you on that
before we want the HF antennas retracted. And just
an update, it's Miami 10 to nothing over Baltimore
at the half.

CDR Okay, we'll stand by on a call on the retraction
and got the score 10 to nothing.

CDR Hello, Houston; America. When do want us to con-
figure the DSE? Do you want us to wait a couple
minutes?

CC Roger. We'd like you to wait a couple minutes.

CDR Okay, we'll stand by for your call on DSE and the
HIGH GAIN.

CMP Houston, America; are you giving any odds on the
time we might get the barber pole on the lunar
sounder?

CC We don't think you'll get it this group but that
pad is now about a 4-minute pad. But it's getting
so close I'd like to watch it.

CMP Okay.

CC America, if we should lose you before our published
LOS here, check the DSE and when you get the barber
pole, you can reconfigure. We're rewinding that
tape now.

LMP Yes, sir.

CC Okay, it's all rewound. You can go ahead and
configure the DSE.

Tape 154/7

CMP Hey, Bob, what about us configuring high gain.
We're getting close to T-start.

09 13 45 25 CC Roger. Go ahead.

09 14 03 XX BEGIN LUNAR REV 74

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 14 30 31 CC Hello, America. Houston is standing by.

CMP Hey, America - Houston, this is America. We've got you loud and clear. A little late on picking you up that time, but worked okay. Okay, on mag Q, Quebec - it's finished right now, and whatever frame number it was on when they left the lunar surface to 143. Q? Oh, K. Mag Kilo, okay. Whatever frame they were on on the lunar surface to 143 were selected shots by the LMP. Frame 143 to 172 were near-side terminator photos of Tsiolkovsky.

CC Okay, Ron. We copy that right from the Flight Plan change.

09 14 31 39 CMP Okay. And PAN CAMERA to STEREO - Jack, ... help me get it. Verify STANDBY on STEREO. Okay, PAN CAMERA POWER coming ON. Oops, stand by here. Okay. V over H, HIGH ALTITUDE.

09 14 31 59 CMP Okay, PAN CAMERA to POWER. Okay, got the power. Okay, we've got a T-start coming up here at 24:07, 12 minutes. ... suppose that's what it should be ... yes, ... Let's see, Houston, America. I only have one pan camera pad here. Is that correct?

CC Let me see. We've got one sitting right in front of us for 233:40. Do you want that one?

CMP I don't have that one.

CC Yes.

CMP I've got the one that starts at 24:07 and ends at 38:42.

CC That's correct, and you don't have the other one because we never said it. We've got it here ready to go.

CMP Oh, okay.

Tape 155/2

CC Okay, T-start time, 233:48:15; T-stop is 234:00:30.

CMP Okay, photo pad is - T-start is 233:48:15, T-stop is 234:00:30.

CC Roger, Ron. And let me give you some words here that you might be interested in. Right now we're looking at probably pulling in those antenna at 233:45 or 46, right in that time frame. If those maneuvers - that should not work, we shall have to jettison the antennas at around 234:3 - 235:39. We have, and we won't give it to you until we need it. We have a VERB 49 maneuver to a jett attitude for 234:25, and that'll keep in that attitude and then we'll jettison the antennas at 235:43, and, of course, we'll have to bring up the logic power on those. We have this all available standing by and there's no sense passing it until we find out how the antennas do on RETRACT.

CMP Okay, that sounds reasonable. Do you have the, or you want to use, the page in the Experiments Checklist there?

CC Roger. Except for the NOUN 78s. We'll change those.

CMP Oh, okay. Sounds good.

CMP It's in the Volkswagen pocket. Okay.

09 14 36 05 CMP I don't think we ever changed it though. Okay, the arrow's there, which indicates that we didn't do it. Okay, LiOH canister change, 19 into A, take 17 and put it into A - A-4. That's correct.

09 14 37 17 CMP At 24, we want the pan camera.

LMP Bob, while we're waiting for the pan camera time, a quickie here. One of the ways that seems to be useful for determining the relative age of the larger basins, to me anyway, is the abundance of block fields on the slopes of the walls or the

slopes of the central peaks. That abundance decreasing with increasing age, and one of the comparisons that I just made that it looks as if Tsiolkovsky and Sklodowska have about the same abundance of - of block fields on both those features of the crater.

CMP Okay ...

LMP They presumably then would be about the same age.

CC Roger, Jack. I noted that.

CMP Jack, to me, Sklodowska is lot more subdued, though, than Tsiolkovsky on the ... Oh, okay. It's ... criteria? Yes.

09 14 30 48 CMP And, Houston, the northern portions - I hate to use mud impact, but that's what I'll call it, multiring basin structure there and it also has a delta-shaped rim to it. There is kind of a moat between the inner ring and the outer ring and then it slopes, again a gradual slope from the center of the crater up to the first basin ring and with a steeper slope on the outside of the first ring going down into the moat. And then the outer ring has the delta - the delta-shaped rim to it.

CC Roger. Ron, we copy that.

CMP Okay, 4 minutes to - and, Bob, you'll keep us honest on this pan camera T-start, won't you?

CC I sure will.

CMP Okay; thank you.

09 14 41 30 CMP And, Houston, Surgeons may be interested to know CMPs blue bag number 5 was comparable to ground test number 3.

CC Roger, Ron.

CMP I think I should probably add a no problems note.

Tape 155/4

CC Understand, no problem.

CMP That's affirmative (laughter). The LMP would like to make a comment, but I won't let him.

CC Things pretty miserable up there?

CMP For a while it was.

CC Ground test bag number 3 wasn't the one you had to drive in with, was it?

CMP Yes.

09 14 43 27 CC You're 30 seconds to T-start time on that pan camera.

CMP Okay, PAN CAMERA to OPERATE at 07. Jack, I'll give you a mark on that.

CMP Okay, 1, 2, 3, start at 7, 4, 5, 6 -

09 14 44 12 CMP MARK it. Okay, stop will be 38:42. And, Houston, how would you like to have a VERB 74?

CC Roger; we're standing by for it.

09 14 44 30 CMP Okay, VERB 74 ENTER.

CMP Now take a good - Yes, I got a picture of one of those with - that star is kind of a classic, I think. Can you get it? I can get it right here, a lot easier, Jack. Yes, that's all right, I can do it. Lay down beside it. There we go. That's 8 at 1/250; that'll be good. Okay, is that what we call Star? Okay, that's right, I didn't think this was Star. That's the one I was talking about having the polygonal base on it and it's west of Mare Smythii for sure. I don't know where we - directly south of - eastern edge of Fecunditatis. And that's frame number 14, I guess, of mag Papa Papa.

09 14 47 10 CC Ron, if you'll give us ACCEPT, we'll give you your TEI REFSMMAT.

09 14 47 17 CMP Outstanding. You have ACCEPT.

LMP And, while we are getting a TEI REFSMMAT, there's a fairly striking graben on the very north edge of Fecunditatis, south of Crisium - just south of Crisium. And it starts in the west within the Fecunditatis Mare and then curves gradually up through the Sculptured Hills structure to the north. And, there's a crater, looks like a subdued impact crater, right on that structure, and you can see the trace of the graben down the walls - the west wall of the crater and up the east wall. And it does - from directly overhead, it appears to taper downward. The walls of the graben, that is, get closer together as it approaches the bottom of the crater. And on the south wall of the graben, as exposed in the west wall of the crater, there's a fairly sharp - sharply defined white area in the talus.

09 14 48 54 CC America, the computer's yours; you can go to BLOCK.

CMP Okay, we're in BLOCK.

LMP With the old pan camera running, we probably can find that graben structure in there pretty well.

CMP Yes, we ought to get some good pictures. It isn't quite as good that way, but you do get some pictures anyhow.

CMP That's what I was trying to figure out. Houston, what's that big crater we're going over right now in Fecunditatis? It's probably on your map - Yes, Taruntius, that's it. Yes.

LMP Speaking of grabens again - how's our pan camera doing?

CMP 38, and we still got 18.

Tape 155/6

09 14 50 51 LMP

Speaking of grabens again, on the southeastern blanket of Taruntius, about a crater radius outward, there's a crater looks like an impact also on a trace of a graben, and in this case the ejecta blanket that extends out along the graben both to the west and to the east is noticeably blue gray against the tan gray of the Fecunditatis or at least the Taruntius ejecta blanket. Basically, it looks like blue-gray wings on the crater along the direction of the graben.

CC Roger, Jack.

LMP Looking at the crater stratigraphy in the northeastern and northern portions of Tranquility, it looks as if you could say that there are blue-gray mare materials overlying very light gray material of some kind. And without any strong exceptions that I've seen and it resembles the same stratigraphy that I think I talked about yesterday on the annulus of Serenitatis and that goes along with what I think Ron told you, that the visual appearance of the annulus and the northern Tranquility Mare, on the surface is indistinguishable.

CMP Yes, that's right.

LMP It also suggests that the mare in here's relatively thin if you're getting down to whatever the basement rock is and that's being represented by the light gray. The legends [?] of the blue-gray material are high up in the crater and really appear to form only about - oh, a fifth to a sixth of the wall height. And I'll give you a crater - There's a crater right between the two Cauchy rilles that shows this fairly well. And Ross Crater also shows it a little farther along, I remember from last time.

CMP Cauchy Crater, isn't it?

LMP Yes, Cauchy Crater is the one I was talking about that's between the two rilles. Actually, it's not as well defined in Cauchy as it is in some of the other craters.

09 14 54 48 LMP The western end of the Cauchy rilles, both north and south ones, seem to have a right lateral or echelon structure, but along the trace still to the west of the crater Cauchy that locally changes to left lateral.

CMP And, Houston, even at the high Sun angle here, the ejecta of the - oh, four or five recent craters around Maraldi, still kind of a bluish-gray, light-bluish-gray. The floor of the crater Maraldi is essentially a dark - more of a dark gray today, I guess, than anything. And the ejecta patterns on that are the same albedo and color distinctions as the ones in the landing site. And, the landing site itself, from this angle, I think is going to - No, once we get up at the same viewing angle as we had on Maraldi, the mantling material in the landing site is the same color, same albedo as Maraldi.

CC Roger.

CMP ... in the crater Maraldi.

09 14 56 51 CMP Yes, I get just a tint of - yes, I was going to say, well no, I still get a feeling that there's just a twinge of the orange or tannish orange around Shorty looking at it with the binocs. What's that black bump on the sides - on the - Let's see, south of the southern side of the South Massif. Can you see that one, Jack?

CMP Okay, we ought to be getting ready for P38. About another minute, Jack. PAN CAMERA to STANDBY. At 38:42.

CMP Okay, 35 now and we want to stop it at 42. Okay.

09 14 58 44 CMP MARK it. Okay.

CC America, we'd like AUTO on the HIGH GAIN.

09 14 58 56 CMP AUTO it is.

Tape 155/8

CC Ron, the numbers on magazine RR show that you have nine spare frames and you will need nine frames there for calibration, so looks like you'll have nine frames on mag RR for whatever you want to use them on.

CMP Okay, let's see now. We have just this next pass coming up here?

CC That's affirmative, Ron.

CMP ... on 85 now. Okay, and Tsiolkovsky, we got those the last time with, on the LM mag is that correct?

09 15 00 28 CMP Hey, Jack, we want to get D-Caldera to high Sun here too. And then, yes, and then the crater with the dike in it, because I think we probably should get those - Yes, Papa Papa, yes. And then as soon as you finished with those, we'll switch mags and I'll whip over there and take some terminator photos. Okay, let's see. Hey, Houston, you sure you want to start retracting the antennas?

CC Oh, stand by, Ron. Just to answer your question on mag Romeo Romeo, you can take it to an absolute number of 106 on the frame count, and the remainder must be used for calibration.

CMP Okay, then 106 is far as we can go on that one. Okay. Thank you.

CMP Fine. Okay.

CC America, Houston. After we start the pan camera at 233:48:15, we would like then to go and start to retract HF antenna number 2. Number 2 first, please.

CMP Okay. As soon as I get the pan camera started, we'll go to retract on that.

CMP Jack, are you talking about the one that's got the red ejecta out to the east? Yes. Right now. Just now looking down there. Is that the one you were talking about? Okay. It's just now coming up. ... See. Okay, can you see D-Caldera? Okay.

CMP Okay, I'll get it. Yes.

CMP Let's see, we're almost at subsolar. Wait a minute, I don't know where we are. Right. We're way past subsolar. Yes, I think.

09 15 04 58 LMP Okay, Houston, on Papa Papa frames - let's see - 13 and 14 were of the crater with the red, brown to orange vein across it and 15 and 16 were of D-Caldera, stereo pairs.

CMP See your dark slide, Jack.

LMP And, Houston, I saw at least two other examples of impact craters in the highlands south of Serenitatis and south of the Sulpicius area that had veinlike distribution of red, brown, or orange material in them.

CC Roger.

CMP And for terminator, but you want to handle the re - retract of the antenna? No, not yet. Soon as the - at 48:15, go to pan camera to operate. Yes, and then we start retracting HF number 2. Oh heck, I cut my finger on the dark slide. Boy, that son of a buck. Yes. That's right. Yes, we'll time it through to start with HF number 2. Be 8:15, 47:15, 47 twice. And, let's see, where does this thing start? 52, I guess. No, 57.

09 15 08 11 CMP Okay, 48:15, stand by. 11, 12, 13, 14 -

09 15 08 15 CMP MARK it. Okay. And, Houston, HF antenna number 2 is going to RETRACT. 3, 1 -

09 15 08 30 CMP MARK it. Barber pole.

Tape 155/10

CMP They can do it down there. But in case ... Let's see. I think they've been taking about 2 minutes, last time - I forgot for sure. Houston knows. How about long is it supposed to take to retract number 2 this time? (Laughter) Any guesses?

CC 130 seconds would be nominal retraction.

CMP 130, huh? Would be nominal? Number 2, yes. No, that's number 1 on your side.

09 15 10 10 CMP That's the one - we had trouble getting it out, the second time, and finally did. Just took a long time to get out there. Yes, we were taking it out and in.

CMP Gene, yes, we're doing this now, and we need a T-stop here, at this time - on the pan camera.

CC How does the barber pole look up there, boys?

CMP ..., Gene.

09 15 11 20 LMP It looks gray. Okay, ...

CC Okay, that's a full retract.

CMP Good. Beautiful.

LMP Now you want to do number 1?

CC That's affirmative and the time of the other was 1:55.

LMP Shall I start on number 1 now?

LMP Okay, Houston. Going to RETRACT on number 1.

09 15 11 44 LMP MARK it. Barber pole.

09 15 11 47 CDR Okay, Houston. I got it visually going in.

CMP Yes, it doesn't come in very fast, does it?

CMP (Laughter)

CMP Oh, yes, yes, yes, yes.

CMP Oh, okay.

CMP Boy, okay.

CC America, Houston. Go to OFF on the switch where it's stall current. Do you have a barber pole or is it gray?

CMP It was still a barber pole. And do you want number 2 OFF, also?

CC Stand by, Ron.

CMP Just asking.

CC That's affirmative, Ron, number 2 to OFF.

09 15 15 04 CMP Okay, number 2 is going to OFF, now?

CC Okay, and the preliminary quick look shows a nominal retract on both of them, Ron.

CMP Mighty fine. That's good. Although I was - had - getting the camera ready to take some pictures.

09 15 16 29 CMP Well, look at the one down here by - You can pick linear segments if you want to on some of them. One long one that goes all the way across there now, it's got a bunch of - Well, this is a ... synthius [sic] one down right down here. Look at this one. Right - right down there. See, just this side of that little - the short one.

CMP Okay, give me a holler on that pan camera when it comes up because I'm going to be taking pictures here; f/8 at 1/250. Boy, it really shows up a flow from the Tobias Mayer area coming on out to - I don't know whether - is that the Bessel Rille or something like that? I don't know what that Rille is. I agree with you, Jack, in that whatever

Tape 155/12

that rille is, that's running east and west there - made up of linear segments, except for the curves around the corner (laughter).

CMP Yes, I think that's Prinz on up there just - Yes, see there. Can you get them back there?

CDR Yes.

CMP Here, take it. Should - should be - Oh, the lowest one?

CDR Yes, on your right-hand side.

CMP Oh, well, let me get these first then. Or - can you get those now?

CDR Yes.

CMP Okay.

CMP Here. I'll get the pan camera. That's the lowest one. Yes, that's the terminator, right on the terminator. I got something on it. Okay. Here. Need a hack here, Gene.

09 15 20 33 CMP Okay? Okay, PAN CAMERA to STANDBY.

CDR You got it?

CMP Yes. What's my frame number here? Oh, wait a minute. It's 105. We'll take one more picture.

CC Ron, did you get the pan camera to T-stop?

LMP Yes, sir. ... good, got it.

CMP Frame 106. That's the last one we could use on this one.

CMP Where - where's our stars? Let me take a look, can I? Oh, yes. Okay. Down in R-1.

CMP Okay, let's see.

LMP - - I didn't take this one. Houston, in earth-light, we have a dim but good view of the Cobra's Head and Schroter's Valley and the Aristarchus Plateau. It's not as bright as it was the first night we were here, but still light enough to distinguish their outlines.

CC Roger.

CMP Okay. That's all the hoses ... her. And, Houston, we're ready to go to RETRACK on the MAPPING CAMERA. Okay - -

CC Okay, we're watching it.

CMP - - 3, 2, 1 -

09 15 22 50 CMP MARK it. Barber pole. Okay, we'll stand by on our cue for ... camera. Okay.

CMP Well, ... know how to do that.

CC PAN CAMERA POWER to OFF, America.

09 15 23 53 LMP POWER's OFF.

09 15 24 02 LMP Okay, LASER ALTIMETER's OFF.

CMP Okay, stand by for P52.

LMP Okay, the MAPPING CAMERA COVER is going CLOSE.

09 15 24 33 LMP MARK it.

CC Negative, negative on that, please.

LMP And, it's gray.

CMP Hey, negative. Don't - Well, he got away with it.

Tape 155/14

CDR That's my fault, Bob. I thought that camera was already in, when you gave us the GO on that.

LMP And I put it back to OPEN, and it went barber pole, then gray again, and it acted properly.

CC Roger.

09 15 25 23 CMP The MAPPING CAMERA's CLOSED now. It's RETRACTED, I mean. Yes, we're okay.

CDR Houston, we'll stand by for your GO on closing the cover.

CC Roger. Stand by.

CC Ron, we'd like one test here. We'd like to take the MAPPING CAMERA TRACK switch to RETRACT and verify the barber pole stays gray.

09 15 26 37 CMP Houston, it's in RETRACT right now or still is and has been all the time, and barber pole is still - I mean is still gray.

CC Okay, you're clear to CLOSE the MAPPING CAMERA/LASER ALTIMETER COVER.

CMP Okay.

09 15 27 00 CDR Okay, it's CLOSED, barber pole, then gray.

09 15 30 12 CMP Ah ha, I recognize Sirius.

CC Gave you another easy one, huh?

CMP Yes, another easy one.

CMP That's Regulus, I think. Isn't it? 22. Yes, is that one - yes - Okay. The dot on the question mark.

CMP It's a little hard to see, but I think that's it.

CMP Yes, maybe I ought to do that one again. Yes.

CMP Rigel, this time, okay?

09 15 33 00 CMP (Humming) 21, Alphard. Okay, that's down below Sirius.

CMP Okay, there's 0.01.

CC We'll buy that.

CMP Plus 0.065; minus 0.050; minus 0.039. Okay, we'll torque at 14:50.

CC Roger, Ron. We copied those.

CMP No, it won't make any difference. Okay.

09 15 34 29 CMP Okay; 1 ENTER. Okay, let's torque her - let's go to the TEI REFSMMAT. 55144. About 90 degrees from pitch, isn't it? Difference? Yes, okay. That's good. Ground knows what they're doing. Okay, we're in CMC, FREE, let's coarse align it. Okay, PROCEED. No ATT.

09 15 35 22 CMP Okay, let's picapar. Okay, it still likes Rigel. (Humming) not if there's a big one.

09 15 36 22 CMP Twenty-one, should be Alphard, I think. Two stars, huh?

CMP Yes, that's a long ways away off. It's outside of the field of view of the sextant. Both of them were.

CMP Okay, 21. Yes. Yes, let's coarse - let's torque this and then I'll do another one.

CMP (Humming). Yes. Yes. Yes.

09 15 38 38 CMP Yes, that brought it in there nice and close. We'll just tweak her up just for the heck of it. Yes.

Tape 155/16

09 15 39 30 CMP Well, ptttth! How's our time doing?

CMP Well, that was close enough, really, but - That's within the limits, but I'd like to get her down to at least 0.01.

09 15 40 28 CDR Hello, Houston. You want those O₂ tank HEATERS pulled ON?

CC That's affirmative, Geno.

CDR Okay, then we'll pull the O₂ TANK 50 WATT HEATERS - three of them - yes, the 50-WATT HEATERS.

09 15 40 41 CDR Three of them OPEN and the O₂ 1 and 2 100-WATT HEATERS, CLOSED.

CC America, Houston.

CDR Okay, those heaters are taken care of, Houston.

CC We see you going around the corner here and you're looking good as you go by us.

CDR Okay, thank you.

CMP Well, the heck with it (laughter). Okay (laughter).

CC You got lots of CMPs watching today, Ron.

CMP (Laughter)

CDR CDR has taken over, now.

CC Do you take credit for that last zero, two?

LMP And after that, the LMP tries one.

CMP (Laughter)

CDR No, sir. I just got tired of looking at it; that's why I'm going to do the next one.

CC Ron, Stu said that all CMPs ought to accept a two. It just makes you more humble.

CMP Yes, I know. I've really accepted it, but I just thought I could do better.

LMP And one thing that you can't do is make Ron more humble.

09 15 43 44 CC Just a reminder with 1 minute to go, Ron. We want to remind you to go back to auto - to the autopilot when you're done with your 52s and the final score in the game was 16 to nothing. Miami over Baltimore.

CMP Okay, mighty fine. Commander's down there trying his luck, now.

CC We're all watching. We just hope we see it before you go LOS.

CMP (Laughter)

09 15 44 21 CDR If you don't hear about it, if you miss it, don't worry - -

09 16 02 XX

BEGIN LUNAR REV 75

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 16 31 04 CC Hello, America; Houston. Over.

CDR Hello, Houston. How do you read America? Over.

CC America, this is Houston. You're loud and clear on your last time around. Over.

CDR Okay, Gordo. You're loud and clear. We thought we'd lost you there for a little bit.

CDR And we're just finishing up an eat period, and looked around, and the spacecraft still looks good on board.

CC Okay. Sounds good.

CDR Got some gyro torquing angles, if you'd like them, please.

CC Okay; go ahead.

CDR Okay; the last P52 produced gyro torque of minus 011, minus 007, and minus 002; GET torque time was 234:26:07. And let's just let it suffice to say we torqued on the commander's P52.

09 16 35 52 CC Okay.

09 16 38 55 LMP Houston, 17.

CC Go ahead.

LMP Yes, Gordy. Gene was trying to call you guys for about 4 or 5 minutes, after we had fairly good up-link signal strength, and you didn't answer, until you said that was the first time you'd called. Is that something that you can explain down there?

CC I think it is, but let me make sure I get the right answer here.

LMP We did not change any configuration in the spacecraft during that 5 minutes.

Tape 156/2

CC Roger.

09 16 40 55 CC America, Houston. I guess we don't have an explanation. We checked with the site, they were locked on and I can't see any reason why, if you were coming down, that we didn't hear you.

CC America, Houston. You read now?

LMP Oh, that's affirm, Gordy. Sorry, I - we were discussing whether or not we had really transmitted, apparently we had.

CC Okay. We'll keep checking here, but first glance doesn't turn up the - any answers.

LMP Okay. Well, after the next run, we would like to have comm as soon as possible, and that's what I was checking on.

CC Roger.

09 16 43 10 CC America, Houston. We're ready with all the updates, both verbal and electronic, whenever you are.

LMP Okay. Stand by a few, please.

CDR Houston, you want the computer?

CC That's affirmative. We're ready with the up-link.

09 16 43 42 CDR Okay. You've got ACCEPT now, and stand by on the updates.

CC Okay.

09 16 46 46 CC America, Houston. The up-link's in there, you can go back to BLOCK.

OMP Okay.

LMP Okay, Houston. We're ready to take final TEI pad from you.

CC Okay, Jack, here's the numbers you've been waiting for. TEI, rev 75, SPS/G&N; 36372; plus 0.63, plus 0.86; NOUN 33 is 236:42:05.35; plus 3039.8, minus 0185.0, plus 0066.1; attitude is 180, 000

and 000; NOUN 44 H_A is NA, H_P is a plus 0022.8; DELTA-V total is 3046.1, 2:25, 3028.5; sextant star is 06, 109.5, 30.0; boresight star is NA. NOUN 61 is a minus 17.87, minus 166.00; 1047.4; 36172; GET for 0.05G is 304:18:32. GDC stars are Sirius and Rigel; 136; 071, 035. Ullage is four jets, 12 seconds. And three remarks: number 1 is single-bank burn time is 02:29. Number 2, post-TEI RCS DELTA-V is equal to 173 feet per second. And number 3 remark is the SPS PU Ox FLOW VALVE, DECREASE, and then control as required. Over.

LMP Okay, Houston. Here is your readback. TEI-75, SPS/G&N; 36372; plus 0.63, plus 0.86; 236:42:08.35; plus 3039.8, minus 0185.0, plus 0066.1; 180, all zeros, and all zeros; H_A is NA, plus 0022.8; 3046.1, 2:25, 3028.5; 06, 109.5; 30.0; boresight star is NA, minus 17.87, minus 166.00; 1047.4; 36172; 304:18:32. Sirius and Rigel; 136; 071, 035. The ullage is four jets for 12 seconds. Remarks: 1, single-bank burn time 2 plus 29; 2, post-TEI RCS DELTA-V is 173 feet per second; and 3, the SPS PU Ox FLOW VALVE will start in DECREASE and then control as required.

CC Okay. That's a good readback and I have another one of those for rev 76.

LMP Okay; go ahead.

CC Okay. It's TEI-76, SPS/G&N; weight is 36372; plus 0.63, plus 0.86; 238:42:07.62; plus 3079.9, minus 0283.7, plus 0004.8; 180, 359, 358; all the rest of the pad is NA. GDC stars are Sirius and Rigel; 136, 071, 035. Four jets, for 12 seconds. The remark is burn attitude based on TEI REFSMMAT. Go ahead.

09 16 56 43 LMP Okay. TEI-76. SPS/G&N; 36372; plus 0.63, plus 0.86; 238:42:07.62; plus 3079.9, minus 0283.7, plus 0004.8; 180, 359, 358; rest of pad is NA. Sirius and Rigel; 136, 071, 035. Ullage is four jets for 12 seconds, and the remark is burn based on TEI REFSMMAT.

Tape 156/4

CC Okay. And one more is a map update. It goes on Flight Plan opposite 236 hours and 50 minutes on the right side of the page.

LMP Okay. 236:50, right?

CC That's affirm.

LMP Go ahead.

CC Okay. The AOS without burn, 237:07:18; and the nominal good TEI AOS will be 236:55:00. Over.

LMP Okay. AOS without, 237:07:18; AOS with, 236:55:00.

CC Okay, Jack. We're getting pretty good with these pads. Another 3 days, we ought to have it down pat.

LMP I think so, Gordy. Is that an offer or do we have a choice?

CC Okay. Yes.

LMP I presume you meant 3 days around the Moon, didn't you?

CC No, no, 3 days to splashdown.

CDR (Laughter) It's all right, Gordy. I know what you meant.

CC We got a lot of parties planned we don't want to - put off.

CC Okay. We'd like the HIGH GAIN on AUTO. And also, EECOM would like the H₂ fans reconfigured. Number 2, OFF; number 1, ON. Over.

09 16 59 59 LMP Okay. As per EECOM's request, H₂ fan 2 is OFF and number 1 is ON.

CC Okay. And we've taken another check on the problem with AOS this rev. We have several sites confirm that they had a solid down-link signal strength and that none of them heard you. We're wondering if you had found anything in audio panel configuration, possibly, that would explain it. Over.

Tape 156/5

CDR Gordy, no. But it's conceivable I could have been keying the intercom. I don't think so, but it's certainly conceivable. I - I checked everything else around here.

CC Okay, Gene. You're loud and clear now, so guess we'll let it go at that.

09 17 00 53 CMP Houston, this is command module pilot, do you read me now?

CC That's affirmative. Loud and clear,

CMP Okay. I'm on the audio panel that Gene was on when he first transmitted.

CC Sounds good.

CMP Okay.

LMP And, Houston; DELTA-V test was minus 22.2.

CC Roger.

CDR Okay, Gordy; this is America. Are you ready for the mapping camera?

CC Roger, Geno. Stand by. Okay; we're ready.

CDR Okay.

09 17 06 05 CDR Okay. MAPPING CAMERA is OFF.

09 17 07 04 CDR Okay. MAPPING CAMERA is STANDBY and IMAGE MOTION is OFF.

CC Roger.

LMP Houston, I'm going to - I'm waiting your cue to check out the number 2 pressure indicator.

CC Okay. Stand by, Jack.

LMP I'm on SPS, of course.

CC Okay, Jack. We're ready.

Tape 156/6

09 17 10 29 CDR Okay, Gordo. We're going to go ahead and maneuver, F30 looks good. The ... flag is reset for VERB 49.

CC Roger.

09 17 10 46 LMP Okay, Houston. Then I'm going back to number 1 on the pressure indication.

CC Okay. We watched it.

CMP And, Houston; America. The EMS DELTA-V test went from plus 100 to plus 100.5, and went from minus 100 to minus 99.5.

CC Copy, Jack - Ron.

CMP Okay; what's our DELTA-V_C? 3028.5. Oh, come on here.

09 17 12 34 CMP Okay; DELTA V_C is set. 3028.5. We're DELTA-V and STANDBY.

09 17 12 54 CMP Okay; we're caged, RATE 2. Okay; we'll put all 16 of them on. Down, up, up, down, up, down, down, up. We're CMC in AUTO and DET is set.

CMP Okay.

CDR Houston, America. We'll pick up the star sextant check and set the DAP when we're in attitude.

CC Roger.

CC America, Houston with some words about the pan camera operation after TEI.

LMP Okay, go ahead.

CC Okay. We haven't told you about this, but we noticed a failure during the last operation of the pan camera, of the stereo. It's completely failed and, so - when you go to OPERATE, which is about 7 minutes after AOS, after TEI, you can expect to get - a barber pole after three frames have cycled through. Want you to just ignore that and let her run. We figure you have 2 minutes of film left, but we won't be able to monitor

end of film, because you'll be on TV on the FM. So we're going to limit the pan camera operation to 5 minutes total, and we'll be able to give you the mark when to turn it off after the 5 minutes. Over.

CDR Okay, Gordo. At 237 in the Flight Plan, where it's "PAN CAMERA, OPERATE," we'll ignore the barber pole. We'll run for 5 minutes and we'll shut it down on your cue.

CC That sounds good.

09 17 16 28 LMP Okay, Houston. The PAN CAMERA is going to BOOST. And also, we're presently configured with the IR, ON and the COVER, OPEN. Apparently Flight Plan neglected to have us turn it off, or are we supposed to burn with it open?

CC Let me check that.

CC America, Houston. We'd like the IR cover closed to keep the Sun out of it.

CMP Okay, and you want the instrument off?

CC Negative. Leave the IR on and I - I'll get back to you in a minute on all these covers.

09 17 18 01 LMP Okay, Gordy. Cover's closed and we'll wait your further word.

CC America, Houston. On the covers, we want all three covers closed, according to the pre-SPS burn cue card. The instruments, the IR and UV, keep running, until after TEI, when you open the covers and back up per the Flight Plan. Over.

09 17 19 39 LMP Okay, we'll do that and going OMNI Delta.

LMP Houston, our last view this time around is the Sun rising over the Aristarchus Plateau and with the Prinz rilles and generally a continuation of the striking views we've had up to now.

CC Roger.

Tape 156/8

LMP We'll leave this country - this part of this planet
for the next group to explore, I guess.

09 17 27 52 CC America, Houston. I think this is what you wanted
to hear, you're GO for TEI.

CMP Outstanding.

CDR Okay, Gordo. Understand America is GO for TEI and
I'll give you a confirm on the star here, in just
a second.

CC Okeydoke.

CDR Say, Gordo, I'm - I got the Moon now in the tele-
scope, be just a little bit before I can give you
a confirm on that, but the DAP is set.

CMP Okay; we'll go ahead and go into P40.

LMP Houston, 17.

CC Go ahead.

LMP Gordy, could you give me a summary of what your
expectations are on the operation of the PUGS?

CC Okay, just a minute.

CC Jack, Houston. We expect you'll need decrease
throughout the whole burn. However, we'd like
you to control it as required, to keep it in the
green band.

LMP Okay. And why do you expect that, Gordy? I
missed one of the burns.

CC Just - just the way it's worked from past history,
that's what we expect this time.

09 17 31 36 LMP Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 17 34 43 CDR Okay, Houston we're down to 6 minutes in the check-list, except for a star sextant check.

CC Okay, Gene.

CC Jack, Houston, with a further word on the PUGS. We have noticed after ignition, on previous burns, some oscillation. We suggest you stay in DECREASE for the first 25 seconds or so, until it stabilizes before you start controlling it.

LMP Roger, Gordy.

CDR Houston, the star sextant check is GO.

CC Roger.

CC America, Houston. About 2 minutes until LOS. One reminder about the DSE: we'd like you to go to LOW BIT RATE just prior to LOS as per the Flight Plan. And then go back to HIGH BIT RATE at 6 minutes prior to ignition per your burn cue card and you can just leave it in HIGH BIT RATE from there on through AOS. We just went around the room once more; everything looks good. Have a good burn, and we'll see you and the TV picture as you come out the other side. Over.

09 17 41 51 CDR Okay, Gordy, thank you. We're looking forward to a good burn. And, we'll see you coming out the other side.

09 18 17 13 CC America, this is Houston. We'd like the high gain, please.

CDR Houston, do you read America?

CC That's affirmative, America. And we have a picture. Over.

CDR Roger, Houston. America has found some fair winds and following seas, and we're on our way home.

Tape 157/2

CC Okay, that's great news.

CDR It sure is, Gordo.

CMP You betcha, by golly. It's outstandingly good. That was a good burn, too. We'll give you the burn report in a bit.

CC Okay.

CDR Okay, Houston, I'll try to give you Tsiolkovsky from about the nadir.

CC Roger.

CDR *** focus. Yes, this - there you go.

CDR This is a grand place to be right now.

CC I'll bet it is, and we've got a great picture of Tsiolkovsky. Got it right in the center, and good focus. Great picture.

CDR I know there's not as many smiling faces down there as there are up here, but we're making up for the difference in numbers.

CC Roger.

09 18 20 29 LMP Gordo, I'll give you a quick burn report. The burn was on time. Burn time was 2 minutes and 23 seconds. DELTA-V_{GX} was 3047.0. Attitude at the end of the burn was 184, 005, 359. That's 184, 005, and 359. There was no trim. The residuals are minus 2, plus 0.7 - Correction, minus 0.2, plus 0.7, and plus 0.2. DELTA-V_C was minus 18.1.

CC Roger. We got those.

09 18 21 14 LMP And, Gordy, the unbalance is about 30 pounds, and oxidizer is 2.8 and fuel 2.9, and I blew FULL DECREASE the whole burn.

CC Roger, Jack.

CMP How's the picture look, Gordy?

CC Real fine.

CDR : I'd tell you exactly what we're looking at, but I can't quite see it.

LMP : Gordy, the country Gene's pointing out is south of the orbit that we've been following for several days, and Ron, even more than Gene and I. And it's some of the striking country of the far side of the Moon that human beings don't very often have a chance to see, but a trend's been started in the last few years, and I suspect it will continue.

CC : Roger, Jack.

CMP : Gordy, America performed superbly.

CC : America, Houston. We need PAN CAMERA OPERATE, now.

LMP : Thank you. PAN CAMERA going to OPERATE.

CC : And can you verify that you got the other SIM bay items that precede that?

LMP : We're verifying that right now.

LMP : Okay, Gordy. The SIM bay should be squared away.

CC : Okay. Thank you.

LMP : Pardon our slowness there.

CDR : Gordy, I'll try and take you across the terminator, if I can.

CC : All right.

LMP : Of course, we're seeing country south of Tsiolkovsky that we've never seen before.

CC : Roger.

09 13 24 52 LMP : And when we get a picture of Tsiolkovsky back, I think maybe even you can see one of the things that both Ron and I have noticed about it is, number 1, it's a basin that is comparable in its freshness and apparent age to the - probably the Imbrius Basin on the near side of the Moon; and, secondly, it has an unusual area in its northeast quadrant

Tape 157/4

that - from which the blanket is excluded. There is an apparent slide. We're not sure what it is, but the normal indications of an ejecta blanket are just not there.

CC Roger that, Jack; and we can see those features you just described. The camera - -

LMP Okay. And for - for your - -

CC - - if you can figure out a way to hold it a little steadier, that would help, but we're getting good resolution.

CDR Okay, Gordo, I'm working on it. You'd think a guy that's been there for however many days we've been there could find it, don't you?

CMP When you see Tsiolkovsky south, the central peaks form an arrow that points south, Gordy.

CC America, Houston. Your altitude right now is 820 - 835 miles. Over.

CDR Okay, 835 miles. And climbing out like a dingbat.

LMP Frames 5 through 20 were taken on mag Papa Papa, at that altitude.

CC Okay, Ron.

CMP There's Smythii down there. I finally figured out where we are. Right down underneath the window. I can see it now.

LMP Gordy, as far as we can, we'll try to run you a little bit along the orbital track. I'll be panning the camera more or less westward. Tsiolkovsky starting and Tsiolkovsky is itself in the crater Fermi, and moving on to the east, the next big pair of craters that we spent some time studying is Hilbert, which is just south, is right there, and just a little bit northwest of there is Pasteur.

CC Oh, Roger, Jack.

LMP Both Hilbert and Pasteur appear to be very old basins, much older than Tsiolkovsky and they have, as you can see, a fill in them, apparent fill - very flat looking at this distance, and very light colored. It's an event on the Moon of which we have relatively little understanding at this time, but possibly the Apollo 16 results, when they're fully known, through the analysis of the samples and other data, may shed some light on that event.

CC Roger. Sorry to - -

CDR Hey, look here - ... - -

CC - - interrupt, but we'd like PAN CAMERA, OFF, now. PAN CAMERA STANDBY, rather.

CDR - - That's a full circle.

09 18 30 08 CDR Okay, STANDBY. Now we're going to be able to pan a little bit more east now of Pasteur and start to show the crater Smythii, the basin Smythii really. It's one of the older large basins on the Moon. It has none of the obvious features of big basins such as Imbrium or Serenitatis. But it's nevertheless roughly circular, has a mare fill, and a very - I'm point right now to the hint of a second ring outside, but the main ring is the one Ron's talked to you a lot about this and has his double-ring craters in it. And we're pointing at some of those right now.

CMP Uh-huh.

LMP Okay, Houston, we can now see Tycho. We're seeing probably about 75 to 80 percent of the entire Moon - face, anyway lit up. The rays of Tycho are very obvious from here. Want the camera over there, Gene?

CDR Let me show it to them.

CC We had a good tour there of Smythii. We recognized the Smith Brothers, the Wright Brothers and started to see Neper before you left it.

CMP No.

Tape 157/6

CDR No?

CMP No.

LMP No, you won't see Tycho for a little bit.

09 18 32 35 LMP You can - Langrenus is now visible at the edge of Fecunditatis there, if you want to show that one.

CDR Just this side of Fecunditatis?

LMP And Humboldt is a crater that ought to show up very well on the television. That's the cracked floor crater there with a little dark mare.

CDR Okay.

LMP There's all the swirls in Marginis. You can really see them now.

LMP Oh, yes. Why don't you get -

CMP Yes. Can you get some of the swirls - -

LMP Okay. Early in our orbit, and particularly Ron, he had the chance to work on the question of these light-colored swirls and Marginis has outstanding examples of them and I'll try to get the camera pointed on those in the northern part of Marginis. Let me orient you, as soon as we're focused here. Okay - Smythii - I'll point right at the center of Mare Smythii, and then move up towards Neper and then into the swirl area a little bit more north. And Gene will zoom you in and let you see what some of that looks like. I don't think we have a full answer at what the swirls are, but some of the things that we saw in Taurus-Littrow and later from orbit around Sulpicius Gallus may suggest to people, from now on, that the possibility of alteration from fluids in the interior of the Moon is more than just a possibility.

09 18 34 38 CC Roger. That's a nice shot there of Marginis.

LMP Can you see the swirls, Gordy? Are the very diffused, light-colored areas that cross various topographic features?

CC That's affirmative, Jack. They're visible from here.

CDR Okay. I'm going to give you an end-on view, if I can, of Mare - of the Crisium Basin. You should be seeing that now.

CMP How is that, Gene?

CC That's a good picture of Crisium as it is very evident on the right side of our picture.

LMP Yes, that's right. And before long, we'll be able to show the landing site and Taurus-Littrow and I think you probably see Proclus, which is the bright crater just off the horizon now. That's the one with the excluded ray zone on its western or southwestern side.

CMP It's not in view yet.

LMP We may not see it, I think we're going the other way.

CDR Right in the horizon. The landing area, Taurus-Littrow, and the edge of the Serenitatis Basin is probably just on the horizon now and I'm not sure it exactly - -

CMP You can see the dark part of Serenitatis is sticking out of the Sea of Proclus the ray-excluded zone. No, that's Fecunditatis sticking up there, isn't it? Because the ray perpendicular to our track now points right to the landing site right off of Proclus.

LMP The area where one of the Russian vehicles set down and returned samples from is just about in the center of your field of view now. Just on the north side of Fecunditatis.

CC Roger. And you're about 1300 miles up right now.

CDR Wow! That's not a bad climb is it, Gordy?

CC Pretty good rate.

Tape 157/8

CDR A friend of mine says "Wow woozle!"

CMP Looking out window - window 3 now, and the Moon is just the size of the window, and I've got my face right up against the window.

CDR Or maybe his head's just the size of the Moon. We're not sure which.

CMP (Laughter) That's right.

CDR I don't know what's happening down there now, Gordy, but this is where the action was one time.

09 18 37 25 CDR Okay, we're starting to, I think, in a little bit, be able to show you the edge of the Serenitatis Basin. It's moving a little slowly right now. It looks like it's creeping over the horizon.

CMP It's going to creep over the horizon, maybe, but I think - -

CDR But I'll tell you what's on the horizon now. I'm not sure I can get it. Let me try the rendezvous window. I think I can show them Apollo 11's landing site.

LMP You can probably get it at the south portion of Tranquillity there, if you - out the center window would be better.

CMP Yes, the center window, you could get it.

LMP See the southern part of Fecunditatis, and then the Tranquillitatis takes off to the west there, Gene, right along that southern edge of Fecunditatis is where Apollo 11 set down.

CDR Yes, and a little bit north of the line that - of the ray of those two craters.

09 18 38 47 LMP Okay, Gordy, in the center of your picture is - about right in there, - is the southern edge of Tranquillity and the Apollo 11 area and that was the ground track, of course, for Apollo 8 and Apollo 10.

CC Roger.

LMP Yes, we'll put you back on Langrenus, which is one of the Copernican-age craters, in this part of the Moon, and I believe it was Apollo 12 had an excellent opportunity for some several orbits to study Langrenus.

CC Roger. We see that. It stands out like a beacon there, on the right side of the picture, and we also saw Messier with its rays.

LMP Okay, our landing site's in view now, Gene.

CMP You're a little bit off the field - let me move - you're almost out of the field here. Let's see - Proclus -

LMP Our landing area is just about in the center of your field of view right at the horizon now.

CC Roger.

LMP That's the best focus we've got, Gene.

CDR Okay, full zoom, and right in that region in the center should be the landing site of Apollo 17. Known, hereafter, I guess, as the Taurus-Littrow area.

CC You're now 1500 miles above the surface, and your climb rate was just computed at 295 000 feet per minute.

CMP ... (Chuckle) That is really moving out.

LMP Sure glad they cleared the traffic out of the way. Let me - Gene, let me switch over briefly and show them the North and South Poles, which nobody really has done much with yet, except for Lunar Orbiter, and some of the Russian vehicles. There's a spectacular valley off - on the South Pole. I don't know the name. It looks like one of these long chain of - - chain of craters.

CDR Does that show up? Let me try it with - Let me try some of these others. Well, oh, here's where it goes.

Tape 157/10

LMP Okay, Houston, we're in - -

CDR Huh? Good picture?

LMP That's in the south polar regions. There's a -
I think you can probably see a long chain of cra-
ters, which so far unvisited by man. In fact, the
whole region has, and that goes for the north pole.

CC Roger, Jack. That's very interesting. Can you
zoom in on that whole valley?

LMP I think that's the best we got, Gordy. That's
full zoom.

CC Roger.

LMP It's one of the biggest crater - chain crater
valleys that I've seen on the Moon. It - we
saw some crossing Mendeleev, in the first few days,
I think we talked about, similar in shape but not
nearly as big.

CC Roger.

LMP Let me move over briefly to give you another view
of Humboldt, which should show up very well now.
We're just about directly overhead. It's unusual
- one of the few craters on the Moon that have
a fairly flooded floor, and appears to have been
domed, and you probably can see some of the cracks
in that floor.

CC Okay, it's in the center of the field now; however,
something is blocking the right side of the view.

CDR How's that?

CC That's real good now.

LMP Around the edge of the dome floor, you can see some
of the dark mare which is prevalent elsewhere in
the region but not so abundant within Humboldt.

CC Roger.

CDR And you - you - you can see - if you can see -
Check it ...

LMP Langrenus, you mean?

CDR Tsiolkovsky is ... the terminis.

LMP Oh, okay.

CMP Out the window.

09 18 44 47 LMP Oh, all right. Hey, there's another view, if you will bear with us, of our old friend Tsiolkovsky. Okay?

CDR Okay, I got it.

CC Roger. It's hard to mistake that one.

LMP Yes, it's one of the more pic - picturesque basins. I guess partly - although it's big, it's not so big you can't look at it all at once. Smythii and Crisium and Serenitatis and Imbrium, in particular, are hard to look at all at once. You're always down inside of them in the 60-nautical-mile orbit.

CC Roger. Just might mention the diameter for those who are watching at home. That's about 180 miles across, I think.

LMP (Laughter) Okay. That's pretty good. I was going to say about 200 kilometers, I think, is what it is, but - -

CMP That's right.

CMP And, Gordy, of course, it's on a part of the Moon that you - you don't see from where you are.

CC Roger.

09 18 46 04 LMP Not yet, anyway.

LMP Okay, let's see if we can move on along our orbital track that we've been following and see what's new that's come into view. Once again, I'll pick you up at Smythii and move you into Mare Marginis, the Margin Sea. And, all the mare, you may recall now, we have pretty good evidence as a result of the Apollo - -

Tape 157/12

CMP Change this ... around.

LMP - - Program - -

CMP Good.

LMP - - that our theories of basalt flows that some 3 to 4 billion years ago, in round numbers, were erupted on the Moon and filled many of the low areas that existed at that time. Not an awful lot has happened to the Moon since - except for the impact craters, some of the younger ones, since 3 billion years ago, which is one of the reasons it becomes so interesting to man. It's - the Moon's frozen in a period of history 3 billion years and older, which is a period of history that we cannot recognize very readily on Earth because of the dynamic processes of mountain building and oceans and weathering that are taking place even at the present time. Understanding that early history of the Moon may mean an understanding of the early history of the Earth. And, I think we're well on our way to a first-order understanding of that history as a result of the Program. Okay, going to take you a little bit farther along. Again, to Proclus, which is the obvious partially rayed crater with a big excluded zone to the southwest. There's Mare Pecunditatis and its contact area with the Sea of Serenity, Mare Serenitatis, and the landing site now has to be just about on the horizon. I think we were a little premature before.

CC Roger.

CMP Yes, we were. That's Macrobius A and B just beyond Proclus, there. Yes, that's really Macrobius - -

LMP Now, you're starting to - just to see the Mare of Serenitatis come over the horizon - -

CMP Yes.

LMP - - and, if you take a line from Proclus between the two bright craters - -

CMP You're not going to get more of the Moon unless we have space up here.

LMP Yes, yes. How's that?

CMP That's better.

LMP Take that line, and that will take you just about to the landing area, right at the edge of the next big mare that you see.

09 18 49 08 CC Okay, Jack, we can follow that just as you told us there. Those three craters are very obvious.

LMP The site, Gordo, is now just to the left - left and a little below center of your picture.

CC Roger.

CDR You can see that ridge of mountains that sticks out and the landing site is - well, from here, anyway, right in that area.

LMP Right, I guess my line was a little bit north of where we actually should have pointed you. There's some dark area just showing up around the edge of Serenitatis on the horizon. I think that will show in your picture as I remember some of these from Apollo 10 before. And it's just this side of the dark area that the Taurus-Littrow area sits, in the mountains, there.

CC We think we have Maraldi in sight now.

LMP Yes, and you also - -

CDR Yes. They should.

CMP Yes. You should.

LMP - - Vitruvius should be visible to you just to the south of the landing area.

CDR Vitruvius is in the monitor, so they should have it.

09 18 51 08 CDR Jack, I think you got a good view. You can see Censorinus now. You can probably get a real good shot at the 11 site at ...

LMP Yes, you're right.

Tape 157/14

CDR There's old Censorinus. It's awful big.

CC How big is it, Geno?

CDR Okay, towards the southern border of - (laughter). Okay. Old Censorinus is right in the middle of the screen.

CC We see it.

CDR You've been there before.

CC Right.

CC 17, Houston. You've just passed 2000 miles.

LMP 2000 miles. We've got about a 95-percent full Moon in front of us. Not too far - matter of fact, I think the Apollo 16 landing area would be just about on the horizon, to the south of Tranquillitatis. And back up to something that's dear and near to our hearts. You probably now can pick out the mountains, the North and South Massif, if you really look closely. What do you think, Gene, from the monitor? Can they see that?

CDR I can't even see the Massifs with the naked eye. No.

LMP See the dark area there next to ... - -

CDR I know where - Yes. I know where to look. But it's awful hard to pick them out. But you're looking right at it. You've got it right - just to the left center. It's just about perfect, the landing site. There's a little dark area in that peninsula of mountains that sticks out and the site is just about right in that area.

CC Roger, Gene, as you say - -

LMP I wish we could show you - -

CC - - we know where to look, but it's hard to confirm exactly the structure there.

LMP Come on, you guys, I can even see the light mantle.

CDR Extrapolation is the nature of our art.

CC I just saw a flash, Jack.

LMP I wish we could - Okay. I didn't hear them. Say again.

CC I just saw a flash.

LMP (Laughter) I wish we could show you some of the color we see on the Moon this trip, but I think we're a little too far away from it. We'll see if we can ... back in ... from here.

CC We - we've been looking for that crater - -

LMP Well, I can show you a picture of the commander. He's fairly colorful.

CDR That's about what we're seeing, Gordy. I can't give you the bottom half because I can't quite move around the post here.

CC Geno, we're getting a great picture ... 80 percent of it.

CDR You getting the whole movie? I'll get it. Okay, I think you can orient yourself with the big basins Jack's been talking about. There's Crisium. You can see the landing site up in the - what is to me the upper left-hand corner of the picture, but you can pick it out by now, I know. Get a better relationship. You're looking at the Langrenus, down there, that bright crater. You ought to be able to see Humboldt. Maybe Jack can give you the whole thing.

LMP ... this in.

CDR Need to get the whole thing.

LMP Yes. He said minimum zoom.

CDR Yes. It's put on the ... Okay, that's pretty good, it's centered just about right in the center. It ought to fit your screen as we climb out. Just about tangential now.

CC That's perfect right where you got it.

Tape 157/16

09 18 56 22 CDR Okay, we'll hold that for a minute. The terminator is coming across, of course, at the opposite side of the Moon from the big basin you're looking at.

CC Roger. .

MCC Geno, what color does that mare look like to you?

CDR What color does the mare look like to me from here?

MCC Right.

CDR Now, I'm a commander; do I have the right to change my mind? (Laughter)

MCC I guess so.

CDR Tom, you know I always thought you could almost make it look whatever color you wanted to, it's so subtle. But the mare - the mare, to me, has got a grayish - a dark grayish mixed with a very subtle tan, and that's what it looks like to me, from here.

MCC Roger.

CMP This is the CMP. I agree with that.

CDR The tan is sort of like a dusted tan in spots in and around and on the mare. I'd say that the basic - if I could pick out a chunk of that gray mare from here, I would pick out a very steel gray - a dull steel-gray color, but if I just took a mass of mare out, I'd have to mix it with a subtle - very, very subtle pastel tan.

CDR That's perfect. You can see Tsiolkovsky now in the terminator, down there. I think Jack's just about got the Moon centered perfect. You got Tsiolkovsky on one end; the big basin's on the other end. How high are we, Gordy?

CC ... gray. Okay, you're 2327 miles.

CDR You know, I think it's worth noting, while we're looking back at the entire Moon as we see it here and you're seeing it there, that America could be

proud of the Apollo heritage it's left here. I know we in the program believe that it's really and truly been a heritage that will prove itself to be one of the best - most beneficial things that have happened to mankind in quite some time, although none of us can really predict the future. But I think everyone that has been part of this program has been proud of its accomplishments. I know we have. We're looking back at someplace, I think, we will use as a stepping stone to go beyond some day. And those aren't words. It's a faith I truly and dearly have. And I think we will all see it in our lifetime, not just as a nation, but as a world. I think the Apollo Program not only has given us the first steps to that sort of impossible dream, but has given us an opportunity to make the first steps in bringing a world together as one unit, so that we can make that step together. It's been a privilege sharing the program - that part of it that we've been in with as many people as we have and as many people as we can, because I've often thought and I've often said before that anything that's worthwhile doing and doing well, is certainly worthwhile sharing with others. This is history being made in our time, while you and I are alive, not 100 years ago or 1000 years ago, and it's sort of the real thing happening right now. You're living it, not just us. We hope that you're getting as much out of it, not just feeling of pleasure and excitement, but that of accomplishment, as we are.

09 19 00 26 CC

Thank you, Gene. Speaking for the ground, as part of the Apollo Team, we second those thoughts, which you put very well.

CDR

Well, Gordy, it's not our accomplishment. It's the accomplishments of a nation. And I think the next set of accomplishments are the accomplishments of mankind.

LMP

Gordy, in - in that vein, I think a couple words, I'd like to more or less reiterate what I tried to say as we finished our third EVA, and that was that the valley of Taurus-Littrow and the orbit of the spaceship America saw the completion of mankind's first steps - first evolutionary steps from

Tape 157/18

the planet Earth into the universe. I think it's important that in doing so, he established a tradition of peace and freedom within the solar system. From that larger home, now, we move to greet the future.

CMP Well, you know, Houston, and America and the world, this is the command module pilot of the spaceship America, and I just feel quite honored and proud to have been a part of this Apollo Program. The Moon, itself, is a magnificent, it's a dynam - well, I hate to use the word dynamic, because it's really not dynamic, but it's a marvelous planet. It has all the wonderful opportunity for exploration. Man must explore. We will continue to explore, and I hope that some day we may all have the opportunity to see mankind enjoy the benefits of the exploration of the Apollo Program.

CC Thank you very much for the great TV show and the - and your final words. We enjoyed every bit of it.

09 19 03 14 CDR And, Gordy, with that, we're about behind our timeline, as we fully expected we might be at this point in time, but believe me, it has been a beginning, it is a beginning, I don't think there ever will be an end, not as long as man is alive and willing.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 19 04 32 CC America, Houston. We didn't have data, of course, while you had the TV on. We're wondering if you configured the SIM bay on our voice call or had you done it earlier? Over.

CDR No, Gordo. We were late. When you called - I guess "PAN CAMERA, ON," we went back and configured a SIM bay and followed those steps in the Flight Plan that follow "TV, ON." We had not done that.

CC Okay. No problem. We're just - just wondered what we had there.

CDR Okay. Are we up to date on the SIM bay now, or you satisfied?

CC No, we're just now getting some data, and taking a look. We'll let you know. Okay. We'll take PAN CAMERA, OFF, now.

09 19 05 42 LMP Okay. The PAN CAMERA power is OFF.

09 19 06 00 LMP Okay, Gordy. S-BAND AUX TV is going to SCIENCE.

CC Roger.

CDR Gordy, it's going to be hard to leave this attitude, but we're going to maneuver now.

CC Roger.

09 19 06 59 CMP And, Houston; America. Mag Delta Delta is empty now. The last 50 percent was used for taking pictures of the TEI.

CC Okay, Ron.

CDR Gordo, going back at that burn. It was an outstanding burn. We were looking about a half a g throughout the burn. She lit off on time. She was a very steady burn. I think she reversed roll a - a couple of times in the dead band. The computer and the EMS were with each other all the way.

Tape 158/2

CMP Chamber pressure on bank A started out at about 87. Bank B brought it up to about 92, 93. And when I first sat down, it was reading 0, now it's reading 5.

CC Okay, Ron. We got 6 down here.

CDR Okay, so in all other respects, the burn was nominal, Gordy. You got the burn report and the residuals, and we'll leave the tracking to you.

CC Roger.

CDR I might add, I don't think they built spacecraft any better than they built these two.

CC I don't see how they could have.

CMP I'll sure second that.

CDR I finally found what I was looking for. I got the man in the Moon.

CC Roger.

CDR For all you nonbelievers, I verify he really is there.

CC Okay.

CDR Gordy, these next series of maneuvers - bring us - bring our middle gimbal angle pretty close to the apple [?]. We're watching it, but appreciate - you not hesitating giving us a call, too.

CC Okeydoke.

CDR Gordo. In answer to PP's [?] question about the color of the maria down there, when you look at Serenitatis, of course we saw this earlier, when we were much closer, but when you look at it from up here, it's - it's got on the northeast side, a very - quite thick, laterally across the surface, dark - typically dark with the tannish colors I was talking about - mare - which sort of borders it. But just north of the - the overlap, between Tranquility and Serenitatis, that contact changes sharply to a - the grays are gone - it's a very sharp contrast and I think those who have seen it

before will remember it, but Serenitatis from where we stand is - much more tan dominated, than gray dominated.

CC Roger.

CDR Gordo, we'll get those numbers out of the first state vector out of the computer here shortly. No hurry to do it though.

CC Okay.

09 19 13 51 CDR Do you have our altitude now? About 4000 miles maybe?

CC I lost that display. Let me check here.

CDR No, I'm just trying to relate it to when we were coming in. I'd say it's more like 5.

CC 3100.

CDR How many?

CC 3100.

CDR 3100. Okay.

CC America, Houston. Sorry to say that the LCRU has pretty well crumped, evidently. We were talking over the biomed schedule and suggest that with your choice, either Gene stay on it or Jack go on it, and then we'll get back to the Flight Plan rotation after the EVA. Over.

CDR Okay, I'll stay on it through the EVA. How's that?

CC Okay, fine.

CDR And we'll pick - we'll pick Jack and Ron in the morning.

CC All right.

Tape 158/4

LMP Gordy, this is Jack. I fail to see the correlation between the LCRU crumping and me going on biomed. Don't tell me you were monitoring it on the Surgeon's console, there.

CC Well, we don't see any correlation either, but we're trying to look for some.

LMP Okay; let me know when you have an answer.

CC Okay.

CDR Houston, America. When you get a hack on - on our track, I'd like to get a first-cut estimate at it.

CC Okay; will do.

CC Geno, it'll take about an hour to get a good hack, to get that much tracking. However, earlier, the Retro was betting everybody there wouldn't be any midcourses.

CDR That's a - that's a good way to feel. Okay, we'll - we'll talk to you in an hour about it.

LMP Whose the wild man Retro? I don't want to play poker with him.

CC It's old ... He's a former B-17 pilot. They're - they're always right on.

LMP Now you're starting to scare me.

CDR You can pass the word to Captain Green, back there on the Ti to clear the flight decks.

CC Okay, we'll do it.

LMP The last time I had anything to do with a bomber pilot, Gordy, he was scheduling my airplane.

09 19 21 28 CDR Hello, Houston; America.

CC Go ahead.

CDR We got PTC orientation in the computer?

CC Negative. But we got it ready to come to you,
if you give us ACCEPT.

09 19 21 55 LMP Okay. It's all yours.

CC Roger.

LMP Gordy, I'm afraid the weather reports on the way
back of the only planet that really has much
weather visible, will be a little repetitive.

CC Jack, we're heartbroken.

LMP For your for - first report, you can just play
the recording back; it's sunny and clear.

CC Okay.

CC You're right on that one - -

LMP The only sign of any weather - -

CC - - except that you left out the fact that it's -
cold also, here.

09 19 23 31 LMP Gordy, you didn't listen. I can't see the Earth.
I'm talking about that other planet.

CC Okay. Depending on what part you're looking at,
it's cold there, too. We got you, though. You
got your REFSMMAT, you can go back - -

LMP There might be traces of an atmosphere - -

09 19 23 56 CDR Okay, Gordy. We're in BLOCK, and I might give my
CMP one more chance at a P52.

CC Okay.

LMP Then, the LMP gets to start trying.

09 19 28 24 CDR Gordy, I can look back and - with the glasses -
the binoculars, and I can see the white mantle and
see all the massifs in the landing area.

CC How about that?

Tape 158/6

CC Back when you had the tube on it, I - I really think - I knew we were looking in the right spot, but you know it was just blurry enough that - you couldn't be sure of exactly what you were looking at.

09 19 28 55 LMP Gordy, let me - since I don't have anything else to do right now, apparently, I'll see - tell you a couple of things I see right here. The annulus - the dark annulus around Serenitatis, does not look complete in - in the due-north area. Oh, there're little partial pieces of dark material up there, but the main part of the annulus seems to cross into the mare region that's north of Serenitatis, and I can't remember the name of that right now. But it very clearly crosses right over there as a band and then dies out in that north region.

CC Roger.

09 19 29 38 CMP Okay, Houston. There's the torquing angle.

CC Okay. We copy.

CMP Okay. And I'll torque at - it looks like - at 238:10. I guess you really don't care, though, do you?

LMP And, once again, albedowise and hue - color-hue-wise, the - that annulus is the same as at Tranquility, and essentially the same as most of Fecunditatis. The areas - although Tranquility and Fecunditatis are mottled ... with tan colors, the - that mottling seems to be local and, probably in large part, related to rays that cross those - those seas.

CC Roger.

LMP At this viewing angle, the dark mantle around Taurus-Littrow area is just a darker shade of blue-gray to me of the annulus, it's a - more just a medium gray, I guess. Whereas the Sulpicius Gallus dark mantle is a brown-gray, quite distinct in its color hue - to me, at any rate.

CC Roger.

CMP Houston, I can't see any stars out there, so I'm going to false torque it instead of coarse align.

CC Okay.

CMP Hopefully, the reason I can is because - cannot - is because the Earth is right in the field of view, and it's still pretty bright.

CC Roger.

09 19 32 30 CC America, we've got a little musical selection for you here. Stand by.

(Music: Going Back to Houston, by Dean Martin)

CDR That's very appropriate. I remember that being played one other time after a TEI burn.

CC Roger. I think it came the other direction that time, didn't it?

CDR If you stand by, we'll express to you our sentiments here, with a short little tune I think you will enjoy.

CC Okay; standyng by.

09 19 37 26 (Music: God Bless America, by Tennessee Ernie Ford)

CC Hey, thank you very much. Very enjoyable and also very appropriate.

CDR It certainly has a twofold meaning for us.

09 19 42 16 CMP That's about par for the CMP, now.

CC Ho hum, another all balls.

CMP (Laughter)

CDR You hit it right on the money.

CC Okay; we've got those.

CMP Okay; and we'll torque at 238:23.

Tape 158/8

CC Roger.

09 19 52 59 CDR Gordo, I'll maneuver in about 10 minutes.

CC Okay; fine.

09 19 54 56 CMP Hey, Houston; America.

CC Go ahead, Ron.

CMP You reckon you'd have one of the photo guys down there to figure out when we could get a full Moon with an 80-millimeter lens.

CC Okay. I'll put them to work on it.

CDR Okay; appreciate it.

09 19 57 19 LMP Houston, 17.

CC Go ahead, Jack.

LMP On the pan camera, you said to expect to see barber pole when we ran it. I did not see that just for your information. It went barber pole and then gray.

CC Okay; thank you.

LMP And, Gordy, several times I have reminded myself to tell you guys something and I keep forgetting. I think it - was yesterday when we did an oxygen purge on fuel cell 3 after about - oh, I think it it was a minute, possibly a minute and a half. The high O₂ flow warning was triggered. Normally that is not triggered when we do the purge. That's the one and only time it's happened. This last one, prior to TEI, there was - it was within the green band and there was no fuel cell caution and warning. Just thought you might be interested in that one.

CC Okay, Jack; thank you.

CMP Houston, Ron here. I think I got - that - on fuel cell 3 too in one of my fuel cell purges, when I was up here by myself. Probably shows up on the data anyhow.

CC Roger.

CDR And you can tell Farouk that - that crater out on Fecunditatis that I've got a picture of, that we worked on back at the Cape and studied quite a bit, has got all the attributes of everything he told me about it.

CC Roger.

CDR Yes, and that's the one - that's the one I was describing on this morning.

CC Okay.

09 20 00 56 CMP Also, be advised the inner ring of the - the basin Arabia is quite visible. It looks like there is a - shallow depression outside the inner ring and when you get up at this altitude right around Saenger, it is indeed, it looks like a raised-up plateau crossing Saenger. And, also, in the vicinity is King - King is almost going into the terminator now, well, it's 10 or 15 degrees from the terminator. But you can see a little bit of a raised-up plateau, that takes in the crater King and goes about a crater - a King Crater - a diameter and a half or maybe 2 diameters to the south, and a crater and a half to the north of King.

CC Roger.

09 20 03 28 CMP You know, Houston, it's also interesting to note, that the - the range of color, from this altitude and from 60 miles, doesn't seem to change at all, really. In other words, the same impressions that I had of color in the 60-mile orbit are the same impressions that I have now, of the same areas.

CC Okay, that's interesting. You're a little over 5000 miles out, at the moment.

CMP Roger.

Tape 158/10

CDR Gordy, you don't have that number on this millimeter camera, do you? We're going to maneuver and I'd like to get a last shot at it.

CC Okay. Well, you're far beyond the point where you can cover the whole Moon with an 80. We were just trying to come up with an altitude for filling up the 250, but you'll get the Moon and then some with the 80, right now.

CMP Okay, that's good. Then we'll take it with the 80.

CC Roger.

09 20 10 39 CC America, Houston. At 240:30, you'll be about 10,000 miles out, at which altitude the Moon will just about fill up the 250 lens field of view.

CMP Oh, okay. 240:30, it looks like for the 250 lens.

CC Right.

09 20 16 40 LMP Gordy, are you ready for an omni or you want to wait a little bit?

CC 17, Houston. Gordon's off the console for the moment. We'll wait a couple of minutes on the omni.

LMP Okay.

CC America, Houston. We need OMNI Delta.

09 20 18 38 LMP Okay. You've got OMNI Delta.

09 20 18 43 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 20 38 37 LMP Houston, America.

CC Go ahead, America.

LMP Looking at our sketches here and trying to figure out exactly what we're looking at in the dark part of the Earth. I guess it's you and, if it's a clear night, you ought to have a pretty full Moon looking back at you.

CC That's right we do. In fact, it's nice and clear all day and I could see it as I came in this afternoon. Your subspacecraft point right now is over the Yucatan Peninsula.

LMP Yes, it's just about the chart I'm looking at, Gordo. Looks like about right smack in the center.

CDR Gordy, do you have a general trend on the prediction in the recovery area?

09 20 40 23 CC I haven't - haven't heard one, but I'll see if we can get one.

09 20 41 58 CC America, Houston. The Sun is just about to enter the lens of the mapping camera, and we'd like you to retract it and then close the cover. We're not copying SIM bay data now, so we'd like you to get a MARK on both the start of retraction - give a MARK on the start of retraction and one when barber pole goes to gray.

CMP Okay. We're going to retract the mapping camera. 5, 4, 3, 2, 1 -

09 20 42 32 CMP MARK it. There - -

CC Okay.

09 20 42 36 CMP - - barber pole. And that was at 20 - 22:30.

Tape 159/2

CC Okay, and we want to keep it running to run the film out of it.

09 20 42 48 CMP Okay, understand.

09 20 45 53 CC America, Houston. How's the mapping camera talk-back look?

CMP Barber pole.

CC Okay. We thought it should have been gray by now.

CMP (Chuckle) Okay, let's see. I've got - we're coming up on 4 minutes.

CC That's what I've got.

09 20 46 51 CMP Hey, there we go. Gray.

CC Okay, thank you.

CMP Took a while - took a while, but it made it.

CMP Okay, the COVER has gone CLOSE; barber pole, gray.

CC Okay, thank you.

CC America, Houston. Got a couple of answers for you here. On this - the O₂ caution/warning indication on the purge, at the time you were pulling 37.8 amps out of fuel cell 3 because the SIM bay was fired up and that'll result in about a flow of 1.37 pounds per hour which - and the trip limit is 1.2, so that's why you got the - the flag on it and you can expect to get the caution/warning anytime you've got 33 amps or more being pulled out of the fuel cells at the time you purge. Over.

CMP Ah ha, okay. That sounds good, then.

CC Also, we've tracked you a while now and midcourse 5 looks like a whopping 0.3 of a foot per second at the present time.

CDR Beautiful, Gordy, beautiful.

CMP That is outstanding.

09 20 51 32 CC America, Houston. In answer to your question about the weather at splashdown, the area right now is 2000 scattered and 10, winds variable at 10. And forecasting the same - 2000 scattered and 10, with 3-foot waves, variable at 10 knots on the wind, and some rain showers, but less than 10-percent coverage on the rain showers in the area. Over.

09 20 52 05 CDR Oh, you're full of good news tonight. Thank you.

09 21 08 58 CMP Houston, America is about to maneuver.

CC Okay.

09 21 11 42 LMP Houston, 17.

CC Go ahead and give us OMNI Charlie, please, while you're talking.

CC Also, Jack, we'd like you - -

LMP Hey, Gordy, this is Jack - since I can't give you - -

CC - - we'd like H₂ TANK 1 FAN, OFF.

09 21 12 18 LMP Go ahead. H₂ TANK 1 FAN is OFF.

CC Thank you and go ahead.

LMP Okay, we got all three of them off now. Right, Gordy?

CC That's affirmative.

LMP Hello, Gordy.

CC Hello; go ahead, Jack.

Tape 159/4

LMP Okay, since I can't help you out on the weather right now in the Pacific, can you give me a run-down of what things look like out there?

CDR I already got it.

LMP Oh, I'm sorry. I wasn't on the loop. Apparently you already briefed somebody on that.

CC I covered the recovery area. Not the rest of the Pacific. Did you want an overall briefing?

LMP No. I was just curious what the recovery area looked like, and I'm sure that my compatriots will clue me in on it, if I'm nice to them.

CC Yes. I'll save them the trouble. It's going to be 2000 scattered, 10 miles, 3-foot waves, variable at 10 knots, and less than 10 percent chance of rain showers. And that's just about what the weather is now, and also forecast.

LMP Okay. Thank you very much.

CC Jack, you've got a lot of SIM bay data stored up there that we'd like to get dumped. Can you give us the HIGH GAIN; PITCH, 30; YAW, 320?

LMP Okay, PITCH, 30; YAW, 320.

09 21 15 19 LMP Okay, it's the old HIGH GAIN for you.

CC Thank you, sir.

LMP Gordy, what altitude are we at now?

CC Stand by, I'll check. 8500 miles.

LMP You clipped. Say again.

CC 8500 miles.

LMP Okay.

09 21 23 06 CDR Gordy, as we're maneuvering, I guess we got one of the most spectacular views of the Moon I've ever seen, from a position like this. It's like - just short of being 100 percent full. We can still see from Tsiolkovsky all the way across the Moon and it's just absolutely magnificent and I'm afraid we're talking here - that the pictures just won't capture the real three-dimensional picture we're looking at. But, uniquely with the binocs I can still see the light mantle in the landing area.

09 21 23 48 CC Roger, Gene.

09 21 25 07 LMP Hey, Gordy, I don't know whether your camera people have anything to do this evening, but I've got a little problem for them if they'd like to work on it.

CC Okay, go ahead.

LMP Well, it seems to me we're not only moving away from the Moon, but we're moving across the face, and I took a picture about 5 minutes ago of the Moon, and it seems to me we could take another one at some X-number of minutes and have pretty good stereo if we matched the printing of the two pictures in terms of scale. And, I'm wondering what's a good time elapse here for a good stereo of the whole globe?

CC Okay, we understand the problem, but I'm not - Well, we'll try.

LMP Well, I guess, if you could figure out what it would - how far we have to move across the face of the Moon and how long that would take to get about a - oh, shoot, a 30 to 1 base-height ratio'd probably be enough - 20 to 1 would probably be better, obviously, but 30 to 1, you could still see the stereo. And you ought to be able to figure that problem out. How fast do - do the guys know how fast we're moving across the face of the Moon?

Tape 159/6

09 21 26 41 CC No, I'll put that one to FDO. Just looking at the big chart up here, I'm sure that the rate is slowing down rapidly, and - because you're - the farther you get away, of course, the straighter away from it you're going. Stand by, I'll see what we can do.

09 21 44 55 CC Jack, this is Houston with kind of a crude answer to your question.

LMP Go ahead.

CC Okay, it turns out right now that you're not moving across the lunar surface very fast, and you - it's getting less and less - right now, I guess it's about a mile per minute. It would take a lot of minutes to get much of a stereo base since you're 10,000 miles out. But, remembering back to Ron's final picture there before you went to the UV attitude, after he asked the question about how high he had to be to fill up the 80-millimeter lens, I think he took one at that time. We're thinking of combining a picture now with that picture, and then enlarging the one to get it to the equivalent diameter. And, some rough calculations of your longitude at that time and then - now, show that you've changed about 21 degrees across the surface of the Moon between that picture and the present time, which comes out, if you take the average altitude between that time and now to - to about a 25-to-1 stereo base, as best I can figure.

LMP Sounds good enough, Gordy. We've got it - I got that one at 5 minutes. I mean at 240 on the hour, so those are probably pretty close.

CC I would guess, you know, that the angle of looking at it - other factors have changed so much that it would be pretty hard to pull them together once you - even though you get the images reduced to the same size, but it might be interesting to try.

09 21 47 03 LMP I agree.

09 21 47 46 CC America, Houston. There's some items coming here now in the Flight Plan. A couple of them, MAPPING CAMERA, RETRACT, and COVER, CLOSED, you've already done. However, right now we still see the mapping camera film rolling, so we want to leave it running until we give you a cue to turn it off - get all the film run out. And, the up-link for a state vector that's shown there will not be necessary. Over.

LMP We were looking forward to get to do something. Now, we'll wait a little bit longer.

CDR Couldn't you just flash a couple of lights on the DSKY just to keep us occupied?

CC Send a crew alert or something?

09 21 48 40 LMP Yes, throw it in once in a while just to keep us on our toes, Gordy.

09 21 49 33 CC The Surgeon had a suggestion. He said if you really get bored, you could all put on your biomed harnesses.

CDR Only listen to about half of what goes down, will you?

09 21 49 59 CC Okay.

09 22 02 22 CDR Gordy, you got any words on the SIM bay prior to going into PTC?

CC Stand by.

CC Nothing additional, Geno, go ahead as per Flight Plan with the one exception. We'll give you a cue when to stop the mapping camera as soon as the film runs out.

CDR Okay, we'll hold up on the mapping camera and its cover, and we'll get the IR, OFF.

CC Roger.

Tape 159/8

LMP Okay. Okay, Gor - Gordy, the IR is coming OFF now.

09 22 03 37 LMP MARK.

CC Roger.

09 22 03 57 LMP And the COVER is CLOSED.

CC Roger.

LMP Hey, Gordy, this is Jack. Is there any updated briefing on the status of the lunar surface equipment and SIM bay findings over and above what we got? I guess - I can't remember when it was - yesterday or some time.

CC I can't think of anything really outstanding. We're just right now coming up on another charge detonation; however, I think I mentioned that the LCRU is "kaput." So, we won't be able to watch it. We're looking at the seismometer traces here. Other - I'll come back with any other words to update you on yesterday's report in a little bit here.

LMP Okay, I - just updated stuff. If something new comes in or - is all we're interested in.

09 22 05 13 CC Okay.

09 22 06 41 CMP Okay, Gordy, we're going to maneuver now to P50 attitude.

09 22 06 46 CC All righty.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 22 12 11 CC America, Houston. You've just run out of mapping camera film. You can go ahead and clean up the items at 240:30 to power down the mapping camera.

LMP Roger.

LMP Okay, Gordy, we're going RETRACT.

CC Okay, I think it should already be in, with the cover down.

LMP Yes, you're right.

CC And just now, the charge exploded at Taurus-Littrow, and we're seeing the results on the tracers here.

LMP Which one was it, Gordy? Do you know?

CC Okay, that one was number 8. A quarter-pound charge, and I guess it was fourth - I'm not sure which location that was. It was 0.4 of a mile from the LCRU, if that helps you decide.

LMP Okay.

09 22 16 37 CC America, Houston. We'd like H₂ TANK 1 FAN, ON, please. That'll get it up for - prior to the sleep period.

09 22 16 54 LMP Okay, TANK 1 is ON.

CC Thank you.

09 22 20 48 CDR And, Gordo, the canister is changed.

CC Roger.

CMP They - Houston - or Gordo, Ron here.

CC Go ahead.

Tape 160/2

CMP Okay, Gordo. As a result of number 5 [?] today and a little bit of a feeling of a little bit of gas right now, with - well, the possibility of a - of the desire, I feel like it may be worthwhile for me to take a Lomotil, and I'd like to get your concurrence on that.

CC Okay, stand by.

09 22 31 57 CDR Houston, America. How are our rates looking?

CC Stand by. They're not down there yet. We want to wait a little bit, Gene.

CDR Okeydoke.

09 22 35 46 CC America, Houston with a response to Ron's question. Over.

CMP Okay, go ahead.

CC Okay, for gas, we're recommending on - only - we're definitely not recommending the Lomotil; we're recommending the gas pills; however - -

CMP ...

CC - - we also don't recommend the Lomotils for a situation that really hasn't developed yet. If you want to discuss it in more detail, we can set up a private loop or - or go ahead as you wish. Over.

CMP Stand by a minute.

CMP Hey, Gordo.

CC Go ahead.

CMP Yes, we'd like to talk to you further, please.

09 22 37 27 CC Okay. Fine.

09 23 20 02 CC America, Houston. It looks good right now to start the roll for PTC.

CDR Okay.

CDR She's GO, Gordo.

09 23 20 39 CC Okay.

CC America, Houston. Sleep configuration on the hydrogen fans, and you can do it now, is H₂ TANK 1 FAN, OFF, and 3, AUTO. That's 1, OFF; 3, AUTO.

CDR Okay, Gordy, we got 1, OFF; 3, AUTO.

09 23 21 50 CC Thank you.

09 23 24 56 CC America, Houston. Over.

CMP Go ahead.

CC On that PTC startup, there was only one jet that fired, and so we only got half the rate we need, and so the - I guess the only way to recover is to stop the roll and start damping the rates again and wait for our call to start it again - over again. Over.

CMP Roger again.

CC And we'd like the procedure on G8-2 using B-2 and D-2 for the spinup. Two jets.

CMP Yes. That's interesting. B-2 and D-2 are both on.

CC Okay, we understand that, Ron. Let us look into that a little further here, then.

CMP I'm sorry. It's D-1 and - Dog 1 and Bravo 2 are on.

CC Okay, that's what did it.

CDR Delta 1 and Bravo 2 is what it calls for, and that's what was on.

CMP Yes, those are the wrong ones though; that's the problem.

Tape 160/4

CC Well, we're reading it both in the checklist and Flight Plan; Bravo 2 and Delta 2 are the ones to use for spinup.

CMP Yes, you're right. Okay. We got - we're reading the wrong ones, I guess.

CMP Okay, Gordy, is this a good attitude or should we go back to the UV/PTC sleep attitude?

CC Stand by. G&C is on the other loop here. Just a second.

CC America, Houston. You need to go back to the pitch and yaw in the Flight Plan, and the present roll will be okay.

09 23 28 44 CMP Okay.

CC Also for this damping, we want you to go to the jets called out at 240:50 in the Flight Plan. That's a - Well, you got it there.

CMP Yes, we got it here.

CMP Okay, give us a call when we get all damped out there. We got Alfa and Bravo for damping jets.

09 23 30 36 CC Roger.

CMP Hey, wait a minute; we got the wrong ones here. Forget it. We'll get back to that. What's in the Flight Plan will do it?

CC Roger. I would think - You're firing into the SIM bay - bay with the present configuration.

CMP You're right.

09 23 34 11 CDR Hello, Houston; America.

CC Go ahead.

CDR Gordo, how's it looking for a midcourse 5? Any further word?

CC Our last information was still a half a foot. Or essentially no midcourse. I'm not sure if we've been affected by the PTC here or not, the single-jet spinup, but we'll let you know.

CDR Okay, fine. Don't worry about it. You won't have a final word on it until tomorrow anyway.

CC That's affirmative. I doubt if we'll have any - enough tracking before bedtime here to give you any update tonight.

CDR Okay, no problem.

09 23 35 15 CC And we'd like you to configure the HIGH GAIN for us. We'd like PITCH, minus 40; and YAW, 90, on the dials and then go directly from AUTO to REACQ.

CDR Okay, say again the numbers, Gordo. I'm sorry; I missed them.

CC Okay, PITCH is minus 40 and YAW, plus 90.

CDR Okay, minus 40 and a plus 9 - 90.

CC That's affirmative.

CDR And REACQ.

CC That's affirm.

CMP We have REACQ and NARROW.

09 23 36 06 CDR REACQ and NARROW now.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

09 23 41 01 CC America, Houston. Over.

CMP Go ahead.

CC Okay, this SIM bay jett configuration just isn't hacking the job of damping the rates. We're going to go to adjacent quads to try to get it dampened quicker. We'd like you to enable Charlie and Delta. To do that, just disable all Alfa and Bravo jets, enable all Delta jets and also Charlie 3. Over.

09 23 41 42 CDR Okay, Gordo. Let me disable all Alfa and Bravo first.

CC Okay, Geno. And then enable all Delta plus Charlie 3.

09 23 42 17 CDR Okay. You don't want Charlie 4 enabled? Or you do? ... - -

CC That's affirmative. But it is already.

09 23 42 25 CDR Okay, you're - Yes, here's what I got. I got - I got Delta 1 and Delta 2 on B/D ROLL. I've got Charlie 3 and Charlie 4 for PITCH, and I've got Delta 3 and Delta 4 for YAW. Okay. That sounds exactly right.

09 23 49 47 CC America, Houston.

CDR America here.

CC Okay. The rates look good now. I'd like you to use Bravo 2 and Delta 2, and go ahead and spin up.

CDR Okay, Gordy. We'll do it - get it this time.

CC Okay.

09 23 51 31 CC America, Houston - -

Tape 161/2

09 23 51 32 CDR Okay, Gordy; they're all off. They're all off except Bravo 2 and Delta 2.

CC Roger.

CDR Yes, we got the right amount that time. Let's hope it stays good.

CC Okay. For Ron only, no Seconal tonight. Over.

CMP Okay.

10 00 02 15 CC America, Houston. G&C, with his years of experience, thinks that this PTC is going to hold. It's looking good so far, and so I think it's safe to go ahead and configure to go to sleep there, if you wish.

CDR Okay, we're in the process now, Gordy. Thank you.

10 00 27 25 CDR Hello, Houston; America.

CC Hello, America; Houston. Over.

CDR Bob?

CC That is affirm.

10 00 27 42 CDR Okay. We're just about ready to turn out the lights. By my watch, about 7:20 in the morning is wakeup time, and I got the other guys on their couches and I'm going to stand the duty tonight and I'm going to leave my lightweight headset in my ear. But if the high gain bothers me during this PTC, I want to go ahead and take it out. And I've got the tone booster connected up and it does work. So, in any event, give me a crew alert in the morning, will you?

CC Okay. You want a - are you telling me you want to get woke up after 8 hours or at 7:20 as planned?

CDR No, as - as by the Flight Plan. We've got to get up as by the Flight Plan.

Tape 161/3

CC Okay. Talk to you in the morning. And we'd like
OPTICS POWER, OFF, ... - -

CDR - - ... Okay, I just didn't want you to ... yes,
sir; we'll get the OPTICS POWER, OFF, and we'll
get the VOICE, OFF, too.

CC Okay; that suits - makes everybody happy - -

10 00 28 43 CDR Okay, we'll see you in the morning then.

10 00 28 44 CC See you in the morning.

10 00 28 47 SC Okay, babe.

END OF TAPE

Tapes 162-165/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 07 50 01 (Music: Home For The Holidays by Jerry Vale)

10 07 56 54 CDR Good morning, Robert. Good morning.

CC Good morning, Geno.

CDR Hey, your choice of music is getting better down there. We're going to have to keep you there every morning.

CC Well, if I'm here waking you up on Wednesday morning, fellow, you're in trouble.

CDR Yes, we're not going to count Wednesday. We'll - we'll work out something else for Wednesday. I - I know we're not much, but we're all you got for Christmas.

CC Okay, America, this is Houston. One little update for you on today's plans. At the present time, midcourse 5 is looking like a quarter of a foot per second, which means at the present time, we're not planning on burning it. But we reserve the right to change our minds sometime in the next hour and a half, if necessary. But that'll give you some thought to what to do today.

CDR Very good, Bob. Outstanding. We'll go along with whatever you want.

CC You guys are getting easy.

10 07 55 40 CDR Oh, we get more likable as days go on.

CMP Good morning, Houston. This is the command module pilot of the spaceship America. And we're up and ready to particpita - participate in another day's activities.

CC I got you there, Ron. And we're ready to part - participate with you, also.

Tape 166/2

CMP (Laughter) Okay, Robert.

CDR Got cold up here last night.

CC Well, I'll tell you, it was 27 at Ellington at 6 o'clock down here, too.

10 07 59 09 CDR Well, it's not quite that cold in here, but there sure is a difference.

CDR And, Bob, how's America looking to you down there?

CC We're looking pretty good. We found nothing overnight to give us any concern, and we see nothing at the present time. Looks great. We're showing you at 66 degrees in the cabin.

CDR Yes, sir. We're going to get it warmed up here, though, slot - shortly. Okay; America still looks good to us.

CC And, America, you're now in the Earth control. We passed about 2 minutes ago.

CDR What was our - what was our velocity going through the changeover in influence?

CC Stand by.

CC And, Geno, you had 3851 feet per second going through the crossover.

10 08 02 07 CDR Okay. We're looking back at a - a very full and very bright, very beautiful Moon, right now. And the Man in the Moon is smiling as he's waving us on home.

10 08 02 29 CC Copy that. We had a good picture of him last night here down in Houston, also.

10 08 12 26 CC America, Houston. Over.

LMP Go ahead.

CC Okay. We lost you there with an antenna change that we didn't catch. So we're back with you again.

LMP Yes, we noticed that.

LMP Hey, Bob. What time does the old back room get up this morning?

CC Which back room?

LMP The geology back room, of course.

CC Well, beats me. I don't know if there's anyone down there or not. Let me see if I can find out.

LMP No, that's all right, Bob. I just want you to pass on a thought. I had a little trouble getting to sleep last night. And they've probably already thought of it. But it has to do with Van Serg.

CC Go ahead. I'll copy it down.

LMP No, just ask them if they've thought about the possibility that the - those Van Serg breccias might be - might be the old indurated regolith over the subfloor.

CC Okay; I got that.

LMP That's an alternative that in the - the heat of battle did not occur to me at the time. It should have, and it may have occurred to some of them.

CC Okay. That's as opposed to being a window through - to the - below the subfloor, which is what you suggested the other night.

LMP Yes, sir. I think I - I think I like the regolith better. It - I think it makes sense from a lot of points of view: the size of the crater, the fact that we should have expected to see something but hadn't up to that time.

CC Okay. I got that.

Tape 166/4

LMP And the breccias were, thinking back on it, could very easily have been soil breccias and just getting coarser as you got closer to the base of the sub - to the top of the subfloor, which is what we were looking at down in the bottom of the crater.

10 08 15 07 CC Okay. Got that.

10 08 20 01 LMP Bob, is your EECOM friend going to let us practice the waste water dump again today?

CC I kind of expect so. Stand by and let me find out for sure. Roger, Jack. There's one coming up at 252:50, about 2 hours from now.

LMP Okay. We'll start reviewing that one. We'll be ready for him this time.

CC We won't let you sneak behind the Moon on this one.

10 08 23 48 LMP Very good.

10 08 35 48 LMP Houston, 17.

CC America, Houston. Go ahead.

LMP Who's the EECOM this morning?

CC Charlie Dumis.

LMP Hey, ask Charlie if it's all right if I turn on the commander's heaters?

CC We don't - Would you clarify that request?

CC I'll tell you - you can - you can use reel 2. About the only thing I can think of, Jack, would be reel 2.

CC Jack, you might use reel 2 if you want to. It's about the only thing we can think of.

LMP Yes, you get the idea.

LMP Anyway, it's cold.

Tape 166/5

CC Roger.

LMP It's not really that bad, Bob, but we're hearing a lot about it.

CC Okay. Well, we'll work it out here, if we can try.

LMP Well, you might discuss it with SPAN.

CC We are, believe me.

10 08 38 03 CDR I'd like not to - like not to waste reel 2. It's got some other good uses.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 09 03 21 CC America, 17 - Let's say it again - America, this is Houston.

LMP Are you sure? Would you like to try again?

CC Well, that's all right, Jack. We'll live with it for a while. We're looking at - no need to acknowledge this - we're looking at your temperature problem. And there's a couple of obvious things I'm sure you've undertaken, but if you haven't - all the window shades off. Get some sunlight in there. And might crank on all the lights to get some more heat load in there. Also the - of course, the cabin fan and the temperature - CABIN TEMP control thumbwheel - it's your option on that. The other things, like mixing valve adjustment and powering up other items, we're looking at very seriously, but we would like to not do those items until after the EVA this morning. We'd like to remain the status quo on the ECS system with the exception of - you do have the cabin fans on your option there. But we would like to re - retain the rest of it status quo until after the EVA.

LMP Well, thank you for all your research in there, Bob. I'll let the commander make the decisions. It - it's his thermostat.

CC Roger.

CMP The CMP feels pretty good so -

CDR I'll see if they can get me mad this morning. That'll warm things up. Temperature's on the way up.

CC Roger. Trying to get reel 2 up to you, if you want.

CDR Pardon.

CC Said, I'll bring reel 2 up to you, if I can get there.

Tape 167/2

10 09 05 32 CDR Well, reel 2 would sure be a ... start when you consider all I've got is Ron and Jack.

10 09 17 49 CDR Hello, Houston; America.

CC Yes, sir.

CDR Okay, Bob, before we exit PTC at 20 past the next hour, we'll have to get your final words on the midcourse.

CC Well, we're working up the midcourse right now, but let's give you some preliminary words, that you won't exit PTC at that time because midcourse 5 is not required - it's less than 0.3 foot per second. Right now your gamma - flight path angle, et cetera, at entry interface is all nominal, and absolutely no midcourse 5 required at this time. And we'll be updating that as we refine the data.

CDR Okay, well, that's - okay, well, we still exit PTC, Bob. We go to a different attitude. We - Yes, you have a different roll angle. I'm looking at the right-hand column of the - of the Flight Plan. Yes, we still exit, so we're going to need some words on it by them.

CC Stand by on that. I've just got - back at 252:20. I was just given the word that we will not -

CDR It's just a case of using coupled or uncoupled jets, Bob.

LMP Bob, you want the IR on?

CC Roger. We're ready for it.

10 09 20 27 LMP MARK it. It's ON.

10 09 22 00 CC America, Houston. We'll assume right now - go ahead and fly the Flight Plan using the notes on the right-hand column there as - as filed, or as planned.

CDR You say we will use the notes on the right-hand side, right?

CC That's affirmative. And we have one update. We would like to move up to 252:10. We'd like to move up the IR COVER, OPEN - -

CDR Go ahead.

CC - - that is - we'd like to move up the IR COVER, OPEN, which is at 252:22, - move that up to 252:10 - just put an arrow up there, please.

10 09 22 52 CDR Okay, we got it.

10 09 24 51 CDR Hello, Houston; America.

CC Yes, sir. Go ahead.

CDR Quick update on the crew status report. The well-being of the crew is very satisfactory, capable of carrying out everything that is required today. And, specifically, the health of the crew is excellent.

CC That's real good news.

CDR Okay.

CC Just for your information, Ron gets the same treatment today that the two - you two surface walkers got. During the mission, channel 8 in Houston is going to carry the full spacewalk in its entirety on live television.

10 09 26 01 CMP Hey, Bob, I think that's outstanding. Thank you.

10 09 28 11 CC America, Houston. I've got a Flight Plan update for you.

LMP Go ahead, Bob.

CC Okay, first of all - at 252:20, where it says, "Exit G&N PTC at roll angle 071," change the high gain angles there to minus, a pitch of minus 64, yaw, 32 - 329.

LMP Okay, we got those.

Tape 167/4

CC Okay, at 252:30, close UV cover. And that's to be done regardless of the fact that we're scrubbing midcourse 5. Just close UV cover at 252:30.

CDR Okay.

CC And if you'll jump over to 262:10 - 262:10, we've got a change on that attitude - as we're just tweaking it up a little bit - 039, 230, 297; HIGH GAIN angle: PITCH, minus 9; YAW, 339.

CDR 039, 230, 297, minus 9, and 339.

CC That's affirm. We're just shooting a slightly different point with the UV at that time.

CDR Okay.

10 09 30 38 CDR We're ready to - No, stand by.

CC And we've copied the 93s. You can go ahead and torque.

CMP Okay. We'll torque at 11.

10 09 32 09 LMP Okay, the IR COVER is OPEN.

CC Roger. Good show.

10 09 40 01 CC America, Houston.

CDR Houston, America. Did you call?

CC Roger. I called, but we're about ready to lose the high gain. I'll call you back as soon as we get back in.

10 09 44 47 CMP Houston, America.

CC Go ahead, Houston. Say it again - Go ahead, America.

CMP (Laughter) Okay, we've got the commander's menu for yesterday.

CC Roger. We're all listening.

CMP Okay. Scrambled eggs, bacon squares, pineapple drink, orange drink, plain old coffee, and 10 pecans - that's 10 nuts, not packages. And a vitamin. For lunch: bread, a chocolate bar, an orange drink, and a can of tunafish. For dinner: a beefa steaka, butterscotch pudding, peaches, orange drink, and catsup. Medical: 17055, about 5 hours of fair, no medication, 4-1/2 cans of water. For the old lunar module pilot: scrambled eggs, an orange PA drink, coffee, sugar cookie, and two pecans - that's two nuts, not two packages, and a vitamin. For lunch: peanut butter, jelly, bread, orange GF drink, pork and potatoes, coffee, and a fruitcake. For dinner: beefa steaka, butterscotch pudding, one peach, orange drink, and a coffee. The LMP medical log - he had about 6 hours of good sleep, no medication, and two cans of water.

CC Wait, Ron, we're going to have an antenna switch coming up. We'll call you back when we get good comm.

10 09 47 51 CMP Okay.

10 09 49 08 CC Okay, America. We're back with you.

CMP Okay. Just a second.

CC Just a reminder on the food report, if you want to shorten them. It's normally used negative reporting - only those things you don't eat on the menu.

CMP Oh, well. I like to talk.

CC Roger.

CMP Okay, for the command module pilot. For breakfast, he ate everything. Okay, for lunch - let's see, he ate everything down to the bread, then he had three slices of bread, didn't eat the cherry bar, add a tea, a chocolate bar, and a pack - Wait a minute, I've got the wrong day, sorry. Negate everything I've said on the CMP. Okay, we're on the CMP again. This time, it's day 11. Okay, make it six bacon squares instead of eight, didn't eat the peaches, add a coffee, package of brownies, and 10 pecans. And the vitamin, ate the vitamin.

Tape 167/6

Okay, for lunch, scratch the cherry bar and add a coffee. For supper, add a catsup. Okay, CMPs medical log: 15054, about 6 hours of good, two Lomotil, two sniffs of nosedrops, four cans of water.

10 09 55 06 CDR Okay, Bob. We've stopped PTC, and we've got SIM bay jets on.

CC Roger.

CC Okay, America. We'd like to cov - close the UV cover, please.

10 09 55 57 LMP Okay, the COVER's now CLOSED.

10 09 57 17 CC America, Houston. If you're all on the headset, if you'd like, we've got the news for the morning.

CDR Okay; we're all on.

CC Okay. We start today's newscast out with this historical fact. Today marks the 69th anniversary of man's first flight in a heavier-than-air powered machine. Back on December 17, 1903, Wilbur and Orville Wright, of Dayton, Ohio, took three historic flights on the sand beaches of Kitty Hawk, North Carolina. The brothers will be honored today at a ceremony at a visitor's center near the flying site. Now, a look at the news. There's apparently been a serious hitch in the peace talks between the U.S. and North Vietnam. Dr. Henry Kissinger, in a curt news conference at the White House, has said that the North Vietnamese have reneged on earlier agreements and have brought out - brought the peace talks to a halt. Dr. Kissinger said the unresolved problems, which center around the number of peace supervisors and their placement, is not acceptable to the President, and Kissinger feels, and we quote, "We have not yet reached an agreement that the President considers just and fair." Final unofficial returns from the Federally supervised election name Arnold Miller the new president of the United Mine Workers. His victory over Tony Boyle appears to be only his first step in his promise to clean up the union. Former President Truman remains in serious condition at a Kansas City hospital.

Doctors say that the 88-year old Truman is not responding to treatment. In the congressional spotlight in Washington, it appears that the contest for the position of House Majority Leader will be between Representative Thomas O'Neal of Massachusetts and Congressman Sam Gibbons of Florida. The two will vie for the post left vacant by the absent and presumed death of Congressman Hale Boggs. Boggs disappeared in the crash of a light plane in Alaska, in October. Northeastern Ohio has been blasted by a blizzard. As much as 28 inches of snow has fallen, blocking highways and closing airports. An additional foot is expected - was expected before it was to move east. Cleveland has been very hard hit with the white stuff, and the snow is now moving into the northeast. They'll have a white Christmas up that way. Here in Clear Lake, it's a clear, crispy day, but a chilly Sunday morning. Ellington had a 27 this morning. Might take a look at sports here. Miami defeated Baltimore yesterday 16 to 0, to go undefeated in the American Football Conference of the NFL.

CC America, Houston. The UV COVER appears on our telemetry to still be OPEN. Could you cycle it and see if we can get it CLOSED, or just give us what your onboard talkback looks like.

10 10 00 36 LMP Okay, Bob. I got it - I only got it to the intermediate position.

CC Roger; thank you.

CC Okay. In a real hair raiser at Candlestick Park, San Francisco, John Brodie came off the bench late in the game, in fact, in the last 2 minutes of the third quarter, and led the 49ers to a 20 to 17 win over the Minnesota Vikings. The win gives the Western Division crown to the 49ers in the National Conference. His - the last touchdown thrown was with 5 seconds remaining in the game. That puts the Washington Redskins, Green Bay, San Francisco, and Dallas Cowboys in the NFC playoffs and closes out the NFC contest. In the American Conference, there's one key game today to decide the winner of the Central Division. Pittsburgh plays San Diego and Cleveland plays the New York Jets. Both

Tape 167/8

Cleveland and Pittsburgh will get into the playoffs, but their position in the standings is not yet known. One will be the wild-card team, one will be the conference - division winner. Miami and Oakland are the other teams in the American Conference playoffs. Cincinnati plays here at Houston. And we'll keep you posted on that one. In local high school football, Baytown Sterling scored a major upset by defeating San Antonio Lee in the 4A semifinals. The score was 21 to 20 and the game in the Astrodome before 26,000 fans. The loss was the first in 28 games for the San Antonio school. In basketball, the Houston Cougars downed California last night, 79 to 75. Some other major college scores: Kansas, 60, over San Francisco, 58; Penn State, 65, over Boston, 63; New Mexico State, 69, Texas El Paso, 49; Indiana, 89, Ohio, 68; Minnesota, 87, Loycla, 81; Florida State, 85, Baylor, 67. And in pro basketball, Houston defeated the Detroit Pistons, 123 to 112.

10 10 02 37 CC

And just a final note from all your friends down at Cape Kennedy, they'd just like you to know that the Merritt Island High School won the Florida State Championship, defeating Tallahassee Leon High School, 40 to 21. And, that's pretty much the update for the morning.

10 10 02 56 CDR

Thank you, Robert, for that Sunday morning news break.

10 10 04 09 CDR

Houston, America. Are we GO for the fuel cell and waste water dump and the other dumps to go?

CC

Roger. You're GO for that, and we're watching them down here.

10 10 04 26 CDR

Okay, we'll start the waste water dump.

10 10 07 39 CC

17, Houston. We'd like AUTO on the HIGH GAIN.

Tape 167/9

10 10 08 19 CC America, Houston. I don't think I ever updated your consumables, and just a real quick update. You're above the line on all your oxygen tanks. You're above the Flight Plan line on all your hydrogen tanks or right on the line. And you're 3 percent above the line on the RCS. That's Flight Plan usage at this time, so you're above the line on everything.

CMP Okay, Houston. Thanks much.

10 10 09 48 CC America, Houston. The M C&W on the FUEL CELL an O₂ FLOW HIGH is normal.

LMP Yes. I guess I finally learned that, Bob, and it didn't bother me a bit.

10 10 12 25 CC America, Houston. While you're working on the fuel cell area there, we'd like to reconfigure our H₂ tank fans. We'd like H₂ tank 2 FANS to ON, H₂ tank 3 FANS to OFF.

10 10 12 43 LMP Okay, you got it.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 10 26 09 CDR For a while, until things stabilize.

CC America, Houston.

CDR Go ahead.

CC We haven't heard any report from you on - and we're just kind of curious. Have you had a lot of condensation moisture around the cockpit?

CDR Negative. No, it's been very dry.

CC Okay; real good. Well, just a reminder; may not be applicable if you've got a good dry cockpit there. On 16 we had some - rather strange readings on the EVAP OUT temperature and a few other ones. And the potential is there for you to get those same readings - especially if you had had moisture - the potential is to get those readings at - after depress, and we'll be watching it closely. I guess - I don't want to say just ignore them, but we'll be watching them and take any readings for after depress there with a grain of salt. And while you're at it, you might go down and zero the optics if you've got somebody in the LEB.

CDR Okay, Bob, stand by. We'll get that. Listen, the tunnel is dry up to the hatch. However, when you put your hand up in the tunnel around the - the edge of the hatch and on the - on the outer periphery of the hatch itself, there is quite a bit of moisture up there. We looked up there yesterday and couldn't find any, but there is some up there today. And the face of the hatch is slightly moist, but it's not - nothing like bubbles.

CC Okay. Well, we just want you to be aware that you may see some extraneous ECS readings. It's no problem at all, but, you know, just wanted you to be aware of it.

Tape 168/2

CC Gene, the specific thing on 16 that occurred was - as we thought it out was that the ECU control unit back of that panel there had the freezing - we think - freezing of the water on it, causing the bad readings.

CDR Okay. When we changed the canister this morning, Ron tells me, there was water back there, too.

CC Okay. We'll just - we can just expect some possible erroneous readings.

10 10 30 03 CDR OPTICS to ZERO. G/N POWER is OFF.

CDR Houston, America.

CC Go, America.

CDR Okay, Bob. We're eliminating everything in the Flight Plan between 253:10, where you terminate the waste water dump, which has been done, and we're picking it up on EVA Checklist at 253:50.

CC Okay; that sounds great, Geno. Press.

CDR Okay.

CC And, 17, if we could have ACCEPT, we'll give you state vector.

CDR Okay, Mr. R. You've got ACCEPT.

CC Okay.

10 10 33 51 CC Say again? Oh, the computer's yours, America.

CDR Okay; thank you. The computer is ours.

CC Roger.

10 10 42 21 LMP Houston, 17.

CC Go ahead, America.

LMP Yes, take a look at the LMPs biomed and see how it looks to you this morning.

CC LMPs biomed looks pretty good, America.

10 10 42 52 LMP Okay.

10 11 03 25 CMP Okay, Houston. The command module pilot biomed should be on the line.

CC Okay, Ron. We'll give you a word here.

CC Ron, your biomed looks great.

10 11 04 09 CMP Okay; mighty fine.

10 11 11 52 CMP Hello, Houston. We just turned the CABIN FAN, OFF.

CC Roger. We are copying it - cabin temp around 70. Is it a little more comfortable?

CMP Well, we got two extremes.

CC Okay.

CMP Okay; let's see now, the EVA umbilical bag is on the rock boxes - on the - LiOH cans now. What's next, Jack?

LMP Yes.

10 11 14 29 CC America, we're showing - -

CMP ... Go ahead.

CC - - we're showing a slightly high O₂ flow. We're just wondering if all the waste compartment vents and all your dump vents are closed as per the Flight Plan.

CMP Well, as a matter of face, no. OVERBOARD DRAIN was OPEN - Let's see, BATTERY VENT was CLOSED during the water dump, but now it's to VENT. WASTE STOWAGE VENT is now CLOSED. We're thinking about opening that WASTE STOWAGE VENT, anyhow, to keep any possible breakage in there from coming

Tape 168/4

back into the cabin. And that way it might go outside during the depress instead of inside. What do you all think of that?

CC Let us debate that one. It sounds pretty good, but let us debate it.

CMP Okay.

CDR Tom, the principle concern is those BUSS samples.

CC Roger. I understand your concern. I - we'll work on it here. I don't think there's any problem to it.

CDR Okay. But all I'm saying is that the BUSS samples have never flown before.

LMP Yes, the EVA umbilical bag is snapped on there. Okay. They're hooked up there, but let me make sure it's hooked down at the bottom this time.

CDR I don't think - I don't think it has been yet. It would, as a matter of fact.

10 11 18 01 LMP Okay; the A-2 rock bag is tied up. Yes.

CDR Okay; that A-7 bag's all squared away. Okay; and let's see what we got there, so we can reach those at the bottom. Temporary storage bag is clear in the top. Yes, we want to leave them there so I can open the bottom. Are they tied up? Okay; here we are. Okay.

LMP Yes, I'll have to. Oh, it will hold up there as long as I snap it. Yes, the EVA bags are okay.

10 11 19 10 CMP Okay. We got everything we want in the jett bag now?

CMP Hey, Houston, this is America. Obviously I'm on VOX here, so I'll try and keep you informed on how things are going.

CC America, Houston.

CMP Okay; go ahead.

CC Some words concerning the waste management vent. We really don't care what you do with it now until - until 20 minutes prior to your suit integrity check. We would like to have it closed for a good stabilized reading during suit integrity check, and it requires to be closed 20 minutes prior to that time for a stabilized flow. After the suit integrity check, if you desire to open it during the cabin depress, that's okay with us.

CMP Okay. We'll leave it closed now, and during cabin depress, we'll probably open it then.

CC Okay. Would you like us to remind you on it or just press on like you are doing?

CMP Yes, that's affirm. We can use all the help we can get.

CC Roger.

CMP Okay.

10 11 22 02 CDR Okay, Jack. The jett bag is taped. Okay. Temporarily stowed.

LMP We're down to mag already.

CDR On the camera, yes. Okay; 8. Okay. Yes, this is a biggy. Okay; let me verify. I think I've already got that. Ah ha, there it is. Yes. Ah ha, there it is.

CMP Okay; we've got that one. Check it. Yes; we're okay. Yes. I don't have mine on yet, but here it is. Yes, it's there. It's installed. Jack screws are fully open. Yes, I - I got it open, but I didn't take anything out. Everything was already out.

10 11 24 40 CDR Okay; TV pole. Right hand. Yes, I know, rock box. No, not for me. Look good.

Tape 168/6

CMP Gene, do you know how to run an extension on the OPS (laughter)? Okay.

CMP Okay. What did you say? You want A-2 now?

CDR Okay; we're A-2.

CDR Okay, Houston; America. The OPS checks out at 5900 psi and is regulating to 3.9.

CC Roger, Gene.

LMP Okay. The old PGA bag is installed.

CMP Okay. And the EV gloves are on. Okay?

10 11 28 11 CDR For some reason, they're called entry boots up here.

10 11 28 45 LMP Okay. Tiedown rope. Where does it go? Okay. And the - Okay; everything goes ...

LMP Okay. Vac bag is in there, headrest pads, tiedown ropes, and heel clips.

LMP Okay; lunar sounder cassette bag is in the EVA bag.

CDR Yes.

LMP What'd we do with that tissue dispenser, Gene?

CDR We use it up?

LMP No, we ...

LMP Yes, just like that. Ah ha, there's the old pressure gauge. And it reads 0.

CDR Okay. It's in the wrist tether pouch?

LMP You're clumsy, too.

CDR Okay. Ah ha, this one?

LMP Yes.

CDR (Laughter) I was just acting surprised; I really know where they go. That's a little - We listen that way.

LMP They're not on yet.

CMP Can't hold everything still to get the thing in there.

LMP Bag go in there? Got it all stowed?

CMP Oh, yes.

LMP Hand controllers are stowed.

LMP Okay; counterbalance is all squared away.

CDR Yes.

LMP Okay?

10 11 33 35 CDR What kind of - what kind of lens?

LMP Keep it in F-1 all the time.

LMP Let's use that other DAC. It goes on the pole with the ..., but you can hook it up. Well, let's put it on the pole first, I guess.

LMP A-1, decon bag.

CDR Oh, okay. I didn't know what you meant. I've got to get in A-1 is what you are saying.

LMP Don't forget my jett bag is down there. Okay; the old jett bag's on the other side now.

CDR In the ... pocket.

LMP Hey, Gene, can you attach this to something up there? Okay.

LMP ... out of here again.

CDR No, it's dirt out here again.

Tape 168/8

10 11 37 09 LMP Okay; you get that ... finished?

CDR Here we go. Here comes the cable. Here comes the monitor. Well, go that way, I guess. Oh, okay.

CDR Here it is. There's the tape. Okay. What else do we need out of the - out of the A-1? Yes. Yes. Yes. Package of towels. Oh, okay. That's right. We need a package of towels, don't we? That's to clean off the - all the stuff when we bring it back in, huh? Who - whose towel do we use? Do we use the commander's? Well, I'll use one of mine (laughter). Okay; here's the package of towels.

LMP Okay; you got a bunch of them. We're only going to need three or four.

CDR Yes. Well, yes. You guys aren't, but I still am.

LMP Yes, okay. Well, I'm not ready to depressurize yet either.

CDR Okay; that's A-1.

LMP Okay.

CDR The cable; the TV.

LMP Put the cable on first.

10 11 44 43 LMP They should be okay, but ...

LMP It just hooks like that.

CMP Got one?

10 11 46 56 LMP Got one.

10 11 50 14 CMP Houston, in case you're wondering, we're still routing cables.

CC Roger. We've got you down in the checklist, the step just prior to "S-BAND AUX TV to SCI." Do you concur on that?

CMP Yes. We're still keeping TV and DAC cables and what have you up to the pole.

CC Roger. We get you Ron.

10 11 52 44 LMP ... before we run out of those.

CC America, Houston.

CMP Yes, go ahead.

CC Is Gene in the commander's seat at this time?

CMP That's affirm.

CC Okay; I'll delay then - a minute here. We're going to have a VERB 49 maneuver coming up to you. We're getting the SIM bay a little bit cold, and we want to warm up those handrails, so we'll be maneuvering here at about 4 - At 254:45, I'll have a maneuver for you.

CMP Okay; we're ready from now on any time.

CC Just stand by. We want to check out the numbers. I just wanted to give you the word that we were going to make this maneuver.

CMP Any time, Bob.

10 11 55 57 LMP Well, you're going to have to put on your helmet - It's really over that way a little bit more, because I got to get into the hatch to get it out.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 11 58 19 CMP Well, anyhow, it's all taped up. What's next?
Okay. There's the old crewman's IV tether.

CMP Ah. Found something we didn't practice.

CC America, Houston. I've got the VERB 49 maneuver.

CDR Oh. Okay. Go ahead with the numbers.

CC Okay. It's ROLL, 150; PITCH, 216; YAW, 330. And that's - we'd like that maneuver to start at 254:45. Just prior to starting that maneuver, we'd like the IR COVER CLOSED and the IR OFF.

CDR Okay. At 24:45 you want 150, 216, and 330. Prior to maneuver, you want IR CLOSED and OFF. And what about the jets on that, Bob?

CC The same jets you have configured. Did you read ROLL, 150; PITCH, 216; and YAW, 330: Is that what you read?

CDR That's what I read, and I'll stay in SIM bay jets.

CC Okay, and you'll need these new high-gain antenna angles: PITCH, minus 32; YAW, 52.

CDR Okay. PITCH is minus 32, and YAW is 52. Got it.

CMP Okay, and then what? Okay. Okay. I'll get off of the headset now then.

LMP Okay. Panel POWER OFF, SUIT POWER OFF and AUDIO CONTROL NORMAL. Got it? CONTROL NORMAL. Okay. Panel 604, Geno, is SUIT PRESSURE ALARM OFF, verify.

10 12 01 43 CDR OFF.

LMP All caps from 603.

CDR Removed.

Tape 169/2

LMP Unsnap CMP comm carrier - cable from O₂ umbilical,
and we'll beep for you on it when you're - -

CC America, Houston.

LMP - - ready.

CDR Okay. We're going to go ahead and close the IR
and turn it off at this time.

CC America, Houston. Would you just close the IR,
and we'll cue you on the OFF call? We'd like to
see it here, and we'd like to do that as a cue.

10 12 02 18 CDR Okay. It's OFF.

LMP Okay.

CDR CLOSED, rather.

LMP COVER's CLOSED.

10 12 02 22 LMP MARK it. And it went gray.

CC Roger. We copy that.

LMP Okay. Route outboard of the strut and wires and
connect CCU head to 603.

CDR ...

CC Geno, I'd like to give you just one bit of inform-
ation we just got from the simulator. When you go
from this new attitude I gave you - this VERB 49
attitude right now - to the EVA attitude, you will
see a middle gimbal angle of 66 degrees. That's
right off the simulator.

10 12 03 46 CDR Okay, Bob. Thank you very much.

CDR We're maneuvering, Bob.

LMP Okay, you got it connected? Secure cable to TV
bracket and top of strut using two straps.

CMP ...

LMP Okay. You understand that? Secure cable - and that's the same one, the comm cables - to TV bracket - top of strut using two straps. You got that?

10 12 06 52 LMP Okay. Position the TV monitor. You got that? And - disconnect PGA bag from couch at four places, Ron. It's the old remove center couch bit.

LMP Going to have to move the old jett bag, though. Back over to your side, I guess, Ron. Yes, let's get this jett bag over on the other side. You want to unhook the PGA bag. I've got the front two. Okay. Now you can take the center couch out.

CMP Yes.

LMP Think you can handle this GOG [?], Ron?

LMP It certainly comes out easier, doesn't it? I mean like you're going to have to - ... that way - that's right, because this place is fuller than the mock-up ever was.

LMP Yes, it's the old full spacecraft story. Well, look what turned up here; the clock. Maps. Well, they should be in R-5. Wait a minute. Yes. Okay.

10 12 10 07 LMP Secured? Yes. Okay. Close and lock your old marmon clamps.

LMP Closed and locked? Okay. Open the old - the EVA umbilical bag.

CMP Open.

LMP Unsnap the top strap and remove spacecraft end of EVA umb all the way to the second tiedown strap. And you're going to attach that to 603, but verify that the EVA STATION O₂ is OFF. Attach the EVA umbilical to 603. Route over couch beam and under wires.

CC Jack, whenever it's convenient, you might turn off the IR now. It's looking great.

Tape 169/4

LMP Okay. The IR ALARM switch is going to OFF.

10 12 13 04 LMP MARK.

CC Thank you, sir.

LMP Okay. You got the O₂ locked?

CMP Yes.

LMP ELECTRICAL locked?

CMP Yes.

LMP Umbilical tether to couch ring and lock and install pin.

CMP Okay.

LMP Got that? SCU OPEN, bleed system, SCU CLOSED.

LMP Okay. And you can close it if your system has bled down. Unstow press gage from EVA bag and connect the gage to 603. And tape the flashlight to panel 603 guard, Gene.

CDR Okay.

10 12 14 37 LMP And then we can - -

CDR ... gage?

LMP Yes, install the gage, tape the flashlight, and then we get rid of the tape, yes. Got one?

LMP Leave the tape on that so the light won't get out, Ron. (Laughter) Jerry Griffin told me that one.

LMP Once you're taped it you can stow the tape. Unstow from the left-hand temporary stowage bag, top pocket: PURGE VALVE, stow in EVA bag, PURGE VALVE patch - pouch. And then the waist tethers, also. (Humming) Waist tethers are in that bag.

10 12 16 21 LMP Houston, do you have recommendation on whether we use 208 or 211 PURGE VALVE? You - you were very interested in that on the lunar surface. Here's yours, I guess.

CC Stand by. We're getting it.

CDR Bob - Bob, we're using my OPS, so I assume it would be 208.

CC That sounds good, Gene.

LMP Okay. Here's some more tape, Geno. Stow in the EVA bag in the proper pouch, and then get the waist - both waist tethers out. And we can attach them up here to the guards.

LMP Yes, I'll get it. And we want one over on the other side, wherever the other one is.

LMP Okay. PURGE VALVE waist - and there's another waist tether in the EVA bag.

LMP Yes, hook that up there. ... put that up ... Oh, that's yours. I'm sorry (laughter). I was looking for this one. All right.

LMP Yes, that's the one. I verified that. Numbers? Okay.

10 12 19 56 CDR Okay, Bob - -

LMP Okay.

CDR - - we're at the attitude, and the high gain is set. And I never did see that middle gimbal angle get to 60.

LMP Unstow the CDRs LEVA, and leave the EVA bags in the LEVA bag - EVA gloves in the LEVA bag.

CC Okay, Geno. It will be the next maneuver that you'll see that middle gimbal angle out around 60 - 66 degrees.

CDR Okay.

Tape 169/6

LMP Should have vacuumed those things (laughter). And particularly since you're going to be looking into the Sun (laughter).

CMP Hey ...

LMP That's right.

LMP Okay, where? ...

LMP Put the - put them in the tan TSB. No, not yet. That's the - Yes, unstow the LMP LEVA and EV gloves. Put the gloves in the top pocket.

10 12 24 11 LMP Oh, they're in the left-hand top pocket. We wiped those off quite a bit. They're not half bad now. I don't have any instructions.

10 12 27 13 LMP Okay. I think we can stick these under the couch.

LMP Yes. Put your LEVA on the helmet. Okay, LEVA bags go up in the tunnel. Then we need to get the CDR's helmet out, too.

CDR Houston, this is America. By my count, we're still about 30 or 40 minutes ahead here.

CC Roger, Gene. You're looking good.

LMP Oh, not too far. I'll have to - can't tell from the list. ... the next page? Huh? Yes. Oh ... I wouldn't know if my helmet was fogged up or not.

LMP Supposed to have put them in the left-hand -

10 12 30 14 LMP Got a place for that ...?

LMP Somewhere I ceased to be careful with my helmet, I can see that because ... (Humming)

LMP Okay. Have you got the CDR's helmet unstowed? The IV gloves?

LMP Put your helmet stowage bag over there. Yes. Place accessory bag in the stowage bag. IV gloves in the temporary stowage bag.

10 12 34 19 LMP

Okay. You got your helmet on? Verified your visors? Verify the LEVA visors? Okay, and we antifogged. Okay. And the helmets and LEVAs are under the CDR couch. Stow loose items. Verify all your loose items, gents.

LMP

We've used it all.

LMP

Okay. Let me verify that we've got all the covers closed. One, two - Covers are closed. Panel 230, MAPPING CAMERA, OFF. SOUNDER RECORDER is OFF, IR is OFF, SELF TEST, HEATERS to - just about. You can get - you can work in that direction now. You're happy with loose items and everything?

CDR

... first?

LMP

CMP first. Yes. They've gotten it. Yes. Then me and then you. I'm just reading you the procedures is all.

LMP

Okay, Houston. For a little while things may sound a little bit confused. We're going to do the old thing about getting into suits.

CC

Roger. We're copying that.

LMP

And if you don't hear from us - if you don't hear from us, off and on; well, that's because we're not talking to you.

CDR

And, Bob, the CDR's going off the loop right now. I'll be back in plenty of time for that maneuver.

CC

Okay.

10 12 37 22 LMP

And - let's see, continuing right here. SELF TEST is OFF, and the UV is OFF. And the DATA SYS - the ON, switch is to OFF, strange as that may sound. And - I can. Yes, I will. I'll stay on for a while, until Gene gets suited.

LMP

And the panel 5 INSTRUMENTATION SCIENCE EQUIPMENT SEB circuit breakers are coming OPEN. Two are open. Ron, you may want to watch that. Yes.

10 12 38 36 LMP

I already stowed mine in my temporary stowage bag. That's it ...

Tape 169/8

CC America, Houston.

LMP Yes, go ahead.

CC Did Ron unplug from the biomed for a while?

LMP Yes, he is off the biomed for a while.

CC Okay. Thank you.

LMP But you can look at me for a while.

10 12 41 03 CC Yes, you're there.

10 12 51 30 CMP Okay, Houston. Gene's got his suit on now, and he'll help Jack get into his.

CC Roger, Ron.

CMP And in case you're won - in case you're wondering, we changed the procedure there a little bit. It was more convenient for them to get those guys suited first and then me.

CC Okay. We'll buy that. You still are off of biomed. Do you concur on that?

CMP Yes, if you want to take a look at it, I can plug it in here. I'm on Jack's headset now, but I can plug it in if you want me to.

CC No, no problem - no problem. We just wanted to - you know, it's easier to remind you now than it is to have you unzip the suit or something, that's all.

CMP Oh, okay. Yes, I understand. Let me check and see if it's still working. I'll go off first and then back on.

CMP Okay. It's hooked up now.

CC Roger, Ron. You look good. You're breathing.

10 12 52 46 CMP I'm breathing, huh? .Okay.

10 13 01 25 CDR Okay, Bob, CDR's suited and back on the comm and biomed.

CC Okay. We copy that.

LMP Houston, how do you read the LMP?

CC LMP, we read you loud and clear.

LMP Okay. I'm in my suit and on suit comm now.

CC And be advised the CDR and LMP both look good on biomed.

LMP Okay. And we're going to get the old CMP in the suit here.

CC Okay.

LMP That or we'll let him do it by himself since he's so proficient at it now.

CC America, Houston. We're copying you as being somewhat ahead on your time line, so don't rush on the - on the suit donning.

LMP Roger. We're not rushing, just going at it systematically. We apparently learned how to do it, though, somewhere along the line.

CC Okay. Well, just want you to be advised we don't particularly want to start early; and, therefore, you're ahead of the time line right now. You can take a break afterwards maybe.

CDR Okay, Bob, ... on that one.

10 13 05 34 LMP Understand, Bob. Understand.

10 13 14 01 LMP Houston, this is the LMP. I've got something for you you've been looking forward to. It's a number. It's 24173.

CC Roger, Jack.

CC Jack, I wasn't sure what you were talking about there for a minute, but it lit up the face on the panel next to me there. So everybody's happy now.

Tape 169/10

LMP Good. I'm sorry about that, Bob. Tell them that it was not intentional to leave it in the suit. As a matter of fact, it might be worth a reminder when you think we're unsuited - suited to take it out.

CC Well, if you wouldn't mind a reminder, we wouldn't mind giving it to you.

LMP Fine with me.

10 13 15 27 CC We're writing it into the EVA Checklist right now.

10 13 22 13 LMP Houston. We're on the top of 3-8.

CC Roger. Understand.

LMP With the exception of the VERB 49 maneuver, the other pages are complete.

CC Roger. Yes, you read my mind on that one.

LMP Say again?

CC You read my mind. That was the next thing I was going to ask you. I hadn't seen a VERB 49, and that's on that page that isn't required at this time.

LMP Yes, right. We're ... by for your Flight Plan time.

CDR We'll - we'll maneuver in the Flight Plan - VERB 49.

CC Roger. We understand.

LMP Okay. Verify your SCU, CLOSED. You ready to go?

LMP Panel 2, CRYO PRESS INDICATOR - INDICATOR is ... 3. Panel 603, EVA STATION O₂, ON. Verify EVA STATION O₂ gage reads approximately same as surge tank. And surge tank reads 850. I guess that's approximately. (Laughter.)

CMP ...

LMP Okay. SCU OPEN. Verify flow and purge umbilical. And then the panel 603, EVA STATION O₂ OFF - O₂ OFF.

LMP Okay. You verified all that (laughter). Waist - remove waist belt stowage strap from umbilical and stow in EVA bag. Okay. That's done. Connect EVA umbilical electrical and O₂ to CMP PGA, right-hand blue and lock. You're going to connect the EVA umbilical to yourself.

10 13 25 36 LMP (Cough). Okay. Your electrical and O₂ are connected, right-hand blue and locked.

LMP Okay?

LMP I transferred the LEB. I don't see that in here anymore.

LMP There it is. Okay. Your next big step here is to connect the waist belt and lock; buckle on the left-hand side.

10 13 27 22 LMP ... down there now, Ron. Can I help you with the connections? You don't have me going down there, you know, until -

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 13 29 53 LMP No.

CDR Okay. Yes, that's good. But you'd like it pointed down, right? Yes, that makes sense. Now, is your belt under the scissor pocket? Okay. We got our comm carriers on, so that's no problem. You ought to put your comm carrier on now. And then we do a comm check.

10 13 32 32 CMP Hey, Houston. This is the old command module pilot back on the loop. How do you read?

CC Read you loud and clear, Ron, and biomed's clear.

CMP Hey, okay.

10 13 32 46 CDR Okay. Some power at panel 10, Ron. POWER, AUDIO; SUIT POWER's ON; MODE, VOX.

10 13 32 51 CMP Okay, we're in VOX.

CDR VOX sensitivity as required, approximately 7.

10 13 32 55 CMP Well, it works good at 9. I'll try it down here. I don't know whether - Well, I'll leave it all the way up. I 'll leave it on 9. It works that way.

CDR PAD COMM, OFF.

10 13 33 08 CMP PAD COMM is OFF.

CDR S-BAND, T/R.

10 13 33 10 CMP S-BAND is T/R.

CDR AUDIO CONTROL, NORMAL.

10 13 33 13 CMP AUDIO CONTROL's in NORMAL.

CDR INTERCOM, T/R.

10 13 33 17 CMP INTERCOM, T/R.

CDR And VHF AM, OFF.

Tape 170/2

10 13 33 20 CMP VHF is OFF.
CDR Okay. ...
CMP Okay.
CDR Panel 3, S-BAND AUX ... verify.

10 13 33 41 LMP Okay, Houston. AUX TV is going to TV now.
CC Roger, Jack. We see it.
CMP (Laughter) Not much of a picture. It was looking right at the floor.
CC We don't see the picture, but we saw the S-BAND ... - -
CMP Not at the camera.
CC - - ... S-BAND AUX TV.
CMP Oh, okay.
CDR Yes.
CMP (Laughter) Okay. Yes, I read you loud and clear, Jack. Yes. Yes, we're going to have to move this TV a little bit, because I can't get the hatch open.
LMP Houston, I think you've heard from the CMP and the LMP. Why don't you try the CDR and see if he hears you?
CC Roger. I thought I already had a contact with Gene. CDR, how do you read Houston?

10 13 35 38 CDR Still reading you loud and clear, Houston.
CC Roger, CDR.

10 13 35 52 CDR Houston, America. That VERB 49 maneuver, you want me to be there at 56:30; you want me to maneuver at 56:30?
CC Your choice on that, CDR. You're ahead of the time line right now.

CDR Yes, we're - we're going to press on slowly through the system prep - preps for depress, and just to make sure we don't run into any problems there, and we'll probably - probably call a pseudo hold before I take any checks there, we'll take a look at it.

CC Roger.

CMP Oh, okay. Yes, let's press on.

CDR ... panel 604, SUIT PRESSURE.

CMP Okay. I don't hear a thing. (Laughter) I - I think I ought to hear that one.

CDR Sure ...

CMP I guess I can pretend like I hear it.

CMP Make sure I'm in AUDIO/TONE back here, but I don't think it makes any difference.

10 13 37 56 CMP No. Don't hear a thing. Houston, any suggestions on the SUIT PRESSURE ALARM, ON, and no tone?

CMP I didn't hear a Houston. (Laughter)

CDR Hello, Houston; America.

CMP I hear you guys, though.

10 13 38 41 CC America, Houston. Just for your information, we've got the TV, and we see the floor.

CMP Okay, Robert. I just turned on the SUIT PRESSURE ALARM, and no tone. Seems like I should get a tone there. That right, Jack?

LMP That's what it says. Verify ...

CDR Hello, Houston; America. Did you get that last?

CC Roger. That's affirmative. And you should have gotten the tone, and we'd like you to try it again. And we're thinking it through right now.

CMP Nothing. (Laughter)

Tape 170/4

CMP Well, let's see now.

CMP Houston, you got a circuit breaker or two we could check on that one?

CC Affirmative, and we'll be right with you with it.

CMP Okay.

10 13 41 58 CC Ron, you might go over on panel 5 and check the INSTRUMENT, SCI EQUIPMENT, HATCH circuit breaker. That has to be IN for the tone to work.

CC America, Houston.

CMP Okay, Houston. It's - the HATCH circuit breaker is IN, and - Couldn't be my headset at all, could it?

CC I wouldn't think so. Not your headset per se, since you're reading us and all.

CMP Yes, that's what I'm thinking, too.

CDR Say - say, Bob?

CMP Yes.

CDR How would it be if I just plugged into the comm cable on that umbilical just to check out the entire suit headset system here on that tone?

CMP You just cut out. One here.

10 13 43 39 CDR Okay. This is the CDR. I'm going off the line for a minute.

CC Ron, you might verify that the NONESSENTIAL BUS switch on panel 5 is on MAIN A.

10 13 44 01 CMP It's in intermittent in my headset. Okay.

LMP That's verified. And Ron thinks he has an intermittent in his headset for some reason.

CC Ron, your transmissions are okay, and you're not breaking up to us. It may be in your headset.

10 13 45 10 LMP Okay, Houston. Gene's able to hear the tone, and Ron's getting it intermittently.

CC Roger. We copy.

CMP How about switching headsets with one of you guys, huh?

CC If you decide to swap headsets, we prefer that you swap with the CDR.

CDR Any special reason?

CMP Yes.

CDR ... I think.

CMP Oh, this?

CDR Yes.

CMP Oh, I see. I'll trade with Jack, here.

CDR Bob, this is CDR. You got any answer to that last question?

CC Roger, CDR. It's almost a tossup, but we would like to have the other man out on - with an absolutely good headset, although we don't think it's a real problem one way or another.

CDR We'll get him out with a good headset, okay?

CC It's a tossup, CDR. Take your pick, I guess, really.

CDR Okay. Stand by. We'll check one out here.

10 13 47 17 CDR Okay. We just made a swap. Okay. Ron is wearing Jack's headset, and he's got a good tone continually when the switch is on, and he loses the tone when the switch goes off.

CC Okay. We've got that.

CDR So CMP and LMP made the switch.

Tape 170/6

CC Roger.

CMP You know, that - No - yes, I didn't - I didn't even realize you could cut it off. If I'd known that, I'd have cut it off before. Yes. If I'd cut it off like that, I'd have my curly locks shaved off in front.

10 13 48 28 LMP Okay, Houston; this is the LMP. Give me a call, please.

CC LMP, Houston. Reading you loud and clear. How me?

LMP Okay. You're loud and clear.

CC Roger, Jack.

10 13 48 46 CMP We're going to try the spacecraft - see if Jack hears the spacecraft tone or not. Just turn the power on and off - the caution and warning power. I got a tone.

10 13 49 24 CMP Hey, that's good and loud. Okay. ALARM is OFF.

10 13 49 31 LMP Okay, Houston. We're going to turn the TV off for a while.

CC Roger.

10 13 49 47 LMP Okay. I'm going to start my maneuver now.

CMP (Humming)

CMP Oh, 351. The CABIN REPRESS valve. Okay, I'll get it.

10 13 50 54 CMP Okay. CABIN REPRESS valve is OFF on 351. And it's verified closed.

CMP Yes, that's right. ... checklist.

10 13 53 19 CDR Okay, O₂ HEATERS, three of them, are in AUTO.

CMP Yes, that's a good number.

10 13 53 46 CMP Okay. Got it? Yes, it's ON.

CMP Okay. You ON or - -

10 13 54 01 CC America, Houston. We'd like OMNI Delta, OMNI Delta.

10 13 54 07 CDR You got it.

CMP Yes, got it in there. Okay. PCV is verified on.
Okay. Yes.

CMP If we decide to put this on later, then you can put
it on for me, because it flops all over the place
down here. Okay. Disconnect red ECS O₂ hose.
Okay.

10 13 54 58 CMP ... the old purge valve, valve 208. It came from
the Taurus-Littrow landing area of the Moon. Okay.
Got the purge valve. Boy. Okay, just looking at
some ... (Laughter) Okay. It's low, is it?

CC America, Houston. We'd like OMNI Charlie.

CMP Yes, you can't see it.

10 13 56 15 LMP You're OMNI Charlie, now.

CC Thank you, Jack.

CMP It's low. ...

CMP What's the matter with - I'm going to try the other
one. That thing, I can't even move.

CMP Oh! Sticks or something. Let's see. Okay. Let
me try the other one.

10 13 57 17 CMP Yes, this one's stuck here, stuck in something.
Couldn't move that if I had to. Okay, we'll use
211 instead.

CDR Okay, Houston. He's going to wear purge valve 211.
It's not perfectly matched, but I see no problems
with it. It's a lot freer.

CC Roger, America. And we anticipate no problems with
using 211.

CDR Okay. Fine, Bob.

Tape 170/8

CMP Okay. We want it in low, you say, Jack - Jack?

10 13 58 06 CMP ... that's low. Okay.

10 13 58 16 CMP Okay. 302, SUIT FLOW is OFF.

CMP Might just as well. I - I turned mine off, see.

CMP Okay. ...

CMP Stay up there in the tunnel, that way.

CMP Yes. This other way - you are in the way there. Let's go the other way.

CMP See, like so.

10 13 59 36 CMP Okay. CMPs hoses are routed up across the tunnel, out of the way - we hope. Ah-ha! Finally getting some flow. Man, I feel a lot better. Okay, cabin pressure's coming up, and - Okay. Jack, I guess you could really go the LEB ... to help me now. Yes - yes, because I can -

10 14 00 50 CMP Okay. I've got - yes, I've got the flow coming in here, so ... up around 5.7.

CMP Okay, just a second.

10 14 01 29 CMP Yes, I - I just - Okay, I see. Yes, it's below 2.5.

CMP Okay.

CMP Man, you guys got that thing dirty.

CMP Here, let me get the hose out of here first.

CMP Oop!

CMP (Laughter) Well, put it on there, I guess. Yes. Close up a hole there next to the ... Okay, let's see, I guess we can button that back up.

10 14 02 56 CDR Okay, Houston. We're at attitude. I'm going to configure the DAP.

CC Roger, America. We copy attitude.

CMP Let's see. Am I getting all tangled up in the hose.
I don't think so. Am I?

CC Okay, America. We're ready for the HIGH GAIN.
PITCH, 43; YAW of 262.

10 14 03 39 CMP Okay. Just a minute. MANUAL and WIDE. PITCH
of 43; YAW, 262. HIGH GAIN. Okay. They want
AUTO now?

CC That's affirmative, Ron.

CMP It still doesn't go full scale, but -

CMP That good enough?

CC Ron, we need it full scale.

CMP Let me try it again. Okay? I'll go to MANUAL
and WIDE.

CC RE - REACQ and WIDE, and then step it down.

CMP Okay.

10 14 04 48 CMP Ah-ha! That works. Okay. You're REACQ and
NARROW now.

CMP Okay. There, you want to - -

CC America, we see your cabin at 5.4, and we'll keep
an eye on it.

CMP Okay. Give us a little call there ahead of time,
and I'll crack the ... Right now - -

CC Roger.

CDR Okay, Jack. You're squared away.

10 14 05 49 CDR Okay, Bob. I've got the proper jets configured,
and A/C ROLL, PITCH, and YAW, MAIN B, are OPEN.

CMP What?

Tape 170/10

CC Roger. And we would like to go back to AUTO on the HIGH GAIN to see if it holds your signal strength for us.

10 14 06 06 CMP Okay. You got AUTO.

10 14 06 25 LMP Okay, Bob. I'll verify that all the SCS switches are set as per 3-9.

CC Roger, America. Thank you.

10 14 07 12 CC And, America. Your cabin press is at 5.6, and you can crack the side hatch valve, if you like.

CMP Okay. Get the old cabin pressure down here a little ways. That's about 5, isn't it?

CMP Okay. ... there.

CC Ron, we're seeing 4.9 on your pressure. You can stop venting there.

10 14 08 39 CMP Okay, we're stopped.

CDR Okay, it's closed.

CMP Okay.

CMP Here, Jack. Why don't you stick that up there in that? Yes.

CMP Up left.

CMP Okay. Yes, that's right side up. Not, yet, I haven't got them all on there.

CC America, Houston.

CDR Go ahead, Houston; this is America.

CC Gene, you probably realize that the audio tone is a separate wire all the way to the earplug, and that's - and that's why there's no problem - the LMP should have no problem.

CDR That's affirm. We understand.

CMP Yes, we understand that. Okay, Gene. The bottom ones look like letters up, right? Yes, okay - That works, okay. Now - we have - Oh, there's the other one. (Laughter) Thought I only had three straps. Okay.

10 14 11 06 CMP Okay. I guess we're ready to strap this thing on, huh? No, I've got to have that first.

CMP Okay. There's the old - O - OPS adapter bracket. It's hooked on. Yes, it floats around there a lot better than it did in the simulator. Okay, Jack. Can you kind of steady it there, and we'll - Some more? Wait a minute. Give me the lower one first. No, up on top, the other way. And then slip - Okay. And an upper one. Okay, need a left upper. There's a left upper.

CMP Okay, the next one's coming around this way.

CMP And then, the left arm's back over here. Ah-ha! There's the old OPS hose. Okay, that's installed and it's locked.

10 14 12 47 CMP Verify locked. Okay.

CDR Okay, what do you need, Jack? Okay.

CMP Uh-oh. (Laughter) Should have done that earlier. It's under your ... now. Here it is. Okay. Oh, okay. (Humming)

10 14 14 36 LMP Okay, Houston; America. The LMP is donning his LEVA now.

CC Roger, America.

CMP Yes, it was - that - The back is the part I can't reach right now. Yes, okay.

CC America, the cabin is at 5.6, if you want to vent a little bit.

LMP Okay, I'll get it.

10 14 15 23 CMP Okay, locked. I'll get the back of it. Can you lock - verify your own alignment?

Tape 170/12

CDR Yes, I can see it.

CMP Which one is locked? Let me twist it just a little bit.

CDR Okay, there we go.

CMP Engage - locked. Okay, it's on that way. Yes. Yes. No, I ... - You're going to have to twist or something. Okay, that's the back.

CMP One is in there, and then the other one was stuck in that bungee there.

CDR There's one, up in the tunnel.

CDR Houston, how does the cabin look to you?

10 14 17 32 CMP Take a look. It's about 5-1/2 now, Gene.

CDR Okay.

10 14 17 38 CC Roger, Gene. It's at 5.3. We're monitoring very closely if you - if it helps you any.

CDR Okay, very fine. I'm coming down very, very slowly on it.

CC Roger.

CMP Gene, can you look on your left side, over there? That's it. Just a second, Gene; hold it there.

CMP Pull valve.

CDR Okay, it moving.

CMP Okay, let's see. You're right. Okay. It's off. Just tell me when. You want it on yet?

CMP Okay, that's that one? Lock. There's your lock on that blue one. Locked? Okay. You closed? Okay, that's locked. That's locked. Locked. Okay. Having trouble getting them on there, Jack, with the - shouldn't be too much pressure there. Let me - let me push it on you.

CMP Twist? Doesn't look like it's on. Okay. Is she locked? Let me see. Okay, let's see your - they're hooked on the right.

10 14 20 40 CMP Okay. That's O₂ - that's a lock lock. Okay, blue one is a lock lock. Okay, that chin is now locked in. That ... is locked in. Okay, and your helmet, I checked that once. Let's try it again; let's see. Moves that way, doesn't it? Okay, it's locked. Here, let me - wrong way (laughter). Okay.

10 14 21 17 CDR Okay, Houston; this is America. The LMP and the CDR both got their helmets and gloves on, and all connections have been checked.

CC Roger, America.

CMP It's open.

CDR Okay.

CMP It's locked.

10 14 21 44 CC America, we are copying the cabin at 4.8. You can stop the venting at this time.

10 14 21 53 CMP Okay, it's - Gene's closing the valve now.

CDR Okay, it's closed. And how are you reading CDR on VOX?

CC Read you loud and clear on VOX.

CDR Okay, fine.

CMP Okay, now she's low.

CDR Okay.

CMP (Laughter) Yes. Got to get the dust cover on the ..., okay?

CDR Okay, we're going to do an integrity check, Jack.

10 14 22 25 CDR And, Houston, the CMPs connections are all verified locked.

Tape 170/14

CC Roger.

CDR Okay, going to integrity check.

CMP Let me know when you get up there because I've got to turn my O₂ off. Well, I guess I can see it from here.

10 14 22 45 CDR Okay. SUIT CIRCUIT RETURN VALVE is CLOSED.

10 14 22 55 CDR Okay, it's CLOSED. DIRECT O₂ is CLOSED. What's suit pressure indicating over there, Ron, about 4.7 to 5.3?

10 14 23 08 CMP Yes, it's about 5.0.

CDR And O₂ FLOW is low, isn't it? Okay.

10 14 23 13 CMP FLOW is down, yes.

CDR I'll just take it off of here, huh?

CMP Yes, just right off there.

10 14 23 22 CDR Okay, SUIT CIRCUIT RETURN VALVE is CLOSED. SUIT FLOW valve - You have flow, Jack? Suit pressure is okay, and O₂ flow is less than 0.4. Suit test. Okay; I'm taking us up.

CMP Okay.

10 14 23 43 CDR Okay. We're in PRESSURE, and DIRECT O₂ is OPENED. Let me cycle the suit circuit return valve.

10 14 23 56 CDR Okay, it's OPEN, and it's CLOSED.

CMP Okay. That's O₂ flow.

CDR Okay. At 4 psi differential, I'll close the direct O₂.

CMP Okay, I'll turn my flow off here a little bit to keep the cabin from going up so far.

LMP Okay.

CMP If it starts to get hot, I'll turn it back on again.

LMP Okay.

10 14 24 25 CDR Okay. DIRECT O₂ is CLOSED.

CMP Should take you up to about 4.5, I think.

CDR Okay, check suit pressure. What are you reading over there, Ron? Ron, what are you reading up on the - the suit - circuit?

10 14 24 41 CMP Oh, I don't know. About - I don't know, 8.5 or 9.

CDR Okay. That's GO.

CC Okay. We're reading 9.0 on the suit pressure.

10 14 24 49 CDR Okay. ... at 4.25, increasing slowly.

CDR Okay, very good. O₂ flow, Ron?

10 14 24 57 CMP Well, it's still off. Let's give it a chance to - -

CDR Less than 0.8? Let's wait for it here.

CMP Yes. See, you've got to go up - you're sitting - -

10 14 25 02 CDR Yes. We're going through about 4.35, now.

CMP Yes. Goes up to about 4.4 or 4.5.

CDR Let me know when it comes down up there, will you?

10 14 25 24 CMP Okay. It's starting to come down now.

CDR Let me know when it gets stable.

10 14 25 42 CMP Okay. It's 0.6 right now, but -

CDR Still coming down?

CMP Still coming down a little bit.

CDR Okay.

10 14 25 52 CMP 0.55.

Tape 170/16

10 14 25 57 CMP It's 0.5.

10 14 26 08 CMP Well, it looks like it's going to stabilize right there at just a little less than 0.5.

10 14 26 12 CDR Okay. Let's see if it stays stable for about 30 seconds.

CMP Okay.

LMP Hey, Geno.

CDR Yes?

LMP ...

CDR Not to me. Oh, to you. Okay. Here.

10 14 26 36 CDR Still stable, Ron?

10 14 25 37 CMP It's coming down.

LMP You guys got pretty good suits.

CDR Yes. They are good, as a matter of fact.

CMP (Laughter) Put dust in them, and it makes them good. Now it's down around 0.3.

10 14 26 51 CDR Houston, how does the suit circuit look to you?

10 14 26 55 CC It's looking real good, Gene.

10 14 27 00 CDR If you're happy, I'll go to DEPRESS.

10 14 27 04 CC Roger. We're happy with it.

CDR Okay. Coming down slow, Jack.

LMP ...

CMP Okay.

CDR Okay. We're coming down.

CMP Is that okay? Or that okay? Okay. But you can't do that. It's going to have to be (laughter) - and -

CDR Okay. Let's see.

CMP Okay. You guys are coming down; I want to give myself a little air here.

CMP Wish I had some of that cold you were talking about this morning, Gene.

CDR Yes. It's plenty cool in here.

CDR Okay. We'll pick it up over here.

10 14 28 27 CDR Okay, Bob, I'll pick it up on page 3-13 as soon as we come down here a little bit more. I'm in SUIT TEST valve DEPRESS.

10 14 28 39 CC Roger.

CMP What's my next thing here? Suit and helmet donning, isn't it?

CDR Yes. We'll get your helmet and gloves on, Ron.

10 14 29 11 CMP Okay. I can go ahead and start doing that now.

CDR Yes, you sure can.

CMP Okay. I don't know if Jack will be able to get my helmet. I'm going to need my gloves. Well, no hurry yet. I need to get the helmet on first.

10 14 29 29 CC America, Houston. You asked for a reminder - -

CDR Go ahead.

CC - - you might want to get the waste management compartment vent prior to glove donning. That is your decision - your choice on that.

CMP Oh, okay.

CDR Ron, can you see our suit-circuit pressure up there?

10 14 30 03 CMP Yes. It's about 7.

CDR Okay.

Tape 170/18

10 14 30 06 CMP Cabin's about 5 -
CDR Okay. We're 6 or so?
CMP Oh. My clean gloves all dirty?
CMP Look at all the water's coming out of that thing.
10 14 30 38 CDR Okay, Jack. You want to take us down the rest of
the way?
10 14 30 46 CDR Okay, Houston, the SUIT PRESS valve - SUIT TEST
valve is OFF, and I can verify we are in BOTH on
DEMAND REGs.
CMP I don't know which is the best way to do this here.
10 14 30 58 CC Roger, America.
CDR Yes, that's that valve you just opened.
CMP Yes. I just opened the waste stowage vent valve
here.
CDR Okay, Ron. You've got the O₂ ON yet, I guess.
Huh?
CMP Yes. It's still ON.
CDR Okay.
CMP Well, let's see - -
CDR I'll let Jack help you with that.
CMP - - ... OPS is in the way in the back here. See
if I can squish down here.
CDR Okay. I'll hold your OPS out of the way.
CMP Okay, wait a minute. I can't see where the - -
CDR Okay, you're in the back.
CMP Wait a minute. Wait a minute. I think something's
stuck in the - oh, I don't have a hose. Okay.
(Laughter)

CMP There's a cable here. The cable to the comm carrier.

10 14 31 58 CC America, you're at 5.7 - -

CMP Comm carrier coming up.

CC - - on your cabin. You want to go ahead and vent a little bit?

CDR Okay. That's good. Half a second here.

CMP Okay?

CDR Well, you're - There you go.

CMP Wait a minute. Something's still in there. What in the world's in there? Everytime I look down, your comm carrier comes in -

CDR You're just not getting it aligned too well.

CMP Let's see if on the sides over there or something.

CDR No. You're clear.

CMP Yes, that buckle. I hadn't thought of it. That's the buckle on the OPS. How. That's something that happened - doesn't happen in there - Wait a minute. That's the engagement right there. Okay. Yes. Yes. I think that's it, isn't it?

CDR Did it lock? Doublecheck it locked, and double-check it in the engage mark.

CMP Okay, that's the lock mark, isn't it? Yes. Okay. Yes. So if I can - Think you know how to get it, huh?

CDR I got to pull the flap up on this side, Jack. You'll have to get it on the other.

CMP Yes, something's not right the way I - There. Okay, that did it.

CDR Okay, Ron. You got - why don't you do a couple of other things before you go any further now.

Tape 170/20

CMP Okay.

10 14 33 49 CDR Okay, give me another - pull the pin on the purge valve and give it to me. And activate it in LOW.

CDR Okay, going activated?

CMP Okay. It's activated into LOW.

CDR Okay. DIVERTER valves - verify they're vertical.

CMP Okay. Wait a minute. That one is vertical. Okay, that one is vertical - -

CDR Okay. Next step is not applicable - -

CMP Wait a minute. Hold it.

CDR Now, you can adjust your PGA tiedown. And set your wrist rings to the ENGAGE position.

CMP Okay, that one's engaged. That one's engaged. How's the noise down there, Houston?

CC Not too bad, Ron.

CC And the cabin is at 4.85. Terminate your vent.

CDR Thank you, Bob.

CDR And Houston, this is CDR. I'm on the cue card now.

CDR Jack, could you get his - his flap on the other side?

LMP Yes, I got - Okay.

CDR Sorry, I didn't leave you -

CMP Oh, let's see.

CDR I got it on this side.

CMP Okay.

CDR Well, it'll do that, too, that's - let's push it down behind his OPS here and that'll - that's about the best you can do on that.

CMP That cover on that - -

CDR Yes. If it's too loose, we can pull the snap and tighten her up.

CDR That's all right. Looks good. ... Okay, Ron, you can -

CMP What?

10 14 36 30 CDR A rock. Houston, we just found a small sample of the Moon floating around in the cabin.

CMP Hold it there, will you? We can't go on to it now.

CC Roger.

CMP Go ahead ... systems.

CDR Let me look at that before you cover it.

CMP Okay. Okay, that's locked.

CDR That's locked.

CMP Okay. Let's - -

CDR Your right glove is locked.

CMP Okay. I'm going to let you help me with the -

CDR Let go - put your other hand - -

CMP Oh, okay. Put the strap on and - -

CDR - - the ring out.

CMP Put it all - up here, yes. On the other side of the valve.

CDR Okay.

CDR Take the top and pull it down.

10 14 37 41 CDR Tight son of a gun.

CMP That's over. Okay. I don't want that.

Tape 170/22

CDR You just ... keep pulling there.

CMP Yes, but it won't go over that - it won't go over that other valve, Gene. There's no -

CDR Stick it under the gauntlet.

CDR There you go.

CMP There we go.

CDR It's over the valve.

CMP Over the valve, okay?

CDR Okay, your right glove is lock lock. Let's get your left one on.

10 14 38 24 CMP Okay, she's engaged.

CDR Okay.

CMP Wait a minute. I've got to turn the pressure off, babe.

CDR Okay.

CDR (Laughter) Okay, on 603, EVA O₂, OFF.

CMP Okay. Wait a minute. I can't even reach it.

CMP Okay, EVA O₂ is OFF.

CDR Okay. Okay, get your other glove. Turn it some more. Turn it the other way. Okay now.

CMP She's locked? Let's push her on up. Okay?

CDR Okay, you are locked.

CMP Wait a minute, I'll get it. ... get some air.

CMP (Laughter)

CDR Okay.

CMP Okay, fully -

CDR On as required to pressurize.

CMP Okay, we're coming up.

CDR Now, let's get that gauntlet.

CMP Okay.

CDR Okay, Houston, the CMP is coming up.

CMP Okay, looks like about 3.4 - 3.5.

CDR You pressurized already?

CMP There we go.

CDR Okay, if you can reach the tone, turn the tone on.

CMP Okay.

CDR And verify and turn it off.

CMP Aaaaah, don't know how I can reach the tone.

10 14 40 46 CDR Want me to help you? Wait a minute, see ... - -

CMP (Laughter) No wonder I can't move. Okay, wait a minute. Hook it in my thing.

CDR Okay. You want it locked in there?

CMP No, that's all right.

CDR Okay. You got to get that. Yes, that's -

CMP Hmmmm, I don't have a tone.

CDR Did you turn it on?

CMP Now it's off. Stupid thing.

CDR You got it? You said you did not have a tone, is that correct?

CMP Yes, that's right.

CDR Houston, do you hear that?

Tape 170/24

CC Understand. The CMP does not have the tone, again?

CMP Oh, son of a buck.

CDR Pretty good ...

10 14 41 55 CMP Okay, I'm reading 3.9, should have low suit flow because I got the purge valve.

CDR Okay. You got your EVA - on 603, EVA O₂ is ON. Is it - is it still on, or have you got it off?

CDR 602 O₂?

CMP Yes, it's ON; O₂ flow is ON.

CDR Okay, and you're reading 3.7 to 4.0.

CMP Yes. Maybe it's just not - maybe I'm still getting too much flow. That purge valve is open, isn't it, in LOW?

CDR PURGE valve is open to LOW. Did you open it? Let me see.

CMP I think I did. Yes, it was open.

CDR Yes. You're open.

CDR Okay, turn the tone off.

CMP Okay, I turned the tone off. Okay, it's off.

CDR Okay, how's your master volume? You happy with it? Or should I jack it up some more?

CMP Houston, say something.

CC Roger, Ron. We copy you. You might try and adjust your VOX, thumbwheel down a little bit. It might help us a bit, knock out some of the background noise.

CMP (Laughter) Okay. Jack, you want to try to knock the VOX down a little bit? Okay, 1, 2, 3, 4, 5 - 5, 4, 3, 2, 1.

CC Hey, you don't sound bad at all, Ron.

CMP Houston, are you reading me?

CC We're reading you loud and clear, Ron. No problem.

CMP Does that - Okay. Did that knock some of the noise down?

CC That's affirmative.

CMP Is that - is that okay? Okay? You're going to get a little bit of noise, I think.

CC Oh, that's affirmative. We realize that.

10 14 44 00 CDR Okay, Houston - -

CMP Okay.

CDR Okay, Houston. Unless we hear otherwise, without the tone at that point, we are pressing on.

CDR Okay, Jack. On 351, get the EMERGENCY CABIN PRESSURE REGs OFF.

CC America, that's affirmative. And we'd like to vent the cabin. You're at 5.7 again.

CDR Okay.

CDR Okay. It seemed like you - it's on 351.

CDR Okay, Houston, I'm 351, EMERGENCY CABIN PRESSURE's OFF.

CC Roger.

CDR Okay, Ron. It says - let me read this to you. "CMP monitor cuff gage" - It's "PURGE VALVE, HIGH, verify tone on at 3.1 to 3.4, then PURGE VALVE, CLOSED and verify tone off." Go ahead and turn the switch on.

CMP All right.

Tape 170/26

CDR You probably didn't get a tone there because you were already on up to pressure by the time you got that switch on. I think that's why you didn't get a tone.

CMP Yes.

CDR So you should get one here. So turn the tone - you got the tone power on?

CMP No, not yet. I can't get down there. Not until I get Jack out of the way.

CDR Okay.

CMP Okay.

CDR Okay, get down there and turn the tone power on, and I think you'll get a tone this time around.

CMP Okay. There.

CDR Okay, tone power's on. What I want you to do is go PUR - go HIGH on the PURGE VALVE, and I'll get that ... - -

CMP I'm going to let you - I'm going to let you do that, okay?

CDR Okay. Now, it's HIGH - -

CMP Okay, coming on.

CDR - - 3.1 to 3.4. You ought to get a tone.

CMP Now, I got the tone at 3.2.

CDR Okay, turn it back on.

CMP Wait a minute.

CDR PURGE VALVE is CLOSED.

CMP Okay. Back up to 4.

CDR Tone off?

CMP Tone's off.

CDR Okay, PURGE VALVE is locked, and it's HIGH.

CMP Locked and HIGH, okay.

CDR Okay. That's where you want it, huh?

CMP Right.

CDR Why don't you come up here, and I'll install a pin for you.

CMP Yes, I'll come up there. (Laughter) I'm stuck. Oh, I can - I can get it. Can you do it?

CDR Yes, I can get it. Okay. Okay.

CMP Okay?

CDR Now, it's locked, the pin is in, and you are in HIGH. Okay, that's verified.

10 14 46 56 CMP Okay?

CDR Okay. Verify flow and cuff gage reads 3.7 to 4.0. Ron?

CMP Okay. I got 3.9 on the cuff gage.

CDR Okay, we're going to do an integrity check on you. On 603, EVA and STATION O₂, OFF.

CMP Okay. Can you reach that gage, or do you want me to do it? Oh, I can get it.

CDR I can get it if I turn around here. I'll get it.

CMP If I can - -

CDR Let me undo this before I pressurize. I'll strap them in again.

CMP How you guys - Always got it before, but I must be laying in a different way here.

CDR Did I get it off?

CMP Okay, I've got the tone.

Tape 170/28

CDR Okay, now. Okay, monitor cuff gage; verify PCV closes. Monitor pressure decay for 1 minute; verify less than 0.8.

CMP Okay, closed, and we're at 3.61.

CDR Okay, when did you start your time?

CMP Okay.

CMP Can you guys hear that tone?

CDR Yes, I can hear it occasionally.

CC That's affirmative.

CMP Oh, you can hear it on the ground, huh?

CC That's affirmative.

CMP Very good.

CDR Okay, Ron. How is - how is your suit pressure?

CMP ... pressure is stuck at 3.6.

CDR That's a good place for it to be. You have about 30 more seconds, don't you?

CMP About 15 more.

CDR Okay. Okay, and you did get the tone on for low flow?

CMP Yes.

CDR Let me know when you're satisfied with the time.

CMP Okay, turn it back on.

CDR Okay. O₂ *** is ON.

CMP Okay.

CDR It's in.

CMP Let me get it. Make sure it's all the way up. ... it all the way up?

CDR Yes, I think it is.

CMP Yes, I can see it increasing.

CDR Here, let me get in there and push it. Put your guard down.

CMP See it in there?

CDR Okay.

CMP Okay?

CDR Okay, you happy?

CMP Yes, 3.7 to 4.0. Stable?

10 14 49 42 CDR Stable, 3.9.

CDR No tone?

CMP No tone.

CDR EVA pressure gage, 100 to 500 psi.

10 14 49 48 CMP Yes. For some reason, the battery is burned out in the flashlight, but - Let me see, it's about - I would say 400, I think. Yes, let's see, its division marks on that gage are 3, 6, and 900. And it's above the 3.

10 14 50 11 CDR Okay, it's good. I can see that.

CMP Yes, it's good. It's about 350.

CDR Okay, verify surge tank pressure. Houston, can you give us a hack on the surge tank as a GO?

CC Stand by on that.

CC Roger. Looking good.

CDR Okay, very good. We're ready to press on with the cabin depress, Ron. GN₂ valve handle, pulled.

CMP Okay.

Tape 170/30

CDR Okay. We'll pick that up when he starts to move.
Okay, gage, min and leave in the vent position.
Pull the handle.

10 14 50 57 CMP Okay.

CDR Leave in vent. Leave in vent.

10 14 51 00 CMP Okay.

CDR Okay. Verify helmet and gloves locked.

10 14 51 07 CMP Okay. ... smooth. Here, I need the - get that
down.

CDR Okay.

10 14 51 10 CMP ... there. Okay, lock locked.

CDR Hey, babe; you looked good when you went by me.

CMP (Laughter) Okay.

CDR Just stay that way.

CMP We'll stay that way.

CDR Okay. Houston, we're standing by for your GO.

10 14 51 29 CC You are GO.

CDR Okay, Ron. Hear the note.

CMP Okay.

CDR EVA warning tone may come on momentarily during
the ... depress.

CMP Okay.

CDR Jack, are you ready?

CDR Okay, babe. When you get out there, just take it
nice and slow and easy. You got all day long.

CMP Yes, that's right. It's not like the zero-g
airplane.

CDR Feel yourself around, and it's nice and easy to
 get around. Just don't let your body start moving
 too fast down there. Okay. Side hatch is coming
 open slowly.

CMP There's a valve ...

CDR Valve? I can't see the gage, but I know we're
 coming down.

CMP Okay.

CDR Houston, can you give me a hack at approaching 3.25?

CC That's affirmative. We will.

CDR Okay.

10 14 52 52 CDR Okay. That's O₂ FLOW HIGH, as expected.

 CMP Okay. And that's - oh, about 3.95.

 CDR Okay.

10 14 53 14 CDR Coming down a little faster, Houston.

 CC Roger. We're watching.

 CDR Okay.

 CDR And, Ron - -

10 14 53 46 CC Okay. You're 3.4 right now - 3.4, Gene.

 CDR - - when you get to the SIM bay, go around -

 CDR Okay. Okay - -

10 14 53 53 CC 3.3, closing.

 CDR - - ... get your feet in the - Oh, okay. Yes, will
 do. Get your feet in the golden shoes, and then
 you can do anything. But get them there first.
 Okay, 3.25. O₂ FLOW indicator is off scale low.
 Okay, can you verify our suit pressure down there?

10 14 54 16 CC Roger. We're - you're locked up. Suit press, 3.8.

Tape 170/32

CDR Okay, very good. We're coming on the way open.
Going to zero. You guys ready? Here we go.

CMP Okay. I don't change. I'm already there.
(Laughter)

10 14 54 32 CDR Yes, but Jack and I are coming up.

 CMP Yes, I know.

10 14 54 47 CDR Okay, we're coming up.

 CDR Okay.

 LMP Nice day for an EVA, Ron. Go out and have a good
time.

 CMP Yes, it ought to be pretty good out there. I ... - -

 CDR Okay, we're coming off the ...

 CMP I just need that one visor down, don't I?

 CDR No, you need your Sun visor down, too. Bring it -
one is protective, and the other is the Sun.

 CMP It is? Well, it looks dark out there. Can't even
see.

 CDR Well, use your own judgment. If - if you're in the
shade, you won't need it. But if you're in the Sun,
you ought to have it down.

 CMP Okay.

10 14 55 44 CDR Okay, Jack. I'm at 2.8 and coming up.

 LMP Okay.

 CDR Well, let's open her up a little more.

10 14 56 31 CDR Okay, the valve's all the way open. And I'm 3.5.

10 14 56 37 LMP Okay, I'm still reading about 3.82, now.

10 14 56 45 CDR O₂ FLOW HIGH light is off. Okay. Wait until we're
stable, Ron, and we'll be with you.

CMP Okay.

10 14 57 00 CDR Jack, it looks like I'm peaking out at - peaking out about 3.75. How you looking? Okay, Ron. You're 3.7 to 4.0?

10 14 57 08 CMP Yes, I'm reading 3.8.

CDR Okay. EVA station pressure gage still up?

CMP EVA station pressure gage - it's ... I can't see it. Okay. Still - yes, about one-third - -

CDR Okay.

CMP - - third ... there. ...

CDR You do not have a tone, right?

10 14 57 25 CMP No tone.

CDR Okay, can you get panel 3, S-BAND AUX TV to TV?

10 14 57 32 CMP (Laughter) Okay.

CDR If you can do it.

CMP ... the old jett bag in the way here. Okay, TV is going up to TV.

CDR You got it?

10 14 57 45 CMP Yes.

CDR Okay. I've got lines on the monitor, and he's doing - the CDR's going ... PTT.

CC Roger, CDR.

CDR Okay, Ron. We're ready for the hatch opening. The lock pin release knob, unlock.

10 14 58 05 CMP Okay. Lock pin release knob, the one on the side. Push it down to yellow, right?

CDR Unlock indicator release, white goes to yellow.

CMP White goes to yellow. Okay.

Tape 170/34

CDR Gear box selector, unlatch.

10 14 58 14 CMP Gear box selector to unlatch.

CDR Actuator handle, unlatch.

10 14 58 19 CMP Actuator handle to unlatch.

CDR Unstow actuator handle.

10 14 58 23 CMP Okay. We'll unstow the old actuator handle.

CDR And the hatch is yours. Unlock it.

CMP Okay, here we go. 1, 2, 3, - Oop! I got ahold of it. And a bunch of ... going out there. (Laughter) Lost the - Oh, there goes the pen. Yes, ... (Laughter) Okay. It was a felt-tip pen. No scissors. (Laughter)

CDR Say, Ron. You want to - actuator handle select lock to L.

10 14 59 21 CMP Okay, wait a minute. Actuator handle to latch. Okay, she's stowed. Yes, it's stowed in there. There it is, okay. There we go.

CDR Okay, now it's stowed.

CMP Now it's stowed.

CDR Okay. Gear box selector to latch.

10 14 59 46 CMP Gear box selector is latched.

CDR Okay, and you and Jack can both lo - lower your inner visors.

10 14 59 53 CMP Okay, inner visor's lowered.

LMP Okay.

CMP That's the ... - -

CDR Okay. Open hatch slowly, and verify that our hex clears.

CMP Verify the what? Oh, the hex. Yes. It's a good thing I hung on to it, or it would have been open by itself. ... Now you're going in - here, let me ... a little bit. Now it's got it.

10 15 00 39 CDR Okay, Houston. The hatch is open.

CC Roger, America.

CMP Almost.

CMP Hey, there's the Earth, right up ahead.

CDR Okay, Ron. You've got a - -

CMP The crescent Earth.

CDR You've got a GO for egress.

CMP Beautiful.

CDR And just take it slow.

CMP Okay. First of all, I got to get back in, and get the old TV camera. Oop. Yes. That's right. I don't even know where the Sun is. Which way is the Sun? Okay, yes. Sun's on the right. Okay.

10 15 01 42 CDR Okay, Houston. Ron's putting the camera out there on the pole now - pole out there, rather.

CC Roger. We see the EVA light out there.

CMP ... stay lower?

CDR Okay.

CMP Man, that Sun is bright. Whoooo!

CDR Pull down that visor, Ron. You're going to need it.

CMP Yes.

CDR Not the metal one, unless you really need it.

CMP No, I don't want the metal one.

Tape 170/36

CDR No, just get the gold one. That's all you need.

CMP I'm trying to - -

10 15 02 20 CDR Okay, you're clear back here.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 15 02 26 CMP Oh, man. We're about to get the old TV pole in and lined up. Locked in there. Oh, oh, forgot to turn the camera on. You have it back? The - sequence, yes. Yes, let me just get on up in the - -

CDR You're a long way from home. We don't want to lose you.

CMP Okay. ... Hey, I think I hear it buzzing. How's the TV picture, Houston?

CC Really great, Ron. Looks great.

CMP Okay. Hey, I see what you were talking about, Gene, on this blister. Something has really blistered on it. Like Quad Alfa. There's a good one? Okay.

10 15 03 47 CMP Guess we're cleared to go down and get the old - the old lunar sounder cassette, huh?

CDR Okay.

CMP Okay. Man, I got my foot hooked to something. Which way do I need to go? There we go. Okay. Okay. How's that? Okay. Forward? Go now? Am I clear?

CDR You're clear, babe. Go.

10 15 04 48 CMP-EVA Okay. Hot-diggety-dog!

10 15 04 51 CDR Okay. Did you see him? He's out.

CC Roger.

CMP-EVA Am I on the tube?

CC That's affirmative.

CMP-EVA Okay.

Tape 171/2

CC Outstanding quality picture, Ron.

CMP-EVA Did you see me wave?

CC That's affirmative.

CMP-EVA (Laughter) Okay. Beautiful! Hey, the paint on here is just a - it's a silver paint - and it's just little blisters on it, is all. You just kind of peel it off with your fingers. Yes, it rolled off the other way. Yes, I can see the Moon back behind me! Beautiful! The Moon is down there to the right - full Moon - and off to the left, just outside the hatch down here, is a crescent Earth. Maybe I can get a picture of that - the Earth as I'm coming back in there. But the crescent Earth is not like a crescent Moon. It's got kind of like horns, and the horns go all the way around, and it makes almost three-quarters of a circle. Hey, that last mapping camera retract must have worked because the door is closed - everything is closed on it.

CDR Okay, Ron, you did get the camera? Right? The DAC ON?

CMP-EVA Yes. Okay, DAC's working.

10 15 06 37 CDR Okay, you're GO to transfer to SIM bay and get in the foot restraints.

CMP-EVA Okay. Here's a piece of the thermal blanket from the - from the SIM door jett. Hey, Houston, they're just kind of laying there underneath the EVA handle.

CC Roger. We see it. Confirm.

CMP-EVA Okay. But it's a pretty clean cut from the SIM bay itself. That's just a piece of that thermal blanket that's sticking around there. Man, it's black off this other way! The pan camera lens is all stowed.

CMP-EVA (Humming) Okay. (Humming)

10 15 08 05 CMP-EVA Hey, almost had my foot in there, then the cable was between my foot - Can you? Okay, I'm having a little trouble, right now, just torquing down to get my foot in the foot restraint, for some reason. Yes. No, not yet. Okay. Okay, the right one's in. And the left one's in. Hey, pretty stable right here. Let go of both hands? See?

CC Roger. We see you waving.

CMP-EVA (Laughter) Hey, this is great! Talk - talk about being a spaceman, this is it! Okay, back to work! My feet are a little stiffer, I think, or something than - than normal. Okay, let's try the old - Ah-ha, the ... is still there! Okay, here's the pan cassette cover and - Oops, there it goes. Okay, before we do anything else here, I guess I better - better hook the old tether on the thing. Okay, tether is on. And she's locked. Okay. It is behind my back? Oh, okay. It's nice and white down here. The UV cover's closed real well. Doesn't seem to be any ... at all on the white face, on the UV or the IR. Everything is in good shape. Looks like part of that - Oh, the cork insulation - chipped off again down here in the corner - in the corner that I'm looking at. Okay, let's try the old cassette. We'll push down on it until it goes past center. Ah-ha! I think that was more than 2 pounds of force to come out, but it came out. And got the film.

10 15 11 40 CMP-EVA Okay, she's locked in there. These EVA handholds are - Hey, the foot just came out - okay - the EVA handholds are - okay, got them free - are rougher than - What was that? I just ... Oh, that was my pocket, okay. And it creates a torque when I cut - when I let go of that pocket, there, I let go with a little bit of a force, and the force has a tendency to throw your feet way up in the air. (Humming)

CDR Keep talking, Ron. I'm walking that one with you.

CMP-EVA Okay. Coming right back. Oh, my feet are bouncing up in the air again. Shouldn't be any - Yes, can you do it? No. Ooooh. Hope I don't hit the end and bounce up again. Yes. See, you twist

Tape 171/4

yourself down there, and then you got to twist to stop, or - or it - you hit - you hit the end and you bounce back up in the air again. Okay, there comes some of the paint. Oh, we'll get attached to the thing on there, before I take mine off. Okay, here comes the old cassette. That - yes - that close enough, Jack, or you want a little closer? Okay. Yes. ... Yes, hook them ... anyway. Okay, and you got the old lunar sounder cassette.

10 15 14 19 CDR Okay, Ron, you're GO to get the pan camera.

CMP-EVA Pan camera's next, huh?

CDR We got a couple of hard and soft covers, don't forget.

CMP-EVA Yes, yes, there's a couple of covers on there. You know, the old EVA pole, I thought when I was looking at that the other day - it depended on what kind of light you're in - it looked like it was burned a little bit. And, sure enough, it is. Okay, let's see, now, which way did I turn on on this thing. I'm still backwards down here. What the heck? (Humming)

CMP-EVA Okay, well, we need to get that big old pan camera. (Humming) Oops.

10 15 15 48 CMP-EVA Okay, I'm locked in there, and you can relax a little bit. Let's see, old suit pressure is - must be breathing a little bit, it's up to 40. (Humming)

CDR Houston, this is America. Everything is looking good from here.

CMP-EVA Houston, this is - Let's see, when you're EVA, they use - they use your name, don't they?

CC Okay, Ron. Yes, sir, we'll use it, Ron.

CMP-EVA Houston, this is Ron. Okay? You hear me okay, I guess, huh?

CC Roger, Ron. Read you loud and clear.

CMP-EVA Okay. (Laughter) Oh, this is great, I'll tell you!

CC Yes, we thought it was Mr. America.

CMP-EVA (Laughter) Well, it is. Something like that. Oh, boy! Beautiful Moon! Full Moon down there. Runs back of - What? You know, you can't see anything. The only thing I can see is the SIM bay. I can see the - the engine bell sitting back here. That's a pretty good sized thing, too. And, of course, the UV - the VHF antenna - is still sticking out there. All of the - all of the poles are on it. So it's working all right. Oh, that's a little bit of a rest. Let's pull the old metal thing off here. Oh, okay, well - see it? Can you see that? The thing I'm holding up. Yes, it's the - it's the cover that's on the outside of the pan camera. It's a thermal cover, see, that covers up the cassette.

10 15 18 07 CMP-EVA Yes, well, I'm in the shadows. There we go. Yes. See, that's right. That's the thermal cover that's on there, and then that's the - -

CC Roger. Yes, we see it, Ron.

CMP-EVA - - Whooooeee (Laughter) Okay. Well, let's see. Ah-ha! There's the pan camera cassette down there.

CC We just saw that cover.

CMP-EVA Okay.

CMP-EVA Okay. Let's see, that's hooked down. And lock it. Yes. ... hook laying there. Okay, it's locked so it won't come apart. Okay, where's the old pin. There it is. (Humming)

10 15 20 02 CMP-EVA Okay, pin is pulled. Frees the handle. And out she comes. Nice and easy. This a heavy son of a gun. Not heavy up here, it just has a lot of - a lot of momentum to it. Once she starts pulling in one direction, it just takes a lot of force to stop it. And we'll just try and - Oops, there's

Tape 171/6

a - ... right there. Wouldn't want to do that. Let me get this thing first and then get this foot out. Okay. I think I'll just kind of let that thing go and hang on with both hands. Get it started right in front of me. Have to look the best way to see that one. Okay. It's just kind of floating around up there. Both feet are free. Okay.

10 15 21 24 CMP-EVA Hey, it's just kind of coming along with me. I'll just let her do that. Hey, she's just floating there.

CMP-EVA Okay. Coming. She's still coming. Must be back behind me. That's good. Nice and slow. Because you don't want that thing banging around too much up there, I don't think.

CMP-EVA Ahhh, there it is! Delivered it right to you. (Laughter) That's the way it ought to be done, isn't it? Okay, got it locked? Yes. Okay. Ah, you got it hooked on my French gauntlet - my truss guard. (Laughter) Okay. That's a good idea. Oh, that Sun's bright when you look into it. That is a biggy. (Humming) You know, I just kind of hook it along underneath me and just go backwards down there. (Humming) That's an unorthodox way to enter the SIM bay, but it works. Okay. We'll ease on up. Oh, okay. I'm going to rest when I get my feet in that thing. Wish you could kind of rest here. You could take it nice and easy. Yes, once you get your feet in there, except that - it kind of - you almost feel like maybe they might come out, you know. (Laughter) So I'm not sure you really trust them. The right foot's in good and tight. Hello, Mom!

CC We see you, Ron. Looking great.

CMP-EVA Hello, Jan. Hi, Jon. How are you doing? Hi, Jaime. Let's see, I'm supposed to rest, though, aren't I? What would you like to know about the SIM bay? Looks great. Nothing is scorched. I was kind of surprised when I saw it on this mapping camera - There was - the two - well, one's just kind of a steel plate there, and right on top of

the door, there's something with a piece of tape on it. And I thought that piece of tape came off before launch.

CC Ron, just a couple questions while you're standing there resting. Is there any damage to the cable that the mapping camera - the cable between the mapping camera and the shelf?

10 15 25 26 CMP-EVA Let me check on that one.

CC Roger. Don't move and look at it. It was not that important. If you can see it, fine; otherwise, forget it.

CMP-EVA Yes. Okay. I want to kind of take a look at it when I go by. There's Jack (laughter) Hey, how are you doing? You're looking right into the Sun, though, and I'm looking right at you. I should have a camera, and I could take your picture. And there - see the Moon back over there? That's a - Well, that's the way it goes. Hey, it's clearer down here when you take that visor up. I hope I took the outside one. I mean the gold one. No, that's both of them, I think. Better leave it down. There we go. Yes, you take the outside one up a little ways and then you can really see down in the SIM bay. You know, that tape down in here is not scorched one bit. The whole side of the spacecraft is scorched like a son of a gun - but the - you know, the panels, and everything. Man, there's bubbles, you know, on all that silver paint that's on here - is, you know, it used to be kind of a bright-looking silver paint. It looks like - it's in a shadow right now - but it looks like it's just been heated up one way or another. Yes, that's it up here between the SIM bay and the top of the service module. It actually looks like it's been burned, you know. Not just a little bit warm, it's just kind of burned because it's bubbled. Yes. That's what you were seeing from the LM, I'm sure. And - but - as far as I can - it's kind of dark down the other side of the spacecraft - the other side of the SIM bay - but it looks like the thrusters don't make any -

Tape 171/8

hardly any marks on there. Now, I look - I look at quad A - the side of quad A thruster, though, and it's all scorched. So I'm not sure but what that might have been - what in the world could do that? Tower jett, do you suppose? I don't know. Might have. Well, let's take one of these covers off. Oh, this is - like it did in practice. (Laughter) Sticking underneath the door. Looks like I can jerk on it a little harder up here. In practice, I didn't want to break it. There's - a part of the - could you see that one?

CC Roger. We see it. Looks like the outer-space Olympics going on up there.

10 15 28 26 CMP-EVA (Laughter) Hey, this is great, I'll tell you! And let me see which way to throw it so you all can see it down there. There it goes. (Chuckle) Okay - -

CC Roger. We see it reflecting off in the distance.

CMP-EVA Did you see it? Okay.

CC Never did that in the water tank.

CMP-EVA (Laughter) Yes. That's the little - the Mylar. That's that tinfoil they make the LM out of, you know.

CC Roger.

CMP-EVA (Laughter) No, not really. You know, it's kind of an insulation-type stuff. And see all that yellow?

CDR If that's what they made the LM out of, you'd never be able to pull it apart, I'll tell you.

CMP-EVA (Laughter) That's right. I - I'm joking about that, you know. I'm really joking. Fellows, it was a good vehicle.

CC We'll send your apologies to Bethpage.

CMP-EVA And (laughter) - No, I guess Bethpage knows I'm joking, you know. Let me see. Hey, I got to make sure I get this on the right handle here, don't I?

CMP-EVA Gee, that's why I wore my watch, and I forgot to start it. (Laughter) Okay. About 40 minutes, huh?

CC We've got you 35 minutes - 36 minutes, Ron.

CMP-EVA Oh, okay. Oh. Okay. Yes, the EVA lights are kind of blistered, also. No, they're back behind, toward the Sun. Put some hooks on there now. I'm hooked onto the (chuckle) cassette. No, maybe that tape's supposed to be on that pan camera, I'm sure. Put the old doors back in there real well. I don't know what - what would cause that thing to - ... those 4 minutes, anyhow. Ah-ha! There's the old mapper cassette. Well, I'm going to - am I supposed to pick it up or what? I want to take a look down in there. Can't get out that way. (Laughter) Got my left foot stuck in there, and you can't go out in the left direction with - with my foot in there. You have to lean over to the right a little bit to take your foot out. (Humming) Yes, nice and clean - down in there. Yes, that cable's in the clear. I can see down in there. There doesn't seem to be anything hanging up on it at all.

CC Okay, Ron; good show.

10 15 32 40 CMP-EVA Okay. Put the old Sun visor down now. Whoops, come back here, little cassette. (Humming) Yes, I was going to try to lift that door up, but should have done that while I was punched down in there.

CC There's no requirement on that, Ron; no requirement.

CMP-EVA (Laughter) Okay. I want to check one thing while I'm out here before I leave, and to see the bottom of this quad A. Forgot to look at it. Yes, well, it looks just like the side almost. More blistered on the side than it is on the bottom, but I think maybe it's just the paint. Okay, I'm coming back in. Oh, Okay.

Tape 171/10

CMP-EVA Man, the RTV is good out here. Looks brand new. Whatever they put on the hinge. Looks like that RTV stuff, you know. That's why they sealed around all their doors on here. And it's spanking clean as ever. (Humming) Okay, no hurry. ... Once (Chuckle) - Outstanding - once you get stable in a position, see, I can pretty much hang on with one hand, and I can twist - Oops. Yes, once you start going, it's a son of a gun to try - it's all wrist action. Working - Yes, but once you get stable on the thing, you can kind of relax there, and - Yes ... drift, you know, and if I ever bang my foot against - against something, just - just barely touch it, and it bangs right back. And - Hey, America looks really great there. Still got that silver tape on him - or is it blue? Looks silver with this helmet. Let's see, I've got to get over this way farther this time, don't I? Okay. There we go. Hey, I got a picture of the waste water dump from the LM the other day, but it looks the same way now. There's all kinds of little ice particles all around the - the periphery of the dump nozzle itself. It covers up the - well, that kind of gold part that's - that's on the - on the end of the dump nozzle. And then, there are little particles of frozen water, I guess - must be - that are - that are all over - up the side of the spacecraft there, but only in the vicinity of the - the nozzle. It goes up just about to window number 1 - it goes up to window number 1 - well, maybe on up to - no, there's particles all the way up the side of the spacecraft, clear up to the top of the tunnel. But they're real fine. I want to see if they're stuck on there. Hey, you can just touch them, and they blow away. They're just little ice particles.

10 15 37 42 CDR Okay, Houston. We got all three cassettes this side.

CC Roger. Good show.

10 15 37 46 CMP-EVA Hey, here's something. You know, the one thing that really shows up - and it makes you kind of proud - it says United States, and it's got a United States of America flag right below it. That didn't get scorched or a darn thing. That's great. And -

let's see now - I see what Charlie Duke meant. Man, it's dark out here. It is really dark. The scimitar antenna, right there - in no shape - no problem. Wish there were some more handholds, I'd go around the other side of the spacecraft. Take a look at the high gain. There aren't any more handholds.

CC Okay, Ron, we don't need any more spacecraft commentary. We'd like you to go ahead and terminate the EVA. You're looking great. You're looking great. Everybody's really pleased, and we'd just like to go ahead and terminate.

10 15 39 49 CMP-EVA Okay. Sounds good.

CDR Okay, Bob, we'll get back in.

CMP-EVA Torque? I can't. How's that?

CMP-EVA Okay, I guess we'll - start getting back in then. I'm up below the camera right now.

CC Ron, you'd be happy to know, on the TV, we got a great view of your OPS [?] with the United States flag on it.

CMP-EVA Hey, beautiful! Perfect! Let's see, which way do I want to get the umbilical down there? Oh, yes, but you're pulling me sidewise, okay. That's all right. Wait a minute. Okay. No, that's all right. Okay. You are in good shape now. Go ahead and start pulling in, now.

CDR Wait a minute, Ron, until we get Jack in the right place.

CMP-EVA Okay.

CMP-EVA Is it clear?

CDR Yes, the umbilical's in. Come on in.

CMP-EVA Okay.

Tape 171/12

CDR You coming in head down or up?

CMP-EVA Up. This way right now.

CDR You can't close the hatch that way.

CMP-EVA I know it.

CDR Okay.

CMP-EVA Not yet. What does that look like on the monitor?

CC Well, you should have - test me, and I wouldn't want to guess. It's probably the full Moon, isn't it?

CMP-EVA It is.

CC You taught me well, Ron; taught me well.

CMP-EVA Okay, you got - got you real well there. Okay, then I'm going to arc it around and ... See if I can turn around here and - Yes, I am. Trying to, anyhow. Yes, wait a minute, I can't - No, I'm not.

CMP-EVA Yes, afraid I can't get to it. Can't point it. Okay, well, I'll just have to get back in.

CC Okay, Ron, we know what you're trying to do, and we appreciate the TV show. We're looking - we're sorry to see you go, but we'd like to terminate.

CMP-EVA (Laughter)

CDR We're terminating - -

10 15 43 21 CMP-EVA Okay, we're terminating.

CC And you might be advised you're right on the Flight Plan, you're right on the Flight Plan.

CMP-EVA Oh, okay. Good. I didn't want to get - cut my time short, or anything, you know.

CDR Unless you can set it way back there. Okay, then I'll keep it right here.

CMP-EVA Sure it's there, Geno? We can shove it underneath your couch.

CDR That's the best place to shove it.

CMP-EVA Can you do that? I'll get up out of your way, here.

CDR Let me get it. Let me get out from under the cord. Okay.

CMP-EVA And, if you can get the TV switch there, Jack, that kind of saves - all that stuff, I guess.

LMP Okay.

CMP-EVA If you can't, I'll get it when I come in.

CDR Okay, and I got it OFF up here, too. Okay, you're in STANDBY. That's all.

CMP-EVA Okay. I'm going to have to come in there kind of - a little bit blinded, because, in order to get in, I got to look at the Sun. So you just got to point me in the right direction there.

CMP-EVA (Laughter) Hey, one of our - Wait a minute - one of our - Kleenexes we're using to wipe the windows with is stuck in the - the gear thing. (Laughter) There it goes.

CDR Okay.

CMP-EVA Okay.

CDR Okay, and back on down.

CMP-EVA Well, let me see here - backing down - let me see, which way do I -

CDR Straight down.

CMP-EVA Okay.

Tape 171/14

CDR I got your leg.

CMP-EVA Got my leg?

CDR Okay, on the left, make sure that the - -

CMP-EVA Wait a minute, let me - What? Swing on the leg, or what?

CDR Just kick it down, you'll be free. Kick your - kick your right leg down.

CMP-EVA There we go. Okay.

CC Hey, Ron. We assume the scissors went out the hatch. Is that affirm?

CMP-EVA (Laughter) I didn't see a thing.

CDR Can you pull it - let me get your umbilical.

CMP-EVA (Laughter) The only thing I saw go out was the - -

CDR Okay, Jack - -

CMP-EVA - - ...

CDR Ron, Ron, how's the hatch? Get down on the hatch. Your OPS isn't fitting through the top. Pull yourself down. Straight forward. Face down. Nose down. Now back.

CMP-EVA Okay. How's that?

CDR Now back. Keep coming. Keep coming. Now, can you reach the hatch?

CMP-EVA Yes, makes it sort of ... Let me get back in a little bit.

CDR Okay.

CMP-EVA Let me get this visor up. One of them, anyhow. That's a pretty Earth up there.

CDR Okay. Keep - keep your - -

CMP-EVA Keep your hand on the - the hatch here. ...
crescent Earth.

CDR Now, does the seal look good to you, while you
got your nose there?

CMP-EVA Yes. Wait a minute - -

CDR Check that stuff on the ...

CMP-EVA Got a cassette going out the window, there. Okay,
it's clear.

CDR Okay.

CMP-EVA You'll have to look.

CDR Kick that back.

CMP-EVA Okay, now I think everything's clear out of
the hatch.

CDR Okay.

CMP-EVA You see, the reason we put that - -

CDR Okay.

CMP-EVA Can we get rid of the - instead of pulling the
pip pin, we put this little hex nut, see, because
I can reach down there and grab hold of the - -

CDR Okay. Start pulling.

CMP-EVA - - the hook and pull - and here she comes.

CDR Okay, she's coming. Here she comes.

10 15 47 23 CMP Okay, and I'm already back inside here.

CDR Okay.

CMP Man, it's dark in here!

Tape 171/16

CDR Okay. You got to - when you made your first turn, you got a pull light, there.

CMP Wait a minute.

CDR Okay, get a couple turns on it.

CMP Okay. There's one turn on it. I mean - I - I can release it?

CDR Okay, now get it back.

CMP That's a little harder to pull shut than I - -

CDR The hatch is coming.

CMP Yes, I thought it was.

CDR Keep going.

CMP That's as far as it will go.

10 15 47 58 CMP Let's see, does that line up with these little marks on there?

CDR Okay; and the hex is clear. That one's in good shape. Close the hatch and - Okay. Verify lock pin dropped in, white to white.

10 15 48 08 CMP Yes. Okay, we're white to white.

LMP Okay, stow actuator handle, ACTUATOR HANDLE in NEUTRAL.

10 15 48 14 CMP ACTUATOR HANDLE is NEUTRAL, and it's stowed.

LMP Okay, you still got white to white?

CMP I still got white to white.

LMP And the dogs over here look good to me.

CMP The dogs look good, let me see if my pencil mark is on there.

CMP Yes, they're lined up.

LMP Okay. GEAR BOX SELECTOR - LATCH. Verify.

10 15 48 31 CMP GEAR BOX SELECTOR is verified LATCH.

LMP Okay. Cabin repress.

CMP Wait a minute, I got to close the - Oh, okay, now I - -

CDR Let's get this, then we can start on cabin repress, okay?

CMP Okay. Side hatch dump valve, close.

LMP Okay. Side hatch dump valve, close.

10 15 48 46 CMP Okay, we're closing it.

CMP You know, it's funny. We didn't see anything come up around that crazy ... we put in there, but as soon as I opened the hatch, the whole world came out.

LMP Okay.

10 15 49 11 CMP Okay. Okay, it's closed.

LMP Okay, on 326, REPRESS PACKAGE, OFF.

CMP Stand by. Well, we got all the stuff in there.

LMP Got it all.

10 15 49 24 CDR Okay. REPRESS PACKAGE is OFF. Ron, on 601, O₂ - REPRESS O₂ OPEN and ... CLOSED. Cabin pressure, 1 psi.

CMP I can't see what the - -

LMP Geno, then you'll have to give us a hack on 1 psi if you can.

Tape 171/18

CMP Wait a minute.

CC Gene, we're watching. We'll give you a hack at 1 psi. No problem.

10 15 49 46 CDR Okay, we're - REPRESS is OPEN.

CMP And I can't get it off there. Wait a minute - -

LMP It's going to come pretty fast, Ron.

CMP I can't even - Wait a minute - I can't turn around far enough to see it.

10 15 50 03 CC And, America, we see your cabin coming up. You're at 0.3.

LMP Okay.

CMP 0.3? (Laughter)

CC You're at 0.7, 0.7.

10 15 50 19 CC Okay; turn it off, you're at 0.1 - I'll say again, 1 psi.

CMP (Laughter) Okay.

CDR Okay; give us a GO when it looks good, Houston.

CMP Oh, yes. See the hatch - -

CC America, you're looking good. No ...

CMP Okay, we're going to go REPRESS - -

10 15 51 16 CDR Okay, REPRESS - OPEN, and let it go to zero, Ron.

CMP Okay.

CDR We'll end up with about 2 psi. Can you see the gage?

CMP Well, wait a minute. Let me turn ... I think I'm still hooked ... There we go. Okay, I can see - No, that's temperature. Okay, here it is.

CDR No, no. I mean the REPRESS O₂.

CMP Oh, the REPRESS O₂?

CDR Right in front of you.

10 15 51 44 CMP Yes, it's almost zero. Oh (laughter) I was looking at CABIN PRESSURE.

LMP No, REPRESS O₂.

CMP It's about zero.

CDR Well, when you think it's zero, you can - -

CC Okay, Gene, we got - we're indicating 2 psi down here at this time.

CDR Okay, Ron. If it's zero, you can close REPRESS O₂ valve.

10 15 52 03 CMP Okay, we'll close the REPRESS O₂. What the - Okay, ... place for a valve.

LMP Okay, we're going to let your flow bring ... rate.

CMP Okay.

CDR And your next move, after we get a hack at 3, will be to disconnect your OPS hose and hold it directly into the cabin volume - -

CMP Okay.

CDR - - and we'll get your OPS ...

CMP Would you - would you believe I'll let you do that?

CDR Yes, I would.

CMP (Laughter) Okay, because you'll be going through this thing.

CDR Yes. Yes, I'm almost down there, now.

Tape 171/20

CMP Say, Houston, I was surprised when I closed the hatch here. It came closed real well, up until about an inch from the - Can you see the CABIN?

CDR No.

10 15 52 59 CC Ron, we're watching the CABIN. It's 2.2. I'll give you a call at 3.

CMP Oh, okay; mighty fine, Bob. I was going to say the - when you're closing the hatch, I expected it to come all the way closed, you know? And it came to within about an inch of the - of being closed on the outer - not the inside, but the other side, and wouldn't come any more, unless you really pulled on it.

CDR Yes.

CMP So and then your - Of course, it was pretty easy to pull because you're kind of flattened down in there anyhow. You just pull it closed, and then once you get the lever over the - over the center, it comes right closed.

CDR Okay, Ron, what I'll do when we get up to 3, I'll disconnect your OPS hose, Jack, and I'll let you pull it around behind his back. And, then, you can hold it in the open cabin and I'll actuate his OPS.

LMP Well, we got a lot of use out of that OPS.

CMP Yes. Let me actuate it, okay?

CDR Okay. I'm glad I didn't have to earlier in the week.

CMP Well, me, too, you know. I'm glad I didn't have to today either.

CDR Yes, I am, too.

10 15 54 13 CMP You know, my gloves are dirty, but I think they're dirty from getting ahold of that - those dirty suits of you guys, you know. Jack, did you get ...

LMP Okay.

CMP Well, you know, you want to see if there's any residuals from the thrusters out there, you know. Well, I couldn't see anything anywhere except the - on the EVA handrails themselves. And that really didn't look like it was a residual to me. It's just a discoloration, and it's kind of a changing of the condition of the - whatever is on those things, you know. Hope they're not painted. I guess what I'm saying is that they were shiny burnished aluminum, I guess, or whatever, prior to lift-off, but now they're kind of a dirty-looking burnished stuff.

CDR Okay, Ron, when they give us that 3, I'll get your hose. Jack can hold it in the cabin, you can activate your OPS.

CMP Okay.

CDR Then we'll watch the cabin come up to 5, and then the OPS will come off, then we'll get a HIGH O₂. ...

CDR How we doing down there, Houston? This is America.

10 15 57 06 CC America, you're looking great. You're up at 2.6. It's going up slowly, just like we expected.

CDR Okay.

CDR Not a bad performance by my CMP, was it?

CMP (Laughter)

CC Was beautiful. We had a beautiful television show. Really beautiful.

CMP (Laughter)

Tape 171/22

10 15 57 50 CDR Well, we got three packs here all snuggled away.
CC Yes, indeed, you made a lot of people in the back room very happy. They're looking forward to getting that film.
CMP Well, the best part about it is, from all indications, it ought to be real good film, too.

10 15 58 16 CC Yes, sir. Looks like everything worked out great. You're at 2.7 and climbing very slowly.
CMP (Laughter)
CMP Hey, Houston. Tell Chuck Stahl [?] that attitude for the EVA was outstanding.
CC Thank you, Ron, he's listening right here, and he's been on the console during the whole period. Got a big grin on his face right now.

10 16 00 36 CC And, America, the cabin is at 3 psi.
CDR Okay, Robert, we're pressing on. Okay, Ron, I'll get your - -
CMP Can you get them off?
CDR Yes. Okay, Jack, if you can get the - hose from behind him.
CDR Okay, go ahead and activate it, young man.
CMP You got ahold of it, Jack? Okay.
CDR Yes, hold on to it tight.

10 16 01 13 CMP You feel anything? Yes, it's really blowing in there.
CDR Okay, we'd like a hack on the cabin when we get to 5.
CC Roger, America. We'll give you a hack.

10 16 02 03 CDR Probably can ... that out. O₂ HIGH FLOW, Jack,
that's a MASTER ALARM ... There it is. Yes ...

LMP That's the main regs coming in, I'll bet you.

CMP Must be the main regs cutting in. (Laughter)
That's right, you can't see MASTER ALARMS, can
you?

10 16 03 54 CC Okay, America; you got 5.1 cabin press.

10 16 04 00 CMP Okay. I'm coming off.

CDR Okay, and I'm going ...

CMP Okay. I'm going to pop the CABIN out there if I
don't turn mine off pretty quick. Okay. Oh, no,
it didn't come up that fast. There's not that
big a hurry. We're waiting a long time to get -
to get from 2 to 3. Yes, you get a HIGH O₂ FLOW.

CMP Yes, my - Oh, your accessory bag is in there, I
guess. The - the gloves.

CMP Just let me get the tone down here. Ding, ding,
ding, ding. Okay, I got it. I think we did,
didn't we?

10 16 06 02 CMP Yes, if we can't find that one, let's find another
one. Got to have something to stick - stick my
gloves in, you know. Yes, the thing you put your
gloves in, you know? There it is, right there.
Yes, you got to use yours. (Laughter) Okay.

10 16 06 45 CC America, Houston. Your cabin pressure's up to
5.5, 5.5.

CMP Okay, we'll turn this off now.

CDR Okay, we're right now at the point where we're
going EVA STATION O₂ OFF.

CMP ... off my clothes? Por favor.

CDR ...

Tape 171/24

CMP Yes.

CDR ...

CMP We're supposed to stick them in the bag, aren't we?

CDR ... bag.

CMP Okay.

CMP Smells kind of funny in there. What'd you guys do? (Laughter)

CMP Surge tank. Ohhhh, yes, it's 700 now, 725. Is that what that - Yes, that's why -

CDR Better turn the ...

CMP There we are. Okay, I'll turn the TV switch on. Well, we're really not transmitting down.

CMP Okay? Yes, we can go to FILL. We got 600, 700, let's see - -

CDR Okay. ... FILL on the REPRESS at this time.

CMP How low do we take this down to? 400? Probably stop before that, anyhow.

CMP Okay.

CC America, Houston.

CMP Yes, go ahead. Go ahead, Houston.

CC Roger. Ron, just two reminders here while you go through your unsuiting and cleanup procedures. We're trying to get established on a new biomed cycle, so we'd like to have the LMP on biomed. We'll be coming up with a complete scheduling here shortly, and just a reminder for the LMP and the commander, we want to make sure we retrieve their PRDs.

CMP (Laughter) Okay, that's a good point.

LMP Okay, I gave you a PRD about 2 hours ago, and just to bring you up to date to where it was, and we'll keep them out.

CDR And commander retrieved his yesterday.

CC Yes. No problem. We just want to make - reminder. We just want you to be reminded that we need them.

CMP Take mine out now. Wonder if I got any zaps when I was out there?

LMP Thank you, Bob. I even forgot that I reminded you to remind me.

10 16 11 02 CMP (Laughter) And 15055. I didn't get very many rads while I was out there, I guess. Like it was 51 this morning. Okay? Here, I'll hold this thing.

CMP How about giving me a squirt? (Laughter)

CMP That right there. Yes, three of them. I threw away all the dirty ones, I think. (Laughter) The whole time. Boy, it - Yes, it sure whipped out through there when I opened the hatch.

CC Sure wish you'd seen the scissors go.

CMP (Laughter) I'll bet - hey, I'll almost make a bet with somebody that it's down behind the optics.

CMP Okay (chuckle). They don't look dirty to me, do they? Wash them off, anyhow, though.

CMP Wait a minute, let me push them back ...

CMP Should have used hot water. Or is that thing cold, you mean? Is that cold? Boy, that is cold, isn't it? No, it doesn't fold there, just stick the whole thing in there like that. No.

Tape 171/26

CMP Yes, now let's use some of that good food tape that's stuck over there. And there's some on the side of the - the light. You can use those to tape those holes ... Yes, just the mapping camera. Yes, that's all. No, just the map. Oh, it has? There's a chunk.

CMP There's your hole through there. Oh, yes, we got a lot of tape, I'm sure. We want to tape this whole thing here.

CDR Okay, Bob, we're in the process of cleaning up the cassettes - -

CMP The breather holes - see the holes in this panel.

CC Say again, CDR, you were cut out on VOX there.

10 16 15 30 CDR Okay. I forgot Ron was still on VOX during this. I just wanted to keep you up to date. We're - we're taping up the cassettes now and cleaning them up and getting them stowed.

CC Roger. Good show.

CMP I'm sorry. I led myself astray. Yes, overlap it, because it won't stick to that thing very good. No, it just won't stick ... We'll just take tape and wrap all the way around the thing. Otherwise, it's not going to stick, period. Yes. It's up? That's right. (Chuckle)

10 16 17 04 CMP Oh, we've been doing this for two or three flights, you know. Why change it for the last one? Yes, probably one all the way around. Get your corner, there. Yes, we got another roll of that tape you guys brought. Just about that size, I guess. You got it? Yes, they're down here. We missed them. (Laughter) Yes.

CMP Keeps the light and the water out of it, I guess. Not the water because you got a breather hole, but keeps the light out that film slot.

10 16 18 44 CMP Two of them are around this way.

CMP Does take a lot of tape, doesn't it?

CMP Yes, sure doesn't stick to a cassette. Sometime. I couldn't find mine. They must have been in the other set of gloves. I forgot about them. Well, that's ... No, there's nothing taped.

10 16 23 15 CDR Okay, Bob, we're on 3-20, and we're all going to get out of our suits and stow them before we get the center couch back in.

CC Roger, Gene. Sounds good.

CDR And I guess I can get some DAP changes for you, if you'd like.

CC Stand by on that.

CC Okay, Gene; you're - you can go ahead and do the DAP change.

CC America, Houston. Just one update. We won't give it to you as an update at this time, but wherever you see IR work just ignore it. Do not turn the IR on and no need to open the IR cover. We're through with it until just prior to entry interface.

CDR Okay, Bob; understand that.

10 16 29 14 LMP UV is ON.

10 16 29 29 LMP And the UV cover's, coming OPEN.

CDR Okay, Bob, I'm going to go down through the Flight Plan down through about 259:45, get this maneuver started. And then we can press on.

CDR Hello, Houston; America.

CC Go, America; Houston.

Tape 171/28

CDR Okay. I'm pressing on through the Flight Plan to about 259:45, and getting everything up to and including the maneuver, and then we will continue with our post-EVA.

CC Okay. We'd like for you to hold on that maneuver, Gene. Don't start the maneuver.

CDR I've already started my roll. Do you want me to stop it?

LMP And did you copy the IR was ON and the COVER OPEN?

CC Okay, we copy that. IR ON and the COVER OPEN.

LMP I'm sorry. I was UV - ON. UV COVER, OPEN.

CDR Hello, Houston; are you reading America?

CC That's affirmative, America. Houston here.

CDR Okay. Did you get the word that it was the UV - ON and the UV COVER, OPEN?

CC Roger. We got that word.

CDR Okay. And I'll stop my roll at 270 degrees and will not maneuver until I hear from you.

CC Roger.

CDR You're not getting a good key down there, by the way.

CC Say again, Gene.

LMP Houston, your keying is cutting you out, I think.

CC Okay; are you reading me now?

LMP Yes, that was good. Did you understand Gene's transmission on his stopping the roll?

CC That's affirmative.

Tape 171/29

10 16 33 15 LMP Houston. CABIN FAN is coming ON.

10 16 33 20 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 16 35 05 CC America, Houston. You're cleared to go to the
VERB 49 maneuver as published in the Flight Plan.

LMP Okay, Bob.

LMP Houston, would you like OMNI Alfa now?

CC Negative. We'd like you to go to OMNI Charlie
for now.

LMP Oh, I'm sorry. Okay, OMNI Charlie, right.

CC No need to apologize. The Flight Plan says Alfa;
we're just going to Charlie, which is the best
antenna.

LMP Well, that's all right. I misunderstood what
Gene just told me about his maneuver.

10 16 46 40 CC America, we'd like OMNI Alfa.

CDR Say again. You're cutting out badly.

CC We would like OMNI Alfa. OMNI Alfa.

CDR Okay. You said OMNI Alfa. We'll go there.

CDR Houston, you read?

CC America, Houston. Your comm is going to be a
little ratty until you get into configuration
here - or rather get into attitude.

CDR Okay, Bob, I'm reading you now. Say again please.

CC I just said it's going to be a little bad comm
until you get into attitude, so we should hold
this for a while.

CDR Okay. Then when we get there you want OMNI Alfa.
Right?

Tape 172/2

CC That's affirmative.

CDR Okay. We'll give it to you when we get there.

10 16 49 51 CC America, Houston. If you have somebody handy to the panel, we'd like to take the H₂ FANs to OFF.

10 16 50 03 CDR Roger. H₂ tank 2 FANs, OFF.

CC Thank you, Gene.

CDR We're OMNI Delta. We're reading you loud and clear. Do you want us to stay here?

CC That's affirm, Gene. That's a good show. It's right - you know, it's right on the line there. It - Delta shows better on the signal strength and Alfa shows better for location. So let's stick with Delta.

CDR Okay.

10 17 07 12 CC America, Houston. Please advise us of how you are going to handle the waste stowage vent. Is that open or you going to close it now?

CMP It's open right now. But we're going to close it here shortly. Do you think we need it closed now?

CC Negative. It's your option. We just want to know what - in case we get an O₂ FLOW HIGH, we might understand what it's from.

CMP Oh, I see. Okay, we'll close it after a bit here.

10 17 13 22 CC America, you might be interested in - while you're doing all this hard work up there you might be interested in how some of the Texas football teams have fared. Houston had a toughy today. Cincinnati took them 61 to 17.

CMP ... Wait a minute.

LMP Houston - took who? 61 to 17?

CC That's what they tell me. And the other one is those - the biggy up at Dallas right now. The Giants leading the Dallas Cowboys in the third period 21 to 3. 20 to 3; I'll correct that, 20 to 3.

CMP Okay. 20 to 3. New York over Dallas, huh?

CC That's what it looks like. That's in the third quarter.

CMP Okay.

10 17 16 19 CC And, Ron, we're going to do a site handover here in about 4 minutes, and we may lose some lock here.

CMP Okay. That's all right.

CC And how's the post-EVA checklist coming? You chugging along.

CMP Oh, chugging along. We've got two guys that have their suits off now.

CC Roger.

CC Well, they say it always takes longer up there than in the - Got all evening to do it. There's no hurry on it.

CMP (Laughter) That's right. Hey. Hope North American doesn't think I was badmouthing their spacecraft down there, because you know - a little bit of blistered paint on it, that doesn't hurt anything. It's still a darn good spacecraft.

CC No, I don't think North American even - I think they think it was just great, but I don't know if I'd ever go to Bethpage if I were you.

CMP (Laughter) Okay.

CC Ron, that was such a great show, I don't think anybody would care. That was just tremendous.

Tape 172/4

CMP (Laughter) Okay, Bob.

CDR Okay, Houston. This the CDR backup.

10 17 18 20 CC Roger.

10 17 25 16 CDR Houston, America; the WASTE STOWAGE VENT valve is CLOSED.

CC Roger, America.

10 17 38 37 CDR Hello, Houston; this is America. Looks like the repress package is up, and surge tank is back up. Would you like us to turn the cell off and turn the O₂ heaters off.

CC Geno, EECOM says affirmative to all that.

LMP Okay, Gordo. How you doing?

CC Pretty good. I saw Ron's stroll around the service module. Looks like he had a ball.

LMP Yes, he did.

10 17 52 15 CC America, Houston; over.

CDR Go ahead.

CC We have ... up the DSE, so we'd like you to go ahead now and do the maneuver listed at 261. Give us the high gain so we can dump it. Over.

10 17 52 44 CDR Okay. Maneuver's coming at you.

CC Okay. And for your information, charge number 5 just went off. It was a 3-pounder, and it's jiggling the instruments on the surface there properly.

LMP Very good. Any new word on the gravimeter, Gordy?

CC I haven't got it yet, Jack. Let me check. Have you heard anything since you asked me the question last night?

LMP Well, whatever it was - No, I haven't heard anything.

CC Okay. I'll try to get an update.

LMP I was thinking of the lunar surface gravimeter, not the traverse. They apparently don't want to talk to me about the traverse gravimeter.

CC Okay. We'll try for info on both of them.

LMP Okay. Any other new stuff you might have heard or get a hold of, I might be interested in.

10 17 58 28 CC Okay. America, Houston; we need OMNI Charlie, please.

CDR Houston.

CC America, Houston. OMNI Charlie, please.

LMP Hello, Houston. How do you read?

CC Okay; loud and clear. Go ahead.

10 17 59 36 LMP Okay. We apparently - in our struggles up here inadvertently hit the WASTE WATER to DUMP and it's back in RELIEF now. That dump is terminated; we have 30 percent waste water.

CC Okay.

LMP I'm not sure what we had when it started. I just noticed the streaming. I don't think it was on very long.

CC Roger.

10 18 06 00 CC America, Houston. We need - we could use the HIGH GAIN now, NARROW and REACQ.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 18 08 05 CC America, Houston. HIGH GAIN's not going to work in NARROW, now. Wait a while; it's in a skin reflection area.

LMP Yes, I'm having the same problem there - I noticed the same problem. How's this, leave it in WIDE?

CC That will be fine.

10 18 09 54 CC America, Houston. We'd like you to go to REACQ now, wait 30 seconds, and then go to NARROW.

10 18 10 43 CDR Hello, Houston. We're turning the CABIN FAN, OFF, for a while.

CC Roger.

10 18 13 20 CC America, Houston. We'd like NARROW beam width.

LMP Thanks for timing 30 seconds for me, Gordy. I think that was beyond me.

CC You're welcome.

10 18 14 33 LMP Doesn't look like it's going to make it, does it?

CC No, it sure doesn't. Stand by 1, and we'll give you an alternate plan here.

10 18 15 20 LMP I'm back in WIDE.

CC Roger.

10 18 17 27 CC America, Houston. We're going to have to have the high gain for the dump and also for a little additional work with the HF antennas and the sounder that we're going to read you here in a minute. So, in order to get it, we'd like you to pitch up 20 degrees in your present attitudes; and when you get there, then we ought to be able to reacquire and go NARROW.

LMP Okay.

Tape 173/2

CC Once you get the antenna locked on in NARROW it will track back to this attitude, and that's what we'd like you do is come back down to this attitude, once you get the antenna locked on.

LMP Okay, Gordy, we got a good lock now.

CC Okay. Fine. Well, then go right on back to the program pitch attitude there, and it should hold.

LMP In work - in work.

10 18 20 14 CC America, Houston. We'd like to have somebody go to panel 230. I'll give you switches real time, save you writing them all down to get a couple of things cranked up here. Over.

CDR Okay. What do you want at 230?

CC Okay. Basically what we're going to do is turn the IR ON with the COVER, CLOSED, to keep it warm so you can do that IR, ON, now. And then we're going to put out the HF antennas and listen to HF getting some data on background noise from the Earth. If you'll put HF ANTENNA 2 to EXTEND, we'll give you a cue when to go OFF when it's all the way out. Over.

CDR Okay. HF ANTENNA 2 to EXTEND on my MARK.

10 18 21 18 CDR MARK it.

CC Roger.

10 18 24 01 CC Okay. We'd like HF ANTENNA 2 to OFF, please.

10 18 24 17 CDR Okay. HF ANTENNA 2 is OFF. It maintained barber pole all the time there. It never went gray until we turned it off.

CC Okay. It probably isn't out yet. The reason we had you stop was because the recorder that's watching that broke down, down here. We got to get that back on line.

CDR Okay.

CC While you're waiting there, I can go over the foot-
ball scores for the weekend, if you wish.

LMP Just a minute. Let's see if we can get Ron on a
headset.

CC Okay.

LMP He's walking - he's walking around here thinking
he doesn't have to do anything any more after
that EVA, but we'll get him back to work.

CC Roger.

CMP Okay, Houston. We're ready for those scores now.

CC Okay. Just 1 second, Ron. I think we've got
another switch for you here.

CMP Okay.

CC Okay. We'd like to take the sounder HF ANTENNA
number 1 switch to EXTEND. We'll let the motor
on 2 cool off. We do have the recorder fixed, so
we can watch 1 now.

CMP Okay. Number 1 is going to EXTEND. 3, 2, 1 -

10 18 27 18 CMP MARK it; barber pole.

CC Okay. I've got the whole list of scores here;
some of these were yesterday you probably heard of,
but I'll just go through them all. San Francisco
beat Minnesota, 20 to 17. Miami made it, I guess
14 straight, 16 to 0 over Baltimore. And Buffalo
beat Washington, 24 to 7, how about that? Cleve-
land beat the Jets, 26 to 10. Kansas City beat
Atlanta, 17 to 14. Green Bay won over New Orleans,
30 to 20. St. Louis beat Philadelphia in a close
one, 24 to 23. Denver beat New England, 45 to 21.
Detroit beat the Rams, 34 to 17; and Oakland beat
the Bears, 28 to 21. And here's some sad news.
The Giants beat Dallas, 23 to 3. And one final
score - Cincinnati, 61, Houston, 17.

Tape 173/4

CC Over.

LMP Over. Gordy.

CDR Gordo, we - don't have any contact - comment. All three of my teams lost today.

CC Roger.

10 18 29 36 CMP Hey, number 1 just went gray on the lunar sounder.

CC Okay.

CMP And I'll turn the switch to OFF, if you want.

CC That's affirmative. OFF on 1 and then on 2, we'd like you to go to RETRACT for 10 seconds, then put her in EXTEND, and we'll watch it.

10 18 30 11 CMP Okay. RETRACT, 1, 2, 3, 4, 5, 6, 7, 8, 9, and about 10, I guess. Okay, then I'm going to -

10 18 30 29 CMP EXTEND, now.

CC Okay.

10 18 31 55 CC Okay. We'll take number 2 to OFF, please. And we're going to let the motor cool down for 15 minutes so you got at least that long until the next time we bug you.

10 18 32 07 CMP (Laughter) Okay. It's OFF now.

10 18 49 07 CC America, Houston. We'd like to try antenna number 2 again.

CMP Okay.

CC What we want is you to go to RETRACT for 10 seconds, and then, EXTEND.

CMP Okay. Wait 1.

10 18 49 33 CMP Okay. RETRACT. There's 10 seconds. Back to EXTEND.

10 18 49 47 CDR It's going to EXTEND, now.

CC Okay, and we're just wondering where you stood on the post-EVA checklist procedures.

CMP Well, probably about 75 percent through. What we're doing is stowing all this stuff out here, and then we're going to go back through and check things off.

CC Okay. Fine.

CDR Gordy, did our little waste-water burn there hurt us or help us?

CC I guess we haven't been able to determine yet.

CC Okay. HF 2 ANTENNA, OFF.

CMP Okay. It was OFF, when you called.

CC I guess the motor is - -

CDR And, Gordy - - ...

CC - - just about stalled out. Doesn't seem to be much - making much - much progress there, so - Go ahead.

CDR I was just going to say we took time out here to grab something to eat, cause it's been a long time between breakfast and lunch so a - I will try and do a little inventory here and give you a page and let you know about where it is.

CC Okay. We're not intimating there's any hurry. We just were curious.

CC Okay, a little more amplification on that antenna. The motor gets hot and it starts - slows down and stops making progress. But each time we make a little more progress to getting it out, and we're almost all the way. We're going to give it another cool-down period. We'll give you a call when we want to try it again.

Tape 173/6

CMP Okay. Sounds good.

CC I do have a bunch of short Flight Plan updates, none of which is very close in the future. So any time someone has nothing to do, I'll be glad to read them up.

CDR Okay. Let's eat for a little while, Gordy.

CC Fine.

CDR Is it still sunny and cold back there?

CC That's affirmative; it was clear and - were you talking about the Houston weather? Or the SIM-bay weather? The SIM bay's getting cold, also. It's cool, but it was sunny here today. It'll probably be a cold night since it's clear.

10 18 53 09 CDR Okay. Thank you.

10 18 58 45 CC America, Houston. We're ready to give another stab on the HF ANTENNA.

CDR Okay.

CMP You want to go RETRACT first, then for 10 again?

CC That's affirm. Ten seconds RETRACT, then EXTEND.

10 18 59 09 CMP Okay. Going to RETRACT and OFF.

10 18 59 22 CMP Okay; going to EXTEND, now.

CC Roger.

CC Okay, Ron, it's getting out there inch by inch, but we got to back off and hit it again. Go to RETRACT for 10 seconds, and then back to EXTEND.

CMP Oh, okay. I went to OFF there for a second, and I'll go to RETRACT now, and then to EXTEND.

CC Okay.

10 19 00 54 CMP Okay. I'm going to EXTEND.

Tape 173/7

CC Roger.

CC Okay, Ron, go to OFF, and it'll be another 10-minute wait.

10 19 01 47 CMP Okay. We're OFF.

10 19 18 31 CDR Hello, Houston; America. Are you ready to maneuver here to the UV stellar target attitude?

CC Stand by; I'll check.

CC Okay. I guess everybody is in agreement. Go ahead and high gain should stay on during this maneuver.

10 19 19 09 CDR Okay; we're maneuvering. I hope the Sun comes in the window on this next maneuver.

CC Is it getting cool up there?

CDR Well, I'm freezing something off.

CC Hey, we got a little procedure to warm things up in the cockpit, if you'd like it.

CDR We - we heard that earlier, and we're passing on that right now.

CC Was it the one about turning INVERTER 3?

CDR No, we didn't hear that one. Why don't you tell us what that one is.

CC Okay, Cernan, put INVERTER 3 on MAIN A. That will put some heat load into the system, and then GO to MANUAL on the TEMP IN valve. Go down and adjust the EVAP OUT temperature to 59 degrees - make it 55 degrees, 55 degrees. And that should help warm things up.

LMP Okay. We'll let you know if we give that a try and, Gordy, I guess we're ready to copy some of those Flight Plan updates.

Tape 173/8

CC Okay. Fine. We'll keep an eye on the TEMP OUT so that - let you know if the - it's getting away. Let's see - let's start on - Stand by 1. Start on page 375 at 263 hours.

CDR Okay.

CC Okay. Down at 263:40 where it lists the jets to use for spinup or for damping, rather, we're going to change the jets to be used for damping, since those ones listed didn't work so hot last night. Want to use all of quad Delta. Delta 1, 2, 3, and 4 and Charlie 3 and 4, those six jets in place of the ones listed.

CDR Okay.

CC Okay, and just to the left of that box delete "IR COVER, CLOSE" and "IR, OFF."

CDR Okay.

CC I guess - delete the deletion. I just got a call since turn the IR ON. We want to turn it OFF at this time, so leave the IR, OFF, call as is.

CDR You want - you want to delete COVER CLOSED, but - but leave IR, OFF, in, huh?

CC Yes, the cover is closed, and we want to turn the IR OFF, at that time.

CDR Okay.

CC Okay. Turn over two pages to 265:20, and make the same jet changes for that PTC rate damping, all of quad Delta and Charlie 3 and 4.

CDR Okay.

CC Okay, then turn over 1, 2, 3, 4, several pages - let me find the next one here. It's on 275:10.

CDR Okay.

CC At 275:10, add "Charge BAT A."

CDR Yes, sir.

CC Turn the page on 276:25, delete "IR, ON." Then down a few lines at 276:45 delete "IR COVER, OPEN, before dump," and a few more lines at 276:57, delete "Charge BATTERY A."

CDR We got them.

CC Okay, turn over two pages to 279:05, and change "LMP don biomed harness" to "CDR don biomed harness." 279:30 - change - check CDR to - check LMP. Change that to "Check CDR" and then make it "LMP doff biomed harness."

CDR Okay. I - I got those, but that's sort of slighting the CMP.

CC Okay, we'll consider that. Go on to - -

CDR That's harness - that's harnessing the commander.

CC (Laughter) Roger. Okay; let's go to 285:10.

CDR Okay.

CC Okay. Right after the VERB 48 add three steps, number 1 is "RADAR, OFF." Number 2 is "HF ANTENNA to RETRACT (OFF, ON STDN cue)." And the next step is the same for ANTENNA 1. "HF ANTENNA 1, RETRACT, (OFF, ON STDN cue)."

CDR Okay. RADAR OFF, HF ANTENNA number 2 RETRACT OFF, on STDN cue and the same for number 1.

CC Righto, and then same page, 285:30, "IR COVER, CLOSE." Delete it.

CDR Okay.

CC Next page, 286:25, "IR COVER, OPEN," delete that. And on the next page, 287:13, "IR COVER, CLOSED" and "IR, OFF," delete both of those. And a little further down the page it says "LMP doff biomed harness." Change that to "CDR doff biomed harness."

Tape 173/10

CDR Okay. I got those.

CC Okay; next page is another PTC spinup, same change, "Delta 1, 2, 3, and 4 and Charlie 3 and 4" instead of the listed jets.

CDR Okay.

CC Okay, and then backtracking for one last one that was just handed to me; go back to 263:53.

CDR Okay.

CC And the high gain antenna angles; change them from a "-40 and 90" to "20 and 180."

CDR Understand; plus 20 and 180.

CC That's affirmative and that completes the list.

CDR What about 285:30 on the jets?

CC I asked the same question, I think. Let me turn to it here. Yes, that one is a - just a short - a short run on it and they just as soon as it wobbles a little so they can leave those jets the same. That's for a UV scan.

10 19 29 21 CDR Okay.

10 19 33 21 CC Okay, guys, it's time for another try on the HF antenna.

CDR Go ahead.

CC Okay. HF ANTENNA to RETRACT for 5 seconds, and then EXTEND, please.

CDR Okay; for 5 seconds. Going to EXTEND -

10 19 33 48 CDR MARK.

CC Hey, good work. It finally made it out. Put it OFF, please.

10 19 34 47 CDR It's OFF.

Tape 173/11

CC Okay. And then got some more steps here, as soon as I find them. Okay. LUNAR SOUNDER OPERATE switch to STANDBY. That's a verify. Then RECORDER, ON.

10 19 35 07 CDR Okay. OPERATE is verified in STANDBY, and RECORDER is ON.

10 19 35 12 CDR MARK.

CC Okay, and RADAR switch, ON.

10 19 35 27 CDR RADAR's ON.

CC Okay. RECORDER, OFF, and MODE, HF.

10 19 35 38 CDR RECORDER's OFF, and the MODE's verified in HF.

CC Okay. That does it. We'll let her tick away now for a while. Thank you.

CDR I don't believe it. (Music) (Laughter) Got a tissue? (Laughter)

10 19 36 25 CMP Exactly what I was trying not to do. (Laughter) (Music).

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 19 53 43 CMP Houston, 17.

F 17, Houston. This is FLIGHT. Gordo's in the back with his family. Go ahead.

10 19 53 56 CMP Okay. I just wanted to pass on an OPS pressure we owe you. That's 2000 psi.

F Okay; copy.

10 20 23 13 CC Hello, America; this is Houston. We're ready for that VERB 49 maneuver as shown in the Flight Plan.

CMP Okay. We'll get to it here. Just a second.

10 20 28 33 LMP Say, Gordy; this is Jack.

CC Go ahead, Jack.

10 20 28 40 LMP It may be in my imagination, but I thought I had a major blink in the light from the spacecraft, not just the floodlights but just generally. Did you have any glitch or anything on the traces?

CC We'll take a look. Stand by. Give us your best guess on how long ago it was.

10 20 29 07 LMP About - now about 20 seconds, maybe 30.

CC Okay.

CC America, Houston. Request the VERB 48 shown in the Flight Plan now.

10 20 31 16 CMP Coming up at you.

CC And we're - we're rechecking on the EPS data. A first glance shows it solid, but we're not sure if it might have been static during that time. We're taking another look here.

LMP Gordy, don't make a big deal out of it. It may have been just my imagination or somebody hitting the floodlight switch, but it - we tried - I - Gene

Tape 174/2

tried that again, and it didn't seem like what I saw. It was just a very quick blink in the lights.

CC Okay. We'll - we'll still chase it down.

LMP Okay.

10 20 43 14 CC America, Houston. The state vector up-link scheduled for now won't be necessary.

CMP Okay, Gordy. How's the old trajectory looking these days?

10 20 43 37 CC They're still carrying about one-half foot per second. However, they're not in a period right now of real solid track, I guess, and - so it - it'll take them some more hours to get a really good handle on it.

CMP Okay.

CC Nobody predicts any more maneuvers until mid-course 7 at the earliest.

CMP What would it be at the latest?

10 20 49 12 LMP Hey, Gordy; Jack.

CC Go ahead, Jack.

LMP I fail to understand why all my friends who used to operate the backroom, even though it's Sunday, why they haven't given you a sort of an interim report on what they - what they think happened at Taurus-Littrow. They usually have those things available.

CC Well, I did - you mean, the whole geological summary?

LMP Well, just the general thing that they pass around after a - a day or so, I think, is the time frame they work in.

CC Yes, there has been such a thing that I think you're referring to. I guess there's a more formal version coming that's supposed to be due out tomorrow

morning, but there was a summary, fairly lengthy, on entire science, including the field geology, which I'll try to dig up and maybe read to you if you wish. Over.

LMP Well, I don't need a lot. I guess it might be useful to have a general summary maybe tomorrow morning some time, if we have some time in the Flight Plan, of what people have seen up to date on things that we wouldn't normally be familiar with for - in preparation for that press conference tomorrow.

CC Okay. Sounds like a good idea. On the - your gravimeter questions, the TGE numbers for the comparison I believe you wanted, between the north and the North Massif and the Sculptured Hills, just aren't available. The whole TGE team took their data and - and left town, evidently. And - we - we have been unable to come up with any good numbers on that question. The lunar surface gravimeter - Okay, break - break here. We need a VERB 48 load as shown, and then - -

10 20 51 41 LMP It's already in, Gordy.

CC Oh, okay. So you can go ahead and do the maneuver then. On the LSG, still no positive success. They've sent just about all the commands it can take with no luck at leveling the beam, and so they've decided to fall back and the whole team is regrouping to consider further course of action. They've turned off the command system to it until some time tomorrow when they'll try again, evidently, with whatever they come up with in their conference. Over.

LMP Okay. We're certainly pulling for them, of course.

CC Roger.

LMP Gordy, do I have it straight, that it, apparently, it's a problem just in the leveling commands, or is it - it is receiving other commands, is that correct?

CC That's the impression I have. I hate to - to say yes certainly. My impression is that it just won't - won't level. It - it will accept commands, but the beam will just not level for a - a reason that they just don't fully understand.

Tape 174/4

LMP Okay. Does that mean that you might - Maybe you could ask Bob when you see him or something - does that mean the beam is not free, or is it not level?

CC As I understand it - Stand by 1.

10 20 54 59 CC Jack, I got a quick agricultural explanation of the problem. (Laughter) Evidently, it's the two plates between which the beam itself is suspended are adjustable, so that - by ground command, so that by driving these plates back and forth, they try to center the beam between them. And then the - the data is initiated. When the beam vibrates between the plates, it changes capacitance, or at least that's the general principle. And the problem is that by drive, they can command the plates back and forth and stop the stop, but they cannot get the beam to leave - leave one of the plates. It just is hung up against one plate, and this would - could be caused by one of the wires that's suspended - sort of hang the beam, pendulum-fashion, being broken so that it has cockeyed off to one side. I guess that's the best guess as to the malfunction at the moment. It's presently in use as a seismometer returning data in that mode, but useless in its primary intended data-taking mode. Over.

LMP Right. Did they see the beam leave the plates at all as I shook it there near the last of our third EVA?

CC I guess the answer to that is "no." They saw you jostling it around and could tell where you were from the data but have no evidence that the beam ever moved from the one plate.

LMP Isn't there any possibility that the telemetry is giving them a false indication of not leveling - or not centering, I guess, would be a better word?

CC Stand by.

CC No, Jack. Evidently, they've eliminated that possibility. They're certain it's a problem - a mechanical problem.

LMP Okay.

10 20 59 14 CC

Jack, reference your - the blink you noticed or possibly noticed - we, looking at the data, see about 30 seconds prior to the time we think you mentioned that it happened but that's close to the time frame, I guess, a 1 or 2 amp oscillation in the main B voltage or current. And it only lasted for one or two data cycles, or like 0.1 or 0.2 of a second is all. We would like to know, though, approximately what setting all the floodlights are at right now.

10 21 00 02 CDR

LEB are full BRIGHT, and the left hand are about three-quarters, right hand's about three-quarters. Jack's the only one who saw that. We didn't - Ron and I didn't see anything on that one, so if it - if it happened, it was awful quick.

CC

Okay.

10 21 01 41 CC

America, we'd like H₂ tanks - H₂ tank 1 FANS ON, please.

10 21 01 54 CDR

They're ON, Gordy.

CC

Okay.

CDR

And we're on a damping mode with Delta 1, 2, 4, and ... 3 and 4.

CC

Roger, Gene.

10 21 03 33 CC

Okay, America. We've got another change to the changes. (Laughter) We'd like you to leave the IR on until our cue here.

10 21 03 48 CDR

Okay. I'll change my change to my change.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 21 12 27 CC America, Houston. The rates look good. We're ready to spin it up.

10 21 12 39 LMP Okay.

10 21 38 50 LMP Houston, 17.

CC Okay; go ahead.

LMP Hey, I was just wondering how the high gain's working out for you?

CC Looking good, Jack.

LMP Okay.

CC Jack, Houston. Over.

LMP Go ahead.

CC The high gain is holding on there, but we think we can improve our - the time we can hold on to narrow beam width a little bit if you'd tweak it to PITCH, plus 15, and YAW, plus 185, please.

LMP Gordy, you said plus 15?

CC Affirmative. Plus 15 and a plus 185.

10 21 42 05 LMP Okay.

CDR Gordy, the canister's changed.

10 21 44 08 CC Thank you.

CDR I guess you're looking at the orange light, too, huh?

10 21 48 13 CC That's affirmative.

10 22 11 28 CMP (Music) Hey, Houston; America.

CC Go ahead, Captain.

CMP Okay, Gordo. I took my comm carrier apart - or, you know, cut this little cloth covering that goes from the plug on up to the headset, what have you. And sure enough, there's two little broken wires in there; and the next one is a little bit - the next one to it is a little bit loose, also. But I found a little piece of metal, and I bent it to the - conform to the shape of the wire and I've got it taped up real tight right now. And I'm going to see if it works for a while - make sure it doesn't cut in or out, you know, or something like that.

CC Okay; good luck.

CMP (Laughter) Okay. Of course, I still have the lightweight headset. I'd just as soon wear the comm carrier for the reentry, if possible.

CC Roger. Say, we've investigated a little more on that possible spike that was alleged by Jack - thought he might have seen. And we mentioned, I think, in response to that, about a 1 or 2 amp jump. Well, looking further, we see those all along; and we think they're probably due to minimum-impulse jet firings. We're trying to correlate that data. But the conclusion, right now, is that we really don't see anything on the data to support what Jack might have seen.

CMP Okay, mighty fine. We - just wanted to - you know, in case there was something there - wanted to make sure you all took a look at it.

CC You bet.

CMP Yes. Knobby. Okay, Knobby, where are you? Hey, I can see a few stars out there on this side of the window.

CMP Can't see anything there. That's right behind the - By gosh, there it is, though.

LMP Houston, 17.

CC Go ahead.

LMP Gordy, this is Jack. Is anybody watching my heart rate - heart rate over the last 15 minutes or so?

CC That's affirmative. We have.

LMP What - what did I peak out at?

CC You peaked at 105, Jack.

10 22 14 59 LMP Hummm, okay.

CMP Well, what do you know. You got to be quick. Just disappeared behind the ... limits.

CMP No, not at all, Jack. Go ahead. Jack's going to stir the cryos again - not stir them but - de-stratify them. 36 Vega. Ahh, that Vega is nothing but a bear. (Laughter)

10 22 17 35 CMP That really shakes the spacecraft, Jack. You can see it when you sit there marking on a star and it just shakes it back and forth. (Laughter) That's all right; no problem. No, no. That's what I say, no problem. No angle difference from 0.1; that wasn't too bad. Number 1 and 36. You got them down? Okay, Houston, and we'll torque at - if you're all set, anyhow.

CC Yes, we're all set.

CMP Okay, about 58:45.

CC Okay. And then, when you do that, we want you to stop the PTC right now. But we want you to use the jet configuration - configuration we used to start at - That's - all of quad Delta and Charlie 3 and 4, rather than the jets listed in the Flight Plan. Over.

CMP Okay.

CC And while we are mentioning jet configurations, that jet configuration is - this is another change to a change to a change, and we're sorry about this. But we want you to use those jets, all of Delta and Charlie 3 and 4, for every stop and

Tape 175/4

start of PTC from here on out, all the way through the final PTC exit, just prior to midcourse 7, which is shown in the Flight Plan - and - and the way we want it, using coupled jets for that final one. But use Delta 1 through 4, and Charlie 3 and 4 from here on out for going in and out of PTC. And I can read you all the time so that applies to - if you can just remember it, that will save some writing. Your choice. Over.

10 22 20 17 CMP I'll write it down here in the spacecraft somewhere.

CMP ... on the back here. Yes.

CDR Gordy, you want Delta 1, 2, 3, and 4, and Charlie 3 and 4 for damping. And you want Bravo 2 and Delta 2 for spinup, as the Flight Plan says?

CC That's affirmative. And the damping is for both entry and exit of PTC from here on out, except that final one, which is coupled just prior to midcourse.

CMP Okay.

CC And you don't need to wait until roll of 14. You can go ahead and stop it right now. We'd prefer it that way, as a matter of fact. Over.

CDR Okay.

10 22 24 51 CDR Is that a CDU glitch there, Gordy? We - Huh? We sure did. Hello, Houston, you read America?

CC Yes. I was just trying to get an answer for you. Yes, it looks, at first glance, like maybe we saw one. Stand by. I'll get a better update.

LMP Gordy, why don't you give me the best OMNI?

CC OMNI Delta is the best right at the moment.

LMP Well, we'll hang on to you here as we go. You were just on the verge of dropping out, but we'll stay with you on the high gain.

CDR Yes, Gordy, our ball - our ball - let's see - reads about 256 ROLL, and YAW - and PITCH is 2 - about 227, and YAW is about 42 degrees.

CC You know - evidently you definitely had a CDU glitch. We're trying to come up with an attitude that you can fly to on the ball as it stands right now in SCS. Stand by.

CMP Houston, both the SCS and the IMU ball are okay, I think. They're both the same. Well, they're almost - yes, except for the GDC - except for the GDC drift, they're both the same. So the error is in the NOUN 20s in the computer.

CC Stand by.

CC Ron, does the - does the GDC and the IMU attitude agree right now?

10 22 28 19 CMP Yes, they do. They agree, you know, except for the 2 or 3 degrees of GDC drift is all.

CC Roger.

CMP And there's our NOUN 20s on the computer now.

CC Roger.

CC America, Houston. What we'd like you to do is - Were those ball angles you read 256, 04 - well, let's see - get the right order - 256, 227, and 042 - Are those still about where you are?

CMP Yes, that's affirm.

CC Okay. We're going to try to compute a - an attitude that can get us - to high gain so we have a little more visibility into the system. That's our problem right now.

CMP (Laughter) Okay.

10 22 32 54 CC America, Houston. What we'd like you to do is roll 180 degrees to about 076 roll attitude.

Tape 175/6

CMP Okay, we'll roll her back to 076.

CC Okay. Then once you get there, the HIGH GAIN angle should be a PITCH of minus 50; and YAW, 205. Over.

CMP Minus 50 and 205. Okay.

CDR We're on the way, Gordy.

CC Okeydoke.

CDR You might check. I was loading NOUN 22. And you might just doublecheck and see what you saw down there and make sure I wasn't loading NOUN 20.

CC Okay, good call; we'll do that.

CC Can you give us best OMNI as you roll around?

CMP Okay, we'll try

CDR Okay, it's OMNI Delta now.

CC Roger. Loud and clear.

10 22 35 57 LMP Houston, I doubt if it's a problem, but the UV cover's still open.

CC Roger, Jack.

CC Okay, we'd like you to zero the CDUs now.

LMP Looks about right.

CDR Looks good, Gordy. It matches the ball.

CC Roger. We see that. We're getting high bit rate now, by the way, also.

CDR I don't know. You can track it down, but I called up NOUN 20 to check the roll angles, and it was not what we were using in the book here, of 14 degrees. And I very easily could have - could have loaded 20 instead of 22.

CC Okay. We'll sure track that one down.

10 22 37 28 CDR ... if that were the case.

CC America, we're ready now for you to proceed on per Flight Plan with the VERB 49 to the sleep PTC attitude. We have not had a chance to go back over the data, but we'll give you a call as soon as we get a chance to check it. Over.

CDR Okay, Gordy. One other interesting thing while we went back and looked at NOUN 22 after the glitch. We still had the NOUN 22 angles I had loaded for the previous VERB 49 at 263:40, which either - even makes me feel more like I did not load 22 on this next time around.

CC Yes, it sounds - it sounds like we might have the problem nailed down, but we'll doublecheck that.

CDR This is a gross admission, if that's the case; but I'd rather have it that way.

10 22 41 35 CC We won't hold it against you.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

10 22 42 11 CC America, Houston. Why don't you hold the PRO on - on this VERB 49 until we have a chance to check and see if we're going to have a gimbal lock problem.

CDR Okay.

CDR Gordy, can I use the roll we got, 142? I'll stand by until you check that gimbal lock out.

CC Stand by. We're checking that. Your answer is negative, Geno. The present roll - the maneuver should - shows on our computer, you'll go to gimbal lock. So suggest you go to 14 and then start to maneuver. ... Over.

CDR Okay.

10 22 49 05 CC America, Houston. Can you give us AUTO and NARROW on the HIGH GAIN? Present angles are okay.

LMP Okay, Houston. The computer knows where the stars are anyhow.

CC Okay. We'd like AUTO and NARROW, and make sure you've selected HIGH GAIN also.

CDR Wise ... wise guy. Works every time, doesn't it?

10 22 50 31 CC Roger.

10 22 53 54 CC Well, America, the final evidence is in, and we're all putting our EMP books back on the shelf. We played it back and we see a VERB 21 NOUN 20, which is what did it - and a 22 and 23.

CDR Okay, I've been sitting here thinking about it. Yes, I had - and also the glitch occurred when I did the final ENTER, so - plus we had the two-axes glitch and a number of things. I'm - I'm glad you confirmed that. Makes me feel better.

Tape 176/2

LMP We were discussing whether or not you needed an EMP or not.

CC Well, there must be one for the situation.

CDR Getting a little quiet up here anyway, Gordy. That one sure snapped us out, though.

CC Us also.

CDR Hey, how far are we from home?

CC Well, I can give it to you in hours from entry interface right away - 38 hours 42 minutes and 4 seconds. And in miles, you're 143 500.

CDR Okay, thank you.

10 22 56 33 CC Picking up speed all the way.

10 22 59 29 CC America, Houston. Over.

CDR Go ahead, Gordo.

CC I've been talking to Don Beaty and Dick Kruse and looking over a transcript of - of a science press conference we edited up. It was kind of ragged but possibly interesting summary of the science as it stands now. In response to your question of - of items that might help you prepare for tomorrow's press conference, I can come with you with those words any time you wish.

CDR ... you can come up with them now.

CC Okay. Let's start with the - the LSPE. All eight charges have now been exploded, and they were all on schedule and produced excellent signals. These data were used in conjunction with the ascent stage lift-off and also its impact data, which should give us an excellent picture of the geologic structure of the outer 3 kilometers of the Moon. This little summary I'm reading right now is - was written by Joel Watkins. The geophone array is functioning beautifully and

and we're already talking about its potential in a listening mode for study of meteorite impact frequency. We still don't have precise EP locations from Ray Batson, so the following interpretation will almost certainly be changed when we get better data and field tapes, which we will use to refine our arrival times. Bearing the above in mind, my preliminary interpretation is as follows. The low-velocity layer seems to be thicker and higher in velocity than at either Apollo 14 or 16 sites. I think this may mean that the low-velocity layer here includes dark mantle material as well as the regolith. Details of the higher velocity substrata are fuzzy, but velocities increase with depth in a way which would be consistent with a thick accumulation of lava flows. This probably represents the subfloor material. And he concludes by saying, "You guys did a great job, see you after splash." On the same subject, Dr. Kovach went a little further, and he just recently admits to seeing evidence of two high-velocity layers, especially after the 6-pound charge was fired, that - that evidence showed up. He also mentions in - mentioned in his press conference yesterday that the - the data point allowed by the - the ascent-stage impact was - was very important - the fact that they - they got it in about 9 kilometers away and the - that data is right in a critical range where - where they see a big change in the - the percentage of - velocity change. I'm getting kind of balled up here in the words, but that data is very important because it's in - where the steep gradient of velocity change occurs. On looking through here, I guess, in - in summary, I'll read a couple of sentences again out of the press conference. We do find evidence of lunar crust as we did in the past, but we may have to thin it considerably. We may have, in fact, have to thin it as much as to 25 kilometers instead of 60 - that they believed it was up until now. And they're thinking they may have to lower the velocity of seismic waves - waves in the mantle, which, I guess, at last guess was around 9 kilometers per second. Now it's looking more like 7.5, and the crustal velocity is probably as low as 6.3 kilometers per second. Okay, yes. That was - that last data was really from Dr. Latham, and he was

Tape 176/4

interpreting that data mainly from the S-IVB impact and readings from some of the other seismic sites. Any questions on that? I realize that this is pretty ragged. Over.

LMP Oh, that's - that's great, Gordy. Did Kovach indicate his tentative depth for the second high-velocity layer?

CC No. As far as the information we have here, he's just - I - I don't see any - the only thing I can see is he mentions we're getting a depth sample down to 3 to 4 kilometers, but that was before all the charges had gone off. So I think, as I say, he just doesn't really state that yet.

LMP Yes, it's a little early. Okay, good. Sounds like what we saw in the field to a certain extent.

10 23 06 09 CC Okay. On the heat flow, it's continuing to work perfectly. It's stabilizing out and, at the present time, they show about a degree centigrade per meter gradient. Apollo 15 is stabilized at about 1.8, and it looks like the 17 site's headed for about the same, which gives consistent data for the two sites. It looks like that's what is going to result when it reaches final equilibrium. And so that - if you call that - those two sites typical of the Moon, then that leads one to the following conclusions; that that data requires that there be a total greater abundance of radioactive isotopes on the Moon as compared to the Earth, so there would be an implication here for a fundamental difference in the composition between the two. And the higher number of isotopes would in turn require that they be located very near the surface, implying substantial differentiation of the material, at least compositionally or stratisfactionally [sic]. It's not necessary that it had have to be stratified. It was only required that it be stratified in most of - in that most of the isotopes be concentrated in the upper layers of the Moon. I guess that's about what we've got on the heat flow at the present time. Over.

LMP Gordy, does he indicate where his minimum temperature lay - zone is now at the site?

CC Stand by. Let me look through here.

LMP I think you mentioned something the other night - about - I thought you said 2-1/2 meters, but I'm not sure.

CC Let me just read it straight off here. There is some words to that effect, but it doesn't sound like 2-1/2 meters. At a large scale - let's see, he's describing a viewgraph here - the surface temperature at the time of this sample was 360 degrees Kelvin. At a depth of about 15 centimeters, it had dropped to 280. At about 65 centimeters, the temperature drops to 254, and that's the lowest temperature we see. Below that depth, the temperature begins to increase again, and it's 257 at the bottom of the probes. Over.

LMP Where was the 254 again?

CC At 65 centimeters below the surface.

LMP Okay. That's about the same, I think, as 15. Very good. Some of our double cores will get that deep.

10 23 09 57 CC Roger. Okay, the TGE has produced some - fair amount of excitement around here - and interest. The instrument really worked beautifully. It had some baro switches that turned it on for temperature control - right aft - during lift-off - and so it had 3 days to stabilize before you got to Taurus-Littrow. And on landing, the bias measurement showed that the bias shift was extremely small, so they feel that they had a very accurate reading on all the readings. And I mentioned the other night that the number they got for the gravity field at the landing site should allow them to actually revise the value for the radius of the Moon at the landing site. But then you asked me about some of the variations in reading around the valley there. Well, it turns out that - if you call the landing site zero on the scale of milligals and then take the differences from the landing

site, over to the South Massif, you have a minus 36; in other words, a lesser amount of gravity. And all these numbers, by the way, are corrected only for elevation, and there are some more sophisticated corrections to - to be put on them. But the - with - correcting for elevation, you have a 36-milligal negative anomaly at the South Massif. And the number at the North Massif was a minus 26. And there is very little difference, within a milligal or so, between the North Massif and the Sculptured Hills site. But you can see that there's a significant difference between the landing site and the foothills on both sides. The Shorty Crater showed a slight positive anomaly compared to the landing site, but it's less than a milligal, which is sort of - you start to think "Well, that means a localized volcanic center," but it's - nobody's really going out that far on a limb. The - they were especially appreciative of the 2A stop, which was - let's see - well, it verified the extremely sharp gradient of the anomalous condition from the foothills as you go back into the valley. The 2A stop - I'm trying to find the number here - Okay, one's a minus 36 at station 2 to a minus 29 at 2A, so it's - it really changes quickly as you get away from the - the mountains. Okay, he summar - summarized his feelings by saying that - the negative gravity anomalies which were measured right at the South Massif and the North Massif clearly indicate that the valley is filled with a higher density of material than the material which makes up the massif so that if the material underlying the floor at Taurus-Littrow - say, is basaltic in composition and has a density of about 3, the material which makes up the massif has a substantially lower density. He goes on to say that we're not sure exactly what the density difference is, but if it's as large as 20 percent difference, then the material in the floor of the valley and the - well, the thickness of the high-density material in the valley has to be on the order of about 1-1/2 kilometers thick. So that's a - I guess that's a minimum thickness, assuming the greatest difference in densities.

10 23 14 38 LMP

That's very interesting, Gordy.

CC

Yes. They're really - everything is really tied in the original theories on the structure and makeup of the valley. Everything seems to be falling right in there, and that's what has - has the whole crowd of scientists around here really smiling. Let's see - let me find out what's next here. Okay. It was Strangway's turn next, and he didn't have any results to present, of course, because he's got to get the tape back first, really. However, the orbital sounder - the command module sounder - when they made the pass across the site with the transmitter on - No, I got it backwards. When it was in a listening mode, listening to the ground transmitter's signals, they found that the signal was in exactly the frequency range that it was supposed to be, and they - they picked up the - exactly the right sequence rate, once every 0.8 second. And when they calculated the power levels, that we were putting out just exactly the 1 watt that we were expected to put out. So that - that everything looks good as far as the operation of the transmitter, and without going into all the details which you know as well as I do about the thermal problems on the receiver, they're still - well, he sums it up, we have no reason yet to be sweating it too badly. They're very hopeful that when the tape gets back, we'll have good data on at least some of the legs, and they're - they're waiting for you to bring it to them. Dick Kruse is here, and he mentioned that all your pains, Geno, in brushing dust off of it probably saved the day. If it's there, it was just due to that, that it did work, because it was really on the ragged edge here.

10 23 17 32 CC

About what's left, I think - is the field geology interpretation. And what I've got and can get tonight because there's no one really around here from the geology team at this time - it's about 11 o'clock at night - is so rambling that I'm not going to bother to read it to you. But I will leave a request so that when Parker get you up in the morning, maybe he can summarize that or answer any questions in that area that you might have. Over.

Tape 176/8

LMP Okay, Gordy. Thank you very much.

CC No trouble at all.

CMP Hey, Gordy. Everything under control at the homefront?

CC Yes, Ron. As a matter of fact, talked to Jan and, well, her words to summarize the - the whole show that you put on this afternoon was "out of this world," which is, I guess, a pretty good way to put it. Jon and Jaime were speechless when you waved and called hello to them. And Jan closed by saying that you - you're going to have to hurry home and help rebuild the wall that was broken out by a huge mob of people that were in your house this afternoon during the EVA. Over.

CMP Well, that's okay. We like a lot of friends, and I'm glad everybody enjoyed it and pass my love on - to everyone.

CC Okay, will do.

CDR What about the other side of the tracks, Gordy? Got any words from over there?

CC Hey - I haven't really talked to anyone in the other two families today. So I'm sure that everything is fine or we would have heard it, but I'll try to get a last-minute update on that before you hit the sack.

CDR Okay, thank you.

10 23 20 28 LMP Gordy, this is Jack.

CC Go ahead, Jack.

LMP Did you have a table there of the various gravity readings, and if so, what did we get at Van Serg? In your - relative to - to the landing site - landing point?

CC No, Jack. I don't have that. I'll ask, but I think the ones I gave you, the four places, Shorty, North, South, and Sculptured Hills, are all we got. But I'll check.

10 23 24 03 LMP Okay.

10 23 24 10 CC America, Houston. The rates look good now. You're clear to spin it up.

CMP Okay.

CDR Gordy, I'm sorry. I'm going to move.

CDR Gordy, this isn't my day. I'll give you the damping again.

CC Okay, fine.

10 23 31 10 CC 17, Houston. We're ready for spinup.

CC 17, Houston. We're ready for spinup.

CDR Gordy couldn't hack it any longer, huh?

CC He's getting some more news for you.

CDR Okay, we'll try and get it right this time.

10 23 33 08 CDR I think I got it for you this time.

CMP Houston, America. Are you ready for REACQ and NARROW on the HIGH GAIN?

CC That's affirm.

10 23 35 59 CMP Okay, you have it. REACQ and NARROW.

10 23 52 22 CC America, Houston. We'd like to verify the present setting of the high gain knobs. We want minus 40 and a plus 90.

LMP Gordy, that's verified.

CC Okay, thank you. I - I have a number of sort of cleanup items before going to bed that I can give you any time.

LMP Why don't you go ahead?

CC Okay. We'll be calling you for the IR, OFF, before you go to sleep. Want to leave it ON right up to the last minute, I guess. Let me see if we can do this next one. Okay. Why don't you just go ahead and do this one? H₂ FANs for sleep - number 1, OFF, and 3 in AUTO.

LMP Okay, we got that.

CC And there'll be no cryo stir necessary. You can leave the OPTICs power switch ON, which will increase the heat input and keep it a little bit warmer in there. You won't have to turn that off per the presleep checklist, if you don't wish to. We are going to change the biomed - -

LMP Okay.

CC - - tomorrow, in deference to the CDRs intimated request anyway, and let the CMP take the next shift where in the Flight Plan it now calls for the CDR. It was really our mistake on the original change. I guess there's no need to call all those detailed Flight Plan changes now unless you want to copy them. A reminder also, prior to going to sleep, to bump the cabin up to 5.7 with the OPS to start getting the gas out of the OPS. And I checked with the remaining two homefronts, Jack. Your - I talked to your mother and sister. Everybody's fine there, and they watched the top of your head a little bit this afternoon on the EVA. They're looking forward to seeing you tomorrow on the press conference and back on Earth shortly thereafter. I got one from Nassau Bay, too, if the commander's listening.

CDR He's listening.

CC Okay, Gene. Your mother and family have arrived. They - in fact, they just walked in from a party with Barbara. They all wish you to hurry home and send their love. Over.

10 23 59 22 LMP Houston, how do you read 17?

CC Okay, 17. Loud and clear now. How me?

LMP You're loud and clear.

CC Okay. Did you - did you get the homefront update for the commander?

CDR Yes, I got it, Gordy, and that's great news and news I wanted to hear, and you can return my love to them for me if you would.

CC Sure will. That completes our list of goodies with the exception of the normal presleep stuff, and we'll be standing by for that from you.

LMP Okay. And you can tell the Arizona people, next time you talk to them, I tried to get more of myself out in that television picture but the CMP saw to it that my umbilical was limited in its length.

11 00 00 21 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 00 18 13 CC America, Houston. I'll turn you over to the crew astrologer here. Pleasant dreams.

LMP Thank you, Gordy. And we enjoyed the day with you. See you tomorrow.

LMP Well, so much for that handover.

CC You guys call while we were unplugging?

LMP Haven't you learned better than to unplug with an interval between?

11 00 36 20 LMP Houston, we're going to turn the CABIN FAN, OFF, for a while. Sorry; it's already OFF.

CC Okay; we copy. CABIN FAN is already OFF.

LMP That's right. It turns out the request was to turn it on, so we will.

CC Okay, understand you're going to turn the CABIN fan, ON. I think that's to keep it a little bit warmer in there for you guys.

11 00 36 54 LMP MARK it. MARK it.

11 00 38 27 CC America, Houston. We'd like to talk to Captain America, please.

CDR Give him about - 5 or 10 minutes and he'll be with you.

CC Okay; have him give us a call when he gets ready.

11 00 38 41 CDR Okay.

11 01 18 50 CC Apollo 17, Houston. We'd like to talk to you guys before you go to bed, please.

CDR Go ahead, Bob.

Tape 177/2

CC Okay, we panicked there, I guess, or we got our - change, we - because we saw you go VOICE, OFF, and we wanted to talk to you guys about two or three things before you went to bed. For one thing, we don't see the cabin pumped up yet with the OPS as per Plan and we don't have the onboard read-outs yet, and we'd like to find out who's going to be on the comm and talk to Ron about his headset. I guess the general concensus of opinion down here, unless we know more about the fix, is there are some possible serious consequences, like blowing up the audio panel, if those wires did get together and short out, depending on which wires they are. So there's some concern about that.

CDR Okay, let's get you the read-out first, and we're going to bounce up the cabin here very shortly with the OPS.

CC Okay, we'd also like to get the INFRARED to OFF, please - the IR.

CDR Okay, it's coming off here shortly. Okay, Bob, the RC - RCS reads 65, 57, 61, and 60.

11 01 21 46 CC Okay, copy those.

11 01 23 27 CDR Houston, are you reading America?

CC I'm reading you now. The last thing we got from you was the RCS quantities. We didn't get the bat quantities.

CDR You haven't heard Ron at all?

CC No, haven't heard Ron a bit.

CC Sounds like the headset - -

CDR Well, I'll tell him to try again.

CC No, America, we're not reading Ron at all, right now.

CDR Okay, he's been on the lightweight headset talking to you all this time. Wait a minute, he's going to check a couple switches.

CC Okay. Which headset is broken? The Snoopy?

CDR Yes, Ron's - Ron's Snoopy helmet.

CC Okay.

CMP Hey, are you reading me now, Houston?

CC I read you loud and clear now, Ron.

CMP Okay, I'm wearing the lightweight headset, now. On the comm carrier, there's a whole bunch of wires, about eight of them - looks like they're twisted pairs, you, know, twisted in fours really. They come up through the thing. And two of those eight wires are cut - are broken in two. The hot end, or the end that comes up from the plug going toward the headset - those two wires both come out individually and individually taped, each one of them. And then the whole group - you know, I bent them out of the way so they wouldn't be touching anything. So they wouldn't touch insulation or tape. I bent them out of the way and taped the whole side of it just to keep the rest of them from breaking in two, and it looks like a pretty good fix on the thing, really. However, if you have any concern about blowing the audio panel - I'll just go ahead and wear the lightweight headset.

11 01 25 22 CC Okay, Ron. Yes, the concern here is not only which wires they are - the potential does exist if one of those shorts to ground to blow the audio panel or at least a circuit breaker, depending upon which wire it is. I gather that what you've done - is that you haven't wired the broken wires back together, but it's just sort of covered the bare leads and wired them out of the way. Is that right?

Tape 177/4

CMP Yes, that's correct. It was too close to the - there is a stiff piece of plastic that comes out of the headset itself, out of the bottom of the left earset, and it's broken off too close to the bottom of it there to - to strip the wires down and wire them together at all.

CC Okay. Roger on that. I guess - let us think about it here overnight. Offhand, our opinion is, as long as you've got a spare headset, let's wear the spare headset - that spare meaning a lightweight. If you're going to be on comm tonight, I guess we offhand suggest wearing the lightweight tonight. Over. How does that strike you?

CMP Okay. Yes, no problem. I won't be on comm tonight, but I'll be wearing the lightweight headset anyhow. The only time I was thinking about it - wearing the other one at all - would be for entry, and there's no problem there. I'll just stick to the lightweight headset around my neck and put that one around my ears just to use as a bump pad, is all.

CC Okay; let us think about it overnight, and we'll talk to some people about it. Let's see, is Jack going to be on the headset tonight and the biomed, both?

CDR Yes, Jack will be on tonight with the biomed and the headset.

CC Okay. We'd like to get one more valve check there, America. Like to check our WASTE WATER TANK INLET valve to AUTO. EECOM says he is in a flat portion and he can't verify that right now by buildup.

CDR Okay, stand by 1.

11 01 27 57 CDR WASTE TANK INLET is in AUTO, Bob.

CC Okay, thank you on that, Gene. And we did not get the BAT read-out for the onboard read-out for the night, BAT C and pyro BATs A and B.

CDR Okay, guess you weren't reading. We're at 36.5, 36.9, 36.9, in that order.

CC Okay, we copy that. And let me ask you a question here, Gene. Right now you're an hour behind getting to sleep. Do you want to sleep the 8 hours or get up by the Flight Plan?

CDR No, let's get up per the Flight Plan. We're very much aware of - of that; we've just been doing some restowage and a few other things around here. But let's get up per the Flight Plan and fine.

CC Okay. We'll talk to you in the morning. As soon as the cabin is pumped up, you're GO for sleep and you can turn VOICE back OFF, at your convenience.

CDR Okay, you'll see the cabin pumped up, we'll go to 5.7 and turn the OPS back OFF.

CC Roger. We'll be watching.

CDR Okay, babe. Take care.

11 01 28 57 CC See you in the morning.

11 01 34 33 CDR We're looking at 5.7 in the cabin.

CC So are we.

CDR Bob, are you going to want to do that again tomorrow?

CC Yes, Gene. I will do it again prior to finish emptying the OPS.

11 01 35 12 CDR Okay.

END OF TAPE

Tapes 178-181/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 08 20 01 (Music: We've Only Just Begun by The Carpenters)

11 08 23 09 CC Good morning, America. This is Houston.

LMP Good heavens. It sounded like Bob Parker.

CC Roger. And in case you didn't recognize it, that was "It's Only Just the Beginning."

LMP Or words to that effect.

CC And, Jack, if you give us a call when all three of you get in the headsets, we've got something else to play for you this morning.

LMP You have a call.

CC Say again.

SC ... Houston, good morning.

LMP I just gave you a call.

CC Okay. We'll cue up something else for you guys. And, Ron, this was something that was recorded over at your house yesterday morning. I think you'll recognize it.

CMP (Laughter) I'll have to wait and see.

(Music: Christmas carol recorded by Ron Evans' neighbors)

Jon Hi, Dad.
Evans

11 08 27 10 CC And, America, if we could do some business this morning. At 275:10 - we'll give you a hack on it - We need UV COVER to go to CLOSE, and we'll give you a call on that one. It's about 3 minutes.

CMP Okay.

CC Okay. One minute to COVER CLOSE - UV, that is.

Tape 182/2

CMP Hey, Houston; America. Sounds like people are getting in the Christmas spirit around the Houston area there.

CC That's affirm. It's a little bit warmer this morning, but it still feels and looks a lot like Christmas down here.

CDR Well, Bob, it feels and looks a lot like Christmas up here, too.

LMP Matter of fact, the LEB reported a temperature of about a minus 2 last night (laughter).

CC Okay; and 15 seconds to UV COVER CLOSE. Five seconds.

11 08 29 59 CC MARK, UV COVER, CLOSE.

LMP It's closed.

CC Copy that.

LMP Yes, the LEB was cloudy, cold, and snowy last night.

CC Snowing too, hey? We're showing you 61 degrees in the cabin this morning, with a suit temperature of 48 degrees.

LMP Glad I'm not in those suits.

CC You could have crawled inside the L-shaped bag, I guess.

CC Okay. And America, we'd also like to get BAT A to CHARGE.

LMP That's in work right now, Bob. Thanks for the call.

CC You're welcome for the answer.

LMP Well, we're trying to keep your spirits up today.

LMP Hey, Bob, what's 4 degrees equal in distance from the Earth?

CC This is the new CAPCOM one. Say again the question. Four degrees equals distance from the Earth?

LMP Yes, sir. What does 4 degrees equal in miles from the Earth?

CC Retro says that 4 degrees essential angle equals 94K. You guys are out at about 125K right now.

LMP Okay, Bob, I was looking at the Flight Plan, and it said field of view is 4 degrees.

CC And we're going to have a network handover. We may be a momentarily - momentary dropout.

11 08 34 33 LMP Okay.

11 08 51 26 LMP Houston, 17.

CC 17, did you call?

LMP That's affirm. I've got some reports for you, if you're ready to copy.

CC Okay. We've all set.

11 08 51 46 LMP Okay. CDR menu - I'll try negative reporting. He did not eat three apricot cereal cubes, pears. And at lunch he did not eat the half a cereal bar. And at dinner he did not eat tomato soup, half a hamburger, and the date fruitcake. On lunch he had also - positive now - lemonade, two pecans, and one-fourth of a chocolate bar. Okay. And - last night, he had about 5 hours of fair sleep, no medication, and 2-1/2 cans of water. And his PRD is 17060? That's right, 60. Okay. For the LMP, day 12: He did not eat for breakfast, pears. For lunch, looks like he ate it all. For dinner, he did not eat the tomato soup, half a hamburger, mustard, pudding, and that's it. And add to breakfast another cup of coffee - bag of coffee; excuse me. And the lunch, an orange drink, an orange-pineapple, another coffee, graham cracker cubes - four of them, two pecans, and one-fourth of a chocolate bar. And - his PRD is 24188, and 6 hours intermittent sleep, 1-1/2 cans of water, and took one Lomotil last night, just as we were turning in, as a result of the Evans affair catching up with the LMP. The CMP - negative reporting

Tape 182/4

again - did not eat sausage, fruit cocktail, orange beverage. And for lunch, he did not eat the peaches. And for dinner, he did not eat tomato soup and the caramel candy. Add to breakfast, coffee, four sugar cookies and four jelly candies. That's for breakfast. To lunch, add lemonade, coffee, two pecans, and one-fourth of a chocolate bar - one-half of a chocolate bar; excuse me. Okay. His PRD is 15058. He had about 5 hours of fair sleep and two sniffs of nose drops and two Lomotils yesterday. And he had five cans of water. And that should do it, Bob.

11 08 56 26 CC Roger, Jack.

LMP Thank you for your indulgence.

CC Thank you for your report. We appreciate it.

LMP Houston, 17.

CC Roger, Jack. Go ahead.

LMP We thought we'd warm up the cabin. And if I recall correctly, the - you approve of us putting INVERTER 3 onto MAIN A and going to MANUAL on the TEMP IN and taking the - EVAP TEMP up to about 59 degrees.

CC That's affirmative.

LMP Okay, Houston. INVERTER 3 is going onto MAIN A.

CC Roger. We're watching it.

LMP Okay.

11 08 58 12 LMP MARK it.

LMP And - Stand by.

11 08 58 52 LMP TEMP IN is MANUAL.

11 09 04 16 LMP Okay, Houston, I think we're pretty close. We're showing about 62. We'll watch it a little bit; and if it doesn't come down, we'll tweak it again.

CC Roger, Jack. And the ground is showing about 60 degrees.

LMP Okay.

LMP Bob, EECOM's procedure's almost like having a fire in the fireplace.

11 09 07 31 CC Roger. Glad you're comfortable.

11 09 17 53 CC America, Houston.

LMP Go ahead, Bob.

CC How would you like a quick look at sports here and then into the news summary while you're having your breakfast?

LMP We'd like the whole thing.

11 09 18 11 CC Well, I guess that we all assume maybe you're like the rest of us and turn to your sport page first sometimes. So we thought we'd recap the pro football action yesterday, in a rather strange day, since there were only - only two games that really made any difference. And I think the scores kind of showed the day. In the American Conference playoff games coming up next weekend, Oakland will play at Pittsburgh. Pittsburgh getting into the playoffs for the first time in 40 years. The Cleveland Browns will take on the undefeated Miami Dolphins, who have won 14 straight. In the National Conference, Dallas will be at San Francisco Saturday, and Green Bay plays at Washington on Sunday. Quickly recapping some of the scores from yesterday. On that sad, sad one here in Houston, Cincinnati rolled over the Oilers, 61 to 17. There were three touchdowns scored in the fourth quarter within less than 5 minutes of play, all on interceptions - on the part of Cincinnati. New York Giants, it says, upset Dallas 23 to 3. I question the upset since Dallas was already in the playoffs; and, in what I watched, it looked like they were aware that they were already in the playoffs. Buffalo upset Washington 24 to 17. And again it's a questionable upset because O. J. Simpson had a great day, and Larry Brown from Washington was kept on the bench

Tape 182/6

for the whole game. Oakland, 28, over Chicago, 21; Detroit, 34, over Los Angeles, 17. Los Angeles' hopes for any playoff berth had been knocked out by San Francisco's win on Saturday, and it looked like they played that way on Sunday. Cleveland, in a real tough one up in New York with 30-knot winds and a - gale - gale-force winds and lots of snow and cold, defeated New York Jets, 26 to 10. Green Bay, 30, over New Orleans, 20, in a tough one, which saw two - two touchdowns being scored off of blocked punts. Kansas City, 17, over Atlanta, 14. And, again, Atlanta's chances for a playoff berth had been wiped out on Saturday; and, apparently, they played that way on Sunday. Denver, 45, over New England, 21; St. Louis, 24, over Philadelphia, 23.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 09 20 31 CC

Pittsburgh defeated San Diego, 24 to 2. On Saturday, Miami had taken Baltimore, 16 to 0, and, as I previously mentioned, San Francisco defeated Minnesota on Saturday, 20 to 17. Just one little note, Jack, you might be interested in this morning's paper, concerning the New Orleans Saints. Dave Parks from the New Orleans Saints has announced his retirement, and he kind of took a rap at the Saints in claiming that they were a team that did not want to win, and that he was retiring unless they would trade him to a winner. It sound like our friend over there might have some problems this winter come contract time. In pro basketball last night, the Houston Rockets beat the Cleveland Cavaliers, 110 to 109. Jack Marin had 35 points, Mike Newlin had 34. In college basketball, UCLA remains number 1 in the latest ratings. Second-ranked Florida State was beaten this weekend by Princeton, 61 to 59. Third-ranked Maryland won, as did fourth-ranked Marquette, fifth-ranked Minnesota, and number 6, North Carolina State. Indiana is rated 15th, Houston is 16th. We can't find Purdue, Kansas, or Cal Tech in the ratings right now. There's one bowl game tonight. Iowa State, who has taken a five-game losing streak into the Liberty Bowl, will meet Georgia Tech at Memphis, Tennessee. In local hockey, the Aeros and the Los Angeles Sharks of the World Hockey Association battled to a 4 to 4 tie.

11 09 21 59 CC

Now, for page 1 news. The outlook for a quick peace settlement in Vietnam has taken an apparent turn for the worse. The Hanoi government radio announced last night that U.S. planes have dropped more mines in Haiphong harbor and has also carried out bombing and rocket attacks on the city of Haiphong. There was no immediate comment from Washington on the charges. The snag in the Paris peace talks apparently hinges on a few key points, according to press association reports. Among them, the North Vietnamese will not accept the idea of two separate Vietnamese states and the method of policing a truce, the two-Vietnam policy being the major stumbling block. The weather here is

making news. Yesterday's reading at Intercontinental Airport was a frigid 22 degrees. Downtown Houston was 32. The airport reading was the lowest since 1932. Up north in the upper Midwest and northeast, it's going to be a white Christmas, and more snow is moving into the area. Chicago had a low of 5 above Sunday; Kansas City, 19; and Albuquerque, 18. Anne Armstrong, long a power in Texas Republican politics, is reportedly about to be named to a high post in the Nixon administration. Harry Truman still clings to life. The 88-year-old President - 88-year-old former President is holding his own, according to his doctors. Debris found floating in the Gulf of Mexico off the west coast of Florida has been identified as that of a Coast Guard Helicopter that crashed. Earlier the chopper had rescued four fishermen from a sinking shrimp trawler. The helicopter was headed back to Saint - Saint Petersburg when it went down with the four fishermen and the crew of four. It's a lot safer up there where you are than on the Texas highways. The State Highway Patrol reported a high number of serious accidents on Texas roads this weekend. A Houston newspaper reports that industrial demand for Trinity River system water will not produce enough money to finance the project and that the City of Houston's water and industrial district funds will have to make up the difference. Meanwhile, the Clear Lake City Water Authority is tossing around a proposal that would require developers to pay 50 percent of the cost of all lateral water and sewer lines. Up around Conroe, in Montgomery County, a transformer blew up Sunday morning and electrical power went out for several hours. Several thousand homes were affected. Baytown was the scene of four armed robberies Sunday. Four business establishments were hit in a 14-minute period. The masked gunmen got about \$500 cash. No one was injured. And a final note, today in history, actress Betty Grable is 56 years old. That's from your news editor, Jim Kukowski,

CDR Thank you for the news, Bob.

LMP And notice the disclaimer.

CC (Laughter)

CDR And you're right, the traffic's not too thick up here, as a matter of fact.

CC Yes, I was wishing that - -

CDR We've been looking for the big man with the white gray beard.

CC - - I was kind of wishing it would get a little thicker up there one of these days.

CDR It will.

CC I'm counting on it.

CDR Hang in there, babe.

11 09 25 35 CC It looks like we're going to have some good football to watch next week, and I think they're going to have a pretty light schedule for you all - so - until after the holidays - and we ought to be able to sit back and relax a bit.

CC And one additional weather report, I'm sure you're interested in. The weather in your primary landing area is looking great, and we anticipate no weather avoidance maneuvers whatsoever. Things are great out there. And I'm thinking of going out and enlisting the Apollo 17 chaplain, so we can maybe get some warmer weather for your arrival back here on Thursday.

CDR Well, I guess if - if anyone can do it, he can do it, if you can find him.

CC He's - he's been around. We've seen his picture a number of times in the paper over at - visiting your house, there, and rooting us home.

CDR I thought I told him to stay away from there. Only kidding, he's always a welcome addition.

CC Roger.

CDR And I might add, he usually is.

Tape 183/4

11 09 28 05 CC I've got a telegram here that was sent out to the U.S.S. Ticon - Ticonderoga, I thought you might be interested in. Coming up on antenna switch, I'll read it to you in a minute.

CC Are you ready for this telegram that was sent out today?

CC Okay, would you like to hear the contents of this telegram that went out of here today to the U.S.S. Ticonderoga?

CDR Yes, sir.

CC It's to the U.S.S. Ticonderoga, passed to the NASA Team Leader. It says, "Stullken, we know exactly where the spacecraft is, and we know exactly where it's going to land. Now, if you can figure out approximately where you are, we will be in good shape. Pull yourself together, and move 50 feet from the target point. Let's end this program right." Signed, The Guys in the Trench, MCC, Houston.

CDR Beautiful, Bob, beautiful.

CC Thought you'd like that one.

11 09 40 30 CC America, Houston. We'd like you to stop the roll that you're in right now, and stop it at roll of 60 degrees. Be convenient if you'd do it right now. Help us keep us on Flight Plan here.

CDR Six degrees, okay. Won't go to 14 -

CC No, 60, 60, six zero, six zero, you're right about there.

CDR That's affirm. Six zero, I'll stop it now.

11 09 40 56 CC Okay, and there's some HIGH GAIN angles that go with that: PITCH, minus 54; YAW, 225. You're on HIGH GAIN now, so unless you lose lock you shouldn't have any problem.

11 09 47 59 CC America, Houston. We'd like to have the UV COVER, OPEN, now, if somebody's over there.

LMP All right, Bob. We may not be by that part of spacecraft for a couple of more hours. Can you hold off?

CC Well, we don't mind. Although if somebody's over - it's convenient, we'd sure like it.

LMP Okay, I'll make a special trip.

11 09 48 37 LMP UV COVER is OPEN.

CC Thank you, sir.

11 09 49 20 CMP Okay, Houston. There are the torquing angles. And if you're satisfied, I'll go ahead and torque.

CC Roger, Ron. We've got them, and you're clear to torque.

11 09 49 35 CMP Okay, torqued at 29:30.

11 09 50 27 CC America, Houston. Now that you're not eating and working, we've got a couple of configuration on the H₂ tanks and the O₂ tank heaters, we'd like to have accomplished.

LMP Okay, Bob. I was just over there.

CC Roger.

LMP Okay, go ahead.

CC H₂ tank 3 FANS to OFF; H₂ tank 2 FANS to ON.

11 09 51 07 LMP Okay, 3 is OFF, and 2 is ON.

CC Roger. And O₂ tank 2 and tank 1 HEATERS to AUTO. if they're not there.

11 09 51 23 LMP Okay, you want 1 and 2 to AUTO. They're going.

CC Okay, and anytime this morning, we would like to get an OPS read-out - whenever it's convenient on that.

LMP Okay, Bob. It was 1000 after we stopped bleeding last night and I'll check it again in a little while.

Tape 183/6

CC Okay. That sounds good enough now. We just needed the reading, so we could figure out what to do with it. You might be interested in your consumables. Right now on the RCS, you're right on the Flight Plan at 51 percent remaining. Your oxygen tanks are all either on the Flight Plan, or just slightly above it, or within the noise level - maybe a tad below it - you're just right on for all intents and purposes. You're in good shape, and your hydrogen is in good shape. You're in good shape on all your consumables.

CDR Bob, we got a GO to start our dumps?

CC Say again.

11 09 53 39 CDR Hello, Houston; America. Have we got a GO to commence our dumps?

CC That's affirmative, and on your waste water dump - we only want it dumped down to 45 percent on your gage - 45 percent on your gage.

CDR Okay, Bob. I guess we're reading about 52 percent now, so we'll dump a little bit.

CC That's affirmative.

11 09 55 01 CC And for whoever is the keeper of the Flight Plan this morning, we've got a couple of changes to your Flight Plan, in addition to those we called as you were eating there, so we've got a couple additions to it - or changes.

CDR Go ahead, Bob.

CC Okay. The first one is at 281:02 - 281:02. Change the call "Manually roll left" to "Manually roll left 60 degrees to a roll angle of 071." We want 60 degrees in a roll angle of 071.

CDR Okay; we got it.

CC Okay. At 281:10, change register 2 of NOUN 78 there to minus 019.74.

CDR Okay; got it.

CC That's it for the Flight Plan updates this morning, so far.

11 09 56 27 CDR Okay, thank you. And the waste water is dumped to 45.

CC Roger. We see it.

11 10 13 52 CDR Houston, America. We're about to maneuver.

CC Okay, we're standing by.

11 10 15 47 CC America, Houston.

LMP Go ahead.

CC Jack, we're trying - This is for Jack - we're trying to consolidate and think through what your request was for some sort of a geology surface update. We - we're just wondering if maybe you don't have the better material at your hands there than we've got down here as far any conclusions or preliminary estimates might be.

LMP Okay, I just thought that you guys may have had some new ideas. We had a good briefing last night from Gordy on the surface experiments. I guess we might want to be updated on the orbital experiments, if there's anything new. And field geology, I guess we got a pretty good feeling for it, but I thought they might have had some new ideas, or something along that line.

CC Well, I'm sure they do, and I don't mean to short-change our geology - geology back room, Jack, but on the other hand, I think - I think really we're just waiting to get the answers from you or tie up maybe their thoughts with you. And I, you know, from a bystander's standpoint, if I read you anything that they've - maybe conclusions that they may have made, we just may be fudging the data because there's - -

LMP I'm not looking for conclusions, I'm looking for ideas.

Tape 183/8

MCC Hey, Jack.

LMP Tell them don't - don't worry about it. You know, I just thought they might have something to say.

MCC Yes, they got plenty to say, Jack. But they're down here and they can say it, and I think what you ought to say up there is what you're familiar with and just confine it to that.

LMP Oh, you can count on that, Deke, I just like to think about things.

MCC Roger, you're going to have lots of time to do that.

CC We'd like AUTO and high gain.

11 10 17 56 LMP Okay, you got AUTO.

CC Thank you.

11 10 23 09 CC America, Houston. We may have not been looking at the right displays at the right time, but we didn't see an O₂ purge. Did you do O₂ fuel cell purge?

LMP Sorry about that, Bob. I misunderstood. I thought - I see it now - H₂ and O₂. I'll go into that now.

CC Okay. We'd appreciate it. We're just keeping you honest.

LMP That's what you need to do.

CDR By the way, Bob, that - 59 degrees on the manual temp control setting made it very comfortable in here.

CC Real fine - real fine.

11 10 24 57 CC We'd like OMNI Delta - OMNI Delta.

11 10 30 10 LMP Okay, Bob. I'm up to date on the O₂ purges now.

CC Roger, Jack.

11 10 50 53 CC America, Houston.

LMP Go ahead.

CC About 15 minutes or so ago, we noticed - or detected a transfer on your ECS FLOW CONTROL proportioning valve from number 1 to number 2 and we were wondering if the switch, ECS RADIATOR FLOW CONTROL AUTO switch, is still in the AUTO position. And if it is in the AUTO po - -

LMP It is in the AUTO position. And we see the "2" here also.

CC Okay, we're - we'd like to just leave everything like it is, and we'd like to go off and study this awhile. And we don't - -

LMP Okay.

11 10 51 35 CC - - anticipate any problem here and it's - number 2 which should work as good as number 1.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 11 24 54 CMP Houston, America, here. We'll probably VERB 49 to the thermal attitude.

CC Roger. We're standing by waiting for it.

CMP Okay.

11 11 31 06 LMP Houston, 17. The OPS is now reading 1100 1100.

CC Roger, Jack. We've got that data.

CC America, Houston.

CMP Go ahead.

CC Ron, if - if you're stowing the OPS, we might want to hold here a second. We're going to want to dump that OPS down to as low as possible pressure, and we'll be wanting to give you a GO on that. Let me get on - get hooked up here around the room.

CMP Okay. You know, we've still got it out. We thought we'd, you know, stow it later this afternoon sometime.

CC Okay; fine.

CMP You know, after we can dump it again.

11 11 33 43 CC America, Houston. Your cabin is down to 4.8 now, so you're cleared to dump the OPS at any time. And we expect with 1100 pounds it would pump it up to about 5.7, so we'll probably have to stop you prior to reaching zero.

CMP Oh, okay. Hey, mighty fine. We'll do it.

CMP Okay, Houston. That OPS is dumping now.

CC Roger, Ron. We'll watch it.

11 11 39 48 CC America, Houston.

Tape 184/2

LMP Go ahead.

CC We've identified a number of cracks and crevices up in the - in the area - any area above the couch plane along the X-axis or just above the couch plane that could possibly be places where the scissors disappeared to. And we would like those areas searched if they haven't been searched already. As an example, the crack between the top of the main display panel number 2 and the - the hatch opening area, that kind of crack and crevice area there. We would like that looked into. I kind of assume you've already done that. We don't want you to remove any panels or anything like that to look in. But have you looked in those areas, or do you plan to look in those areas here shortly?

CMP Hey, Bob, I've looked in some of those things. But just to make sure I've covered everything and the fact that we checked it again, why don't we go over it again.

CC Okay.

CMP Wait a minute and I'll get my flashlight, and then we can start doing it again systematically.

CC Okay.

LMP It's scissors, my dear Watson, scissors.

CC Seriously, it would have saved a lot of problem if you'd seen them floating out, Jack. We would have just not had to have done any of this.

CDR Houston, America.

CC Roger. Go ahead.

CDR Bob, it looks like we're going to make it on this OPS depress. She's reading 0, and she's just barely bleeding out. We're somewhere around 5.5, so I'm just going to let it bleed out now. And then we'll stow it.

CC Real fine; real fine.

11 11 47 11 CMP Okay, Houston. Checked it out above MDC number 2.

CC Okay; and - -

CMP Also, looked - -

CC - - there was the area around - -

CMP Go ahead.

CC - - each of the plus XX - the XX struts and the PLV vent there, and the other XX strut. You might check - pay particular attention to that area.

CMP Yes, we checked that. And also checked it again now.

CC Okay. From our pictures, and this may not really be the case, on the - above main display panel 3, where it says - where the handhold, the structure part of handhold, looks like there's some cracks and crevices right above - right around that handhold area that could, between the handhold and panel 6, that a pair of scissors could slip up into.

CMP Okay. We're looking around there, and it doesn't look like they could - Well, they could possibly fit in there maybe. But, anyhow, we checked it, and they're not there.

CC Okay. And then on the other side of the cockpit in the same area around handhold, back behind the - that crevice area back behind the COAS power panel, panel 15, and the handhold. And then also that little area in front of the handhold, where - the cutout for main display panel 2, you might look - take your light and look in there.

11 11 49 06 CMP Okay. I'm over there now.

11 11 50 51 CMP Okay, Houston. No joy on that part either.

CC Okay, Ron. The next couple are really down in the lower equipment bay area, and then I've got one area up in the tunnel - two areas up in the tunnel that are suspect areas, and then that does it. Which would you like first?

- CMP I'm up in the tunnel, now.
- CC Okay; the tunnel area. The only thing we show up there is the - the four handholds around the - around the tunnel. I don't think scissors could get up there, but there - they - maybe they could slip in something like that. Anyway, those four handhold slots up there, you might check in those two areas.
- CMP Those scissors couldn't fit in those handholds, but it's good to check them. Something else might be in there.
- CC Okay. The - Oh, in the other one up in that area, Ron, and I assume you - you've put that outlet bag over the cabin fans - and we wouldn't want you to fool with that at all, because it's probably all full of dirt and everything - but if you didn't, then the outlet to the cabin fan area might be a potential place.
- CMP Let's see. We installed that the first day out, I think. And it's been on there ever since.
- CC Yes, we assumed you did. I just was trying to cover all bases here. Okay; the last three items - I think you've actually called one of them - are down in the lower equipment bay. One of them is the - the crack just below panel 101, down in the lower equipment bay. I think you called that one the first night, didn't you?
- CMP Not below 101; no.
- CC Okay. Our pictures show a crevice below 101, and also while you're right there, I - I don't think it's even - there's a crevice above the door for the optics stowage area that you might check up in there. It might have lodged. And, also, while you're right there, Ron, our picture, of course, shows your hoses stowed, and they kind of come out right there to the right of panel 120, the optics stowage area. And so you've got some area behind those panels - behind those hoses and that - where it might have lodged, but I believe you had to move those in order to do your EVA yesterday, anyway.

CMP Yes, the hoses in the tunnel have all been moved around in here, as far as the hoses are concerned. I still think the biggest probability is - is right above the optics stowage, and that's what I was talking about before. Because it's about - oh, an inch. You know, the crack is at least an inch deep in there and as long as the optics stowage thing itself.

CC Okay; and let me - We'll have one more recommendation for you.

CMP Okay.

CC And then over panel 250 there's a little bitty opening - It shows in the pictures - over panel 250.

11 11 54 50 CMP Okay; we'll check that in a second here.

CC Our only thoughts, Ron, on the - any other position that you might see - You know, if it's above the couch plane and you really think it might be a suspect area, you might consider taping the crack, if you desire. The tape probably isn't going to hold it in if it wants to come tumbling out, but it - it's something you could do if you wanted to.

CMP Okay. Yes, I understand that, Bob. That's a good point.

CC And, Ron, while we're talking to you, we'd like to tag up with you on one more item unrelated to the scissors search, and that is your headset situation. And we just want to leave the - make sure you're going to do as was said last night and will not plug that - the headset with the broken wire, you will not plug in again, and we'll arrange your entry configuration in some configuration that does not require that headset to be plugged in. Is that affirm?

CMP Yes, that's affirm, Bob. I think what I'll do, I'll wear it as a bump hat, you know, and then - and then use the lightweight headset with the - you know, with the earplugs underneath that. I'll put the lightweight headset around my neck, and

Tape 184/6

then have the mike sticking up in front of me, and with the earplugs on. I - I tested that configuration; it's comfortable. No problem. It'll work. And I will not plug in the comm carrier at all.

CC Roger. We just wanted to tag up with you on that. That's what we'll be expecting, and we'll - we'll put this to bed forever.

11 11 58 06 CMP Okay; mighty fine.

11 12 02 33 CDR Houston, America.

CC Go ahead.

CC Go ahead, America.

CDR Okay, Bob. We got the major compartments inventoried and stowed, frankly, with the exception of the things we need, of course, between now and then in the sleeping areas and what have you. We'll finish that off, of course, as we finish up with gear and as we get up in the morning. But there's very little left to do, and any contingency weight changes, which there may be just a couple at the most, we'll inventory those and give them to you in the morning.

11 12 03 23 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 12 28 29 CC America, 17. Say again. 17, Houston.

CMP Go ahead.

CC I've got an interesting little press release here. Jack Schmitt - and I'm sure all of you will be interested in, but based upon your work up in the Shorty area on the surface, the people out at Flagstaff went back and looked at the Apollo 14 250-millimeter camera frames from - and showed that it had colored frames that showed brownish and orangish colorations on a bulbous dome in the Crater Langrenus and on a 4-kilometer dark halo crater on the ejecta blanket of Theophilus. And they've made that news release today.

LMP Very good. We may have triggered something.

CC Yes, sir.

11 12 29 43 CMP Bob, I'm on my maneuver.

CC America, we'd like OMNI Delta.

11 12 31 14 LMP You have OMNI Delta now, Bob.

CC 17, Houston. OMNI Alfa.

11 12 38 08 LMP You got it.

11 12 46 37 CMP Houston, America. Would you like the HIGH GAIN?

CC That's affirmative.

CC America, you can go to AUTO on the HIGH GAIN.

11 12 47 42 CMP You got it.

CC Thank you.

CDR Houston, America.

CC Go ahead, America.

Tape 185/2

11 13 02 00 CDR Okay. We might be 5 or 10 minutes late on starting ALFMED. We're still putting some sensors on.

CC Roger.

CDR Hello, Bob.

CC Yes.

CDR Can you get a reading? Is it the same two subjects on ALFMED as we had going out, or is this a case where you want all three of us? It's not exactly clear.

11 13 03 57 CC Jack, we agree with you that it's not clear, and FAO tells us we want the two - same two subjects wearing the blindfolds as on the transearth coast as was on the translunar coast.

CDR Okay. Well, this has been Gene, and that's the way we'll do it.

CC Roger, Gene.

LMP Houston, this is Jack.

CC Go ahead.

11 13 06 17 LMP Yes. We've got pretty good attitude here, and the - ask FAO if they want them on VOX and if they also want the notes recorded up here.

CC Okay. I'll check on that.

11 13 07 12 CC The easiest way to do it would be to just go ahead and do it on VOX, and we'll get everything recorded down here.

LMP I agree, because taking notes is good when you're having dropouts, but it's hardly the same as tapes.

CC That's affirmative. And since you do have - you're locked up on comm and HIGH GAIN and that, well, let's just go ahead and we'll just record it all down here for you.

LMP Okay.

CC Jack, Houston.

LMP Go ahead.

11 13 09 33 CC This is your option, Jack. But if you want to, you can put the other set of blindfolds out and see what you see, too, in VOX and give us the data.

LMP Roger. Maybe I will. One problem is, though, that I notice that once things get going with two, that they were starting to interfere, and three might do the same thing.

CC Okay. Your option. No - -

LMP I may put them on anyway.

CC It's your option. No problem.

LMP I may put them on just to watch.

CC Roger.

LMP It's the only movie we have this afternoon.

CMP Houston, America.

CC Go ahead.

11 13 11 41 CMP Roger. Would you ask the Surgeon to check and see if the command module pilot is alive and well.

11 13 12 00 CC Okay. They're seeing data. It looks sort of squirrely and - but it looks - they want it to settle down for a little while.

11 13 12 33 CMP Better go VOX.

SC ...

CDR Got to unplug that there.

CMP Yes, I'm ready.

Tape 185/4

11 13 14 43 CDR Okay, Bob. CDR and CMP have got their blindfolds on.

 CC Roger.

 CMP I got it.

11 13 15 12 CDR Okay. We're starting.

11 13 16 42 CMP Houston, this is Ron. While we're getting dark adapted here, probably won't see any for a while. Let me just record on the tape my impression of these light flashes as they occurred around the Moon and at other times. In general, they've all been essentially - just a - as - as it says - a flash, with a - with a little bit of a glow, and usually in one eye or the other eye. And for some reason, most generally, they've been kind of - if you - you don't want to say it's in - it's in the periphery of your vision, because you get the feeling that maybe there was a flash over to the left or down to the right or something like that. But you don't get a distinct impression as to where the flash came from. Well, you can - you can see where it came from, but not - you can't see the flash itself. Like it was just beyond your vision. Most of them have been like that. At one time and one time only throughout the flight, I can remember kind of a triple flash, so to speak. And in that case, there was a bright flash in the left eye on - on - about 10 o'clock in the left eye. And then it repeated itself again about 2 o'clock in the left eye. And then about, oh, 10 o'clock, a quarter of the way out, in the right eye. I just got a bing, bing, bing, just like that. Three - three of them right in a row. And the rest of the time, though, they've all essentially been single flashes to me.

11 13 18 41 CDR This is Gene here. I'll just remark that both Jack and I did see them on the lunar surface. I guess the best summation I can make of that is I think I saw both lines and - and the spots or the flashes a little bit more sharply, but that might be because of the adaptation - dark adaptation

in the LM prior to going to sleep was probably a little bit better. And I'd guess - It's awful hard to tell time when you're under - when it's dark, ... but I guess I want to say they were quite frequent, and I'd say that means two to three a minute now. That could be way out, but that's what I'd guess.

SC (Cough)

11 13 34 03 CMP (Cough) ... in my ... or something. I don't see anything.

SC (Cough)

CC America, Houston. We haven't heard anything. Have you seen any flashes at all?

11 13 44 34 CMP Haven't heard a - I haven't seen a thing, Bob. Can't understand it.

CDR Same here from the CDR. I haven't seen anything.

CC Roger. I understand. Your heart rates are down pretty low, like maybe you fell asleep or something.

11 13 44 50 CMP Oh, no. Well, the LMP dozed a couple of times but - I thought I saw one, Bob, but I'm not sure. I squinted hard about that time. I may have just triggered something.

CC Roger. Okay. We're just standing by.

LMP The last time we were in PTC, were we not?

CC Yes, you were, and that's one reason you had to copy it down, because we kept losing comm on you.

LMP Yes, as I recall, they seemed to come in batches when - when I was taking notes. Is that what you people observe - or recorded, rather?

Tape 185/6

CC That's affirmative, Jack. And the thought that occurs, of course, is that you may be blocking with the shielding on the spacecraft somehow.

CMP Houston, has my biomed settled down?

CC That's affirmative.

11 13 49 19 CMP Okay.

END OF TAPE

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11 14 06 33 LMP No, I still fail to see any flashes. I rotated 180 degrees along the rotation axis along Z and saw no change. LMP.

11 14 10 11 CC America, Houston. The light flash observation time is up, and we'd - we'd like to move on into the Flight Plan. And this call - It is for Ron - -

LMP Hey, Robert.

CC The EMS entry check is on - at 281 as shown. We'd like you to do that now prior to the maneuver, which is at 281, or delay it until about 281:50 when you're not maneuvering. We'd like to do that check when you are not in - not maneuvering.

CMP I'll go ahead and do it now. What's going up this minute - coming up here?

CDR Okay.

CMP Let's see what's coming up first.

CC Okay. You can do it now. You've got about 5 minutes prior to the VERB 49 maneuver.

CDR What would that be? EMS check? Okay. Why - why don't you go over it now?

LMP Your eyes all right?

CDR Give yourself a chance to open your eyes.

LMP Yes.

CMP That must prove something, the fact that we didn't even see them, huh?

CC It would probably tell you that there's a point source, and the spacecraft is blocking it somehow.

CDR Or the Earth. Or the Sun.

LMP I believe it.

Tape 186/2

CC Oh, yes. Yes. Yes. If I wanted to get technical, something's blocking them. That's right.

CDR (Laughter) Much as we have been seeing them, I can't believe that. Okay, Ron. Why don't you go ahead and do that, huh? I just put mine up.

11 14 12 58 CMP Okay. I'm on page 1-3, and the EMS FUNCTION is OFF. Circuit breakers are CLOSE. EMS MODE to STANDBY. And FUNCTION to TEST 5 - or TEST 1. EMS to NORMAL.

11 14 13 11 CMP Okay. The hairline is over the notch in the self-test pattern and in test pattern number 4. Okay; 0.05G light came on in TEST 2. Go to TEST 3.

11 14 15 02 CMP Okay; it's 10 seconds, and the down light came on.

11 14 15 31 CMP Okay; it's 58.0 in the range counter. Okay; TEST 4. She's counting down, and trace went down. Going straight along.

11 14 15 56 CMP MARK it. 10 seconds. 0.0. How about that? And it stops at the lower right-hand corner of the trace.

11 14 16 36 CMP Okay; with TEST 5, trace went up, and 10 seconds later the upper light came ON.

11 14 17 02 CMP Okay. We'll go to RANGE SET here. ... cool down a little bit. And the trace moves on up to zero. It looks like it worked good, Houston.

CC Roger. Sounds great.

11 14 17 22 CMP Okay; we'll go to STANDBY and OFF.

11 14 23 39 CC America, Houston.

CDR Go ahead.

CC Just some words for Ron. When he gets into the P20 option 2, the maneuver there was tried on the simulator, and it got out to 71 degrees on the middle gimbal angle. And they got a gimbal warning light, although 71 degrees is the maximum yaw angle they got.

CDR Okay; we'll try it.

IMP Bob, for your recorded information there, mag Tango - Tango on the 35-millimeter camera - frames - let's see - 8 through 13 have the ALFMED prime observer position data on them.

CC Roger. We've got it recorded.

11 14 30 24 CC Just another piece of data, guys. On this maneuver you're in right now, it should go out to a 67-degree middle gimbal angle right in this maneuver.

CC America, Houston. We'd like to close UV cover until we're in attitude now.

CMP Okay; we'll close the cover.

11 14 32 41 CMP Okay; COVER is CLOSED.

11 14 36 12 CC America, Houston.

CMP Houston, this is America. Go ahead.

CC Roger. We've got a procedure we'd like to go through to eventually put the ECS RADIATORS FLOW CONTROL over to AUTO, and we have a bunch - several steps we'd like to go through before you do that move.

CMP Okay. Wait a minute; I'll write them down here so we can ...

CC Roger. Are you ready to read it - or copy it?

CMP Okay. Go ahead.

Tape 186/4

11 14 36 48 CC Okay. On panel 5, the ECS RADIATORS CONTROLLER circuit breaker AC1, verify CLOSED. Panel 2 ECS RADIATOR FLOW CONTROLLER to position 1. ECS RADIATORS FLOW CONTROL POWER to OFF, center then POWER. Wait 20 seconds. ECS RADIATORS FLOW CONTROL to AUTO. Over.

CDR Houston, America.

CC Go ahead.

CDR Do you suspect it was a - a power glitch, or do you think the controller actually failed and you're just now verifying it?

CC Negative on either of those cases. We've just had lots of spurious changes in the past history on flights. John's sitting here saying you had a number of times on 10, and so - since we're not - We just think the power controller probably saw a temperature glitch or something, and we think it will just come right back. No problem.

CDR I - Come to think of it, I guess we did, now that he recalls it.

CC We'd like OMNI Charlie.

CMP Okay; you have OMNI Charlie.

CC And while you're there, we'd like the UV COVER to OPEN now.

11 14 39 20 CMP Okay; we'll open the UV cover.

CMP Okay, Houston. I'm ready to proceed on this pitch maneuver.

CC Roger.

11 14 40 34 CMP And, Houston, the readback on the flow controller there. We'll check panel 5. ECS RADIATOR CONTROL circuit breaker AC1, verify it's CLOSED. Then we'll put the ECS FLOW CONTROLLER to position number 1. And we'll turn the ECS FLOW CONTROLLER POWER, OFF, then center.

CC It's OFF, center, Ron, and then up to the POWER.

CMP Okay. I couldn't figure out my writing. Okay; that's right. The power is OFF, center, and then - back to POWER. Then wait 20 seconds, and put the ECS FLOW CONTROLLER in AUTO.

CC That's affirmative.

11 14 41 05 CMP Houston, America. You want to start that now?

CC That's affirmative. Any time. And in case you're wondering - case you're wondering about that middle step, that's a reset to logic step by going off on the POWER and then back to POWER.

CMP Okay.

11 14 42 34 CMP Okay. ECS FLOW CONTROLLER is going to position 1. Okay; ECS POWER is OFF, and it's back to POWER. And we're waiting 20 seconds.

CMP Okay; FLOW CONTROLLER is going to AUTO now - and stays gray, it looks like.

CC That's what we expected. And needless to say, Ron, we'll be watching your ECS system very carefully for you, just in case it flips back. We don't expect any problem.

CMP Okay; mighty fine.

11 14 46 49 CC And, America, Houston. I've got a midcourse 7 and a MIDPAC entry pad.

CMP Okay. Just wait 1, please.

CC Roger.

11 14 49 32 CC And, America, Houston. We'd like to bring up the high gain, so we can get the dump going and get the data down. It's a YAW, plus 15; PITCH, 204. Say again. PITCH, plus 15; YAW, 204.

Tape 186/6

11 14 49 50 CMP Okay. PITCH, 15; YAW, 204.

CC Roger.

CMP Houston, America.

CC Go ahead. Go ahead, America.

CMP Okay; I assume this line in here, "Stop pitch rate at 146 degrees," means stop at 146 degrees in pitch. Is that correct?

CC Roger. Stop at 146 degrees pitch.

CMP Okay. Thank you.

11 14 51 52 CDR You've got the high gain, ... told us, Bob.

CC And, America, Houston. I've also - besides these pads, I've also got a Flight Plan update. For the first one, item is at 282:10. Either one you want to take first?

CDR Okay; why don't you go ahead with the Flight Plan update first.

CC Okay, Gene. At 282:10, manually - manual roll left 40 degrees prior to the VERB 49 maneuver. Insert "Manual roll left 40 degrees." And that'll give you a roll angle of 342 prior to starting that maneuver.

CDR Okay; I've got it.

CC Okay. The next one's quite a ways over. It's at 284:55.

CDR Okay; I've got it.

CC Okay. First thing at 284:55, we'd like a VERB 48; first register, 11102; second register, 01111.

CDR Okay.

CC A VERB 49 maneuver to lunar sounder thermal attitude at 285:00. The attitude is PITCH, 122 - say again, ROLL, 122; PITCH, 065; YAW, 047. That's 122, 065, and 047. HIGH GAIN angles with that will be PITCH, minus 24; YAW, 160.

CDR Okay. At 285:00, a VERB 49 to ROLL of 122; PITCH, 065; YAW, 047; HIGH GAIN is minus 24 and 160.

CC Roger, Gene. And then at 285:10, where we had you write in the "Antenna retract," we want you to delete that. The purpose of the maneuver above that is to heat up those antennas, and we will retract them on a cue from us when we feel the temperatures are warm enough.

CDR Okay. What about the "RADAR, OFF" at that point?

CC Delete "RADAR, OFF" also.

11 14 55 35 CDR Okay. I've deleted the whole update at 285:10 I had.

CC That's affirmative.

CDR Bob, Jack's ready to take the pad.

CC Okay. They just pointed out there's also VERB 48 at 285:10, which is not applicable either. And, Jack, I've got the MIDPAC area - say again. Let's do the midcourse 7 pad first. MCC-7.

LMP Go ahead.

11 14 56 17 CC RCS/G&N; 26735. NOUN 48s are not applicable. 301:17:57.78; plus 0001.9, plus 0000.0, minus 0000.1. Roll is 082; pitch, 041; yaw, 331. HA, not applicable. Plus 0022.9; plus 0001.9, 0:04, 0001.9. Sextant star is 31, 328.9, 34.4. Rest of the pad is not applicable. And in case I cut out and came off my key too fast, back up there in NOUN 81, that's a plus all zeros for Delta-V_Y. Set stars are Sirius and Rigel; 256, 152, 069. It's a four jet; plus-X. Assumes a PTC REFSMMAT. Over.

Tape 186/8

LMP Okay, Bob. I assume that DELTA-V_z was plus all zeros also.

CC No, I'm sorry. DELTA-V_z was minus all zeros .1 - .1 on DELTA-V_z.

11 14 58 44 LMP Okay; midcourse 7 readback. RCS/G&N; 26735. NOUN 48 is NA. 301:17:57.78; plus 0001.9, plus all zeros, plus 0000.1; 082, 041, 331. HA is NA. Plus 0022.9; 0001.9, 0:04, 0001.9; 31, 328.9, 34.4. Rest of the pad is NA. Sirius and Rigel; 256, 152, 069. Four jet; plus-X. Assumes PCT-TC REFSMMAT.

CC Roger. One change. On DELTA-V_z on your NOUN 81, that should be a minus four balls 1 - minus four balls 1.

LMP Roger. Thank you. Minus four balls 1.

CC Okay, Jack. That got us warmed up for the MIDPAC area entry pad.

LMP Go ahead.

CC MIDPAC area; 000, 153, 000; 304:01:37, 268. NOUN 61: minus 17.89, minus 166.13; 06.4; 36090, 6.49; 1047.2, 36172. RRT time: 304:18:37; 00:28. NOUN 69s are nonapplicable. D₀ 4.00, 02:08; 00:17, 03:37, 07:39. Sextant Stars 13, 117.3, 15.5. Boresight Star is not applicable. Lift vector is UP. Over.

11 15 01 57 LMP Okay. MIDPAC area; 000, 153, 000; 304:01:37, 268; minus 17.89, minus 166.13; 06.4; 36090, 6.49; 1047.2, 36172; 304:18:37; 00:27. NOUN 69 is NA. 4.00, 02:08; 00:17, 03:37, 07:39; 13, 117.3, 15.5. Boresight is NA. Lift vector, UP. Over.

CC Roger. The RET of 0.05G is 00:28 - 00:28.

LMP Okay. I'll change that to 28 for RET 0.05G.

CC That's right, and I've got one - we've got seven assumptions here on - or comments.

LMP Go ahead.

CC Comment 1: Use nonexit EMS pattern. Comment 2: RET 90K - -

LMP Go ahead, Bob.

11 15 03 39 CC Roger. Comment 2: RET 90K, 06:01. RET mains, 08:26. RET landing, 13:18. Break break. UV COVER, CLOSED, please.

11 15 04 10 LMP Okay; it's CLOSED. And, Bob, you're cutting out every once in a while. I missed your comment 1.

CC Okay, Jack, let's try comment 1 over again. Use nonexit EMS pattern. Comment 2: 90K time, 06:01; mains, 08:26; landing, 13:18. Comment 3: Constant g is roll right. Comment 4: GET of moonset, 304:16:13. Comment 5: Assumes midcourse 7, MCC-7. Comment 6: Assumes entry REFSMMAT. Comment 7: GDC align for entry REFSMMAT. Stars are Sirius and Rigel. ROLL, 273; PITCH, 256; YAW, 347. Over.

LMP Okay, Bob. Somehow I got more than seven, but I'll give you the ones I got. One: nonexit EMS pattern; 2: RET at 90K is 06:01; 3: mains are 08:06; 4: landing is 13:18; 5: Constant g is a roll right; 6: 304:16:13 is moonset; 7: assumes MCC-7; 8: assumes entry REFSMMAT. And 9: GDC align is Sirius and Rigel; 273, 256, and 347.

CC Roger. You've got a good readback there, Jack. The reason why is those times are all lumped into comment 2. However you want to do it there, fine.

LMP Okay.

11 15 06 46 CC One correction here. RET main times - I thought you read to me 08:26. It is 08:26 is the time on RET mains.

Tape 186/10

LMP Okay. I read 08:06.

CC Okay, 08:26. 26 is the time.

LMP Okay. I got mains at 08:26.

CC Roger, Jack.

11 15 08 41 CC America, Houston. We'd like AUTO on the HIGH GAIN, and we'd like you to do that manual roll and VERB 49 maneuver, which is listed at 282:10. We'd like you to start it now.

CDR Okay, Bob.

CDR Hey, Bob. I don't think your 342 is going to work out. I've just - Correction, if you will. Roll left. Left 40 degrees coming up.

CC Okay. I'm just sitting here, staring at FAO, and asking why it doesn't work out. Let me handle that. That's fine.

CDR No, it - Hey, Bob, it will. I was thinking of roll right. I'm on my way left now, and we will get 342.

CC Okay.

CDR Close to it. We'll get about - about - let's see now, 20 - whatever - whatever 360 minus 20 is. That's about 342.

CC Okay.

11 15 14 09 CDR Okay, Bob. We're there.

CC Roger.

CDR Bob, I press right on to the VERB 49?

CC That's affirmative. Press right on with the VERB 49.

CC We're just using this as a little addition here to get more time - more thermal heat on those - antennas.

11 15 20 40 CC America, Houston. We'd like OMNI Delta.
LMP Okay, Bob. I gave it to you a few minutes ago.
CC You got one on INCO that time.
LMP The first one.

11 15 25 34 CC America, Houston. We'd like UV COVER, OPEN,
please.

11 15 26 01 CMP Okay; it's OPEN.

11 15 26 08 CC America, Houston. We'd like ACCEPT. We've got
a state vector that goes with those pads we've
called up.

11 15 26 16 CDR Okay, Bob. You've got ACCEPT.
CC And you can get into the Flight Plan. We gave
you about a 15-minute bonus on your eat period
there. You can jump right into the eat period
if you want.
CDR Okay. Thank you, Houston.

11 15 29 21 CC America, Houston. The computer is yours.

11 15 29 28 CDR Thank you, Houston. ...

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 15 45 27 CC America, Houston. This is for Ron. It looks like one of your sensors may have come loose, so we're getting bad data. And don't interrupt your eating, but when you get a chance you might try and push them on or service them or whatever needs to be done.

LMP Okay, he'll get it. Is it by any chance printing upside down?

CC No, it's correct according to the - -

CMP I'm upside down in the tunnel.

CC - - doctor. Okay. (Laughter) Do you like eating that way? Is that the new trick?

LMP I don't see how his family is going to live with him.

CMP We're not going to be able to do that for very much longer, you know.

11 15 46 16 CC About 21 hours and 52 minutes.

11 16 16 29 CMP Houston, America.

CC Go ahead.

CMP Okay, Bob. I've kind of fiddled around with the sensors, now. Are they working okay now?

CC Stand by, Ron. Ron, your sensors look good, right at the moment.

CMP Okay. Good enough.

11 16 23 00 LMP Hey, Houston; 17.

CC Go ahead, 17.

LMP Yes, we'd like to run a check here on this TV setup. Are we going to disturb you if we go to TV on the S-BAND AUX switch?

Tape 187/2

CC Stand by on that. Let me check with OSO.

LMP And, Bob, if it is an inconvenience, could you look ahead and find the time we can have 10 or 15 minutes, if possible, to work this out.

11 16 23 41 CC Roger.

11 16 27 46 CC America, Houston.

LMP Go ahead.

CC You can have the TV switch to TV for about 35 minutes starting right now, if you'd like. And, while while - if you're working around there, we would like to take BATTERY A off the CHARGE and put BATTERY B on CHARGE.

LMP Okay, it's in work. And, we probably won't need it for that long. And, we'll get back with you as soon as we can.

CC Roger.

11 16 28 24 LMP Okay; we're in TV now.

11 16 30 05 LMP Okay, Bob, BATTERY B is on CHARGE and 7-Alfa reads 1.3.

CC Roger. We got that.

11 16 38 42 CDR Okay, Bob, I'm going to pick up the manual roll right for the VERB 49.

CC Okay, Geno. You've got a new capcom now. Good evening.

CDR Good evening, Gordo. How are you doing?

CC Real fine. How about you?

CDR Very fine. I'm going right for my VERB 49 maneuver, now.

CC Okay.

11 16 40 41 CC America, Houston. We need OMNI Charlie, please?

Tape 187/3

11 16 47 20 CC America, Houston. Suggest you try to get the HIGH GAIN up at a PITCH of 10; YAW, 210.

CMP PITCH, 10; and YAW, 210; okay.

CC Roger.

11 17 00 11 CC America, Houston. We've sealed up the DSE with science data. And, so if you're through with the TV rehearsal, we'd like the AUX band - the S-BAND AUX switch back to SCIENCE, so we can get the rest of the data real time.

LMP Okay. We just finished and going to SCIENCE.

11 17 00 31 CC Roger. Thank you.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 17 14 31 CDR Hello, Houston; America.
CC Go ahead.
CDR Gordy, how far out are we?
CC How far out? 100 000 miles, approximately.
CDR Okay. Thank you.

11 17 18 25 CC America, Houston. A little more precise answer. You're 97,500 miles, and you passed the halfway point about 2 hours ago. And we're going to have a site handover here on the hour.

11 17 18 41 LMP Got all that, Gordy. Thank you.

11 17 24 30 CDR Hello, Houston; America.
CC Go ahead, America.
CDR We'll stand by for your call to power up the TV.
CC Roger.

11 17 25 18 CC America, Houston. We're ready for TV.
LMP Roger, Gordy.

11 17 26 41 CDR Okay. We're going to TRANSMIT on the TV now.
CC Roger.
CDR And let us know when you've got a picture.
CC Will do.

11 17 27 19 CC American, Houston. We've got a picture. Looks good, looks in focus, and we see the flag in the patch.
CDR Okay.
LMP Houston, here's the crew of Apollo - Apollo 17, Spaceship America.

CC Roger, Apollo 17. If you're ready for the questioning, I'll begin.

LMP Go ahead, Gordo.

CC Okay. As usual in these inflight news conferences, the questions that will be asked of you were prepared by correspondents covering the Apollo 17 mission at the Manned Spacecraft Center in Houston. They will be read exactly as written and in the order determined by the newsmen. The first question is for Jack Schmitt. If you, as a geologist, were coming home from a field trip on Earth, you'd be drafting a preliminary report and discussing it with fellow geologists. In terms understandable to laymen, can you summarize what you would be saying in your preliminary report about your field trip to Taurus-Littrow?

LMP Well, I'll - I'll give that a try, Gordy. I think the thing we had hoped to accomplish at Taurus-Littrow was to look at a - as broad a spectrum of the history of the Moon as possible in one small area, as the concluding flight to the Apollo Program. And I think we did that. I think we had look - did look at some of the oldest rocks that it is possible to see with our capability in the breccias of the South and North Massifs. I think we saw some intermediate-age rocks of fairly unexpected character, I believe, in the subfloor crystalline or igneous rocks, the gabbro, as we called them there. And we also understood, I think, that those rocks, in fact, had intruded into the breccias of the North Massif. We found, I believe, in the - at the Crater Van Serg, on the third EVA, that the regolith, or the garden zone, on the top of that subfloor gabbro, or the igneous rocks, was quite thick, or appears to be very thick, which is an expected result, and will - hopefully, those rocks will have much information about a fairly extended period of lunar erosion. And, we found that there was indeed a dark mantle over the area

of - variable thickness; but, apparently, of relatively recent age, and that in turn had a light mantle of material of which we do not yet understand, and I think that the samples are going to have to tell that story. It may well be a land slide that has come off the South Massif. And, then, possibly as important as any finding, we found that even later than that relatively young light mantle deposit are avalanche - possible avalanche - we have alteration reminiscent of the alteration by hot waters or hot gases on Earth, and that was the orange - appears to be the orange soil that we found around the Crater Shorty. And, subsequently, in orbit we started to pick up, and particularly through Ron Evans' efforts, pick up more of the apparent evidence of such alteration taking place in fairly recent time on the Moon. All of those items, I think, are extremely significant and go through the full range of our present knowledge of lunar history. And, a report I would write would initially summarize that particular sequence of events.

CC Question number 2 is for Jack, again. What other probable explanations besides volcanic origin do you have for the orange rock and colored soil that you found at Shorty Crater?

11 17 33 02 LMP

Well, they don't necessarily have to be volcanic, Gordy. I refer to them as alteration, and much of the hydrothermal, or hot water, alteration we see on Earth is related to recent volcanism, or ancient volcanism; but, also, we know of that kind of alteration of preexisting materials to take place as a result of - of just fluids working their way up through the Earth's crust, and I presume that such a process is also possible on the Moon. The ones we saw seem to be associated with areas of dark mantle of various types, and most of the photographic evidence we have is that those dark mantle deposits are associated with volcanism, but it is not necessarily proved yet, I believe, that the - the orange soils or the alterations we've seen are volcanic. However, the

Tape 188/4

process would be a related process, that is, one of internal origin.

CC The third question is for Cernan or Schmitt. Your voices are so much alike that it is unclear to some of us which one of you found the orange rock and who first spotted the layer of orange soil on the crater rim.

11 17 34 22 CDR Jack found it. He uncovered it as he was walking on the rim, and we worked with that, and then, as I went around the crater to take the stereo base pan from within the crater, I could see alterations radially down from the rim farther beyond where we were working down to the center.

LMP I don't think that that question of who found it is as specifically as important as that that we were there with the equipment and the training jointly to not only recognize that but to take advantage of having recognized it, and I hope that we did.

CC Okay. The next one's for Ron Evans. Why do you think you were able to see so much orange material from lunar orbit, after your partners had found some on the ground, where none of the previous Apollo crews reported seeing anything but grays, tans, and browns?

11 17 35 22 CMP Well, I think, for one thing, that we were in, essentially, a different orbit than some of the other crews that had been up there before. And even though each of us has a color tone in our own eyes, what we come up with, I think, is a function pretty much of what you'd like to believe and what you'd like to see out of things. If you feel it has a tint of orange with it, and this is in a new area that we really haven't flown over that much, and this is primarily - where we were seeing this type of thing was on the western rim of Serenitatis, and some of the - well, at least it looks like known volcanic deposits along the rim of Serenitatis.

LMP Gordy, let me add quickly that there's no such thing as a truly objective observer; and, I believe, that once you start looking for something, and when Ron heard about what we were doing, I'm sure he started looking, himself, to see what we had seen. That leads you to see things. Now that's not seeing things that are not there. It makes you look for things that are there, and that's extremely important; and that's where the kind of training all three of us have had and I think has made it possible for us to find a lot of things that might not otherwise have been found.

CC Here's one addressed to all three crewmen. What will you remember most about this mission?

CDR Boy, that's a loaded question, Gordy. There's so many things, but I think probably the thing that - when I think about it - that will stick with me most is the same thing that stuck with me - for my last two missions - not so much being there, but it's getting the chance to get home and share what you've seen and what you've done with other people.

CMP I think in my case, the lift-off itself was something brand new for me. It's something beyond - The booster ride itself was something beyond what I could really comprehend. So, I think that's - oh, it's a very important part of it. I will always remember that part of it. But I'm kind of like with Gene; I feel that even though the three of us have been up here and had the opportunity to observe the Moon, look at what we could find and that type of thing, I think that we have an obligation to share our experiences with the rest of the people.

11 17 38 08 LMP Well, Gordy, that is a difficult question. It has been a fascinating experience from so many detail aspects. I guess, generally speaking, the thing I carry back with me, I hope, is an increased perspective not only for the history of the solar system, but I hope for the future of mankind within that solar system.

- CDR Gordy, this doesn't mean that that last 50,000 feet won't stick in my mind for a long time.
- CC Roger, Gene. Again for all three crewmen. Now that you are returning home from what may be the last lunar exploration of this century, what short-range and long-range plans do each of you have for the future?
- CDR Well, my short-range plans are certainly to enjoy Christmas with my family, think about the flight, get its data down on paper. My long-range plans are to turn around and look at the next flight whenever that may be and put my efforts and experience toward that flight and get to work on it.
- CMP I think my short-range plans - of course, first of all tomorrow I want to make a real good reentry, and that's kind of the real short-range part of it. From that point on, as I mentioned before, I think we have a responsibility, at least, I feel we have responsibilities to share our experiences with the rest of the people not only in the United States, but with the people of the rest of the world. Beyond that, I also have a strong desire to continue participating in manned space flight in whatever capacity that I might be able to.
- LMP Well, I can do nothing but echo Gene and Ron's words and maybe add, Gordy, that I hope that through the next few years I'll be able to make some contributions that guarantee that this Apolly 17 flight is not the last exploration program in this century in space.
- CC Again, for all the crew. Throughout the mission there were periodic reports from each of you about gastric distress in one form or another. Does this trouble make you think that the three Skylab missions of 28, 56, and 56 days scheduled for next year are too ambitious?
- CDR No, not at all. I don't think they are too ambitious, Gordy. I think that's the reason we're flying each and every one of these flights one at a time. To find out if there really are potential problems in

diet or what have you, and I think we solved a lot of them from Apollo 15 and 16, and those few that we had I'm sure we can solve, accordingly, prior to Skylab flying.

CMP I don't think I can add anything to that.

LMP I think we've made a big improvement over the problems that occurred on Apollo 16, and I think as a result of our observations in conjunction with the medical people, primarily at NASA, that solution - a very clear solution will be found for Skylab and any other mission we want to fly.

CC Okay. For Ron Evans. You seemed almost euphoric during your space walk yesterday, and other space walkers before you seemed to have had this same reaction to the experience. Can you describe what it was like and how it made you feel?

CMP Well, I think for those of you who had the opportunity to watch yesterday, it is pretty obvious how I felt out there. I'm not sure euphoric is the word. I - it's an opportunity - Well, to me I guess it was an opportunity to be what I call a "real space man." And - you're out there in the deepness of space, with nothing there but your spacesuit on, and you're doing the job that has to be done. And we're riding around in space out here, and this is in a capsule and we look out the window, you know, but it's nice firm feeling. It's a solidly built vehicle, and you get the zero g effect on the thing, but you don't get the feeling of - really getting out and walking in space. And once I became accustomed to what it was like in the EVA environment, then you relax and you take it easy, you try to accomplish what you can and observe what you can and really enjoy it. And I think I really enjoyed it.

LMP I had a hold of his umbilical most of that time and I didn't notice that he was ready to jump out into space if that's the kind of euphoria you're talking about.

CC Okay. For Eugene Cernan and any other later comments. You talked a lot about this mission being the end of the beginning, but a lot of people don't agree. Recognizing the United States is stopping lunar exploration for the foreseeable future, how do you feel?

11 17 43 48 CDR When we look back at the Apollo Program I don't think anyone can privately to themselves and publicly say that this isn't truly indeed really a beginning - a beginning of man's really first venture out into deep space. And once there's a beginning, there's a continuation. The probing into deep space by man, the next landing on the Moon, a trip to Mars may not be for 10 years, a decade; it may not be until the end of this century. But I personally have faith that it will happen. I think it's a restraint, an abnormal restraint of man's intellect at this point in time to restrict or tend to think that he will restrict his own feeling of exploration, his own quest for knowledge. He's had an opportunity. He's proved that he could take advantage of this opportunity, and I think that the nature of mankind is going to just press on. That's why I believe not - we of Apollo 17 - yes, it's a beginning; but the whole Apollo Program is really the true beginning of what's to come in the future. And I firmly believe that. We can look back in a 100 years or 200 years and the 5-year or 10-year period of time, we may be slowed down here. I think we'll be - we'll be lost in the merit of what is really accomplished during the next several decades.

CC The next question is for all the crew. The American people seem to be getting fairly blase about space flight and television coverage of Apollo 17 has been at a minimum. But this is not the case abroad. For example, in the Republic of Zaire, the former Belgian Congo, an estimated 20 million people are watching extensive coverage on TV sets set up in the villages. What do you have to say to the people of underdeveloped nations?

LMP Well, Gordy, first of all, I'm not sure that the amount of television coverage is necessarily a measure of the interest of the American people. I don't have those figures at hand. I'm sorry to hear that the adventures we had and the insight that maybe we gained into not only ourselves, but to the history of the solar system was not shared extensively with the American people, if that's true. As far as the rest of the world is concerned, and also the people of the United States who may not participate as much in the affluence that we all would like to share, I think that's what space flight in general and the Apollo Program in particular has offered, is many new avenues from which we can provide for those people abroad and for our own people, the kind of quality of life and the material - including the material quality of life that everybody aspires to. I think we've just begun the adventure of understanding how - what we've learned and how we've learned to do it in space can be applied to these particular kinds of problems. That is one of the great challenges that I think NASA and other agencies within the United States Government and other governments abroad have, is to use this base of technological information now for their own people.

11 17 47 26 CDR I'd like to just add to that very briefly, Gordy, that America has led the way into space in the past. I believe we will in the future. But, a point I tried to get across several days earlier in this flight is that the real promise of the future for all the peoples of the Earth is to weld themselves into a coherent group of people who can live and work together and then enjoy all the benefits and all the knowledge that is to come from future space explorations. I think we are doing this not just as Americans but as human beings and everyone throughout these countries throughout the world who are watching us right now are also human beings no different than we are. It's their accomplishment as well as it is ours.

CC Question 11 is for Jack. Do you think the United States waited too long to send a geologist to the Moon?

- LMP We're grinning because I think we predicted that question. Gordy, I think the United States waited too long to go into space in the first place, and I think they're probably going to wait too long to go back. I will always feel that way no matter who goes or what qualifications he may have or may think he has. I think that the most important thing that maybe I have done is to - to be able to show that we can build a transportation system that allows you to fly people of a wide variety of disciplines. And I think that we have shown that, and I think that it's occurred at about as soon as possible within the Apollo Program.
- CC The last couple of questions are in a lighter vein for Ron Evans. There has been a lot of discussion about missing a pair of scissors in the command module. Who really lost the scissors?
- CMP Well, I think it must have been one of those other guys because I was asleep and I got up the next morning and it was gone.
- LMP Didn't happen on my watch.
- CC And also, Ron, did you squeaking of those mice on board keep you awake?
- CMP No, the mice really didn't - there are plenty of other things going on inside the spacecraft here that we can hardly even hear the mice. As a matter of fact I really haven't heard them yet.
- CC Okay. This completes the list of questions submitted by the newsmen here in Houston. There are a little less than 7 minutes left on our scheduled time for any other further remarks you might like to make.
- CDR Yes, Gordy, I think we'd like to take this opportunity to each say a word or two.
- LMP Well, just briefly, Gordy, I feel that I have done something that's very significant here in my life. I hope that - and will do everything I can to see that it is not the most significant thing I ever do. But, I feel that the fact that I had the

opportunity to do in a large part to the tangible and intangible effects that my mother and father had on my life and to them I send my thanks and I hope that I continue to live up to their expectations.

CMP You know on Apollo 17, here, we've had two outstanding vehicles and that's the - don't let me get you wrong, I'm not discounting the booster either. But, I've watched a lot of people work on a lot of spacecraft, and I'm very proud to be able to say that all the vehicles that have been associated with Apollo 17 have been outstanding. And, the reason they are outstanding is because of the people that have been working on them. And, I'd like to give our thanks and the well-done to people who worked on our spacecraft.

CDR Gordy, prior to leaving and I guess I can certainly assume during the flight we've carried many, many well wishes and carried many prayers aboard from people throughout the world. I personally believe that those prayers played no small part in any success that we were able to achieve on this flight. I ask those people, however, to continue their prayers in particular for some of our friends and some of our comrades who are still in southeast Asia - POWs, MIAs who may not - although God willing I hope they will - but who may not have the opportunities to get home and enjoy the Christmas that we're looking forward to. And with that from Apollo 17 spacecraft America on December 18, 1972, we all wish you a very, very Merry Christmas and a happy holiday season. Godspeed and God bless you all.

11 17 53 12 CC Thank you, guys. That was a good show. We enjoyed every minute.

LMP Okay, Gordy. I presume you want to go back to SCIENCE in the comm configuration, and we're getting squared away here for a big VERB 48.

CC Okay. That's affirmative. Back to SCIENCE, please.

11 17 58 48 CDR Gordy, if you like, I'll go ahead and maneuver now.

CC No. We want to hold the maneuver until 55.

Tape 188/12

CDR Okay.

11 18 05 06 CC America, Houston.

LMP Go ahead.

CC Okay. We're ready to go with that VERB 48 and then the VERB 49 as listed a little bit early here. That'll put us in the hot-soak attitude.

CDR Okay, Gordo. Be with you in about 30 seconds.

CC Okay.

11 18 07 21 CDR Houston, America is on her way.

CC Okeydoke.

11 18 12 47 LMP Houston, 17's getting the high gain up, if you want it.

CC Yes. We think we're already on it, Jack.

LMP Well, I meant to have the other angles.

CC I think you can just leave it alone. It is holding some - during the maneuver and should hold until the end of it.

LMP Okay. The maneuver's over, Gordy.

CC Roger.

LMP Now we're even.

CDR Hello, Houston, America.

CC Go ahead.

CDR Okay, Gordy. With these relatively fixed attitudes most of the afternoon, we got the - the tunnel totally dry, but the forward hatch is awful wet. I just thought I'd throw that out.

CC Okay.

11 18 36 53 CDR Houston, America. If you're ready, we'll maneuver.
CC Stand by; we're checking. Not yet. Temperatures aren't up as high as they would like. We'd like to hold 5 minutes at least.
CDR Okay; we'll just stand by for your call on the maneuver.
11 18 37 33 CC Okay.

END OF TAPE

APOLLO 17 AIR-TO-GROUND TAPE TRANSCRIPTION

11 18 45 54 CC America, Houston.

CDR Go ahead, Houston.

CC You guys aren't going to believe this, but Santa Claus just walked in the MOCR with a long white beard, red suit, black boots and all, and he's passing out presents to everybody.

LMP How did he get there before we did? We just saw him up here about 5 - 5 days ago.

CC Well, he beat you back.

11 18 46 24 CDR Gordy, I'd - I'd believe anything. Has he got anything with our name on it?

CC I'll ask him. I don't see anything yet.

CC America, Houston. You can go ahead and start the VERB 49 maneuver. Have a change in the high gain angles, though, as printed there. Make it a plus 30 and 190, instead of minus 40 and 90. That's a plus 30 and 190 on the high gain.

CDR Okay, I got them, Gordy.

LMP Gordy, when you get a minute, would you ask one of the Surgeons there what my heart rate peaked out at in the last 15 minutes or so?

CC Okay, I'll do that. I'm just looking at some of the presents here. Mine was a little Skylab food can - flip-top can. It says, "CAPCOM's Postflight Dinner." And I'm pretty sure there's absolutely nothing in it, but I'm afraid to pull the lid off. The Surgeon's got a little plastic telephone that says "For Private Conversations Only."

LMP (Laughter)

CC And your heart rate went to - -

Tape 189/2

LMP I'd be more worried about what might be - -

CC Your heart - -

LMP Ought to be more worried about what might be in that can, Gordy.

CC (Chuckle) Yes, I am. Geno's heart rate peaked at 115 to 120.

11 18 48 52 LMP Okay, what did the LMP's peak at? He wasn't doing anything.

CDR I'm not even on biomed, as a matter of fact, Gordy.

CC Oh, I'm sorry. My mistake. (Chuckle) Not the Surgeon's. That was the LMP's.

CC Stovall, on the front row there, got a little shovellike gadget with a sign on it that says "Trenching Tool."

LMP Beautiful. (Laughter)

CDR I thought they might give him a coin. A flipable coin.

CC He's got a coin like that. It says "CSM Active" on both sides.

11 18 50 02 CDR Yes, that's what I figured.

11 18 55 24 CC America, Houston. We're ready for a spinup now.

LMP Okay.

CDR We're spinning, Gordy.

11 18 57 16 CC Okay. It's looking good.

11 19 14 53 CC America, Houston. We'd like to throw a few switches on panel 230 and try to get the HF antennas retracted. Over.

LMP Okay. Go ahead.

CC Okay. First of all, RADAR - OFF.

11 19 15 14 LMP Okay, Gordy, the RADAR is OFF.

CC Okay; then HF ANTENNA number 2, RETRACT. And give us a mark, please. It should take about - a little over 2 minutes.

LMP Okay, going to RETRACT -

11 19 15 30 LMP MARK it. Oh, HF-2? Gordy, I started 1. I'm sorry.

CC That's all right. Keep it. It doesn't matter; just keep working on 1 there. Keep it in RETRACT.

LMP Okay, it's in RETRACT - and stayed there.

CC America, Houston. As you come up on roll of 30, we'd like you to - Okay, break, break - we would like the ANTENNA 1 switched to OFF now.

11 19 17 54 LMP It is OFF.

CC And we got a good retract. Okay, for the guy on the - -

LMP Gordy?

CC Go ahead.

LMP It was still barber pole when I went to OFF.

CC Okay, that's the one we had trouble with before. That's what we expected. Okay, you can go number 2 to RETRACT now.

LMP Okay, number 2 - RETRACT -

11 19 18 30 LMP MARK.

CC Okay, and for whoever is driving the spaceship there, we'd like to stop the roll - stop the PTC at a roll angle of 30 instead of what's in the

Tape 189/4

Flight Plan. That's 30 degrees. And you're passing through 73 right now. Over.

CDR Okay, Gordy. I got it. I'm looking at NOUN 20. We'll stop it at 30.

CC Okay, and I have different high gains to go with that attitude. They'll be minus 24 and 206.

CDR Okay. We got them.

CC Jack, Houston. You should be retracted now and have a gray. And you can go OFF if you do.

LMP That's affirm and congratulations.

11 19 21 05 LMP And the switch is OFF.

CC Okay, and those high gain angles I passed you are probably misleading. It looks like the high gain ought to just hang on when you stop this maneuver.

LMP Okay.

CC America, Houston. It'll be about 5 or 6 minutes until we finish the dump before we can go ahead with that VERB 49, in case you got something to do.

11 19 22 37 CDR Okay, Gordy. Thank you.

11 19 29 51 CC Okay, America. We're ready for the maneuver now.

CDR Okay, Houston. Here she comes.

CDR America is on her way again.

CC Okay.

CDR Gordy, I see two DAP changes here. You want to change this one during the maneuver or - after the maneuver - and then the next one before the next maneuver?

CC We want the DAP load after you get to attitude and then the other DAP load before you start the next maneuver.

CDR Sounds - that sounds good here. Okay.

CC America, Houston. We need the UV cover closed.
The Sun's getting in there.

11 19 32 17 LMP CLOSED, Gordy.

CC Thank you.

CC We should be safe now. Open the UV cover, please.

11 19 35 05 LMP Gordy, it's OPEN.

CC Thank you.

LMP Doesn't it bother you to wield such power, Gordy?

CC I'm getting accustomed to it.

11 19 38 24 LMP Gordy, for the first time in seemingly several
days, we see the Earth.

CC Roger. Standing by for a weather report.

LMP (Laughter) Afraid I don't know whether or not
there's any weather down there.

CC Guess you can't see too much of it, huh?

LMP No, sir. You're down to a fingernail, if you'll
pardon the expression. It - Oh, let's see - it's
about a - what do you think, Gene? - about a
one-eighth Earth - one-sixth to one-eighth Earth?

11 19 39 24 LMP Got picture, Ron. (Chuckle) You can see it
later. (Laughter)

11 19 46 37 CDR Hello, Houston; America.

CC Go ahead.

CDR Okay, Gordo, 286:52 on the Flight Plan and
287:40 - Is there an update on that? CMP put his
biomed harness on - oh, I guess 4 to 6 hours ago.

Tape 189/6

CC Yes, let me check on that. I - There was something on this when I left last night, but I'll have to get the latest here.

11 19 47 14 CDR Okay.

11 19 54 26 CC America, we're ready now for the steps at 1 - 286:43 - CMC MODE - FREE and AUTO. VERB 48, VERB 49, and so forth. On the biomed, we're going to leave it up to you. Whoever - draw straws or whatever - whoever you decide to wear the biomed tonight, it's your choice.

CDR That's easy. Jack and I will put it on in the morning. How's that?

CC Okay.

CMP You get to watch Captain America tonight then.

CC Okay, Captain.

11 19 57 35 CC America, Houston. We'd like OMNI Alfa.

11 19 59 43 CC America, Houston. We can take the high gain now that you're there. The angles in the book, minus 37 and 48 and AUTO.

11 20 04 43 CC America, Houston. We're ready for VERB 74.

CDR Coming at you, Gordo.

11 20 04 52 CDR MARK it.

CC Okay, we got a good dump. Thank you.

11 20 07 52 CMP Okeydoke.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 20 17 30 CC America, Houston. Over.

CDR Go ahead.

CC Okay. We've been thinking about the - the busted Snoopy hat and have a suggestion on a - on a configuration that we'd like to present to you as an alternative to the plan you mentioned earlier. See what you think about it.

CDR Hey, Gordo.

CC Go ahead.

CDR Can - can you hold off with that update? Ron's off the headset right now, and it'll be a few minutes. And I'd like to hear him - have him hear that.

CC Okay. And just as a brief introduction before he gets on, we're really thinking about letting Jack have the broken one. Nothing personal, Jack, but think that it's probably more important that you and Ron have the - the all-up ones. Over.

CDR Yes, we've already discussed that, but let - let Ron talk over with what his plan is, and let's hear yours.

CC Okay, give me a call when you're ready.

CDR Okay. And for food for thought, you might think about that. We looked at a way of just taping the electronic part of the lightweight headset right to - to his helmet. It looked pretty good. So chew on that one for a while, and we'll be back with you and you can come up with your plan.

CC Yes, that sounds like that's - that's our plan, essentially, but I'll go through it in case there's anything that either you or us haven't thought of about it.

CDR Okay.

CC America, Houston.

Tape 190/2

LMP Go ahead.

11 20 22 08 CC We'd like to give you what EECOM has said should be the final H₂ fan configuration for this mission.
H₂ FAN 2, OFF, and 3, AUTO.

11 20 22 26 LMP Okay, H₂ FAN 2 is going OFF and 3 to AUTO.
And this is truly a historic event.

CC It's been a pleasure to share it with you, Jack.

CDR Isn't that the way we started? Isn't that the way we started?

CC I think it is. Affirm.

LMP Very appropriate. My congratulations and my hat off to the EECOM.

CC Thank you, sir.

11 20 23 55 CC America, Houston. We'd like you to spin it up on B-2 and D-2, and we have one change in the HIGH GAIN REACQ and NARROW angles. Instead of a YAW of 90, we want a YAW of 45.

11 20 24 19 CDR Okay, I'll set them at a YAW of 45.

CC Roger.

CC You probably weren't aware of it, but your IR is chilly. Would you turn it on up until bedtime to warm it up a little, please?

11 20 25 21 CDR Okay, that's only - that's only appropriate. IR is ON.

CC Roger.

11 20 25 45 CMP Okay, Gordy. I just spun up America for you.

CC Thank you.

11 21 04 03 CMP Houston, America. The - the CMP is in biomed.

CC Okay, CMP.

CMP Very good.

CC This probably isn't too good a time to have an emergency.

CMP (Laughter)

CC The reason I say that is we got a big Chinese feast going on here in the MOCR.

CMP (Laughter) Oh, you do?

CC Had some food brought in, and everybody's probably more interested in eating than the America right now, I must admit.

CMP (Laughter) Uh-oh.

CMP Houston, America. How's the delivery girl situation? Is it as good as it used to be?

CC Oh, yes. Better, if anything.

CMP Outstanding.

11 21 06 21 CC Ron, I have some words on our suggestion, probably the same as what you've done already on rigging up the headsets for - for entry tomorrow any time you have a free moment to listen.

CMP Oh, sure. Go ahead. I'm just sitting here right now.

CC Okay. Geno mentioned that you'd already essentially taped the electronic part to your Snoopy hat. I guess, first of all, we're suggesting that you rig - rig this up for Jack, and let you have the good one just to be sure. And I'll - I'll quickly run through the steps we have. I think maybe this will be the easiest way. And you can then listen and if you've done it already or if you - if this mentions something that you haven't thought of, it'll at least accomplish the job. They have about 15 steps here, but I don't think it'll take long to summarize it. They suggest taking the headband off the lightweight headset; in other words, taking the electronic part off the headband, straighten the mike boom, and straighten the - the comm carrier

boom, the appropriate one for whichever ear Jack wears his molded earpiece in, then rotate the lightweight headset mike boom 90 degrees. They found that was necessary to get it to face your mouth when - when you end up with this all taped on there. You have to sort of twist it, force it 90 degrees. Then lay the lightweight headset boom along the comm carrier boom with the electronic part on the outside of your - your earpiece on the Snoopy hat. And the - the hose that goes to the molded earpiece facing downward coming out down and with the - the mike boom 1 inch beyond the comm carrier mike boom tip. And then tape the two booms together for the entire length of the comm carrier boom. And then rebend the whole works back so that the tip is back in front of your mouth. And then tape the electronics box onto the side of the earpiece, and you can run tape all the way around the lower part of the earpiece, and you can lift up on the leather-covered doughnuts on the inside there, pull that loose and then run tape underneath. Just pull the lower part of it loose, run tape all the way around to really securely anchor the electronics box to the outside of the - the earpiece so there's no chance that that will slip off or shift. Then you can kind of push the leather earseal back down on top of the tape inside. Let's see. Then - -

CMP

Yes. So far - so far, we're right with you.

11 21 09 45 CC

Okay. Then take the comm carrier electrical lead, and double it back on itself, and - and tape it together so that it doesn't flop around. And now you've got it essentially set up. I - I've lost my place here in the sequence. Just a second. Okay. Place the molded earpiece - Well, actually, one further modification was then to run the - the hose, which is now external, up underneath the leather doughnut and out through the ear opening, and - and pull it on through. Now you - to put this all on, you'll have to stick the molded earpiece in your ear and then as you pull the Snoopy on, sort of pull the slack out of the - the audio hose there so you don't end up with a lot of hose coiled up in the earcup. And the - the remaining hose then just sort of dangles down beside your neck. Fasten the chinstrap, and make sure that the hose isn't pinched or - anywhere. Readjust the

mike boom to a half inch from your - in front of your lips, and make sure one of the foam parts of the mike boom is facing your mouth. Okay. Then you just route the - the electrical lead and the - the plug on down through the slot and the ICG, and put - put all the excess length of the connectors and the - the excess stuff down inside the ECG [sic] so it doesn't flop around, and of course mate the pins, the connectors, and snap the ICG closed at the front to be sure that it'll capture. One thing they did try in this configuration is - was - was to see if you could get the helmet on over all that, in case a suited reentry became necessary at short notice, and it does go on. Randy Hester tried it. And with just a little cocking of the head, you can get the helmet on over. How's that sound to you?

11 21 12 24 CMP

Hey, Gordy. That sounds essentially what we were thinking about. We hadn't got to the extent of trying to hook them up yet, you know, put them together yet, but we're thinking along the same lines anyhow. And you brought up a couple of points that are good.

CC

Okay. If you got any questions or anything, I've got a demo model sitting right in front of me here, so that we can just discuss it real time as you get it set up. I assume you're going to try to work that up tonight. Is that right?

CMP

Yes, we can, I guess. Okay, and the - the reason you'd rather have Jack do it than me is simply - simply because of the redun - redund - I can't say the word. (Laughter) Redundancy.

CC

That's affirmative. It gives you and Gene the - the prime - best equipment, and we see no - no reason why this won't work, but like you say, it's only one mike in place of two on the other ones.

LMP

I'm surprised you didn't have us tape two headsets to the Snoopy helmet.

CC

Well, Jack, we'll just take that chance.

LMP

Well, it took 14 days, but I finally know where I stand.

Tape 190/6

CC I do have a question. Well, first of all I give you a little weather for the South Pacific tomorrow, if you're interested.

LMP Stand by and let's get the commander on the headset here in a minute. Then you can pass it up.

CC Okay.

CC Not bad.

CMP Well, I'll let her go this time.

CC Okay, we got them.

11 21 19 39 CMP Okay, we'll torque at 59:45.

CC All righty.

11 21 20 11 CC America, we would like to stop the roll this time around as you come up on 146 roll.

11 21 20 28 CMP Okay, we'll stop it on 146 roll.

11 21 25 49 CC America, Houston. When you get her stopped there, we'd like you to hold the attitude until we get the DSE dump before doing the VERB 49.

11 21 26 00 CMP Okay, Gordo. We're there now.

11 21 28 20 CDR Hey, Houston; America. We can take those words on the weather in the recovery area, if you like.

CC Okay. It can be summed up by one word, "Excellent." 2000, scattered, and high-scattered are forecast. I'm looking at a satellite picture - high-resolution satellite picture that shows you in the middle of a big high, and she's just - very faint hint of clouds in the area. And the trend of the weather movement is such that you're going into a - an even clearer area by tomorrow. The wind will be 090 at 10; visibility, 10; 2994 on the altimeter. It's of no consequence to the Navy guys, but the landlubber will be glad to learn that there is 3-foot wave heights, and the temperature is 77 degrees. Over.

CDR Sounds like a fighter pilot's day to come aboard. I think they'll be able to take those seas.

11 21 29 37 CC (Laughter) Roger. Okay, you can start the VERB 49 if you wish.

11 21 30 42 CC America, Houston. One other request you might be thinking about that you'd - and that is any delta to the nominal entry stowage that we might not know about we'd like to know about before you go to sleep tonight so we can think about the c.g.

CMP Okay, Gordo. We'll be able to give you those.

CC America, Houston. We're ready to spin it up.

10 21 40 34 CMP Okay.

END OF TAPE

Tape 191/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

11 22 38 36 CDR Hello, Houston; America.

CC Go ahead.

CDR Gordo, we're just finishing chow and doing a little cleaning up, and I'm doublechecking the stowage and so forth. But we do have a minute. Is there by any chance any late news? Anything going on today that might be of interest?

CC Okay. I haven't heard of anything. You did get a news report this morning? Is that correct?

CDR Yes. We sure did.

CC Okay. I'll see if there's any deltas to that. It'll take me a couple of minutes.

LMP Okay. How's the Houston weather today?

CC It was overcast but warmer. Kind of standard winter weather for around here. Not nearly so frigid as it has been the last couple days.

11 22 39 26 LMP Okeydoke.

11 22 54 07 CDR Hello, Houston; America.

CC Go ahead, Gene.

CDR Okay, Gordo; the entry stowage will be as - as in the Flight Plan Supplement, with the exception that there is a - a small LM jettison bag, max weight of about 25 pounds, which will be - which is already, as a matter of fact, packed in A-7.

CC Okay. We got that.

CDR And the presently used jettison bag weight really isn't very much at all, that's just for house-keeping trash and so forth. We will tie between A-2 and A-3, and there's probably not, at the most, more than 5 pounds there.

CC Okay.

Tape 192/2

CDR And right now we haven't seen any specific spot to tie down the LEVAs. If you've got a recommendation, we'll take it. If not, we'll just pick a spot down in the LEB area to tie them down.

11 22 55 29 CC Okay. I'll see if we have a plan for that.

11 23 16 02 CC America, Houston. I've got an update to the news.

CDR Okay, Houston. America's listening.

CC Okay. It's some more like human interest stuff rather than pure news. One thing the - in the Liberty Bowl football game Georgia Tech beat Iowa State. Well, I guess it's not quite over yet - this is a fourth quarter score, Georgia Tech 31, Iowa State 24. And, there is a story about the Moonship that's streaking smoothly homeward. There's nothing in it that you don't know about, though, except maybe one little part of the article describing a quote from William E. Fastie of Johns Hopkins University, member of the Orbital Science Team, who said that a rather startling discovery is the Moon is simply not degassing. It has nothing left in terms of anything that you think - that can create an atmosphere. Much to his surprise, even the amount of hydrogen, an element that should have been the most abundant outgassing candidate, turned out to be about 1 percent of its predicted value. He speculated that the absence of a planetary magnetic field on the Moon works to the purge surface of any atmospheric accumulation. The atoms of gases that have vented to the surface, he theorized, pick up an electrical charge then - and are then swept away by the solar wind, which is a stream of electrified atoms pushing far out into the solar system of the Sun. Former President Truman is stabilized is the word they are using now. His heart condition is unchanged. His kidneys are failing him, and he's termed to be still in a very serious condition but resting comfortably. A declining birth rate and a desire for fewer children in the years ahead have caused the census bureau to reduce sharply its estimates of future population growth in the United States. By the year 2000, for example, the estimate is now 20 million fewer people than had been forecast on the basis

of previous statistics. Reduction could have major implications for American society in many areas. And it reflects changes in birth and child planning, which now suggest that the U.S. may eventually reach zero population growth. The last one is pretty interesting, and more so if you can see the picture that goes with the story, about James L. G. Fitzpatrick who for 40 years has been interested in copying natural flight. And he has now designed a batlike flying machine that may be ready for a test run next summer. Fitzpatrick said that the first - that first, every small part of the ungainly structure must be tested carefully. Otherwise you end up either in a disaster or a grave, and we try to avoid that sort of thing. After three decades of trying, Fitzpatrick, who's 66, believes his latest device comes closest to the real thing, although it still needs a small motor to flap the wings. Asked whether his device, as yet unnamed, works on the flight principle of a bird, he said, "I don't know anyone who knows what principle a bird works on, but I guess this is more like a bat or a pterodactyl." Fitzpatrick's ornithopter or flapping wing airplane is equipped with cockpit controls that include a throttle that regulates the 1-horsepower engine and up-and-down flight. Other equipment includes rudder pedals to regulate a power steering system, a parking brake, a pseudopaddagium, I don't know what that one - that word is, it's a new one on me, to transfer power from the engine to the wings, and a two-way radio. It has a maximum 40-foot wingspan and weighs 320 pounds. It is 6 feet long and it looks like a cage of scaffolding covered in parts by canvas. He said he's far enough along on building his device that he will be able to test the way the wings move in the Staten Island Community College gym by the first of the year. However, there will be no free flying. The gymnasium test will involve tying weights to the wing tips and flapping the wings. He said that his bird is rather slow in maturing; and it's been a long gestation period which involved 9000 hours of experimentation, \$40,000 in his money, and the dissection of 300 birds of various species. "I've been interested in flight since 1930," he said. "Basically, I was curious as to why various things flew, and I've been painfully finding out ever

Tape 192/4

since." And he winds up with a real quote here. He said, "Never has so much been done with so little success." That's the news. No, wait - wait a minute. One final closing story. In Atlanta, Georgia, a 5-year-old boy crawled up on Santa's lap in a department store and asked him what Santa would need if he had two boots and one sock. Dick Wright, a Georgia State University graduate student in the off season, said he thought quickly and replied, "Another sock," and the child punched him in the stomach.

LMP Huh! Merry Christmas.

CDR Thank you for the news, Gordo.

11 22 22 30 CDR That's a very enjoyable evening to go to bed with on our final night of the flight.

CC Before you turn in, we got a little shopping list to run down with you if you're - nothing to write down, but if you're ready to listen.

CDR Okay, go ahead.

CC Okay. The Surgeons are, first of all, request that Ron press on his sensors. They're looking like they're getting loose according to the data here. They also reco - recommend for Ron that if he's still using the nose drops - I guess he has been - they recommend that he take one decongestant pill before going to sleep and one after breakfast in the morning. It's a suggestion. It's his option. The thought being it might help in clearing your ears during that final descent. You may leave the optics power on for more heat in the cabin if you wish. We'd like you to stop charge in battery B. Over.

11 23 23 54 CDR Okay. He's taking that off the line now; off the charge.

CC Okay. And we'd like the IR, OFF.

11 23 24 05 CDR Okay. It's OFF, Gordy.

CC Okay. Let's see, we owe you an answer on what to do with the LEVAs. I guess they were supposed to be on the helmets in the PGA bag. Is that going to be a real pain to get at, and put them there?

CDR No, it's not going to be a pain at all, Gordo; it's just impossible.

CC Okay, well -

CDR There's just no room in there at all - not - none at all.

CC Okay. I'll - probably not have an answer for you tonight, but first thing in the morning - someplace to put them.

CDR Okay. It won't be any problem strapping them somewhere, but we thought maybe you had a better idea than we did; if not, when we get our rock bags tied down and all in place, we'll take a look at a good spot for the LEVAs and let you know.

CC Okay. G&C - I don't know where you are on the checklist - the - just a reminder to zero the optics before you turn in. And I'd like to - say for the whole White Team, who are just - here in another hour, will finish up their - their work with the Apollo Program, and myself included, that this sure has been a pleasure working with not only the two best spacecraft the program has seen but we think the best and most cooperative and - crew also. And it's been a privilege in my estimation and a real pleasure, too, and looking forward to seeing you on Thursday.

CDR Well, Gordo, those are awful kind words, and we do appreciate it very much, but I think you know how we feel about the help you guys give us down there. And - well, it really makes our job easy up here. From the Cape back to the Pacific is - it's the guys from the trench all the way up to the top back there, and that's what it's really all about. We thank you, those are good words, but just consider them reciprocal also.

CC Thank you.

Tape 192/6

CMP We appreciate it there, White Team.

CC Thank you, Ron.

CDR Gordo, we'll hang on the air here and we're going to finish up our presleep checklist and we'll just give you one final buzz before we go off on the voice switch.

CC Okay; very good.

CDR By the way, the Earth is sure starting to get big.

CC Okay. You're about 80,000 miles out.

CDR Okay, outstanding. I guess, based upon your midcourse 7, that that's a good sign, isn't it? That it's getting big?

CC That's what it's supposed to do.

11 23 27 45 CDR It's a - although there's not much of it to see, it's really sort of spectacular because the crescent is getting smaller and smaller although the Moon is getting - is getting larger, and of course the crescent we're looking at now is the Pacific. But even if there were landmasses in there, I don't think we could see much besides the reflection off the clouds - and a - well, in this case, the ocean. But - it's really a pretty spectacular sight because out the other window, now that we're on an intervertical [?] PTC, we've got a full Moon looking back at us. And it's sort of a poetic place to be the night before entry.

CC Yes, I'll bet it is.

CDR Hang in there, babe, and we'll see you for sure Thursday.

CC Okay; it's a deal.

11 23 45 53 CMP Houston, how's the CMPs biomed now?

CC Okay, Ron, looks real good.

CMP Okay; mighty fine.

CC I got a final on the Liberty Bowl. Must have been exciting. John Young should be happy. Georgia Tech squeaked through, 31 to 30.

CDR Looks like there's some pretty good football games coming up this weekend, too.

CC That's right, in the pros.

11 23 48 20 CDR Houston, America.

CC Go ahead.

CDR Gordy, we'd like to go back to AUTO on the GLYCOL EVAP TEMP IN, you concur?

CC That's fine with the EECOM. Your choice.

11 23 48 39 CDR Okay. We're just going to go back to AUTO on the switch.

CC Okay.

CDR And we also would like to take that inverter off. It's getting a little warm in here now and this PTC ought to be pretty comfortable tonight.

CC Okay.

11 23 48 56 CDR Okay, we'll take INVERTER number 3 OFF. And I think the POWER's OFF, also.

CC Okay.

12 00 00 15 CDR Houston, America.

CC All right. Go ahead, America; Houston.

CDR We bid you hello, Bob, and at the same time, good night.

CC What can I say? I'm crying.

CDR Well, we thought we'd give you about 8 hours to think about it.

Tape 192/8

CC That's about all I've got to do.

CDR See you in the morning, babe.

12 00 00 53 CC Roger.

END OF TAPE

Tapes 193-196/1

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

12 07 20 02 CC (Music: Anchors Aweigh and the National Anthem)

12 07 28 53 CC (Music: Anchors Aweigh and the National Anthem)

12 07 31 31 CMP Hey, Houston. This is America. That's mighty fine.

CC Roger, America. It's Houston. We're ready to have you come home today.

CMP Hey, mighty fine. We're all set, too.

CC Okay, might read you a page - -

CMP ...

CC Go ahead.

CMP Okay, we've been waiting a long time for Anchors Aweigh. And we've missed it. (Laughter)

CC I imagine - -

CMP You going to play it again?

CC - - imagine you'll hear it a couple of more times today, too.

CMP Oh, okay. But if we could hear it again, that'd be great.

CC It'll take them awhile to cue it up, and maybe we'll work on that. Let me give you guys a few items here while you're thinking. Number 1, the old weather report: 2000 scattered - high scattered - 10 miles visibility, 3-foot seas, winds are out of the east at 10 knots. Just about exactly what you had yesterday, and probably what we've been telling you for 2 or 3 days. Looks like we're going to have a midcourse 7 this morning, about 2 feet per second. Pretty much just to really center us in the corridor. We're already within the corridor now, with no problems. We're going to exit PTC at a different roll angle. We'll read

Tape 197/2

that up to you later when you get the Flight Plan out; but just so you don't go ahead and exit early, we will be sending you something up on that exit PTC to new roll angle. And as far as the LEVAs are concerned, you guys were looking for a place to stow those last night, and what we're suggesting is putting them in the sleep restraint on top of A-8 where you've got one suit stowed, apparently. And we're suggesting you put one of those on the helmet on that PGA. And the other one, as it were, loose and in the bag. Over.

12 07 33 47 CMP Houston, America. We've got the PGAs in the bag. (Laughter) Hope that's right.

CC You got all three of them in the L-shaped bags, or have you got - The understanding down here, apparently, in talking last night was that one was in a sleep restraint on top of A-8 - in the sleep restraint bag.

CMP Well, we've got CMP and LMP suits in the bottom - I mean, the commander and LMP suits at the bottom part of it. CMP suit's in the top of it - of the L-shaped bag.

CC Okay, we'll work on that. And we've got something else for you here - just a minute.

CC (Music: Anchors Aweigh)

CDR Thank you, Robert. Most appreciative.

CC Okay, we aim to please. That's also, I might tell you guys, the third time we've played that this morning, although you's only heard it twice. We played it once before we sent the crew alert.

12 07 37 11 CMP CMP has no comment.

CC Okay, America, we'd like to request MEDIUM on the HIGH GAIN antenna, please.

CMP Okay, you have REACQ and MEDIUM.

CC Okay. And I guess now on the LEVAs, what we're suggesting is you put them - put the two of them in by themselves in a sleep restraint and tie it down on top of A-8. And I've got a lot of fancy words about how to tie it down on top of A-8, if you guys can't figure out how to do it. I can read it off to you, or we can leave it to your intuitive good sense.

CMP Well, so far, we've kept pretty much with most of your recommendations around here. I think we could probably hack that one, too.

12 07 40 27 CC

Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

12 18 06 54 CDR Houston, America.
CC Go ahead, America.
CDR We're looking at your big smiling crescent. How far out are we?
CC Stand by. You're just about to cross the 40,000-mile line here in the MOCR.

12 08 07 08 CDR 40,000 miles. Okay.

12 08 37 54 CMP Houston, America.
CC Go ahead, America.
CMP Okay. Good morning, Robert. I've got the INJECTOR VALVE temps for you.
CC Roger. We're ready to copy. Five Charlie, 3.95; 5 Delta, 4.4; 6 Alfa, 4.15; 6 Bravo, 4.05; 6 Charlie, 4.3; 6 Delta, 4.2.
CC Okay, Ron. Those sounded good.

12 08 39 10 CMP Okay.

12 08 46 57 CMP Got that now.

12 08 48 08 CMP Houston, America, with the food and medical report.
CC Stand by on that, Ron. We've got an antenna switch coming up. As soon as we get you back on comm, we'll go ahead with it.
CMP Okay.

12 08 48 37 CC Okay, Ron. The switch has been made. You're ready - we're ready for the copy.
CMP Map.
CC Oh.

CMP Okay, Houston. Do you want to copy? Okay, Houston. On the commander's menu, we use negative reporting. Okay, did not eat potato soup, chicken stew, and peach ambrosia. I'm sorry, I started with meal C instead of A. And then to add on meal Charlie, three-fourths jelly candy. Okay, we'll start with A again, on the commander. Did not eat peaches and cocoa. Meal Bravo, did not eat chicken and rice soup and fruitcake. Add one-fourth jelly candy. Okay, for breakfast on day 14. Did not eat mixed fruit. Did not eat cinnamon toast and bread. Did not eat coffee. And add one can of peaches. Okay, commander's medical log: PRD, 17065; 5 hours, fair; none; and five cans of water. Okay, for the LMP, start with meal A, day 13. Did not eat bacon squares, apricots, cocoa. Meal Bravo, did not eat chicken and rice soup. And add - add on graham cracker cubes and a plain coffee. Meal 13, did not eat chicken stew, peach ambrosia, grapefruit drink, and add on a plain coffee and sugar cookies. Day - day 14, meal A, did not eat a half a sausage and a mixed fruit and scratch the potassium in the coffee - A plain coffee. Okay, LMPs PRD, 24227; 6 hours of good; none; and three cans of water. Okay, CMP, meal A, Day 13: did not eat four bacon squares, apricots, and add on a car - a carmel candy. Meal Bravo, did not eat one-fourth of the fruitcake. Add on two tea, three-fourths jelly candy and graham cracker cubes. Meal Charlie, did not eat chicken stew. Add on one-fourth jelly candy. For breakfast, did not eat mixed fruit. Scratch the with K in the coffee. Drank the coffee, but it was black. Add on peaches. Okay, CMPs medical: PRD, 15062; 7 hours of good. The rest of the guys said it was noisy, but I thought it was good. Let's see - medication: one decongestant, one Seconal; and three cans of water. And that completes the medical/food readback.

CC Roger, Ron. Just a word on your consumable status this morning. You're in good shape on RCS, oxygen, and hydrogen. You're in real good shape.

CMP Okay, Houston, America. When you get that roll angle, let us know, will you?

CC Yes, the roll angle is 306, exit G&N PTC at roll angle 306. And we'll call you when we get there - when you get there.

CMP Okay, we're watching it, Bob, 306.

CC And, America, Houston. The high gain angles to go with that roll angle of 306. HIGH GAIN angles are PITCH, 34; YAW, 267. Over.

CMP Roger. 34 and 267.

12 08 57 29 CC And, America, Houston. I've got a couple of other items on this Flight Plan updates, if you're ready to copy now.

CDR Go ahead, Bob.

CC Okay, at 301:50, 301:50, add "UV COVER, CLOSED."

CDR Okay, got it.

CC Okay, and then on the other page there. At 302:06, delete the line, "UV COVER, CLOSE."

CDR Okay.

CC The next change here is to the Entry Checklist and to the entry cue card.

CDR Okay, go ahead.

CC On the Entry Checklist, page 1-3 between steps 23 and 24, it's actually part of step 23. S-BAND OMNI antenna Charlie, change that to Delta - on the S-BAND OMNI antenna, Delta.

CDR Okay, we've got Delta at horizon check attitude.

CC Roger. And if you'll go over to 2-4, Entry Checklist, where it says, "Yaw back to zero degrees" after SEP, we would like you to insert, "Select OMNI Charlie" - OMNI Charlie, at that time. And that will be also required on your entry cue card at 45 minutes where it says, "Yaw to zero," you'll have to be OMNI Charlie, select OMNI Charlie.

Tape 198/4

CDR Okay, we've got it covered everywhere.

CC Okay, and the reason for that is for better coverage going through Hawaii and that and then OMNI Charlie is coming back up on the ARIA.

12 09 00 01 CDR Okay, Bob.

CC And, America, Houston. Just one word to the CMP, if you have a chance. One of your EKG sensors seems to be loose, if you can tighten it up a little bit.

12 09 00 28 CMP Okay, I'll start pressing on it.

12 09 06 36 CC America, Houston. You're getting pretty close to your 306 roll.

CDR I'm watching here, Bob. NOUN 20.

CC Okay. Real fine.

CC We'd like AUTO on the HIGH GAIN.

CC America, Houston. We'd like ACCEPT; we've got your entry REFSMMAT.

CDR Okay. You have ACCEPT.

12 09 07 52 LMP Okay, Houston. IR is coming ON. Houston, do you copy? The IR's ON and the COVER's coming OPEN.

CC Affirmative.

CDR Okay, Bob. Spacecraft is configured in SCS as per the Flight Plan up through the P52.

CC Roger.

CC America, Houston. The computer is yours.

12 09 09 18 CMP Roger. We're with the BLOCK.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

12 09 15 11 CMP And, Houston; America. Have you copied the DSKY?

12 09 15 15 CC Roger, Ron. We've got you NOUN 05.

CMP Okay.

12 09 15 33 CC And we've got your NOUN 93s.

12 09 15 42 CMP Okay, we'll torque at 55:45.

12 09 17 18 CC Ron, while you're doing your maneuvering, no need to answer, but just a reminder. Due to the - stopping your roll angle differently, you're under the EI REFSMMAT attitude, your roll will be about 046, and you'll see a max yaw of about 64 degrees during this gyro torquing.

CMP (Laughter) Okay, thanks for calling.

CMP It sounded like yesterday you might have had a cold, and it sounds like it might be a little worse today.

CC No, no. Feeling great.

CMP Okay, mighty fine.

CC That's my "get serious and get you home" voice, see?

CMP (Laughter) Okay, perfect.

12 09 28 38 CMP Okay, Houston. This is the coarse align torquing angles, and we'll torque at 08:45.

CC Stand - Okay, go ahead. That's fine.

CMP You want me to read them down to you?

CC No, that's all right. We didn't need them.

CMP Okay, I didn't think so.

CC And just for your information, I might pass along the drift checks on the platform have been extremely good, and the platform is in real good condition. I'm sure you're - -

Tape 199/2

CMP Hey, mighty fine. What kind of values - average values have you been coming up with? I remember some in lunar orbit, but I don't know if - they haven't come back since then.

CC You're down like 0.005 degrees per hour, down in the thousandths of degrees per hour.

CMP (Laughter) That's - that's not bad at all, is it?

CC No, that's - you could take it right back to the Moon if you wanted to, by golly.

CMP Yes, sure could.

12 09 30 57 CDR Okay, Bob. GDC is aligned, and we are in CMC.

CC Roger.

CC America, Houston. If you'll give us ACCEPT, we'll give you an MCC-7 target load, a target vector, and an entry vector.

12 09 31 31 CDR Okay, you have ACCEPT.

CC And, America, we've got the MCC-7 and the entry pads for you whenever you're ready to copy.

CDR Okay. Stand by 1. And you might be interested to know, we have had no problems whatsoever locking the YY strut on this flight.

CC Good show. We copy that.

LMP Okay, Bob. Ready for midcourse 7.

12 09 33 16 CC Roger. Midcourse 7, RCS/G&N; 26686; NOUN 48s are not applicable; 301:18:00.34; plus 0002.1, plus all zeros, minus 0000.1; 000, 130, 000; H_A is not applicable, plus 0022.9; 0002.1, 0:09, 0002.1; sextant star is 31, 329.9, 34.8. Rest of the pad is not applicable. Set stars, Sirius and Rigel; 273, 256, 347. One note, we would like two-jet plus-X RCS using quads Bravo and Delta. I'll say again, two-jet plus-X RCS quads Bravo and Delta. Another note, HIGH GAIN angles: PITCH, minus 83; YAW, 244. Over.

CC And, America, the computer's yours.

12 09 35 37 LMP Okay, going BLOCK. Okay, Bob. Here's your read-back. It's a midcourse 7, RCS/G&N; 26686; NOUN 48 is NA; 301:18:00.34; plus 0002.1, plus all zeros, minus 0000.1; 000, 130, 000; H_A is NA, plus 0022.9; 0002.1, 0:09, 0002.1; 31, 329.9, 34.8. Rest of pad is NA. Sirius and Rigel; 273, 256, 347. Ullage is two jets plus-X RCS quads B and D. That's Bravo and Delta. HIGH GAIN: PITCH, minus 83; and YAW is 244. Over.

CC Roger, Jack. Good - good readback except it's not ullage. It's just your two-jet burn.

LMP Well, okay. Two-jet burn, then.

CC And, Jack, we have the entry pad. Standing by for your call.

LMP Okay, Houston. We're ready to copy.

12 09 37 20 CC Okay, it's into the MIDPAC area; 000, 153, 000; 304:01:37, 268; NOUN 61s minus 17.88, minus 166.13; 06.4; 36090, 6.49; 1044.9, 36172; 304:18:37; 00:29; NOUN 69 is not applicable; D₀ 4.00, 02:09; 00:17, 03:37, 07:39; sextant star is 13, 117.3, 15.5; boresight star is not applicable; lift vector is up. I've got six comments. You can take those now, or we can get the readback and then go through the comments.

LMP Go ahead on the comments, and take them a little slower than usual, Bob.

12 09 39 10 CC Okay. Comment number 1: Use nonexit EMS pattern. Comment number 2: RET 90K, 06:01. RET mains, 08:26. RET landing, 13:17. Constant g is roll right. And the last comment: GET moonset, 304:16:14. Over.

12 09 40 35 LMP Okay, Roberto. That's mid-PAC; 000, 153, 000; 304:01:37, 268; minus 17.88, minus 166.13; 06.4; 36090, 6.49; 1044.9, 36172; 304:18:37; 00:29, NOUN 69 is NA; 4.00, 02:09; 00:17, 03:37, 07:39; 13, 117.3, 15.5; boresight star is NA; lift vector is up. Comments, 1: use nonexit EMS pattern; 2: RET 90K is 06:01; RET main, 08:26; RET landing,

Tape 199/4

13:17; comment 3: constant g, roll right; 4 is GET moonset, 304:16:14. Over.

CC Roger, Jack. Good readback. That should be the last of the pads.

LMP Okay, sir. Give my hand a rest.

12 09 49 00 CMP Okay, Houston. Changing the DAP for PD [?] on the two-jet plus-X.

CC Okay, we're watching.

CDR Hello, Houston; this is America.

CC Go ahead.

12 09 51 41 CDR Okay, Bob. Looks like CDR has - there's no biomed electrolyte sponges in the spacecraft, either in the LM kit we brought back or in the command module kit. So it looks like I'll be going in without biomed.

CC Roger, Gene.

CC Hope you can make it, Geno, without that.

CDR (Laughter)

CDR Okay.

CMP Let me know when you want the numbers there, Gene.

12 09 55 30 CMP ... 86.8, going normal. (Laughter) There's the commander's ALARM. That's good.

12 09 55 51 CMP Okay, plus 329.90. Plus 34.800. And we - star 31.

12 09 56 17 CMP And, Houston, we've got a minus 29.2 on the DELTA-V test function of the EMS.

CC Roger. We copy that, Ron.

12 09 56 37 CMP And star - star sextant check is good there, Houston.

CC Roger.

12 09 56 51 CMP Okay. You guys can go ahead and dump now.

CMP (Laughter) Must be accelerating ... my EMS pump.

CMP Well, I'll be darned.

12 09 59 01 CMP And, Houston, you go to ENTRY and NORMAL on the null bias check. EMS is counting like a son of a gun. (Laughter) Almost as fast as the DELTA-V test but not quite.

CC Roger. You're really smoking along, aren't you?

CMP (Laughter) Well, I wouldn't think it would sense that, but - -

CC Roger.

CMP Anyhow, we'll use burn time and - NOUN 85 for the - the burn.

CC Roger.

CC Ron, you're happy with your EMS and null bias check, aren't you?

12 10 00 41 CMP Negative. Not on the null bias check, no. I'll give you a count in a minute. I'm going to redo the EMS DELTA-V test, and then go back and try another null bias check. But it looked like it was counting from about 100 to - to 75 in 30 seconds, but let me check that out.

12 10 01 21 CMP Okay. Did the DELTA-V test, and that time we got a minus 20.3.

12 10 02 13 CMP Okay, Houston. They started at minus 100 on the null bias check; 30 seconds at 118.8.

12 10 02 54 CMP One minute, 137.8.

CC Ron, would you verify those are negative numbers?

CMP That's affirmative. They're negative.

12 10 03 35 CMP Okay, a minute and 40 seconds, minus 162.7 or so.

12 10 04 31 CMP Okay, Houston. We've got a little bit of time here. And looks like I've still got three EMS tests left. I'd like to go ahead and do another EMS test on that, and we'll see if that integrator is all fouled up completely - on the range integrator.

Tape 199/6

CC Okay, Ron. We agree.

CMP Okay.

12 10 05 49 CMP Okay, TEST 1 looks all right.

12 10 06 08 CMP And TEST 2 is okay; .05 G light is ON. Okay, going to TEST 3; 10 seconds -

12 10 06 28 CMP MARK it. Upper light came on.

CMP Okay, a 58.0 in the range counter -

12 10 07 03 CMP MARK it. Okay, it's slowing down going across -

12 10 07 13 CMP MARK it. Ah-ha. Okay. G line comes across at 9 z - g's (laughter), and range indicator indicates 0.0. Outstanding.

12 10 08 18 CMP And test 5 works all right.

12 10 12 43 CMP Okay.

12 10 13 13 CMP Well, looks like a P41 here. What've you got now?

CDR ... 9, 130, and 359. Oh, about 25 minutes from the burn, 25.

CMP Think you can get those things done by that time?

CMP Okay, just so I won't forget it, let's go ahead and trim it.

12 10 13 52 CMP Okay, we are trimmed. About 1 minute. ... 24 minutes to the burn.

CMP Both ...

12 10 16 22 CMP Houston, America. Does it look like we're going to hack it on the waste water tank there - ... out there?

CC Ron, yes. We're not going to dump the waste water tank at this time, and we won't dump it after midcourse 7 of course.

CMP (Laughter) Okay. Just wanted to make sure.

12 10 17 14 CMP Yes. BAT C, up around 36.5. Pyros, 36.9, 36.9.

12 10 17 33 CMP ... Okay. Fuel cells are looking good, too.

12 10 17 44 CMP A/C is looking good.

12 10 19 25 CMP About 18 minutes yet.

CC America, Houston.

CMP Roger. Go ahead.

12 10 19 37 CC Oh, Ron, we've been kicking around this EMS test and the null bias test and that, and we concur on this burn using NOUN 85s and your burn time as your cues and not using EMS. We would like, however, for you to bias the EMS. Set in a plus 118.8 at - and it will go to NORMAL at T_{ig} minus 30 seconds and we'd just be interested in what the EMS does under a very small g field like this.

12 10 20 11 CMP Okay. We'll set in at plus 118.8 and turn it to NORMAL at T_{ig} minus 30 seconds. And I'll try to look at it at the end of burn time or go to STANDBY at that point in time so we can make a good hack on it.

CC Roger. That'd be great, Ron, and we see no problem for entry with EMS.

CMP Roger. Mighty fine.

CMP We've really got the Christmas spirit out the window here. Looks like it's really snowing.

CC (Laughter) Roger. Glad it's not snowing on us with that stuff.

CMP (Laughter) Oh, it's frozen.

12 10 22 59 CMP Okay, Gene. Let me read through the P41 here just to make sure we got everything. Okay, we're in SIM basic configuration, I guess. Yes, the IR's ON, and it won't hurt anything. UV's ON, but at this point in time, it won't make any difference, I guess. CMC is ON, ISS is ON, SCS is operating. We tested the caution and warning, the DELTA-V test works, null bias ... And DELTA-V_C, we'll set that up.

Tape 199/8

12 10 23 58 CMP Okay. We got 118.8 and DELTA-V in STANDBY. BMAGs are caged and RATE 2.

12 10 24 13 CMP Okay. AUTO RCS SELECTs. We'll put those on for trim. We're just going to trim the X-axis only? Okay, I'll leave the A/C OFF. Okay. I got the DAP. VERB 04 NOUN 46 ENTER. CSM. Don't use A/C. Use B/D for plus-X. ... DEAD BAND, one-half degree per second. Use B/D for ROLL. Okay.

12 10 24 55 CMP Okay, ROT CONTROLLER ACs are ON, DIRECTs are ON. ... 13 minutes. Okay, I got the DET set. Looks like it agrees. And we're in CMC and AUTO. We're in the burn attitude. Done the boresight and sextant star check. We're in P41, have maneuvered to the right attitude.

12 10 25 27 CMP And we're still in RATE 2. CMC, AUTO. Okay, let me realign the old GDC.

12 10 27 02 CMP Okay, the old GDC is aligned. Let's see. MANUAL ATTs are in RATE COMMAND.

12 10 27 10 CMP The DEAD BAND RATE to LOW. LIMIT CYCLE is OFF. ATT 1, RATE 2.

12 10 27 25 CMP Okay, stand by for 5 minutes. And we're 10 minutes from the burn, Gene.

12 10 27 43 CMP And, Jack, burn time is 9 seconds - 9 seconds. And we'll trim X only to 0.2 foot per second.

CMP Houston, America. Does this kind of change our entry angle, what, about 0.2 - 0.2 degree?

12 10 28' 36 CC 0.2 of a degree, Ron.

CMP Oh, okay.

CMP Which way? Does it steepen it or shallow it up?

CC It'll make you a little more shallow. Very little shallow - -

CMP Oh, okay. Okay.

CC Ron, it's going to run you from 6.7 entry angle to a 6.49.

CMP Oh, okay. Yes, that's what I thought, okay.

12 10 29 50 CDR Eight minutes to go. ...

CMP Next time we do this, we'll have to allow a little more time for the - the BUSS/dumping, I think, prior to the burns.

12 10 31 10 CC America, Houston. You're GO for MCC-7.

CMP Roger. We're GO for midcourse number 7.

CDR Is one of those going the other way?

CMP I guess they go in all directions. It just looks like they're - they're looping by window 1 here.

CC Go ahead.

CMP That's only 2.2 foot per second.

12 10 35 04 CMP TRANS CONTROL POWER is ON. Okay. We're ON and armed.

CMP Okay, we have trim. There ... down there.

12 10 36 00 CDR Okay, Houston; America. We're coming up on 2 minutes, and we're ready for MCC-7.

CC Roger, America. You're looking good.

CMP Yes, burn time is 9.6. Clock's right on.

CMP Yes, that's right. It'll go out automatically within 30 seconds. Okay.

CDR (Laughter) I wonder what we've got now. ...

12 10 37 09 CMP ... 30 seconds, we'll go EMS to NORMAL.

12 10 37 24 CMP DEAD BAND, TRANS CONTROL, AC DIRECTs, CMC, AUTO.

12 10 37 28 CMP Okay. There we go, 30 seconds. EMS to NORMAL.

CMP Okay.

CMP ... Ten seconds to go, Jack. 2, 1 -

Tape 199/10

12 10 38 02 CMP MARK it.

CDR We're burning, Houston.

CC Roger.

CMP Okay, got her? And I stopped it right at 9 seconds. There's your NOUN 85.

CC We're looking at them.

12 10 38 27 CMP Okay, EMS is 100.1. Okay, TRANS CONTROL POWER is OFF. DIRECTs are OFF. Hand controllers are safed.

CDR Houston, looks like the burn was right on the money. You saw the residuals, and the burn was a 9-second burn, on time.

CC Roger, America. It looked good.

12 10 39 02 CDR And the VERB 66 is in.

CC Roger.

CMP Ah-ha, I get to get out of my g suit.

CMP You know, while I think about it, Houston, I've noticed it throughout the - the flight here. In the simulator, CMC control will allow your rates - you know - to bounce back and forth maybe up to, oh, sometimes 0.1, more than likely 0.05 degree per second as it trims within the dead band. In four-jet translations, as well as in two-jet translations, your rates get up to about almost 0.4 degree per second as it's damping within its own dead band there.

CC Roger, Ron.

12 10 40 37 CC America, Houston. Just to make doubly certain that we don't get any venting from the waste tank, we would like on panel 352 the WASTE WATER RELIEF valve to OFF, please.

CMP Okay, we'll get that. BATTERY net presumably will stay OPEN, though, is that correct?

CC Stand by on that, Ron. That's affirmative, Ron.

CMP Okay, we'll leave the BATTERIES in OPEN.

12 10 41 45 CMP Okay, Houston. The dump PRESSURE RELIEF valve is
in OFF.

CC Roger.

12 10 42 50 CC And, America; Houston. We'd like WIDE on the HIGH
GAIN.

12 10 42 58 CMP (Laughter) Okay, the old HIGH GAIN is on WIDE and
AUTO.

12 10 43 04 CC Roger.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

12 11 00 58 CC America, Houston.

LMP Go ahead.

CC Jack, we're just more or less trying to fill up our data book down here and if you haven't already done one, we'd - like any free time, if Ron would run another null bias check just to see if the drift changed when we did that little bitty burn.

12 11 01 19 LMP Okay. I'll mention that to him.

12 11 02 45 LMP Houston, 17.

CC Go ahead, America.

12 11 03 00 LMP Yes, Bob; this is Jack. You have any problem reading me with this comm configuration I got on now?

CC No, we're reading you loud and clear. If I was a little late on that, it's because I've got some problems down here on my console, that's all. The whole room yelled at me that you'd called.

12 11 03 17 LMP No, that's no problem. I just hadn't made a check with you and I wanted to make sure I was readable.

12 11 07 07 CMP Okay, Houston. This is America command module pilot on the LMP's comm carrier. How do you read?

CC Read you loud and clear, Ron.

CMP Okay, good. I understand you want a null bias check again?

CC Yes, we're just wondering if maybe the - maybe it was an air bubble or something in there - in the - small g-field of that midcourse 7 burn might have changed something. Just like to take a look at it.

CMP Okay. We'll take a look at her.

Tape 200/2

12 11 08 37 CMP Okay, in 30 seconds, 94.0; starting at plus 100 that time, for some reason.

12 11 09 07 CMP One minute, 87.8.

12 11 09 56 CMP Okay. It was 79.0 at a minute and 40 seconds.

CC Okay, Ron. We got that.

CMP Do you want to try the minus 100 part of it? Really think it's worth it?

CC Well, Ron, we'd like it if you could dat - data gathering point, that's all - -

CMP Okay. Let's do - -

CC You know what's due on entry.

CMP The other guys are crawling around down under the couches. They're trying to get that stuff locked in there anyhow. I think I must have shrank, my shoes went on easier now than they did on the fitting. I must have shrunk, I guess, is the correct terminology. Shrank? Shrink?

CC Whatever you like.

CMP (Laughter)

12 11 12 06 CMP Okay, minus 105.8 at 30 seconds.

12 11 12 37 CMP Minus 115.7 - I mean 111 - 111.7 at 1 minute.

12 11 13 16 CMP And it's minus 119.1 or 2 - about 2 - about 119.2 about a minute and 40.

CC Okay, Ron. That's very consistent data both ways on that - after the burn. It doesn't tie up with the data prior to the burn too well.

CMP Uh huh.

12 11 14 13 CMP Houston, UV COVER is CLOSED and talk back's gray.

CC Roger.

12 11 19 29 CC Ron, we're going to break lock here a minute.
We've got a site handover.

12 11 19 33 CMP Okay. I understand.

12 11 26 05 CDR Hello, Houston. How do you read CDR?
CC Read you loud and clear, Ron - Gene.

12 11 26 12 CDR Okay, Bob. I'm back up now and I'll stay with you.

12 11 28 10 CMP Okay, and IR can come OFF. And the UV, OFF; IR
cover, CLOSED. S-BAND AUX TV, OFF. OFF, yes.
And DATA SYSTEM, OFF. Through with the old Flight
Plan. Let's check and see if we've got those
other two items first. I think we do. Yes, that
was one.

CC Okay, Ron, we'd like to make sure that the LOGIC
POWER on 181 is OFF, center.

CC Okay, stand by 1. Yes. Yes, they're in DEPLOYMENT
RETRACT. Let's put them to OFF.

12 11 29 41 CMP Okay, DEPLOY MAIN A, MAIN B are both OFF, center.

CC Okay, Ron. Thank you.

CC And it's sad to shut off the SIM bay, it's operated
so tremendously in this mission.

12 11 30 11 CMP SIM bay has been outstanding.

12 11 38 20 CMP Okay, Houston. We're coming up on 2 hours here.
How about the logic sequence check?

CC We're standing by.

12 11 38 31 CMP Okay, SECS LOGIC, two of them are CLOSED; SECS ARM,
two are CLOSED; ELS CSM SEP, BAT A, BAT B are
CLOSED. Okay, ELS LOGIC is ON; ELS AUTO is ON.
Okay, Houston, you all set for the SECS LOGIC?

CC That's affirmative.

12 11 39 12 CMP Okay, number 1 is ON. SECS LOGIC number 2 is ON.

Tape 200/4

CC America, we're GO for PYRO ARM.

12 11 39 33 CMP Okay, that sounds good. We're go for PYRO ARM. Okay, SECS LOGIC number 2 is coming OFF; SECS LOGIC number 1 is OFF. ARM BAT B is OPEN; ARM BAT A is OPEN; ELS LOGIC is OFF; ELS is to MANUAL. Okay, the old SEP breakers are OPEN.

CC Roger. God show, Ron.

CMP Okay, we've got her.

CDR Hello, Houston; this is America. We are stowed for reentry.

CC Roger.

CDR And, Bob, as a note of interest, the spacecraft is dry. Both the forward hatch, the tunnel, and the tunnel hatch.

12 11 43 24 CC Roger. We got that.

12 11 55 35 CMP Okay, Houston, this is America. We'll whip into a P52 here.

CC Roger. We're watching it.

12 11 56 50 CMP There goes the Earth. Man, it was just a sliver.

CMP Houston, you'd be happy to know that the Moon, now, has finally gotten back to its normal size for us.

CC Roger.

12 12 01 07 CMP Well, that's not 5 balls, but that's not a bad way to end, I guess. You know, I never noticed it before, but I'm looking next to the - to the Earth, right now. And, of course, that makes it a kind of bluish reflection inside the - the sextant, and you can't see the reticle brightness at all. It just - you know, it just comes through as a black - black line in there. And there are two lines. You know, I've got two - One of them must be - there are two - two reticles - no, there are two reticles. One's in focus, but the other one isn't.

CC Roger, Ron. We can accept the NOUN 05.

12 12 01 52 CMP (Laughter) Okay. There we go. There's NOUN 93.

CC Then you can torque those, Ron.

CMP Okay, we'll torque at 45 - 42:15.

CMP Okay, Houston. We're going to maneuver to the horizon check attitude now.

12 12 03 06 CC Roger, Ron.

CDR Houston, America. I'll go OMNI Delta now.

CC Roger. We concur.

CMP Got the commander's ALARM.

CC Roger. Copy.

12 12 09 36 CDR Houston, America. The horizon star check is GO.

12 12 09 41 CC Roger. Good word.

END OF TAPE

APOLLO 17 AIR-TO-GROUND VOICE TRANSCRIPTION

12 12 22 48 CMP Okay, EMS FUNCTION is OFF. and two of them are CLOSED - EMS circuit breakers are CLOSED. EMS is in STANDBY. TEST 1. Okay; and wait 5 seconds.

12 12 23 11 CMP Okay, it's 10 seconds. Looks good - indicator light. This one. That always comes on on TEST 1, I don't know - .05 G light always comes on TEST 1. Okay? And still got two of them left. Let's try number 2, I guess. Never pass up a gas station, if you really need it. Okay, TEST 2.

12 12 24 08 CMP Okay, it's out.

CMP Okay? There we go -

12 12 24 30 CMP MARK it.

12 12 24 40 CMP MARK it. Okay, 10-second timer works. Always comes out.

CMP Okay, we got 58, is that in there? Okay; wait a minute. Okay, here we go. There goes zip. TESTs are going down. Stops at 9gs going across, counting down.

12 12 25 43 CMP MARK it. Okay, it stopped at 0.0. Stopped right at the old black line there. That's good. Okay, .05 G light on. Okay, 10 seconds later or so, here we go.

12 12 26 10 CMP Yes, it's going out. It stopped at 0.2. It advanced 10 seconds and the light came on. Okay; let's see, we can go to 37K. Hey, Houston, let me doublecheck on this. The .05 G light was on, in EMS TEST 1, when I went to NORMAL. And it seems to me like that's normal but it may not be. Could we check on that for sure.

CC Okay, we're checking on that.

CMP Can - press on with the activation here.

Tape 201/2

12 12 27 25 CDR Houston, we're pressing on with the primary water evap activation at this time.

CC Stand by 1. It's affirmative - to Ron - that he can press on with EMS jun - TEST.

CMP Okay; thank you much.

CC And to Gene, on those water boilers, that's affirmative.

CDR Okay; fine.

12 12 27 49 CMP Okay, nonexit pattern, that's what we want. See the line on 37K. Okay; we go to RANGE SET - Flick! There it goes, up to the top. Okay, we're in RANGE SET, and we'll stand by now.

12 12 28 25 CDR Houston, we're going to activate the secondary.

CC You are GO on the secondary.

CDR Okay.

CC Okay, Ron, as you're going through the test, just a word on that EMS TEST 1. It is not normal for the zero - .05 G light to be on in ENTRY TEST mode 1. It is probably a result of that drifting accelerometer. It's - we'll have to just wait and see what the rest of the test looks like.

CMP Okay; the rest of the test was GO.

CC Okay. Again, it's probably the result of that drifting accelerometer, and possibly under the high-g load of entry, it will be no problem at all. It's all probably in the - drifting in the - in the mud.

CMP Okay. Mighty fine.

CC And, America, if you can give us ACCEPT, we've got a vector for you.

12 12 29 44 CMP Okay; you have ACCEPT.

12 12 30 18 CDR Okay, Houston; both evaporators are up.
CMP Well, I just -

12 12 31 22 CDR Hello, Houston; on the preheat, we've got 5 Charlie,
at 38.
CC We copy that. And we're running the cal curve.
CDR And we've got 6 - Okay, and we've got 6 Bravo,
at 385.
CC America, the computer is yours.

12 12 32 02 CMP Okay, we're going to BLOCK.
CC America, Houston. We looked through the cal curve,
and we recommend no preheat on the RCS.
CMP Roger, Houston. I understand. No RCS preheat -
command module RCS preheat.
CC That's affirmative.

12 12 35 13 CC America, Houston. Somebody standing by on the VHF?
We'd like to get the VHF voice check out of the
way, if that's possible.
CDR Okay; go ahead.
CC Stand by. We'll reconfigure here.

12 12 36 45 CC America, Houston. We'd like to verify that the
left antenna is selected, and that we are in VHF
SIMPLEX Alfa.
CC America, Houston. America, Houston.
CMP I'll get them on S-band. Houston, this is America.
Go ahead on S-band.
CC Roger. Did you get my last call? We'd like to
verify, in left antenna, and in SIMPLEX Alfa? And
we'll give you VHF check here shortly.

Tape 201/4

CMP Affirmative. Maybe that was feedthrough, but we were on - Jack was on - VHF, called you back on VHF. Must have been S-band feedthrough, though. But verified; we're antenna left and VHF SIMPLEX Alfa.

CC Roger, Ron, and we are going to simul. I understand Jack is reading us on the VHF.

CMP Yes, that's affirm. And he was retransmitting on VHF; evidently, you weren't reading our VHF.

CC Roger. It's normal to have VHF up-link prior to receiving VHF down-link. We're satisfied here.

CMP Okay. Mighty fine.

12 12 39 20 CC And, Ron, just for clarification, we will make another VHF check when you get a little closer, so we can get a down-link signal on you.

CMP Oh, okay, real well.

CDR Hello, Houston. We have a GO on the pyro bats, they're both 37, we're picking the checklist up on the top of 1-6.

CC Roger. We understand.

12 12 40 50 CMP Okay. On Panel 8. Okay, DIRECT ULLAGE are OPEN. COMMAND MODULE HEATERS are OPEN. Okay, DOCKING PROBES are OPEN - Whoops, stand by, stand by - let's CLOSE the RCS LOGIC, then. RCS LOGIC - MAIN A, MAIN B are going CLOSED. Okay, DOCKING PROBES are OPEN; SPS PITCH - and YAW - we'll open two more - that leaves four of them OPEN; three FLOAT BAGS are OPEN; and SECS, ARM are OPEN; EDS BATs are OPEN; ELS CSM SEPs are OPEN; POSTLANDING VENT is OPEN. Okay, they're all - all the others are CLOSED.

CMP GDC seems pretty good, let's recheck it here. Okay, GDC is realigned.

CDR Okay, Houston, if you're ready, we're going to pick up the command module RCS activation.

CC Roger. We're standing by.

12 12 42 57 CMP Okay, SECS ARM circuit breakers, two of them, are going CLOSED. Okay, Houston, ready for the LOGIC ARM.

CC You're GO for LOGIC.

12 12 43 08 CMP Okay. LOGIC 1, LOGIC 2.

CC America, you're GO for PYRO ARM.

12 12 43 25 CMP Okay, GO for PYRO ARM. PYRO ARM A, PYRO ARM B.

CMP Okay.

CDR Okay, Houston, coming up on the command module RCS pressure. 3, 2, 1 -

12 12 43 44 CDR MARK it. And we got it.

CMP Boy, you sure can hear it flow in somewhere.

CC America, Houston. We've got two good rings.

CDR Very good, Houston; they're looking good on board.

12 12 44 23 CMP Okay; SAFE the PYROs.

CC Okay, America; Houston. I've got a short update on your Entry Checklist.

CDR Go ahead.

CC Over on page 2-4 of the Entry Checklist, middle of the page, we would like to delete, "EMS MODE to NORMAL" at that point. "EMS MODE to NORMAL," delete. We'd like to move it over on the 2-5 at 0.05 G time. Put "EMS MODE - NORMAL."

CDR Okay; we'll get the EMS NORMAL at 0.05 G.

CC Roger. We have no update on the entry pad. You are nominal at this time. I do have your weather information and your ship recovery call signs. Over.

Tape 201/6

CDR Okay, Bob. Why don't you go ahead?

CC Okay; generally, the weather is good. It's 3000 foot, scattered, 10-miles visibility. Wind is 130 at 10; wave heights, 2 to 3 feet. Altimeter, 2994. The altimeter 2994 will give you a minus 17-foot DELTA-H which means, Gene, that when the altimeter says zero, you'll still be 17 feet in the air. The closest recovery forces, the prime recovery ship is the Tico, call sign "Tico." Closest recovery will be - aircraft will be a helicopter, call sign "Recovery," and a backup will be call sign "Swim," and they'll be on scene at splash. In case of a constant-g entry for any reason, the aircraft call sign is Samoa. Rescue 1 will be downrange and in the vicinity of the constant-g point. Over.

CDR Okay, we got Tico. And the prime recovery ship - prime chopper - is Recovery. The backup is Swim, and we've got Rescue 1 Samoa, downrange.

CC I guess that's uprange, depending on how you look at it, Gene.

CDR (Laughter) Okay.

MCC Geno, with weather like that, even a Navy captain like you should make a good landing.

CDR We'll hang in there, T. P. You know nobody likes a pitching deck, not even a Navy captain.

CC Roger.

12 12 48 09 CDR Houston, we'll be back with you and pick it up at 45.

CC Roger.

CDR America, Houston. We'll do our best to put it all together and come right down the stack, like you got me.

CC America, Houston. We would like Jack to give us a call on VHF Alfa. We are reading good signal strength down-link at this time, and we'd like to get a signal strength up-link with him at this time, also. Check, please.

LMP Okay, this is the LMP on VHF. How do you read? 1, 2, 3, 4, 3, 2, 1. Over.

CC Roger, LMP. You're coming through a little bit scratchy but sounds - we can read you. You're sounding good. How me on VHF?

LMP You're loud and clear, Bob. Loud and clear.

CC Okay; good VHF check.

12 12 52 31 CC America, Houston.

CDR Go ahead.

CC Just a note of amplification on our change on 2-5 moving the EMS MODE NORMAL at .05 G time. If the .05 G light does not come on at .05 G time when you go to NORMAL there, plus 3 seconds, go to the normal backup procedures to start the EMS.

CMP Okay; I understand that, Bob. Thank you.

CC Okay, Ron; just a little reminder.

CMP Mighty fine.

12 12 53 23 LMP TAPE RECORDER is REWIND.

12 12 54 51 CMP Okay, we're in RANGE SET. Okay, crank in 1044.9.

CMP Okay, 1044.9. Okay, inertial velocity, set. Slew to 36,172.

12 12 56 13 CMP Okay, we got 36,172. Set. Okay, velocity at .05 G - Okay, let's see - ENTRY and STANDBY. Okay? FDAI SOURCE to ATT SET. ATT SET to GDC. EMS ROLL is ON. Okay, turning the old YAW. And it's 45 degrees to the right. And 45 degrees to the left. Okay; RSI is zero. EMS ROLL is OFF. Okay, let's align the old GDC again.

Tape 201/8

CDR Houston, America. The EMS is initialized; the RSI is aligned; and we're ready to pick up the command module RCS checks.

CC Roger. We're standing by, Gene.

12 12 58 05 CMP Okay; GDC is aligned to the IMU. Okay? Verify A/C ROLL is OFF. RCS LOGIC, two circuit breakers are CLOSED. Okay, SCS. MINIMUM IMPULSE.

12 12 58 45 CDR Okay, Houston, we're going to transfer the command module.

12 12 58 49 CMP Okay. Just a little bitty blunk. Okay, the ring 1 is going OFF. Okay; we're operating on ring 2. Ring 2 is all MAIN B. You can hear it go click, click. Click, click, okay. (Laughter) Happy with ring 2. Okay, 1 is going up to ON; 2 is coming OFF. Okay, ring 1 is all MAIN A. Okay. Yes, you can see it, too, can't you? Okay, it works. Okay, ring 2 is going back to MAIN B. 1 is MAIN A; ring 2 is MAIN B. Okay? Okay. Okay, we still got control of the service module.

CDR Okay, Houston, the RCS check looks good on board.

CC Roger, America; and it looked great down here.

CMP CMC in AUTO. Yes, clock's running to RRT. Yes, it is.

CDR Okay, Houston; America. We're on top of 2-2. We're going to stand by for 30 minutes.

CC Roger. We're following you right on the line.

CMP ...

12 13 01 43 CMP Twenty minutes to horizon check time. Okay, I'll get back into - what is it - 268? That's good. Yes.

12 13 02 52 CMP Okay, 29 seconds until .05 G, V_{circ} is 02:09.
Drogue, 07:39. Okay. And no .05 G light, P64 is running. We'll go to BACKUP, VHF RANGING at .05 G plus 3 seconds. Yes. We'll get the NORMAL first, that's the main thing; these things can come later. And then we'll get EMS ROLL on .05 G. Yes, let's see, the third one is really not going to -

12 13 04 07 CMP Yes, these are plus 3 seconds - .05 G time is 29 seconds plus 3 - plus 5 - and 29 plus 5. The way I understand it, anyhow, from what the ground said, is that the .05 G light will probably come on as soon as you go to NORMAL, anyhow. Yes. Yes.

CMP Slide sideways - you can just slide your foot in and out of the thing.

CMP I wonder what 6-1/2 g's is going to feel like? That half a g on TEI (laughter) felt like I was in the back of the couch.

12 13 05 57 CMP Thirty-three minutes. Yes, it will. Yes, it's right on. When is - begin blackout? And - Okay. Blackout 17 seconds. Okay. That's comm blackout, by the way. (Laughter)

CMP Okay, getting ready for the BUS TIES.

12 13 06 56 CDR Okay, Houston, BUS TIES are coming ON.

CC Roger, America.

CDR A/C is ON and verified, and B/C is ON and verified.

CC America, Houston. The batteries are on line, and they look good to us.

12 13 07 31 LMP Okay, and TAPE RECORDER's ON here.

CMP Okay.

12 13 08 43 CMP Okay. Let's start sep - sep checklist here.

CDR Okay, Houston. We're pressing ahead here, about 5 minutes early.

CC Roger.

Tape 201/10

12 13 08 51 CMP Okay. ELS CSM SEP, BAT A. BAT B - CLOSED. Yes. Okay. I'll BYPASS the old primary RADIATORS. Okay, REPRESS PACKAGE valves going ON - O-N. Okay. We'll cut off the service module's supply of oxygen. Okay. SURGE TANK is verified ON. Okay. PRESSURE RELIEF valves are verified NORMAL. Okay. We're verified in RCS COMMAND. Okay, SECONDARY FUEL is As, Bs, Cs, and Ds. All OPEN. VHF is off. HIGH GAIN.

LMP Houston, loads appear to be balanced on main A, main B, fuel cell.

CC Roger, Jack. We copy that.

CMP Okay. Don't see anything yet.

12 13 11 33 CDR Houston, step 5 on 2-2 is complete.

CC Roger, America.

CDR Or parentheses 5; I guess it is.

CMP Okay.

CC America, Houston. You may be interested. We've just taken another look at your last batch of data, and it confirms your pad. You are absolutely nominal - right on the pad.

CDR That's good news, Robert. Thank you.

CMP Outstanding.

CC We aim to please.

CDR Okay, and we're going to keep it nominal.

12 13 18 22 CMP That's okay. We'll go in a little bit early.

12 13 19 19 CMP Yes, they look pretty good. Hey, you can go ahead and go on through there and then I'll - RATE COMMAND. DEADBAND, MIN; V RATE to LOW - Okay, I have you - RATE to HIGH - Yes, that's better - DEADBAND MIN; RATE to HIGH. SCS. Oh, 1 minute. Okay. I doubt if we'll see it - we might, though.

CMP Think you will? Yes, I don't know (laughter). I've got the Sun shining right in my left window here, so -

CMP I don't see anything. Do you see anything, Jack? (Laughter) I don't either. Did it?

CMP Yes, see I got too much shining in - light - sun shining in on there - glaring on the window. That's good, as long as it's there, somewhere. Oh, I see it! It's off to the left! Oh, it's out the left window (laughter). Okay, Yes. That's a dark horizon, though.

CDR Okay, Houston. We've got the horizon, now. We're going out of plane, now.

CC Roger.

CMP Yes - see - see - You can see it better when you're out of plane. We must be just seeing the horn. Yes, it's the airglow, but see that's the horn that's been - we've been seeing all the time that's off to our left.

12 13 22 52 CMP Yes, verify BYPASS.

CMP Okay, and stand by. Hey, Jack, when I yaw down here, can you get a picture?

12 13 23 16 CMP Okay, BMAGs, ATT 1/RATE 2; RATE COMMAND; SCS. DEADBAND MIN; RATE to HIGH. COMMAND MODULE RCS LOGIC is ON. SECS LOGIC verified ON. Okay. Here come the pyros - PYRO A, PYRO B.

CDR Okay, Houston. On my mark - I'm going to hit the CM/SM SEP.

CC Roger.

CDR 3, 2, 1 -

12 13 23 50 CDR MARK.

CDR We got it.

Tape 201/12

CMP Oh, ho! Did we get it! That thing really bangs, doesn't it?

CDR Looks like we got a good separation, Houston.

CC Roger.

CMP Okay; MINIMUM IMPULSE. RATE 2.

CC We're going to be handing over sites in 1 minute. There'll be a slight break of comm here.

CMP Okay.

CC We'd like you to go to OMNI Charlie.

12 13 24 27 CMP OMNI Charlie.

CMP Okay. We're yawing back to zero.

CMP (Laughter) We've got junk all over the place (laughter). Okay, yes, wait a minute. I'm going to take a look at the horizon here first. ENTRY; STANDBY; 36 170 1044. Okay. We're MINIMUM IMPULSE, RATE 2, SCS, DIRECTs are ON; AC, DC.

CMP Yes, you can go ahead. I'm SCS, anyhow. It will be.

CMP You know the sound of the jet firing is a lot louder than what we usually have the simulator set for.

CMP Okay. We're back to the dark horizon again, but we'll pitch her on down. On? Okay. There you go. Got everything up.

12 13 27 54 CMP Okay. Okay, 4153 miles to go. Velocity is 31,253 feet per second, increasing.

12 13 28 23 CDR Okay, Houston. We're at 63, and we're just standing by for .05 G.

CC Roger, America. You're looking great. We've got a TV picture of the weather in the recovery area, and the ship Ticonderoga, and it's looking great.

CMP Probably warmup afterwhile a bit. Well, this thing kind of wants to - wants to yaw left all the time.

CC America, at 9 minutes prior to entry interface here, you're looking great down here.

CDR Okay, Bob. We're looking good on board and standing by for .05 G.

CMP (Laughter)

CMP (Laughter)

12 13 30 45 LMP Houston, be advised that hydrogen tanks 1 and 2 still seem to be with us. At least I get gage readings - plus 200 psi.

CC Roger. We'll run that one through EECOM.

CMP (Laughter)

12 13 31 11 CMP Well, that'll save you - save the 5/5 for a minute. DIRECTs are MAIN A and MAIN B? Both controllers are on? Think they got AC1. Should be 153, I think, isn't it? Here it is, right here. Yes, no more eating upside down. I was just getting used to that. It's a lot of fun. Getting use to it? I was use to it after the second day - first day. You know the - the - it wants to trim itself; pitch up too. I got to keep blapping the right yaw - and I got to keep pitching down, to make it go down. See the - the rate just decreases.

12 13 32 23 CMP Two minutes until moonset. I don't even see a Moon. There it is up there. Can you see it, Jack? It's out of window 3. It should be off to your right. You might be able to see it. That's the way the Moon looked about 13 - 14 days ago, isn't it? Small one like that.

CMP Try the pressures on both rings? They still okay? Okay.

12 13 33 42 CMP Five minutes to RRT.

Tape 201/14

CMP 304:16 on my card. What - Yes, it's got a little bit of a cross - coupling on it. We might be picking up C-55 - might be picking up a few rates, anyhow. Probably not yet. Usually about 59.

12 13 35 00 R-1 ... Loud and clear, now. Nothing coming through on that transmitter.

SC ...

SC ... disappear.

CMP Couldn't see a star out there if you had to. There's all kinds of little white particles floating around out there from the jets.

CMP I've lost the ... out the window.

R-1 Four ... you're coming through now on the 18, loud and clear.

R-2 Roger. Stand by.

CMP Houston, America. Do you still read?

CC Check, Houston. Read you loud and clear. We're going out through ARIA.

CMP Okay.

CDR And, Houston, mode set was on time.

CC Roger.

CDR And we're coming up on 2 minutes from RRT, and we're going for it.

CC Roger, America. You're looking great.

CMP There's the horizon. Got the horizon, now.

12 13 37 17 CMP ... We're GO to CM.

12 13 37 26 CMP Pressure's looking good. We got RATE COMMAND to go yet. And I'll get that? RATE 2 on the BMAGs.

CMP Okay. You got a minute. 400,000 feet.

LMP ... really moving, isn't it.

CMP Look at that ... go by.

LMP Okay. Needle's off the peg now. It's looking good.

CMP Jack, can you take a picture of that, too? Get a picture of that horizon - -

CDR Is that pointing at the horizon?

CMP Okay. No. That's all right; I'll get it. That's all right; I'm sorry.

12 13 38 32 CDR Houston, we're 5 seconds from RRT.

CC Roger, America.

12 13 38 40 CDR RRT.

CMP Okay. You want to go to RATE COMMAND?

CMP Okay. .05 G is 29.

CDR We have a ...

12 13 42 52 CMP Roll right 50 - still at 3 g's.

CDR Okay.

CMP ... Okay. 3 gs. Got a potential of 130 - got a 130 range.

CMP Looking good - 3 g's. Right on.

CDR Okay. Roll right 40.

12 13 43 13 CMP Okay, right 40.

CDR Okay, right -

CMP Right 45.

CDR Okay - -

Tape 201/16

CMP Okay, the g is good - move left about 2.8.

CDR Okay - -

CMP There's reverse. Okay. Over the top.

12 13 43 30 CMP Okay. It's still about 2.9 g's. Took some more pieces off the outside of the spacecraft. Hey, it didn't stay on there very long. Okay.

CMP Up ... About 2.8 g's here. Got a potential of 65, 65. 8,000 feet a second.

CMP That's about 40 - that's right. Yes, that's right. Thirty feet.

CDR Okay, roll.

CMP Okay. ... 3.1 g's. Okay. There she goes over the - that ought to relax the g's a little bit. Hey, that's good - beautiful computer.

12 13 44 21 CMP Okay, about 3.1 g's. We're about 4500 feet a second. ... roll, 22 miles - 4000 feet a second, zero plus 88 degrees. Okay. That's good. Okay, looking good. Okay. We ought to be in there. Roll left, okay - about - about 2.2 g's. Okay. It feels like there's a mag around here. Okay. Okay. Roll that baby - still good. Okay. 2 g's. Steam pressure's pegged - Okay. Is that on time? Pressure's up 39 - okay. Okay, first ... 67. ... at 67. Put 1.8, it says, okay. Call it out.

CDR Hello, Houston. This is America. We're showing ... 1.8 short.

12 13 45 42 CMP ARM the PYROs. CABIN PRESSURE to BOOST.

CDR This is America. We're showing 1.8 miles short - 17.86 by minus 167.5.

12 13 45 51 CMP They're ARMED. We're stable. Looking good. Coming down like a son-of-a-buck. Man, oh, man! Okay, there's 35K. Stand by for ELS LOGIC, right? Okay? There goes all the paper off the spacecraft. Okay, that's 30K. ELS to AUTO - LOGIC - and then AUTO. Okay, stand by for the apex. And it bumps. Okay, there we go!

12 13 46 22 CMP There goes the drogues. Okay, back them up. Hey, come here, Jack. What? Okay ... to go. Man, oh, man! - Hey, it really vibrates! Okay.

CDR Okay, Houston; America in the blind - we got the mains - we got the drogues, we got the drogues. Okay, there's 12, 13K. 12K - 12K.

12 13 47 16 CDR Mains at 11K. Mains ... -

LMP There's the mains. Okay. They're reefing.

CDR Bearing 350.

CDR Through 8000 feet.

CDR ... about 1 mile short.

CDR Okay, Recovery, Houston; America. We've got three good mains; we're at 6500 feet.

R-1 Zero, zero at 3.5. Apollo 17, this is Recovery. Good morning.

CDR Hello, Recovery; it's a beautiful day! We're out of 610; we've got three good mains.

R-1 This is Recovery. Have a visual on you, and they're blooming nicely.

CDR Outstanding! And all is well on board, all is well on board.

R-1 Wonderful.

CDR You sound good down there.

R-1 Waiting for you.

R-1 One hundred, zero, zero. Our positive, 280 at 11.

R-1 Visual, bearing 243.

12 13 49 35 CDR Hello, Recovery. This is America. We're out of 4000 feet now, and all is well.

Tape 201/18

R-1 ... Tico.

CDR Go ahead.

R-1 Any report on computer read-outs. Over?

CDR Not yet.

R-1 ... standing by ... feet up.

CDR ... Houston, DSKY shows minus 1.3. Lat is minus 17.88; long is minus 166.11.

12 13 50 46 CDR Hello, Recovery; America, is through 2000 feet.

R-1 Recovery, Roger.

P-1 This is Photo. ... the command module as it descends. Their three main parachutes are fully deployed.

CDR America's out of 1500 feet.

P-1 The parachutes are fully deployed. The command module is descending, and Photo is circling as it descends.

CDR And America is now out of 800 feet.

P-1 Command module is descending, stand by for splashdown.

CDR America's at 300 feet.

12 13 52 00 P-1 SPLASH.

12 13 52 01 CDR MARK.

END OF TAPE