NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 14

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 14 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). The speaker column indicates the source of a transmission; the text column contains the verbatim transcript of the communications.

Beginning with this mission, 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 flight-plan time occurring as the result of midcourse corrections or spacecraft burn-time differences (trajectory dispersions).

Should these updates occur, the Apollo elapsed time (the true mission-elapsed time) may not agree with flight-plan and MCC times. Users of this transcript are cautioned to apply the appropriate time-update deltas 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. To indicate the period of GOSS net 2 usage, a heavy dark line will be used alongside the time column.

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.

(CORRECTED PAGE FOR APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION)

The Apollo 14 mission was flown January 31 to February 9, 1971; lift-off occurred at 21:03:02 G.m.t. (4:03:02 p.m. e.s.t.) on January 31.

Speakers in the transcript may be identified as follows.

Spacecraft:

CDR	Commander	Alan B. (Al) Shepard, Jr.
CMP	Command module pilot	Stuart A. (Stu) Roosa
LMP	Lunar module pilot	Edgar D. (Ed) Mitchell
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)
NEW	USS New Orleans
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-509 call sign will be Apollo 14. When both vehicles are

manned, the call sign will be Kitty Hawk for the CSM and Antares for the LM. The call signs for the CDR and LMP during lunar surface operations will be the individual crew's first names."

Transcription of these tapes was managed by David M. Goldenbaum, Test Division, Apollo Spacecraft Program Office, to whom questions regarding this document should be referred.

ACRONYM LIST

Because specialized readers of the Apollo 14 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
ALSEP	Apollo lunar surface experiments package
AOS	Acquisition of signal (or of site)
AOT	Alinement optical telescope
APS	Auxiliary propulsion system (S-IVB)/Ascent propulsion system (LM)
ARIA	Apollo range instrumentation aircraft
ARS	Atmosphere revitalization system
ASE	Active seismic experiment
BEF	Blunt end forward
BSLSS	Buddy secondary life-support system
CCIG	Cold cathode ion gage
CDH	Constant delta altitude (height)
CM	Command module

CMC	Command module computer
COAS	Crew optical alinement sight
CP	Control point
CPLEE	Charged particle lunar environment experiment
CSC	Close-up stereo camera
CSI	Coelliptic sequence initiation
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
DRT	Dome removal tool
DSE	Data storage equipment
DSEA	Data storage equipment assembly
DSKY	Display and keyboard
DTO	Detailed test objective
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
GDC	Gyro display coupler
GET	Ground elapsed time
GETI	Ground elapsed time of ignition
HGA	High-gain antenna
HTC	Handtool carrier
IMU	Inertial measurement unit
IP	Initial point
ISA	Interim stowage assembly
IU	Instrument unit
IVT	Intravehicular transfer
LCG	Liquid-cooled garment
LEB	Lower equipment bay
LEC	Lunar equipment conveyor
LEVA	Lunar extravehicular visor assembly
LGC	Lunar module guidance computer
LM	Lunar module
LOI	Lunar orbit insertion
LOPC	Lunar orbit plane change
LOS	Loss of signal (or of site)
LPD	Landing point designator
LSM	Lunar surface magnetometer
LRRR	Laser ranging retroreflector (also LR^3)

LTC	Lunar topographic camera
MCC	Mission Control Center/midcourse correction
MESA	Modular equipment stowage assembly
MET	Mission event timer or modularized equipment transporter
MSFN	Manned Space Flight Network
MTVC	Manual thrust vector control
OID	Octal identifier
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)
PIPA	Pulsed integrating pendulous accelerometer
PLSS	Portable life-support system
PRD	Personal radiation dosimeter
PSE	Passive seismic experiment
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
SCE	Signal-conditioning equipment
SCS	Stabilization control system

SECS	Sequential events control system
SEF	Sharp end forward
SIDE	Suprathermal ion detector experiment
SLA	SM/LM adapter
SM	Service module
SNAP	Systems for nuclear auxiliary power
SPS	Service propulsion system
SRC	Sample return container
SWC	Solar wind composition
SWE	Solar wind experiment
TDS	Thermal degradation sample
TEC	Transearth coast
TEI	Transearth injection
T_{ig}	Time of ignition
TLC	Translunar coast
TLI	Translunar injection
TPF	Terminal phase final
TPI	Terminal phase initiation
TSB	Temporary stowage bag
TVC	Thrust vector control
UHT	Universal handtool

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

MILA (REV 1)

Day	Hour	Min	Sec		
00	00	00	03	CDR	LIFT-OFF. Clock starts.
00	00	00	05	CC	Roger. Clock start.
00	00	00	11	CDR	Tower clear. Roll and pitch starts.
00	00	00	14	CC	Roger; you have good thrust in all five engines.
00	00	00	29	CDR	Okay, Houston. Roll complete.
00	00	00	30	CC	Roger. Roll complete.
00	00	00	39	CC	Stand by for Mode I Bravo.
00	00	00	42	CC	MARK; I Bravo now.
00	00	00	43	CDR	Okay, we're I Bravo.
00	00	01	12	CC	14, Houston. Everything looks good here on the ground.
00	00	01	16	CDR	Roger.
00	00	01	56	CC	Stand by for Mode I Charlie.
00	00	01	59	CC	MARK; I Charlie now.
00	00	02	01	CDR	We're I Charlie. EDS AUTO's OFF.
00	00	02	03	CC	Roger.
00	00	02	16	CDR	Inboard cut-off.
00	00	02	17	CC	Roger. Inboard.
00	00	02	44	CDR	Cut-off.
00	00	02	45	CC	Roger.
00	00	02	46	CDR	And separation.

00 00 02 48	CC	Roger.
00 00 02 49	CDR	Ignition on five.
00 00 02 51	CC	Roger.
00 00 02 57	CDR	Looks good on five engines.
00 00 03 00	CC	Roger. We confirm good thrust on all five.
00 00 03 15	CDR	Skirt SEP.
00 00 03 17	CC	Got you.
00 00 03 21	CDR	And there goes the tower.
00 00 03 23	CC	Roger. We confirm the skirt SEP. And you're in Mode II now.
00 00 03 27	CDR	Mode II.
00 00 03 29	LMP	STEAM PRESS, WATER, AUTO.
00 00 03 31	CC	Roger, Ed.
00 00 04 01	CC	14, Houston. At 4 minutes, trajectory and guidance look good.
00 00 04 06	CDR	14; Roger.
00 00 04 10	CC	And, 14; Houston. The CMC is GO.
00 00 04 14	CDR	Roger; CMC, GO.
00 00 05 47	CC	Stand by for S-IVB to COI.
00 00 05 49	CC	MARK. S-IVB to COI now.
00 00 05 52	CDR	S-IVB to COI.
00 00 05 54	CC	Roger. And your times are nominal. Level sense arm, 8 plus 39, and S-II cut-off at 9 plus 16.
00 00 06 02	SC	...
00 00 06 21	CDR	... Houston. Gimbal motors are running.

00 00 06 24	CC	Roger, 14. Gimbal motors on.
00 00 06 39	CC	Stand by for S-IVB to orbit.
00 00 06 41	CC	MARK. You have S-IVB to orbit now.
00 00 06 44	CDR	Roger. S-IVB orbit.
00 00 07 43	CDR	Inboard cut-off.
00 00 07 45	CC	Roger. Inboard.
00 00 08 25	CC	14, Houston. You're GO for staging. The CMC is GO.
00 00 08 29	CDR	Roger. CMC, GO.
00 00 08 42	CC	We have level sense arm now.
00 00 08 44	CDR	Roger. Level sense arm.
00 00 09 09	CC	Stand by for a Mode IV capability.
00 00 09 12	CC	MARK. You have it now.
00 00 09 15	CDR	Roger. Mode IV.
00 00 09 19	CDR	We have a cut-off.
00 00 09 21	CC	Roger. Cut-off.
00 00 09 23	CDR	And staging.
00 00 09 25	CC	Roger.
00 00 09 26	CDR	And good thrust on one.
00 00 09 28	CC	Roger.
00 00 09 33	CC	14, Houston. Thrust looks good on the S-IVB.
00 00 09 37	CDR	Thank you.
00 00 10 12	CC	14, Houston. Everything's looking perfect here.
00 00 10 16	CDR	Roger.

00 00 10 51	CC	14, Houston. Predicted cut-off is as planned, 11 plus 43.
00 00 10 57	CDR	Roger.
00 00 11 12	CC	Apollo 14, Houston. Predicted cut-off 11 plus 43 nominal. Over.
00 00 11 19	CDR	Roger. 11 plus 43.
00 00 11 42	CDR	We've got a good cut-off.
00 00 11 43	CC	Roger.
00 00 12 15	CC	Apollo 14, Houston. The booster is safed and your orbit is GO.
00 00 12 21	CDR	Roger. Good show. GO orbit; booster safed.
00 00 12 31	LMP	TVC SERVO POWER, two, coming OFF now.
00 00 12 48	CC	14, Houston. I have a Z-torquing angle when you're ready to copy.
00 00 12 53	CDR	Okay. We're showing about 99 by 102.9.
00 00 12 56	CMP	... SAFE.
00 00 12 57	CC	Roger.
00 00 13 03	CDR	Okay, two, SAFE.
00 00 13 06	CDR	SECS LOGIC, two, OFF.
00 00 13 11	CMP	Arming breakers coming open.
00 00 13 16	CDR	Okay, three BMAGs going to RATE 2.
00 00 13 24	CDR	Okay, RCS LOGIC's OFF.
00 00 13 34	CDR	Okay, two in NORMAL.
00 00 13 42	CC	Apollo 14, Houston. The Saturn is configured for orbit. We're showing you in a 102 circular orbit - -
00 00 13 49	LMP	Okay.

00 00 13 51	CDR	Understand. 102 circular.
00 00 14 46	CMP	Okay, Gordon, I'll take the Z-torquing angle.
00 00 14 50	CC	Roger, Stu. The Z-torquing angle is a plus 0.14. Over.
00 00 14 59	CMP	Plus 0.14.
00 00 15 01	CC	Roger.
00 00 15 29	CC	14, Houston. You have 45 seconds to Vanguard LOS. There'll be about a 40-second gap to Canary.
00 00 15 39	LMP	Roger, Houston.

CANARY (REV 1)

00 00 18 15	CC	Apollo 14, Houston. How do you read through Canary?
00 00 18 18	CDR	Loud and clear, Houston.
00 00 18 20	CC	And you're loud and clear.
00 00 22 40	CC	14, Houston. About 45 seconds to LOS. We have nothing for you before Carnarvon. Over.
00 00 22 47	CDR	Roger. We're on the checklist.
00 00 22 50	CC	Roger.
00 00 22 52	LMP	See you in Carnarvon, Gordon.
00 00 22 55	CC	Roger, Ed.

CARNARVON (REV 1)

00 00 51 34	CC	Apollo 14, Houston through Carnarvon. How do you read?
00 00 51 39	LMP	We read you loud and clear.
00 00 51 42	CC	Roger. We're reading you a lot of background static.
00 00 51 52	LMP	Houston, are you ready for a IMU REFSMMAT realine check, P52 numbers?

00 00 52 00	CC	Roger, Ed. Go ahead.
00 00 52 05	LMP	That's NOUN 71 - are 22, 24; NOUN 05 is all balls; NOUN 93, plus 00.085, plus 00.010, plus 00.166; GET of 38:15. And we just burst into sunlight, Gordo. It was quite a sunrise.
00 00 52 36	CC	Roger, Ed. We copy that.

HONEYSUCKLE (REV 1)

00 01 03 11	CC	Apollo 14, through Honeysuckle. Over.
00 01 03 21	CC	Apollo 14, Houston through Honeysuckle. If you read, go omni Charlie.

END OF TAPE

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STATESIDE PASS (REV 1)

00 01 29 59	LMP	Hello, Houston; Apollo 14. How do you read?
00 01 30 02	CC	Apollo 14, this is Houston. You're loud and clear, Ed.
00 01 30 15	CC	Apollo 14, Houston. You're loud and clear. Go ahead.
00 01 30 28	LMP	Roger, Houston. We've completed our checklist up to page ...
00 01 30 29	CC	14, Houston. We started getting - pretty bad static right in the middle of that transmission. Will you say again?
00 01 30 37	LMP	Roger, Houston. We have completed our ... L2-18.
00 01 30 45	CC	Roger.
00 01 31 12	LMP	Houston, we're starting to extend the docking probe now.
00 01 31 15	CC	Roger, Ed. And I have a TLI plus 90 pad any time you're ready to copy.
00 01 31 20	LMP	Roger. One second and I'll be ready for you.
00 01 31 50	LMP	Okay, Houston, the probe's extended.
00 01 32 02	LMP	Houston, I'm ready to copy.
00 01 32 08	CC	Okay, Ed. One question from Dr. Gilruth. They are wondering how y'all like zero g.
00 01 32 17	LMP	Say again, Houston.
00 01 32 20	CC	Dr. Gilruth was wondering how you like to fly - how you like flight in zero g - -
00 01 32 26	LMP	I think I got that one, Gordon. You're asking about zero g and it's - it's really great. Everybody's in great shape, we're having a ball, well ahead of the time line.

00 01 32 38 CC Roger, I'll go ahead with TLI plus 90, Ed, if you're ready.

00 01 32 43 LMP Go ahead.

00 01 32 45 CC Okay, it's a TLI plus 90, SPS/G&N. NOUN 47, 64470; minus 1.45, plus 1.30; T_{ig} is 003:59:51.13; NOUN 81, minus 0515.8, plus all balls, plus 8420.6; attitude, 181, 256, 001; H_A is NA; H_P, plus 0017.1; 8436.4, 9:01, 8404.9; sextant star, 15; 221.4, 39.9; boresight star is NA; NOUN 61, minus 30.14, minus 025.00; 1154.4, 33721; GET for .05g, 012 - correction - 010:57:29. GDC-aline set stars are Sirius and Rigel; 333, 083, 013; no ullage. Go ahead.

00 01 35 29 LMP Roger, Houston. That comm wasn't too good. I missed the burn time, trunnion angle, and - Please repeat those two.

00 01 35 47 CC Roger. Your burn time is 9:01 and trunnion angle, 399. Over.

00 01 35 58 LMP Roger. And say again the burn time.

00 01 36 01 CC Burn time 9:01, 9:01. Over.

00 01 36 07 LMP Roger; 9:01. TLI plus 90, SPS/G&N. 64470, minus 1.45, plus 1.30; at 003:59:51.13; ... 515.8, plus all zeros, plus 8420.6, 181, 256, 001; NA; plus 0017.1; 8436.4, 9:01 8404.9; 15; 221.4, 29.9; NA; NOUN 61, minus 30.14, minus 025.00; 1154.4; 33721; GET of .05g, 010:57:29; Sirius, Rigel; 332, 082, 013; no ullage.

00 01 37 41 CC Okay, Ed. I have about four corrections. The first is on DELTA-V_X on NOUN 81. I missed your readback on that. It should be minus 0515.8. Is that what you got?

00 01 37 55 LMP That's affirm; 0515.8.

00 01 37 58 CC Okay; a couple of readbacks were incorrect. Trunnion angle is 39.9, 39.9. Over.

00 01 38 08 LMP Roger; trunnion, 39.9.

00 01 38 11	CC	And on R-alines, or the GDC aline, that is 333, and pitch is 083. Yaw you read back correctly, 013. Over.
00 01 38 26	LMP	Roger; 333, 083, and you're coming in very loud and clear now, Gordon.
00 01 38 33	CC	Okay, Ed. You've been loud and clear. I'll give you the P37 for lift-off plus 8, if you're ready.
00 01 38 38	LMP	Go ahead.
00 01 38 40	CC	Okay, GET of ignition is 008:00, 3283, minus 165, and GET for 400K, 045:38. Go ahead.
00 01 39 02	LMP	That's 008:00, 3283, minus 165, and 045:38.
00 01 39 13	CC	Roger, your readback's correct, and I have the TLI pad.
00 01 39 19	LMP	Okay, these pads are sure wrecking my viewing, but all right.
00 01 39 32	LMP	Okay, Houston, go ahead with the TLI pad.
00 01 39 35	CC	14, Houston. Before the pad, would you give us POO and ACCEPT for a new state vector?
00 01 39 42	CDR	Okay, you have it.
00 01 39 49	CC	And I'm ready with the TLI pad.
00 01 39 51	LMP	Go ahead.
00 01 39 52	CC	Roger; time base 6 predict; 2:18:51; attitude for TLI, 179, 136, 000; burn time, 5:52; 10363.0; 35549; SEP attitude, 359, 168, 319; extraction attitude, 301, 348, 041; ejection time is 3:56:00. Go ahead.
00 01 40 07	CDR	Okay. I have 02:18:51. I missed the angles; burn time, 5 plus 52; 10363.0, 35549; 359, 168, 319; 301, 348, 041; ejection, 3:56:00. And would you give me the angles again, please?
00 01 40 28	CC	Roger, Al. Your readback was correct. The TLI attitude is 179, 136, 000. Go ahead.
00 01 40 42	CDR	I have 179, 136, 000.

00 01 40 47	CC	Roger. Readback correct.
00 01 42 07	CC	Apollo 14, Houston. The computer is yours. We're through with the uplink.
00 01 42 11	CDR	Okay. Thank you.
00 01 43 40	CDR	Okay, Houston. We're going to stand by for your GO for pyro arm.
00 01 43 46	CC	Roger, Al. Stand by.
00 01 43 49	CC	You're GO for pyro arm now.
00 01 44 00	CDR	Okay, Houston. Our LOGIC switches are on.
00 01 44 03	CC	Roger. Now you're GO for pyro arm.
00 01 44 06	CDR	Thank you.
00 01 45 10	CC	Apollo 14, Houston.
00 01 45 13	LMP	Go ahead.
00 01 45 15	CC	We have about 4 minutes to LOS Vanguard, Ed. And, due to the launch delay, the Canary pass will be pretty low elevation, marginal; at the most, about 2 minutes long.
00 01 45 30	LMP	Okay. Thank you.
00 01 46 25	CC	Apollo 14, Houston.
00 01 46 29	LMP	Go ahead.
00 01 46 30	CC	We're reading the CDR's EKG loud and clear now. We're wondering if you did anything to fix it up there.
00 01 46 38	LMP	No.
00 01 46 41	CC	Roger. It looks good.
00 01 49 39	CC	Apollo 14, Houston.
00 01 49 42	LMP	Go ahead.

00 01 49 44	CC	Roger; we're real close to LOS, so I'll go ahead and give you the words I've got about TLI. First of all, the - the monitor angles on page L2-24 should all be increased by 2.5 degrees. And, if you're monitoring the TLI burn with the cue card, the pitch angles should all be reading about 9 degrees higher than on the card. The yaw should be within a quarter of degree, one-fourth degree of what the card reads. Did you copy? Over.

CANARY (REV 2)

00 01 51 27	CC	Apollo 14, Houston through Canaries. Over.
00 01 51 31	LMP	Okay, Houston. We got nothing of your last transmission. You dropped off the air.
00 01 51 36	CC	Okay, Ed. I'll start over. For the TLI - coming up on your monitor - First of all on the cue card, the yaw angles as shown are okay. The pitch that you see on the ball should be 9 degrees higher all the way through the burn than as shown on the cue card; just add 9 to all your pitch angles and that should be good. On the ORDEAL angles that - is shown on pages 2-24 and 25, increase each of those by 2 and a half degrees. At 57 minutes instead of 18, you should have 20.5 degrees; at 59 minutes, 12.5; and at 59:55, 8.5 degrees. Over.
00 01 52 40	LMP	Roger; understand that the yaw angles are okay. Pitch should be - angle should be plus 9 degrees and ORDEAL angles increased by 2.5 degrees.
00 01 52 52	CC	Roger. That pitch is a 9-degree increment over what is shown on the card. In other words, all the angles should be 9 degrees higher than as shown on the card - the inertial angles. Over.
00 01 53 04	LMP	Roger; got you, Gordon. We got that. We're with you.
00 01 53 18	CC	14, Houston.
00 01 53 22	LMP/CDR	Go ahead.
00 01 53 23	CC	On your P15, we show that you loaded the wrong seconds figure for time base 6. Will you check that?

00 01 53 42	CDR	Thank you, Gordon. Good call.
00 01 54 29	CC	14, Houston.
00 01 54 32	CDR	Go ahead.
00 01 54 34	CC	For that time to take, you're going to have to reselect P15.
00 01 54 40	CDR	Roger. I - I did, Gordon. We'll run through it again.
00 01 54 43	CC	Roger.

ARIA (REV 2)

00 02 16 37	CC	Apollo Houston, this is - Apollo 14, this is Houston through ARIA 4. How do you read?
00 02 16 44	LMP	Houston, this is Apollo 14. Loud and clear. How me?
00 02 16 47	CC	Roger. You're readable; a little bit in the background noise, but loud and readable.
00 02 16 55	LMP	Roger, Houston.
00 02 17 14	LMP	Okay, Houston; 14. How do you read now?
00 02 17 18	CC	Apollo 14, Houston. You're readable, too. Go ahead.
00 02 17 23	CMP	Okay, I was just checking the comm here. Gee, you're just beautiful; the ARIA is really putting out for us.
00 02 17 29	CC	Roger. I guess this is the best ever for ARIA.
00 02 21 26	CC	Apollo 14, Houston. Over.
00 02 21 29	LMP	Go ahead.
00 02 21 30	CC	Roger; we missed if you did call time base 6 starting. I would like to know how the tank pressures look; over.
00 02 21 38	CDR	Okay, it looked to us like time base started within 1 second of nominal time, and the oxidizer

		tank is currently - quietly - at 3 7 and the ... tank is currently setting quietly at 2 6.
00 02 21 54	CC	Roger, Al.
		CARNARVON (REV 2)
00 02 24 07	CC	Apollo 14, Houston. Over.
00 02 24 38	CDR	Hey, Houston. 14.
00 02 24 40	CC	14, Houston. How do you read?
00 02 25 49	CDR	Okay, Houston; 14. How do you read us?
00 02 25 53	CC	Roger, 14; this is Houston through Carnarvon, and you're loud and clear.
00 02 25 57	CDR	You're 5 square.
00 02 26 36	CC	Apollo 14, Houston.
00 02 26 38	CDR	Go ahead.
00 02 26 39	CC	You're GO for the Moon. GO for TLI.
00 02 26 40	CDR	Roger. GO for TLI.
00 02 28 34	CDR	We have IGNITION.
00 02 28 37	CC	Roger; IGNITION.
00 02 28 42	CDR	Smooth start. Steering is good.
00 02 28 44	CC	Roger. We show good thrust on the S-IVB.
00 02 30 39	CDR	Houston. Tank pressures are steady at 40 and 30.
00 02 30 43	CC	14, Houston. Roger.
		ARIA (REV 2)
00 02 33 43	CC	14, Houston. Through ARIA 2. Over.
00 02 34 25	CDR	There's the CUT-OFF.
00 02 34 27	CC	Roger, 14. CUT-OFF.

00 02 34 32 CDR ... are venting down. The oxidizer is coming down through 35 now. The fuel is coming down through 30.

00 02 34 41 CC Apollo 14. Roger on the vent.

00 02 35 03 CDR Houston, 14.

00 02 35 05 CC 14, Houston. Go ahead.

00 02 35 09 CDR Reading a V_I, plus 35542; DELTA-V_c, minus 8.8, plus 04399 ...

00 02 35 39 CC 14, this is Houston. We copy V_I, plus 35542, DELTA-V_c of minus 8.8, and what's the last two? Would you repeat?

00 02 35 55 CDR Okay. H-dot, plus 04399; altitude, plus 01747.

00 02 36 07 CC Roger. Plus 04399 and plus 01747.

00 02 36 14 CDR Okay. I'm not sure I got your H-dot readback ... plus 04399.

00 02 36 22 CC Roger. 04399.

00 02 37 28 CDR Houston. On the ... oxidizer pressure is now down around 18 and fuel pressure is about 17.

00 02 37 41 CC Roger. I understand; 18 and 17 on the tank pressures.

GUAM (REV 2)

00 02 38 57 CC Apollo 14, Houston through Guam. Over.

00 02 39 00 LMP Go ahead, Houston. Say again.

00 02 39 02 CC You're loud and clear, Ed. And we should have continuous voice and data from here on out. You're loud and clear through Guam.

00 02 39 12 LMP Okay, Gordon. We have your - have good signal strength for you now. And I might say the earth is starting to drop away very rapidly at this point.

00 02 39 21	CC	Roger.
00 02 39 25	LMP	And Stu and Al have started to change seats. We're going into our - -
00 02 39 28	CC	Roger.
00 02 39 30	LMP	- - pre-SEP checklist.

NOTE

After the Guam pass following TLI, there is continuous acquisition among Goldstone (GDS), Madrid (MAD), and Honeysuckle (HSK).

00 02 40 25	CC	Apollo 14, Houston. I have an update to your high-gain gimbal angles as shown on page 3-3 when you're ready.
00 02 40 38	LMP	Okay. Go ahead.
00 02 40 40	CC	Okay, about five lines from the bottom, this is the high-gain angles after pitcharound for docking. It should be a pitch, plus 11; and yaw, plus 306.
00 02 40 59	LMP	Understand. Pitch, plus 11; and yaw, plus 3 - plus 306.
00 02 41 06	CC	Roger. That's right.
00 02 44 00	CC	Apollo 14, Houston. I have some updates for your - for you now. Over.
00 02 44 06	LMP	What type of updates?
00 02 44 08	CC	I've got the S-IVB maneuver time and SEP time that goes on 3-1, and then a new S-IVB viewing attitude.
00 02 44 17	LMP	Roger. I'm ready to copy.
00 02 44 23	CC	The S-IVB maneuver time, 2:49:23. Maneuver will be complete in 3 minutes, and the nominal SEP time is 2:59:23.
00 02 44 44	LMP	Understand S-IVB maneuver 2:49:23 and it'll maneuver for 3 minutes. SEP is 2:59:25 - 23.

00 02 44 53	CC	That's correct, Ed. And then on page 3-7 - stand by 1.
00 02 45 08	CC	14, Houston.
00 02 45 12	LMP	Go ahead.
00 02 45 13	CC	Terminate the cabin repressurization. We show you over 6 psi.
00 02 45 17	LMP	We beat you to it.
00 02 45 20	CC	Okay. And we have 3 7 in front of you. I'll give you the new S-IVB view-attitude NOUN 22 angle.
00 02 45 33	LMP	Okay, go ahead.
00 02 45 34	CC	Okay, it's about a quarter of the way down where it reads 93, 39.6, and 355.8. Change them to read same for roll, 090; pitch, plus 349.0; and yaw, plus 356.0.
00 02 46 04	LMP	Roger; understand. Roll is the same, pitch is 349.0, yaw is 356.0.
00 02 46 13	CC	Roger; your readback is correct.
00 02 53 25	CC	Apollo 14, Houston. Give us omni Charlie, please.
00 02 53 31	LMP	All right, Houston. You have Charlie.
00 02 53 34	CC	Roger.
00 02 54 58	LMP	Houston, 14. The S-IVB tank pressures: oxidizer, 24, and fuel is 9.
00 02 55 08	CC	Roger; oxidizer at 24; fuel, 9.
00 02 57 59	CC	Apollo 14, Houston.
00 02 58 04	CMP	Go ahead, Houston; 14.
00 02 58 06	CC	Roger; you are GO for transposition and docking, and we're to have a site handover from Guam to Goldstone at 3 hours even; over.

00 02 58 18	CMP	Okay, understand. We're going to Goldstone at 3, and we have a GO for T&D.
00 02 58 23	CC	That's affirmative.
00 03 00 50	CMP	Houston, 14. I'd like a GO for pyro arm.
00 03 00 57	CC	14, Houston. You're GO for pyro arm.
00 03 00 59	CMP	Okay.
00 03 02 58	CDR	Okay, Houston. We have separated, turned around, and started.
00 03 03 03	CC	Roger.
00 03 03 07	CDR	And we have the usual ...
00 03 03 11	CC	Roger.
00 03 04 06	LMP	Houston, 14.
00 03 04 08	CC	Go ahead, Ed.
00 03 04 12	LMP	You should have the television here in a minute. There it comes.
00 03 04 19	CC	Roger. We're not seeing it yet.
00 03 04 37	CC	Roger, Ed. We're getting a great picture now.
00 03 04 40	LMP	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 03 04 44 CC We can see the drogue down toward the bottom of the picture and slightly left. You might move the camera a little bit left and down about a half a frame.

00 03 05 02 CC That's real good. Right there.

00 03 06 00 LMP Houston, how's the television look to you now? Anything I can do to the picture?

00 03 06 04 CC No. I wouldn't change a thing, Ed. Looks really good. It's right in the middle and steady.

00 03 06 13 LMP Okay.

00 03 07 53 CC Apollo 14, Houston.

00 03 07 56 CDR Go ahead.

00 03 07 57 CC Just for your information, we've lost data with the LVDC. We don't have any procedures for you with regard to that.

00 03 08 08 CDR Say again, Houston.

00 03 08 10 CC We've lost data with - all data from the LVDC, but we have no change in the figures. Go ahead with normal procedures.

00 03 08 19 CDR Okay.

00 03 10 09 LMP Houston, 14. Do you need any commentary to help you identify what you're seeing on the TV?

00 03 10 18 CC We're - we're picking out things pretty well here. If you have anything for - the rest of the country, you might go ahead and talk if it won't interfere with the operation there.

00 03 10 35 LMP Okay, I'll chat for a minute. The S-IVB is surrounded here by typical thousands, or millions of particles that came out when we separated. They look like little winking stars, floating around in a very random pattern. The sunlight is shining very strongly off the top of the lunar module as we drift into it. Stu's doing an excellent job of sliding in here very slowly. As you can see

that - our approach speed is a few tenths of a foot per second, probably. And the LM is starting to get very large in our field of view; starting to cover the window, out my plus-X window. And the LM and the S-IVB are boresighted right out our X-axis. We can see all of the - orange, yellow - thermal protection around the LM. The parts that are black, silver, and white; the colors stand out very nicely. And I can look across - across Stuart.

00 03 12 29	CC	Hi, Ed, this is Houston. About how far out in range are you now, would you estimate?
00 03 12 33	LMP	About 5 feet.
00 03 12 35	CC	Roger.
00 03 12 38	LMP	...
00 03 13 04	LMP	And Houston; we're about to dock.
00 03 13 05	CC	Roger.
00 03 13 22	LMP	We're probably a foot - 18 inches to 2 foot out now.
00 03 13 26	CC	Roger.
00 03 13 55	LMP	And we docked.
00 03 13 57	CC	Roger. We could see a slight oscillation.
00 03 14 58	CMP	Okay, Houston. We hit it twice and - Sure looks like we're closing fast enough. I'm going to back back out here and try it again.
00 03 15 06	CC	Roger.
00 03 16 52	CMP	Man, we'd better back off here and think about this one, Houston.
00 03 16 56	CC	Roger.
00 03 16 57	LMP	We're unable to get a capture.
00 03 17 00	CC	Roger, Ed.
00 03 17 52	CMP	Okay, Houston. We backed out a little bit, and that last time I hit it pretty good and we're just not getting - getting the capture latches in there.

00 03 18 06	CC	Roger. We suggest you verify, if you haven't already, the docking probe circuit breakers on panel 8.
00 03 18 12	CMP	That's verified.
00 03 18 15	CC	And - stand by 1.
00 03 18 31	CC	And, Stu, we suggest you go to EXTEND on the DOCKING PROBE EXTEND/RETRACT switch and check the talkbacks gray.
00 03 18 40	CMP	Okay. We did that when we extended them, but we'll sure do it again.
00 03 18 43	CC	And then back to RETRACT.
00 03 18 58	CMP	Okay. We get both gray in the EXTEND position.
00 02 19 02	CC	Roger.
00 03 19 06	CMP	And we go RETRACT and both gray.
00 03 19 18	CC	14, Houston. One other suggestion. Go to panel 229 and check the EPS group 4 circuit breakers.
00 03 19 33	CMP	Okay. They're both in.
00 03 19 35	CC	Roger.
00 03 20 14	CC	14, Houston. We're about out of ideas here. Suggest you verify you got it - the switch back in RETRACT and then give it another try at docking.
00 03 20 24	CMP	Okay.
00 03 21 32	LMP	Houston, we're starting to drift back in now.
00 03 21 35	CC	Roger, Ed.
00 03 23 04	CC	Apollo 14, Houston.
00 03 23 06	CDR	Go ahead.
00 03 23 07	CC	We suggest that at the initial contact that you hold plus-X for 3 seconds or so at least.
00 03 23 17	CDR	Okay, Houston. We tried it before, but not quite 3 seconds.

00 03 23 22	CC	Okay.
00 03 23 25	CDR	And ... a good rate coming in this time.
00 03 23 34	CMP	And here we come in again.
00 03 23 37	CC	Roger.
00 03 23 54	CMP	Okay, Houston. I hit it pretty good and held 4 seconds on contact and we did not latch.
00 03 24 02	CC	Roger. We're seeing it all on TV here.
00 03 24 49	CC	Apollo 14, Houston.
00 03 24 51	CDR	Go ahead, Houston.
00 03 24 54	CC	For your information, at 3 plus 34:24, a nonpropulsive vent in the booster will be sequenced open. We don't expect to see much from it. Over.
00 03 25 06	CDR	Say that again, please.
00 03 25 08	CC	At 3 plus 34:24, a nonpropulsive vent in the booster will be sequenced open. Over.
00 03 25 18	CDR	Okay, we got you.
00 03 25 20	CMP	Okay, Houston; 14. I can look in the drogue and I can see three marks 120 degrees apart, like the capture latches are scratching the drogue. They're about - I don't know - inch and a half long going into the hole in the drogue about - spaced about 120.
00 03 25 46	CC	Roger.
00 03 26 19	CC	14, Houston. Can you describe the scratches? Are they sharp scratches or rounded off? Over.
00 03 26 26	CMP	Well, I didn't really see that good. I can move back in, I guess. We can take a look at them. They look like fairly distinct - scratches coming into the hole, but - let's move up. We'll take another look.
00 03 26 41	CC	Roger.
00 03 30 20	CMP	Houston, 14.

00 03 30 22 CC Go ahead.

00 03 30 23 CMP Okay, Gordon. I'm sure you're all thinking along the same lines, but - you know, if the capture latches were depressing as they slide into the drogue, I don't see why they would have made those marks.

00 03 30 37 CC Yes, that's been discussed here. We think probably something is holding them out. One possibility is a sort of a shearpin that gets pulled off when the tower is jettisoned and - First look at it looks - We're thinking maybe that may not be - may not allow the capture latches to depress. I guess we'll just have to tell you to stand by while we talk it over here more.

00 03 31 07 CMP Okay. We're - we're nice and comfortable. And I'm just going to drift around here about this range and try not to use any more fuel than I have to.

00 03 31 16 CC Roger. A reminder. You have about 3 minutes until that vent will come open. Keep an eye on that booster when that happens.

00 03 31 23 CMP Okay. How about you give me a mark on that beauty?

00 03 31 25 CC Will do.

00 03 33 56 CC Stu, this is Houston. That vent is due in 30 seconds.

00 03 34 00 CMP Okay.

00 03 34 15 CC 10 seconds.

00 03 34 24 CC Ready -

00 03 34 25 CC MARK. It should be on now.

00 03 34 27 CMP Man, it's beautiful.

00 03 34 29 CC We can see one-half of it from here.

00 03 34 32 CMP Okay, I'll back down a little bit and let you watch this.

00 03 34 38	LMP	There's lightning - the whole sky. Of course, it's the source of another 10 million particles floating out in front of us.
00 03 34 52	CC	Roger, Ed.
00 03 34 55	LMP	As I was going to say when we were - got busy there a little while ago - look out our left window across Stuart, we could see the Earth receding.
00 03 35 06	CC	Roger.
00 03 39 01	LMP	Houston, we observe that the S-IVB is slowly rotating.
00 03 39 07	CC	Roger, Ed.
00 03 40 39	CMP	Gordon, how do you read?
00 03 40 42	CC	Loud and clear. Go ahead.
00 03 40 43	CMP	Okay, I'm not sure what we might be doing to the windows. I guess it's a minor problem at this point, but is everybody happy with us sitting here in this vent?
00 03 40 54	CC	I don't think that point's been raised. Let me ask it around here.
00 03 40 59	CMP	Okay.
00 03 44 08	CC	Apollo 14, Houston.
00 03 44 10	CMP	Go ahead.
00 03 44 12	CC	While we're working on the problem here, we suggest that you go to a 5-degree dead band in the DAP. That will be a DAP load 11112 to save RCS, and nobody's come up with a good suggestion on what to do about the windows, so I guess we just won't worry about it now.
00 03 44 33	CMP	Roger. Like I say, I think it's a minor problem.
00 03 58 49	CC	Apollo 14, Houston. I'd like you to try one thing. Take the EXTEND/RETRACT switch to RETRACT and tell us what the talkbacks read in RETRACT as you have on others before.

00 03 59 10	CMP	Okay, Gordon. You want the switch in RETRACT and a read - readout of the talkback?
00 03 59 17	CC	That's affirmative; while the switch is in RETRACT.
00 03 59 21	CMP	Roger. It's in RETRACT now and the talkback is gray.
00 03 59 25	CC	Roger.
00 03 59 27	CC	Okay. That tells us right there that the capture latches are indeed cocked and that kind of says that there's something in there that's keeping us from releasing them when we go ahead and dock. And it says that we cannot fire bottle.
00 03 59 47	CC	It just wouldn't fire, is that the true ...? It would not fire. Right?
00 04 07 38	CC	14, Houston.
00 04 07 40	CMP	Go ahead.
00 04 07 42	CC	Another question. Can you remember back to the initial probe extension, did you hear a thud as though it did extend out?
00 04 07 50	CMP	That's affirmative, Gordon. I guess I should have mentioned that sooner. Yes. We got the thud and we got the talkbacks on barber pole, then immediately back to gray. But we did feel - feel - feel the thud.
00 04 08 04	CC	Roger, Stu.
00 04 11 38	LMP	Houston, 14.
00 04 11 41	CC	14, Houston. Go ahead.
00 04 11 44	LMP	Do you want me to leave the television running or shall I take it down now?
00 04 11 49	CC	Stand by. Like to leave it running, Ed. But we're not seeing that booster right now. It's in the lower left corner, just barely. But we'd like to keep it running for a future use.
00 04 12 02	LMP	Okay.
00 04 12 54	CDR	Houston, 14. And turning the PYROs and SECS - and SECS LOGIC, OFF.

00 04 13 02	CC	Roger.
00 04 14 30	CC	Apollo 14, Houston. Over.
00 04 14 32	CMP	Go ahead.
00 04 14 34	CC	Okay, we'd like to essentially try the docking again with the normal procedures rather than going to more drastic alternate procedures. We'd like you to reconfigure the DAP. R_1 should be 11102 for docking. We'd like you to go to EXTEND/RELEASE and hold it for at least 5 seconds, and then return to RETRACT and proceed with one more try at a normal docking. Over.
00 04 15 13	CMP	Okay, we'll put a narrow dead band in and we'll go EXTEND for 5 seconds at least and back in RETRACT and bang it again.
00 04 15 24	CC	Roger.
00 04 15 55	CC	And, 14; Houston. Make your closing rate on this try, not - not fast, not slow, just a normal closing rate.
00 04 16 03	CMP	Okay. We'll try it. I thought that's what I had the first time, but we'll give it a go.
00 04 16 10	CC	Roger. The first time looked that way to us. We'd just like to try it again.
00 04 16 14	CMP	Okay.
00 04 16 36	CC	14, Houston. When you do that EXTEND/RELEASE - for the - at least 5 seconds so you can read the talkbacks to us.
00 04 16 45	CMP	Okay.
00 04 16 57	CDR	And, Houston, we'd like to bring SECS LOGIC, ON, and get another GO for pyro arm.
00 04 17 02	CC	Stand by. We're ready for LOGIC, ON.
00 04 17 11	CDR	LOGIC is ON.
00 04 17 51	CC	14, Houston. You're GO for pyro arm.

00 04 18 00	CDR	Roger. Go for pyro arm.
00 04 19 06	CDR	Houston, 14. Are you ready for the EXTEND/RELEASE position of the switch?
00 04 19 13	CC	That's affirmative. Go ahead, Al.
00 04 19 15	CDR	Okay. Going in RETRACT, and EXTEND/RELEASE on my mark. Five seconds.
00 04 19 21	CDR	MARK. My barber pole stayed gray, back to OFF. Barber pole is still gray.
00 04 19 31	CC	Roger; understand.
00 04 19 33	CDR	Back to RETRACT. Barber pole still gray.
00 04 19 37	CC	Roger. I understand the talkback stayed gray all the way through.
00 04 19 40	CDR	Affirmative.
00 04 30 56	LMP	Okay, Houston, we're starting to close on it now.
00 04 31 01	CC	14, Houston. Roger.
00 04 32 11	LMP	About 4 feet on it, Houston.
00 04 32 13	CC	Roger, Ed.
00 04 32 23	LMP	Here it comes.
00 04 32 34	LMP	No latch.
00 04 32 35	CMP	No latch, Houston.
00 04 32 37	CC	Roger.
00 04 34 38	CDR	Houston, 14. I'm sure you're thinking about the possibility of going hard suit and bringing the probe inside to look at, as we are.
00 04 34 49	CC	That's affirmative. We may have one more procedure to try prior to going to that. Stand by 1 now.
00 04 34 57	CDR	Okay.

00 04 37 11	CC	14, Houston.
00 04 37 14	CMP	Go ahead.
00 04 37 15	CC	We'd like some more words on the exact appearance of the drogue, the scratches, and so forth. Over.
00 04 37 26	CMP	Okay, I'll give you - try to give you the best. As I look at the probe - and then you all can figure out where the docking latches are from there; but as I look at the probe in the docking position, the prominent thing - are we have three scratches about - oh, maybe a couple of inches long, and they're really - well, the top one is about - essentially 12 o'clock, maybe 11:30, and then they're spaced, you know, equally around the ring, about 120 out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 04 38 24 CMP And there is one other scratch that I didn't see before, that I must have put on this last attempt. I noticed it as we backed out, and it - Well, there - there are a couple of other little ones, but the next prominent scratch is, oh, at about the 7 o'clock position. It starts at the hole and runs out for about 3 inches - maybe 4 inches.

00 04 38 33 CC Roger.

00 04 38 34 CDR Houston, all these scratches are radial, and they're right up at the very apex of the drogue.

00 04 38 40 CC Roger.

00 04 38 56 CC Hey, Stu. This is Gene-o. Do you read?

00 04 38 58 CMP Yes, loud and clear.

00 04 39 02 CC Okay. We - we got one more idea down here - Before doing any hard suit work, and - let me throw it out at you, and you come back with your impressions. We're thinking of - of attempting to - to dock actually without the aid of the probe, which requires some pretty fine alinement. We're thinking that maybe you could go ahead and go through a normal plus-X and put the probe in the drogue, and while your holding a - This will help you with your alinement - and while you're holding a plus-X, go ahead and blow a bottle and try and retract the probe. Now, if the probe retracts, it should retract well out of your way, so that the - the actual docking latches, with any luck on the alinement, should mate. Now, if you get one latch, we feel we'll - we'll be fast and we can - we can get them all. There's one hooker. The configuration that we think you might be in - Electrically, there may be a series path broken which doesn't allow us, actually, to - to retract the probe through blowing one of those bottles. But we feel it sure is worth a chance or, worth a try before - before we do any hard suit work.

00 04 40 37	CDR	All right, Gene-o. Let me see if we understand you on that. Your - your thought is to blow one of the bottles to retract the probe after we're alined up and just before contact - or wait until we contact, and then thrusting, and then retract the probe.
00 04 41 00	CC	Okay, Al. We're - we're thinking that actually, if you use the - Leave the probe extended until you actually contact, that - that any small, minute misalinement, at least in translation left, right, up, or down, will be taken out as the probe centers in the hole of the drogue. If you can keep a plus-X going at that time and then retract the probe, hopefully, your alinement will stay fairly close and - and we may pick up a couple of the docking latches. Now, as I said, we've got some reservations. We're not - we're not sure, actually, the probe is going to retract, so you might keep that in mind. But again, if it doesn't retract, we haven't lost a bottle, and if it does retract and you - you do get a docking latch, we've accomplished what we wanted to.
00 04 41 58	CDR	Okay. Stand by 1.
00 04 45 52	CDR	Okay, Houston. We'll review what we're going to do for you. See if it is the right thing. Stu is going to make the approach; close at a very slow rate until initial contact. He's going to call out at that time and apply plus-X. I will then go to the RETRACT PRIME 1 position.
00 04 46 15	CC	That - that's it, Al. That - That should - should do it if that - that probe does actually retract, and if our alinement is good enough, the possibilities are pretty good of picking up the dock on latch.
00 04 46 29	CDR	Okay. You - Your theory is, it is going to retract because you feel the capture latches are locked.
00 04 46 33	CC	No. I - Actually, the impression here is that it is not going to retract.
00 04 46 39	CDR	Okay.

00 04 47 30	CDR	Okay, Houston. We're on our way in now and we're going to try the plus-X until it's - After its initial contact, try the plus-X until it's settled down for perhaps a second or two and then go through the retract cycle at that time.
00 04 47 45	CC	Roger.
00 04 54 56	LMP	Okay, Houston. We're about 12 to 15 feet away.
00 04 54 58	CC	Roger, Ed. We got a very good picture.
00 04 57 00	CDR	We got some, Houston. I believe - -
00 04 57 02	CC	Roger.
00 04 57 03	CMP	- - we got a hard dock, Houston.
00 04 57 05	CC	Outstanding.
00 04 57 06	CMP	We got it.
00 04 57 09	CDR	We noticed no response for practically perhaps 2 to 3 seconds after initiating PRIME RETRACT 1. We then got barber pole on both - went gray on both at the hard dock.
00 04 57 26	CC	Roger, Al. That's great.
00 04 57 28	CC	Super job, Stu.
00 04 57 30	CMP	Thank you.
00 04 57 31	LMP	It didn't even wiggle when you hit it. Right in there.
00 04 57 34	CDR	Okay. Shall we proceed with the checklist?
00 04 57 59	CC	14, Houston.
00 04 58 02	CDR	All right. Go ahead, Houston.
00 04 58 04	CC	Roger. We'd like you to proceed on now with the normal hatch and tunnel procedures.
00 04 58 24	CDR	That's in work, Houston. We'll keep you advised.

00 04 58 58	LMP	And, Houston, I'm turning the TV off now.
00 04 59 01	CC	Roger, Ed.
00 04 59 39	CC	14, Houston.
00 04 59 43	CDR	Go ahead, Houston.
00 04 59 45	CDR	Roger. We want to just verify that you're still all hard suited before proceeding with the - the tunnel procedures - -
00 04 59 51	CDR	Not hard suited.
00 04 59 53	CC	Not hard suited, but completely suited up before proceeding the - the tunnel procedures.
00 05 00 00	CMP	Roger. We will - Roger, Houston. Why don't you review the procedures again as we go down the checklist here, and we'll check with you again when we get to that point. We do watch the cabin pressure pretty closely, you know.
00 05 00 20	CC	Roger.
00 05 00 58	CC	14, Houston.
00 05 01 00	CDR	Go ahead.
00 05 01 01	CC	Al, can you just give us a - a qualitative feeling of what it sounded like when those docking latches just did go? Did you get a - a sort of ripple bang or are you convinced you got quite a few of them?
00 05 01 15	CDR	Yes. It was a ripple fire, Gene-o. I'm convinced we did quite a few.
00 05 01 19	CC	Yes. That - that sounds pretty familar, Al. It - it sounds like you're really probably - I wouldn't be a bit surprised to see if you got them all.
00 05 01 27	CDR	Yes. I think we got quite a few, Gene-o. It looked - It was a good hard dock.
00 05 01 31	CC	Beautiful. Tell Stu that session he had this morning paid off.

00 05 01 37	CMP	I believe it.
00 05 01 39	CDR	Yes. And we're going to buy him his present from here.
00 05 05 15	LMP	Houston. DELTA-P at 2.0. We're starting a - a DELTA-P stable check.
00 05 05 25	CC	All right, Ed. Would you repeat your last, please.
00 05 05 29	LMP	Roger. We're starting to check the DELTA-P for 3 minutes.
00 05 05 32	CC	Roger.
00 05 08 16	CDR	Houston, Apollo 14. We have lost 1/10th of 1 pound per square inch by the DELTA-P gage during the 3-minute period. We'd like to proceed as we are.
00 05 08 30	CC	Roger, Al. Stand by.
00 05 08 36	CC	All right. You're clear to GO with that.
00 05 08 38	CDR	Roger. Proceeding.
00 05 09 03	CC	Apollo 14, Houston. We'd like you to verify the H_2 FANS, OFF.
00 05 09 08	LMP	That's verify.
00 05 09 10	CC	Roger.
00 05 09 13	LMP	Belay that, Houston. They're OFF now.
00 05 09 16	CC	Roger, Ed.
00 05 17 18	CC	Apollo 14, Houston.
00 05 17 20	MS	Go ahead.
00 05 17 21	CC	Have some RCS quantity numbers - just - it should make you feel good. You used 131 pounds so far, which is 62 pounds below nominal, but you're still 211 pounds above the redline. Over.

00 05 17 48	LMP	Roger, Houston. We got - We used 131 pounds, which is 62 pounds below nominal. And say again how much above redline?
00 05 17 57	CC	You're still 211, 211 pounds above the redline.
00 05 18 04	LMP	And, Houston, we got all the docking latches.
00 05 18 09	CC	Roger. Understand; you got them all. Very good.
00 05 18 11	LMP	Al's checking carefully now, but that's his first report.
00 05 18 15	CC	Roger.
00 05 22 16	CMP	Okay, Houston. We got all the latches, and everything was fine. All we had to do was just tap on number 2 and 8 to lock the handle down.
00 05 22 27	CC	Roger, Stu. If you haven't bled the nitrogen with the red button, don't for a minute here.
00 05 22 36	CMP	Oh, you caught us in time. We have not bled it.
00 05 22 40	CC	Okay. Stand by. I want to make sure that - what EECOM wants to do here.
00 05 24 46	CC	14, Houston.
00 05 24 48	CDR	Go ahead.
00 05 24 50	CC	Okay, after a massive discussion here, we've decided - have you go ahead with the procedures as you see them in your checklist there. Verify the EXTERNAL LATCH ENGAGED indicator, not visible, and then go ahead and bleed the GN_2.
00 05 25 07	LMP	Wilco.
00 05 34 56	CC	Apollo 14, Houston.
00 05 35 00	LMP	Go ahead, Houston.
00 05 35 02	CC	Roger. In 5 to 10 minutes, the S-IVB fuel pressure should get up to the point where it'll vent. It's through a nonpropulsive vent - it shouldn't affect you - much. Over.

00 05 35 15	LMP	Okay, in 5 to 10 minutes. Thank you. And we're just about to put the hatch back in.
00 05 35 21	CC	Roger.
00 05 38 53	CMP	Houston, 14.
00 05 38 56	CC	Go ahead, 14.
00 05 38 58	CMP	Okay, Gordon. Is there - Just want to make sure that we're all talking on the same frequency on this ejection and - and the maneuvering and everything. Have we got any changes on any of those procedures?
00 05 38 16	CMP	I guess that - -
00 05 38 17	CC	Stand by.
00 05 38 18	CMP	I guess what I'm wondering is - after this long a time, is the S-IVB still in the same condition, and so forth and so on?
00 05 38 26	CC	Okay, Stu. Stand by. I'll get a good summary of that.
00 05 38 30	CMP	Okay.
00 05 38 34	LMP	Gordon, be advised. We're on page L37 and ready for pre-LM SEP and ejection.
00 05 38 39	CC	Roger, Ed.
00 05 40 27	CC	14, Houston.
00 05 40 29	MS	Go ahead.
00 05 40 31	CC	Roger. I'd, essentially, like you to go through procedures and - as you would have nominally. The - the only anomaly with the booster is - right now - is the - that we have lost the downlink from the launch vehicle digital computer, and so your visual indications of its attitude and maneuvers are the only ones that we'll have. We have no read-out on booster attitude down here. And, actually, we've lost many of the downlink parameters on the booster; however, it shouldn't

affect the evasive maneuver and targeting to impact. Over.

00 05 41 21 CMP — Okay, Gordon. That - that - that's what I was wanting to clarify before we pressed ahead so we'll - we'll press right on down and - as nominal and give you the call when we see it and so forth.

00 05 41 33 CC — Roger.

00 05 46 06 CDR — Houston, 14. We'd like a GO for pyro arm, please.

00 05 46 11 CC — You have a GO for pyro arm.

00 05 46 16 CDR — Okay.

00 05 47 09 CMP — Houston, we're going for SEP.

00 05 47 14 CC — Roger.

00 05 47 54 LMP — Houston, got a CRYO PRESS light in the - O_2 tank 3.

00 05 48 01 CC — Roger. We're - we estimate that's probably stratification.

00 05 48 07 LMP — Roger. Sorry, that's also tank 1 and 2 that just dropped down.

00 05 48 11 CC — Roger. We saw that.

00 05 53 23 CC — Apollo 14, Houston. We'll be standing by from you for a - let you have the S-IVB visually and a GO for the yaw maneuver.

00 05 53 33 CMP — Okay, Gordon. It's just now coming out from behind the LM for me in the left window here. About another 15, 20 seconds, we ought to have a good view of it.

00 05 53 44 CC — Roger.

00 05 54 05 CMP — And - Okay, we're well clear, Gordon, if you want to go ahead and do yaw maneuver at your convenience.

00 05 54 14 CC — Roger, Stu.

00 05 54 56	CC	14, Houston. We just sent a checkout command to the booster which looked good. So we're getting ready to start the yaw maneuver now.
00 05 55 04	CMP	Okay. Why don't you give me a mark when it's coming?
00 05 55 08	CC	All right, will do.
00 05 55 21	CC	14, Houston. We'll be commanding at 55 plus 30, about 5 seconds from now. Ready -
00 05 55 31	CC	MARK.
00 05 55 46	CMP	Okay, she - she's moving, Gordon.
00 05 55 49	CC	Roger, Stu.
00 05 58 34	CMP	Well, Gordon, the maneuver looks like it's going well. She's sure maneuvering away from looking at us, and it's a beautiful sight.
00 05 58 43	CC	Roger, Stu. It sounds good to us. We had some question about command capability and it sounds like it's okay.
00 05 58 51	CMP	Oh, yes. She's going away from us.
00 06 00 36	CC	Apollo 14, Houston. Would you give us OMNI Delta?
00 06 00 48	LMP	Okay, you have it, Houston.
00 06 00 50	CC	Thank you.
00 06 01 29	CC	Apollo 14, Houston.
00 06 01 31	CMP	Go ahead.
00 06 01 33	CC	With a GO from you up there, we'll plan to initiate the APS evasive burn at 6 plus 04 even. Over.
00 06 01 46	CMP	Okay. Yes, it's well boresighted away from us, and we'll be standing by.
00 06 01 52	CC	Roger.
00 06 04 28	CC	Apollo 14, Houston. The evasive maneuver should be going now. How does it look?

00 06 04 33	CMP	Roger. We - we see the booster moving.
00 06 04 39	CC	Roger.
00 06 04 50	CC	Now the last thing you can do for us on this, because of our lack of determining the booster attitude, is, as it fades out of view - if you can determine if it is still looking stable. Over.
00 06 05 02	CMP	Okay. We can sure handle that, and you got some venting there, too, as you started that maneuver.
00 06 05 10	CC	Roger. That's normal. I was expecting it.
00 06 05 14	CMP	Okay.
00 06 08 07	CC	Apollo 14, Houston. Would you go to MANUAL and WIDE on the HIGH GAIN, but stay in OMNI Delta?
00 06 08 19	LMP	You've got it.
00 06 08 21	CC	Thank you, Ed.
00 06 09 47	CMP	Houston, 14.
00 06 09 50	CC	Go ahead. Go ahead, 14.
00 06 09 52	CMP	Okay, Gordon. I'm sure - sure you all have been - been talking about it. Do you want me to press ahead with the maneuver to the P52 attitude and go into that?
00 06 10 04	CC	Roger, Stu. That's affirmative. We'd like you to go through with the normal procedures as shown in the flight plan down to that P52 at 5 hours and 40 minutes, but at that point we're going to deviate slightly in order to save some RCS. We do not want you to do the fuel cell purge or the waste water dump. We're planning to have you - or - or - and we do not want you to do the - go into PTC. At that point we're planning to do the P23 which will be a little early, and we'll have a new attitude for that. And then we'll go into PTC. Right now it looks like midcourse 1 is likely to be necessary, so that we'll save one PTC spinup. That way we'll save some RCS. Over.

00 06 10 56	CMP	Okay, now at 5:50 you say, do not do the fuel cell purge or the waste water dump?
00 06 11 03	CC	That's affirmative, Stu.
00 06 11 06	CMP	Okay, we won't do it.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 06 16 13	CC	14, Houston.
00 06 16 15	LMP	Go ahead.
00 06 16 16	CC	Roger. As soon as you get to your attitude there, we're ready to uplink a new REFSMMAT to you.
00 06 16 23	LMP	Okay.
00 06 18 40	LMP	Houston, 14. Do you want me to start a battery B charge?
00 06 18 44	CC	Stand by, Ed.
00 06 19 05	CC	Ed, that's affirmative. Go ahead with the battery B charge.
00 06 19 08	LMP	Okay.
00 06 22 45	CMP	Houston, 14.
00 06 22 52	CC	Go ahead.
00 06 22 53	CMP	Hey, Gordon. I can - got a beautiful view of S-IVB now, out of the left-hand window, and she's stable as a rock.
00 06 23 03	CC	Roger, Stu.
00 06 23 14	LMP	And, Houston, I've initiated battery B charge.
00 06 23 18	CC	Roger, Ed. Would you give us OMNI Charlie, Ed?
00 06 23 28	CC	You have it.
00 06 23 30	CC	Roger. And at about 6:25:20 the LOX dump should start on the S-IVB. You might keep an eye on it at that time. I'll give you a warning about 10 seconds prior.
00 06 23 43	LMP	Okay.
00 06 25 08	CC	Apollo 14, Houston. That LOX dump should start in about 10 seconds.

00 06 26 18 CC Apollo 14, Houston. The LOX dump should be complete now. Did you see anything of it?

00 06 26 24 CDR Yes. It's a beautiful sight, Houston. The sun was shining from the side; it was streaming out. We tried to get a couple of Hasselblad shots of it from the corner of the window. It was really fantastic.

00 06 26 38 CC Roger, Al.

00 06 27 01 LMP Okay, Houston. You have POO and ACCEPT.

00 06 27 04 CC Roger. And we'd like you to try to bring up the HIGH GAIN now. Use a PITCH of plus 28 and a YAW of plus 317. Over.

00 06 27 19 LMP Roger. 28 and 317.

00 06 27 35 LMP Okay. You're in AUTO and locked up, Houston.

00 06 27 39 CC Roger.

00 06 28 08 CC Ed, this is Houston. We're having a little problem with our read-out of high-gain-antenna angles here. Would you read out your onboard pitch and yaw angle?

00 06 28 17 LMP Roger. PITCH of plus 29 and YAW of about 320 - 330.

00 06 28 28 CC Say again the YAW.

00 06 28 31 LMP About 330.

00 06 28 32 CC 330. Roger.

00 06 30 36 CC 14, Houston. We have the REFSMMAT and trunnion bias zero in there. It's your computer.

00 06 30 46 LMP Okay.

00 06 41 24 LMP Houston, 14.

00 06 41 34 LMP Houston, Apollo 14.

00 06 41 38 CC Apollo 14, Houston. Go ahead.

00 06 41 40 LMP Roger. Did you get our NOUN 93s?

00 06 41 45	CC	That's affirmative. We copied them.
00 06 41 47	LMP	Okay.
00 06 41 53	CC	Ed, would you give us the torquing time?
00 06 41 57	LMP	Roger. 006:40:35.
00 06 42 02	CC	6:40:35.
00 06 50 46	CC	Apollo 14, Houston. Over.
00 06 50 48	LMP	Go ahead.
00 06 50 50	CC	Okay. If you haven't already, we'd like you to continue on through the rest of the procedures in the flight plan after the P52 down to 6 hours, except don't do the O_2 fuel cell purge or the waste water dump.
00 06 51 05	LMP	Okay. That's what we're planning to do.
00 06 51 07	CC	And, then, Ed, I have a longer update; I want you to do a P23, the one that's scheduled for about 9:50 in the flight plan - correction 9:30, and if you'd turn to that, I'll give you some new stars and other information to go then.
00 06 51 30	LMP	Stand by.
00 06 52 11	LMP	All right Houston, I have the flight plan open to 09:30.
00 06 52 17	CC	Roger. Stand by 1.
00 06 52 34	CC	Okay, Ed. On the P23, the optics CAL attitude is the same as listed there. Like you to change the P23 sighting attitude to roll, 184; pitch, 2 - -
00 06 52 52	LMP	Hold it, hold it.
00 06 52 54	CC	Okay.
00 06 52 55	LMP	Okay. I'm ready; go again.
00 06 52 57	CC	Okay. It's listed there at 42. Roll, 184; pitch, 283; and yaw, 310.

00 06 53 11	LMP	Okay. The sighting attitude is 184, 283, 310.
00 06 53 17	CC	That's right. And we have a change in the order of doing the stars, plus a couple of substitutions. I'd like you to use the listed star number 3, that's Gamma Centauri, number 53. I want you to do that star first.
00 06 53 38	LMP	Hold it a minute.
00 06 53 47	LMP	Okay, 53, Gamma Centauri is first.
00 06 53 50	CC	Roger. And then the star that's listed number 2, number 236, will be the second star.
00 06 54 00	LMP	Roger. Delta Ophiuchi.
00 06 54 03	CC	Okay. And then the third star is a different one, a new one. It will be star 161, Iota Centauri - and Earth far horizon.
00 06 54 27	LMP	Okay, star 3 is 161, Iota Centauri, EFH.
00 06 54 34	CC	Roger. The NOUN 70 for that star is the same as the NOUN 70 on star number 1. It ought to be easy just to write it down. That'll be 00 all balls on the first register, all balls on the second register, and 00120 on the third register.
00 06 54 58	LMP	Understand.
00 06 55 00	CC	And NOUN 88 is completely different. First register, minus 75603; second register, minus 27129; and third register, minus 59566. Over.
00 06 55 34	LMP	Roger, stand by a minute.
00 06 56 01	LMP	Okay. For Iota Centauri, NOUN 70 is all zeroes, all zeroes, 00120; NOUN 88; minus 75603, minus 27129, minus 59566.
00 06 56 24	CC	Roger, Ed. Readback correct. Okay, the fourth star will be star number 24, Gienah, Earth's far horizon. And NOUN 70 will be first register, 00024; second register, all balls; third register, 00120; and you don't need a NOUN 88 for that one. Over.

00 06 57 13 LMP — Okay. The fourth star is 24, Gienah, EFH; NOUN 70 is 00024, all zeroes, and 00120.

00 06 57 26 CC — Roger. That readback's good. After you finish that P23, we'd like you to do the O_2 fuel cell purge and the waste water dump. And then the - the activity to follow is still under discussion here; we're talking over possibly removing the drogue and taking a look at it at that time and possibly cranking up the TV to give us a picture of it back here. So the decision to start PTC after finishing the P23 will depend on whether we're going to request you to give us a TV shot of the drogue and probe. Over.

00 06 58 10 LMP — Okay. Understand, and the - following the P23, you want us to press on with the O_2 fuel cell purge and waste water dump that's listed about 11:25. Is that correct?

00 06 58 23 CC — I guess it's listed there, and it's also the same thing you skipped back there at 5 hours and 55 minutes. I guess - -

00 06 58 37 LMP — Do you want us to do it immediately after the P23, or wait until 11:25.

00 06 58 45 CC — Roger. Stand by. I'll check on that to be sure. Do that immediately after the P23, Ed.

00 06 58 55 LMP — Roger.

00 06 58 58 CC — One other thing, while you have a pencil in hand, is a lift-off plus 15 P37 block data when you're ready.

00 07 00 56 LMP — Houston, go ahead with the P37 for lift-off plus 15.

00 07 01 00 CC — Okay, Ed. GET of ignition is 015:00; DELTA-V_T, 5700, minus 165; GET for 400K, 045:04. Go ahead.

00 07 01 23 LMP — Okay. GET is 015:00; 5700, minus 165; 045:04.

00 07 01 37 CC — Roger, Ed. Your readback's good.

00 07 02 45 LMP — Houston, 14.

00 07 02 47	CC	Go ahead, Ed.
00 07 02 56	CC	14, Houston; go ahead.
00 07 02 59	LMP	Roger, Gordon. We didn't quite understand when you wanted us to start this P23 that you passed the info on.
00 07 03 08	CC	Right now, whenever you're ready.
00 07 03 12	LMP	Okay. Stu's going to get out of his suit here, and we'll be ready in a few minutes.
00 07 03 16	CC	Roger.
00 07 15 26	CDR	All right, Houston; 14. How do you read?
00 07 15 32	CC	Apollo 14, Houston. Go ahead.
00 07 15 33	CDR	Okay, Gordon, I just wanted to check and make sure that I was back on the comm here.
00 07 15 39	CC	Roger, loud and clear.
00 07 29 14	CC	Apollo 14, this is Houston. Over.
00 07 29 18	CMP	Go ahead, Houston.
00 07 29 20	CC	Roger, Stu. When you get ready to commence your P23, we have a change to the sighting attitude, based on your current estimated time of starting. Over.
00 07 29 33	CMP	Okay. And, hey, could you give me an estimate on - on this? Are you wanting us to press on into that right now, or do you want us to go ahead and get the suits stowed, so forth?
00 07 29 43	CC	That's really your option, Stu. Whenever you conveniently get ready to run a P23, why don't you check with us, and we'll make sure you've got a current attitude? Over.
00 07 29 56	CMP	Okay.
00 07 45 09	CMP	Okay, Bruce. How do you read?

00 07 45 14	CC	Go ahead. Apollo 14, this is Houston. Go ahead.
00 07 45 22	CMP	Okay, Houston. I'm getting ready to start this P23, and - and I guess that last P52 will still be good for this, and I'll start into the optics CAL attitude and then get your VERB 49 attitude to start after that.
00 07 45 41	CC	Okay. And I'll check and see if we want to update our attitude from the one I got here in front of me, and we'll pass it up to you when you're ready.
00 07 45 52	CMP	Okay.
00 07 46 02	CMP	And, Bruce, I guess I want to verify we do not need another P52. It's been - what - an hour since that last one?
00 07 46 13	CC	That's verified.
00 07 46 18	CMP	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 08 01 54	CC	Apollo 14, this is Houston. Over.
00 08 01 56	LMP	Go ahead.
00 08 01 59	CC	14, this is Houston. We'd like you to acquire us with the HIGH GAIN antenna. PITCH, minus 75, and YAW, plus 99. Over.
00 08 02 12	LMP	Roger. Minus 75 and plus 99.
00 08 02 28	CC	Apollo 14, this is Houston. Change YAW angle to plus 120.
00 08 02 36	LMP	Okay, Houston. We've locked up AUTO TRACK.
00 08 05 31	CC	Apollo 14, this is Houston. Ed, we'd like you to read out the PITCH and YAW position meters on the HIGH GAIN antenna for us, if you would, please.
00 08 05 42	LMP	Roger. The PITCH is reading - minus 90, and YAW is 150.
00 08 05 51	CC	Roger. Minus 90 and plus 150.
00 08 06 19	LMP	No, make that about 180 - I mean about minus 80 and 150.
00 08 06 23	CC	Roger, 14. Minus 80 and plus 150.
00 08 09 48	CMP	Okay, Bruce, how about that attitude for the P23?
00 08 09 53	CC	Roger, Stu. The attitude will be roll, 179; pitch, 280; yaw, 310. Over.
00 08 10 07	CMP	Roger. 179, 280, 310.
00 08 10 13	CC	Roger. Out.
00 08 45 23	CC	Apollo 14, this is Houston. For your information, the booster people are planning an APS burn on the S-IVB at 9 hours GET even. Over.
00 08 45 34	CMP	Roger. Thank you.
00 08 46 07	LMP	Houston, 14. Have you any idea where we should look to see it?

00 08 46 40	CC	Stand by on that one, Ed. And, if we can get some good angles and stuff for you, we'll send them up.
00 08 46 48	LMP	Okay. We've just been moving around here. We've lost track of it.
00 08 46 53	CC	Roger.
00 09 00 03	CC	Ed, this is Houston. Coming up on the S-IVB APS burn, and - we don't have a good attitude for you to look out right now.
00 09 00 13	LMP	Okay. We'll kind of look around and see what we can see.
00 09 00 16	CC	Roger.
00 09 00 24	LMP	Give us a hack on it, Bruce.
00 09 00 26	CC	Roger. It's going now. It's about a 4-minute burn.
00 09 02 10	LMP	Houston, we've been unable to spot the S-IVB.
00 09 02 30	CC	14, this is Houston. You can try looking out the right-hand side window and - with your line of sight depressed a little bit from the straight-out position.
00 09 02 46	MS	...
00 09 02 47	CC	... SPS engine bell was.
00 09 02 50	LMP	Roger. The Sun's coming in that window.
00 09 03 01	CC	Okay. That's probably going to make it pretty difficult to spot.
00 09 03 08	LMP	Makes it a little hard on the eyes.
00 09 03 25	LMP	Bruce, we've been sincerely busy with housekeeping up here. We haven't had a chance to - describe anything we've been seeing. We'll get around to that after a while.
00 09 03 36	CC	Say again what you're going to get around to.

00 09 03 38 LMP — I was saying, we'll get around to - doing a description for you after a while.

00 09 03 44 CC — Roger.

00 09 04 25 CC — And the S-IVB burn has been completed, Ed.

00 09 04 49 CDR — Bruce, we've been wondering if you found your headset all right when you got back to the MOCR.

00 09 05 01 CC — Yes, I've got it on. I didn't notice anything wrong with it. You may be a little subtle for me, but go ahead.

00 09 05 16 LMP — You obviously found it. It is working.

00 09 18 55 CC — Apollo 14, this is Houston. I have a flight-plan update for you.

00 09 19 01 CDR — All right. Just a minute.

00 09 19 29 CDR — Okay, Houston, go ahead with your flight-plan update.

00 09 19 32 CC — Roger, 14. We have a P52 that was previously scheduled in the flight plan at 9 hours GET. We'd like you to hold off on that P52 until after PTC is established, and then run it while in the PTC mode. After your P23s are complete here, we'd like you to perform the oxygen purge and waste water dump. Also perform the DELTA-V test and null bias checks, as called out in the flight plan at 9 hours and 20 minutes GET previously. And then you can deactivate the primary evaporator at your convenience. And we'll be having instructions for you on what we want to do on - with respect to the probe and drogue, and I guess that we'd like your commentary or your feelings on how you'd feel about pulling it out and reinstalling it this evening before you turn in. Over.

00 09 20 51 CDR — Okay. You want the P52 regularly scheduled for 9 to be done after PTC is commenced. You want O_2 purge and water dump, and ... now and we'll do the DELTA-V test and null bias check momentarily, as soon as 23's been completed. We'll check out the probe and call you back.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 09 22 43	CMP	And, Houston; 14.
00 09 22 45	CC	Go ahead, 14.
00 09 22 47	CMP	Okay, Bruce. I just wanted to say a word about that P52 that we had just before the P23. Went to that P52 attitude and PICAPAR - I went to pick the star that was occulted by part of the LM. So you probably saw me dial in another star. And the stars weren't probably separated too far, as far as the criteria goes. So if anybody's looking at that, that's the reason.
00 09 23 19	CC	Roger. We copy.
00 09 27 31	CDR	Houston, Apollo 14.
00 09 27 34	CC	Go ahead, 14.
00 09 27 37	CDR	Regarding the probe, I don't think we'd mind taking it out tonight, discussing it with you, letting you look at it, and then leaving it out for the night.
00 09 27 50	CC	Okay, 14. We copy. And as I mentioned earlier, we haven't really gotten all the inputs yet on what we want to do. Whether we'd like to do this tonight or whether we might want to wait until tomorrow, but I'll get back to you as soon as we - we have and we'll incorporate your feelings into the decision down here and send them back to you. And did you copy on my flight-plan update? We'd like to get the primary evaporator deactivated whenever it's convenient with you all.
00 09 28 28	CDR	Okay. It has been deactivated.
00 09 28 32	CC	Okay. Thank you.
00 09 34 08	CDR	Houston, on the EMS null bias check, we had start at minus 100 and terminate with minus 99.4.

00 09 34 35	CC	Roger, Al.
00 09 34 48	CC	14, this is Houston. Would you prefer to take time out to have something to eat or press on with the drogue operation now?
00 09 34 59	CDR	I think we could do both simultaneously.
00 09 35 01	CC	Roger.
00 09 35 03	CDR	... the drogue, Bruce, is to get it out, look at it, discuss it with you, and give you some time to think about it, and tie it down here with us while you're thinking about it.
00 09 35 15	CC	Roger. We're tentatively looking at taking the probe out, doing that, tying it down, and we may want to take the drogue out, but we thought you could just lock the drogue back in place, and then the hatch, to go to sleep for the evening.
00 09 35 30	CDR	Sounds good.
00 09 35 32	CC	Okay. And be right back at you in about a minute with the hot smoking word.
00 09 35 46	CMP	Hey, Bruce, are we going to get in - start PTC before we start in on the drogue?
00 09 35 52	CC	That's unresolved right now, Stu.
00 09 35 55	CMP	Okay.
00 09 37 31	LMP	Houston, 14. This is a pretty fine snow storm we have going out here.
00 09 37 37	CC	Roger. We copy.
00 09 44 15	CC	14, Houston. We're showing about 15 percent on waste water on telemetry now.
00 09 44 21	CDR	Roger. We've just shut it off. We're showing 22.
00 09 44 27	CC	Roger. Out.
00 09 57 20	CC	Apollo 14, this is Houston. Over.
00 09 57 25	LMP	Go ahead.

00 09 57 26 CC — Okay, Ed. Here is what we would like to do on the probe removal - or actually the whole probe-inspection shooting match. We'd like to remove the tunnel hatch, of course, and let you make a quick visual inspection there to see if there is anything that looks significantly amiss. If you see anything, we'd like to photograph it; and, in this whole sequence, we would like to have you power up the television and send a picture down, which we'll receive at - at Goldstone and record. Although we still have about an hour or an hour and a half before we can be configured to receive the television back here live, and then pressing on from there, if you want to make a couple of notes on a pad, we'd like you to perform the probe removal in accordance with the decal with the following exception.

00 09 58 34 LMP — Better hold up a minute, Bruce.

00 09 58 36 CC — Okay.

00 10 02 12 LMP — Houston, 14.

00 10 02 14 CC — Go ahead, 14.

00 10 02 16 LMP — Roger. Can you give me the changes of this probe-removal procedure so that I can copy it on page S2-5?

00 10 02 24 CC — Roger. Actually we'll be looking at page S2-6 for the changes, that is, the section that applies to both TLD and LOD. Over.

00 10 02 35 LMP — Okay, I'm ready to copy.

00 10 02 38 CC — Okay. At the top of page 2-6, the first step, "Probe umbilicals" - disconnect and stow. We'd like you to verify proper connection of the umbilicals before you disconnect and stow them. And I guess you might take a look for bent pins, contacts, and all sort of stuff. Down - 1, 2, 3, 4, 5 - at about the sixth line down where it says "Capture latch release handle lock - rotate counter-clockwise to unlock." We'd like you to verify that it is locked prior to unlocking it. You got that one?

00 10 03 25 LMP Okay, go ahead.

00 10 03 27 CC Down about five lines further, we have "Capture latch release handle - pull, rotate to unlock, 180 clockwise," and we'd like you to pay particular attention to whether there is unusually high torque required to unlock the capture latch release handle in this step. And we'd also like you to verify the absence of, or report, any damage to the pyro cover or to the capture latch release handle. And the pyro cover that we are talking about is the - it looks like an extruded metallic shell just forward of the capture latch release handle there. It's the one that bears the decals on it that say, "cock" and "unlock." Over.

00 10 04 33 LMP Okay. Damage to the pyro cover and what else?

00 10 04 36 CC Any damage to the capture latch release handle? And then as you pull it out, we'd like to know if you notice any unusual forces required to remove the probe.

00 10 05 00 LMP Okay. Let me read it back.

00 10 05 02 CC Okay, go ahead.

00 10 05 04 LMP At top of page S2-6, "Probe umbilicals." Before we disconnect and stow, we want to verify that the "yea verilies" are properly connected.

00 10 05 14 CC Yea, verily.

00 10 05 17 LMP And there's 1, 2, 3, 4, 5 "Capture latch release handle lock"; before rotating counterclockwise to unlock, I want to verify again that that is locked.

00 10 05 30 CC Roger.

00 10 05 31 LMP And that you would like for us to pay attention to the torque required to loosen any of these items - oh, that's the capture latch release handle; and you want us to observe for any damage to the pyro cover or the capture latch release handle and to observe any obvious damage that's apparent to the capture latches or the probe end.

00 10 05 54	CC	Roger, Ed. And we currently have the lines from Goldstone back to the building up here, so I think that we'll probably be ready to support via TV almost in real time. And for onboard photography, we're recommending use of the electric Hasselblad set on f/2.8, 1/125th of a second at 3-1/2 feet, magazine O for Okmulgee, which is stowed in Alfa 13, and you might verify the f-stop with the spotmeter set at ASA 64, if you have the chance. Over.
00 10 07 10	LMP	Okay, Bruce. I got that, I believe. The electric Hasselblad at 2 8, 125th, 3.5, magazine O for Opinaka [?], it's stored A-13, and we'll check it with the spotmeter. How long will you have Goldstone coverage, Houston?
00 10 07 54	CC	14, this is Houston. We'll have Goldstone coverage for about another hour and a half. If that's any problem, we can reconfigure to pick up Honeysuckle. And the shutter speed is 1/125th; that's 1 slash 125. Over.
00 10 08 15	LMP	Roger, Houston. One twenty fifth.
00 10 08 26	LMP	Getting edgy already down there.
00 10 15 38	LMP	Houston, 14.
00 10 15 40	CC	Go ahead, 14.
00 10 15 42	LMP	Bruce, it'll probably be 15 minutes or so before we finish getting some chow, and we'll start up into that tunnel for you.
00 10 15 49	CC	Roger. We're standing by down here. We've got the color converter going so we can watch you in glorious living color. And just give us a yell when you're ready to go.
00 10 16 00	LMP	Wilco.
00 10 20 22	CC	14, this is Houston. When you get around to the hatch removal in the tunnel, we'd like to get a LM/CM DELTA-P reading prior to your equalizing the pressure. Over.
00 10 20 37	CMP	Roger, Bruce. We'll give you that.

00 10 20 40	CC	Roger.
00 10 20 59	CC	Stuart, how is your peanut butter?
00 10 21 06	CMP	Hey, Big Jack, not enjoying any peanut butter.
00 10 21 11	CC	Hey, you're doing a good job.
00 10 45 47	CC	Apollo 14, this is Houston. Over.
00 10 45 52	CDR	14. Go ahead.
00 10 45 55	CC	Roger. If you're about wound up on eating, I've got a correction to the inflight erasable load of T_{ephem} for you, and we'd like to suggest a change to the DAP to open you up to a 5-degree dead band to save a little fuel. Over.
00 10 46 19	CDR	Okay. We'll call you back in a minute.
00 10 46 21	CC	Roger.
00 10 52 09	CDR	Okay, Houston. 14's ready to copy T_{ephem}.
00 10 52 14	CC	Roger, Apollo 14. This is correction to the inflight erasable load procedure for T_{ephem} as found on page G9-4 of the G&C Checklist. Under column B, line 04 now reads 33304, and should be changed to read 35242. Line 05, under column B, now reads 07000, and should be changed to read 03262. Over.
00 10 53 06	CDR	Okay. Page now - 9-5, that is. How about giving it to me again? 9-4, that is. Go ahead.
00 10 53 16	CC	Roger. That's page 9-4. Under the OID line number 04 in column B for Buffalo, you'll find the entry 33304; that should be changed to read 35242. Over.
00 10 53 45	CDR	Okay. 04 Bravo, 35242.
00 10 53 49	CC	Right. And the next entry directly below it on OID line 05 now reads 07000, and that should be changed to read 03262. Over.
00 10 54 08	CDR	Okay. 05 Bravo should read 03262.

00 10 54 12 CC Roger. Readback correct. And on your DAP, we're recommending an R_1 load - Okay, I see you've got it already. Sorry about that.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 11 05 25	LMP	... Houston.
00 11 05 28	CC	Apollo 14, this is Houston. Go ahead.
00 11 05 32	LMP	Roger, Houston; 14. I got the camera set up and we're starting to work on the tunnel now. When you're configured for television, we'll let you have it.
00 11 05 43	CC	Roger. We're configured, and let me see if we're ready to have you send it down. Roger. Let her rip.
00 11 05 56	LMP	You have it.
00 11 06 23	CC	Stu, this is Houston. Before you equalize, would you give us the LM/CM DELTA-P?
00 11 06 30	CMP	Roger. We're working on that.
00 11 06 32	CC	Roger.
00 11 06 45	CMP	Roger, Bruce. And it's 0.5.
00 01 06 49	CC	Understand 0.5?
00 11 06 52	CMP	And affirmative.
00 11 06 53	CC	Roger. Out.
00 11 08 53	LMP	Okay, Houston. We're starting to bring our pressure up until ... in the tunnel.
00 11 09 00	CC	Roger.
00 11 09 45	LMP	Okay. DELTA-P to zero.
00 11 09 48	CC	Roger.
00 11 12 11	LMP	Houston, we're starting to bring the hatch out now and put it on the foot of the couch.
00 11 12 16	CC	Roger. Out.
00 11 13 55	LMP	You're not getting much light down there, Houston, but that's the hatch going under the left-hand couch.

00 11 14 02	CC	Roger, Ed. Even with the low level of light, we're getting a pretty good picture here, especially after it's color converted.
00 11 14 38	LMP	Can you see anything up in the tunnel, Houston?
00 11 14 40	CC	We really aren't seeing much in the way of the docking mechanism. Here we go. That looks better.
00 11 16 28	CMP	Okay, Houston, as we start the inspection, we find that the probe umbilicals are properly secured.
00 11 16 35	CC	Houston. Roger. Out.
00 11 22 31	CMP	Okay, Bruce; I don't know how well you can follow with the TV camera down there, but I didn't see anything obviously wrong with the umbilicals, and the capture latch release handle lock was in the LOCK position.
00 11 22 44	CC	Roger. Thank you, Stu.
00 11 24 41	CMP	Okay. The capture latch release handle turned very easily, Bruce.
00 11 24 44	CC	Roger; out.
00 11 24 51	CC	You didn't notice any damage to the pyro cover or anything like that, did you?
00 11 24 55	CMP	No, I - I didn't, Bruce. I - I looked it over here with a flashlight and, gee, I can't - can't see anything out of the ordinary. We'll - we'll drag it down and take a look at the outside of it. But, I didn't see anything wrong with - with the pyro cover or any of the connections or anything like that.
00 11 25 15	CC	Roger.
00 11 26 07	CC	And, Stu, while you're at it, would you say that the force that it took to remove the probe up there from the tunnel area was high, low, or indifferent - or nominal?
00 11 26 21	CMP	Well, you know it's the first time I've done it without gravity helping a little bit - and pushing back, but I - I wouldn't say it was exceptionally

hard. I sort of braced myself on the bottom of the tunnel and gave a pull and she came loose.

00 11 26 47 CC Roger.

00 11 27 01 CC Okay. We'd like you to examine the probe head as you're now doing with particular emphasis on any evidence of unusual shearpin shearing in the bushing hole there at the end, or foreign material in the capture latch release button area or foreign material or damage anywhere in the areas of the capture latch hooks.

00 11 27 35 CMP Okay. We'll give it a go.

00 11 27 55 LMP All right, Bruce. The first ... we looked we don't see anything obvious about it.

00 11 28 01 CC Okay - -

00 11 28 02 LMP If you could give us some instructions as to where you'd like to look, we'll leave the camera right in on it for you.

00 11 28 07 CMP And, Bruce, up here in the very tip of the probe - you know where the - the tower hooks on it, it looks clean. I don't see anything fishy about that right off the bat.

00 11 28 22 CC All right. Is that the bushing on the end you're describing to me, Stu?

00 11 28 26 CMP Yes.

00 11 28 46 CC Okay, 14, we'd like to get some closeup photos of the probe head around the capture latch release button of each capture latch hook; and if you find any scratching or damage up there - of that area in particular, also.

00 11 29 06 LMP Okay, Bruce.

00 11 30 06 CDR Houston, looking at the drogue, we see that there are three scratches - 1, 2, 3, 4, 5 - that are rough to the touch ... broken the surface of the drogue.

00 11 30 25	CC	Al, this is Houston. You're coming through very weakly. Can you, maybe, put the mikes closer to your mouth? I think that might be the problem.
00 11 30 33	CDR	Okay, I was looking up and away from the mike when I was talking but, I was in the - up in the tunnel. I'm looking at the drogue and there are these radial scratches which we described before that have - that feel rough to the touch. They've probably scratched the surface of the drogue - perhaps a fourth of an inch.
00 11 31 08	CC	Roger.
00 11 31 24	CC	Al, this is Houston. You mentioned the dimension associated with these scratches - You mentioned a quarter of an inch. Was that width or depth of penetration, or length or what? Over.
00 11 31 38	CDR	Yes, I was trying to describe the depth of penetration, and it's very difficult because we don't have any kind of gage on it, but it has scratched the surface to a depth of perhaps - I don't know - 3 or 4 thousandths maybe. Very definitely scratched. It's just rough to the touch.
00 11 32 05	CC	Roger.
00 11 32 17	MCC	Now, I'm confused, CAP COMM. Is that - the scratch is of 3 or 4 thousandths?
00 11 32 25	CC	Okay. Understand you're saying they're about 3 or 4 thousandths of an inch deep and on the order of a couple of inches long?
00 11 32 32	CDR	That's right. They're very light. They all - as I said before - radial scratches leading away from the apex of the drogue and some are about 2 inches long, one's about 1 inch long, one's about three-quarters, and one's about one-half inch long. These are apparently the marks made by the capture latches as they made the docking attempt and then backed in - cut into the service of the drogue.
00 11 33 07	CC	Roger, we copy.

00 11 33 31	CC	Okay, when you get through taking some photos up there, we'd like you to take the capture latch release handle, pull, rotate it counterclockwise to the cock position and then manually depress all three capture latch triggers at the base of the capture latch hooks, simultaneously, and verify that the capture latch release button should move forward to the lock position flush with the probe hatch - bushing.
00 11 34 00	CMP	Okay. Why don't we do that and then when we get all through, we'll go through and get the pictures you want.
00 11 34 07	CC	Roger.
00 11 34 10	CMP	And we're going to bring the drogue out, too, so you can take a look at it on the TV.
00 11 34 31	CC	Roger, Stu; and after you do get it out, we'd like you to hold the TV steady on the area of the drogue where the scratches are for a couple of minutes and do likewise again on the capture latch area of the probe.
00 11 34 47	CMP	Okay.
00 11 35 45	CMP	All right, Houston; I'm moving the television camera on the drogue now. Al's going to put a light on it. It is pretty dark.
00 11 35 51	CC	Roger.
00 11 36 19	CC	14, this is Houston. We're getting a picture, but the illumination level isn't very good and I guess I - I for one can't see any scratches right here.
00 11 36 31	CMP	Roger; it is pretty hard to see it in Houston. It's the light level. We're going to try another little trick here. Let's see if we can get you some light.
00 11 36 48	CC	Okay.
00 11 37 34	CMP	All right, Houston. We're going to move in on the - You're looking at the center of the drogue now and the scratches - you can see Stuart's thumb there. He's going to point to them and we'll see if we can get enough light for you to see them.

00 11 37 48	CC	Okay.
00 11 37 55	CC	Roger, we - we got that last one, Stu, and we got that one you're pointing at now.
00 11 38 29	LMP	All right, Bruce. I think that this illumination will give - illumination will give it to you if you will let me hold it for a minute here.
00 11 38 35	CC	Okay.
00 11 38 44	CC	Roger. We can see about five or six of these radial scratches in the present scene - right - right where you're looking there, about three of them. One - -
00 11 39 01	CMP	Yes, that's - that's affirmative, Bruce.
00 11 39 08	CC	Okay, now, I guess that at the 4 o'clock position you got about three scratches and then at 8 o'clock, you've got one. Do you have anything up at noon?
00 11 39 29	LMP	That's affirmative, Bruce. There's one long one at 12 o'clock noon.
00 11 39 34	CC	Roger.
00 11 39 52	LMP	From the looks and from the feel, I believe it appears that the probe hit the drogue almost dead center every time we tried to make contact. But, it just rebounded right off of it.
00 11 40 07	CC	Roger; we copy.
00 11 40 09	LMP	Okay, we're going to put the drogue back in place if you're through with it now.
00 11 40 15	CC	Negative, we'd like you to hold it out for a minute or so. We ultimately want to wind up fit checking the drogue and probe here.
00 11 40 25	CC	Okay, back on the probe, we'd like you to take the capture latch release handle, pull, rotate counterclockwise to the COCK position or a 150-degree rotation.
00 11 40 37	CMP	Okay, I've done that.

00 11 40 41	CC	Okay, now manually depress all three capture latch triggers at the base of the capture latch hook simultaneously and verify that the capture latch release button in the end of the probe moves forward to the LOCK position; that is flush with the probe pushing.
00 11 41 04	LMP	Okay, you want us to push all three of them simultaneously, is that right?
00 11 41 07	CC	That's right.
00 11 41 12	LMP	All right. Say it again, and verify what?
00 11 41 16	CC	Okay, the little button right at the tip of the probe which is the capture latch release button from the LM active side - where you got your finger - should pop out flush when you trigger all three of these latches simultaneously.
00 11 41 37	LMP	Got it. Is it flush? Okay I'm going to pull back in and it came out - it appears to be almost flush. ... count it as flush, the way it is now.
00 11 42 26	LMP	We're going to repeat it, Houston.
00 11 42 52	CC	14, Houston. We're requesting MEDIUM BEAMWIDTH on the HIGH GAIN antenna and we're going to have to handover from Goldstone here shortly.
00 11 43 04	CMP	... we repeated that, and it - it comes out - flush.
00 11 43 11	CC	Roger.
00 11 43 23	CC	In looking at that button, do you notice anything unusual about it - any burrs, any bending, or any way it could be hanging up on something?
00 11 43 36	SC	...
00 11 43 40	CC	Say again, Ed. We had some static.
00 11 43 46	LMP	Stand by. We are looking at it now.
00 11 43 47	CMP	Al's taking a look at it. The top of the button looks smooth. Of course, you can't see down below it. But it seems to keep from knocking - .

releases fairly easily. It doesn't appear to be sticking at all.

00 11 44 05 CC — Okay. I guess that's what we really wanted to know about it.

00 11 44 18 CC — 14, Houston. If you could - on the TV pictures - refrain from using the flashlight in close here, I think we've got enough light to - to see it with the ambient light.

00 11 44 31 LMP — Okay.

00 11 44 36 LMP — Maybe you do. We don't seem to.

00 11 44 40 CC — Okay. We got 30 seconds to handover; so we're going to just go into a standby mode here for a minute or so until Honeysuckle picks up.

00 11 44 48 LMP — Okay.

00 11 45 22 CC — And, Ed, now that you've got the capture latches in the LOCKED position out there on the end of the probe, we'd like you to push as hard as you conveniently can in zero g on each of the capture latches and verify that they do not depress.

00 11 45 41 CDR — All right. We've done that. We'll do it again, and they don't.

00 11 45 45 CC — Okay.

00 11 46 04 CDR — Houston, they're not going to go in that way.

00 11 46 07 CC — Okay. They shouldn't.

00 11 46 28 CC — Okay, 14. Now we'd like you, using tool B or some other suitable tool, to depress the capture latch release button in the end of the probe there to cock the capture latches.

00 11 46 43 CDR — Roger. Stand by.

00 11 48 32 LMP — Houston, we can cock the capture - capture latches by pressing in the button on the end of it.

00 11 48 40 CC — Roger. And now that you've got the drogue out, we'd like you to position the drogue and push it

over the capture latches until the capture latch release button extends; and, I guess we'd like you to do it several times and try applying different combinations of offset, side load, and torque on the thing, and check it up for any indications of dragging, binding, or anything it might be giving the problem that you experienced a few hours ago.

00 11 49 15 LMP Okay. Say again now how you would like - like us to cock the capture launches in the way we just did by depressing the button on the end of the probe. And then fitting it over - into the drogue several times and repeat this operation. Is that correct?

00 11 49 31 CC That is correct. If you put the probe in a fixed place and then put the drogue over it, you could sight in through the hole on the end of the drogue and keep a good eye on things.

00 11 49 44 LMP Roger; understand.

00 11 49 58 CC 14; and, one of these times when you have the drogue on over the end of the probe, you might try just holding the drogue in position and wiggling the capture latch release button in and out several times. In this condition, it won't do anything but it will allow you to assess possibilities of binding or sticking of that particular part of the mechanism.

00 11 50 26 LMP Okay, Houston.

00 11 53 10 LMP Houston, I'm going to get rid of the TV camera for a minute. It's not doing us any good and it's taking all three of us to handle it.

00 11 53 19 CC Okay. Roger.

00 11 53 21 LMP And it appears we may have to get on the LM side to do this. There's not quite enough room here to work.

00 11 53 26 CC Okay.

00 11 56 15 CC Ed, this is Houston. Have you had any - luck, I guess you could call it - in getting the probe and drogue to bind by applying lateral forces to the drogue?

00 11 56 27	LMP	Not yet. Stand by; we're getting ready to try again now.
00 11 56 32	CC	Oh, okay.
00 11 56 36	LMP	Hey, Bruce, there just wasn't any place that worked handily with that. We're going to put the drogue back in - Al's on the other side - and then we can put it up in there right.
00 11 56 51	CC	Okay. By the other side, do you mean over in the LM?
00 11 56 57	LMP	That's affirmative.
00 12 00 38	CMP	Houston, 14.
00 12 00 41	CC	Go ahead, 14.
00 12 00 44	CMP	Okay, Bruce. We cycled it - oh, about four or five times, and it goes in just so easily. The capture latches dock and hold it, and we've tried it by putting the capture latch release handle at 150 and putting it up and they move in. We've tried it by leaving it - you know, the yellow - and cocking them by pushing in on the end of the probe on the probe release plunger. And it works both ways, just real fine.
00 12 01 24	CC	So, what you're trying to tell me is you still haven't come up with anything that would be the problem.
00 12 01 30	CMP	That's basically it.
00 12 01 38	CC	Would you pass over to Al that, while you've got the probe and drogue in the tunnel there and mated - He's on the other side - and keeping them engaged, would he push the capture latch release button in and out several times and see if he can make it stick up against the bushing by pushing sideways, or anything of that sort, on it while it's being pushed in and out.
00 12 02 01	CMP	Okay. We'll try that.
00 12 04 47	CC	14, this is Houston. While you're up there in the tunnel, we'd like to get a roll angle read-out

on - from the index mark as you come back through; and, with respect to further procedures, I guess we got a - a write-in comment coming down here which is a step that says further instructions will follow tomorrow.

00 12 05 20 LMP Didn't quite understand all that, Bruce. But try it, try us again.

00 12 05 24 CC Okay, we're asking for a docking tunnel roll index reading at your convenience, and - -

00 12 05 32 LMP Okay, we got that.

00 12 05 34 CC You've exhausted our imaginations for right now on troubleshooting the probe. We'll work on it some more overnight and be back with you in the morning.

00 12 05 47 LMP Roger, Houston. Understand.

00 12 05 53 CC And would you confirm that Al was unsuccessful in getting the capture latch release button to bind up against that bushing in the end of the probe?

00 12 06 06 CMP That's a negative, Bruce. We cycled it several times; and he pushed on it and tried to jimmy it; and we - The thing slides in just so easily and locks up; and, when he pushes on the - on the plunger, why she releases very easily; and we can't seem to find any bind or get it to malfunction for us at all.

00 12 06 34 CC Okay. While you're holding the - holding the probe in place there, we were wanting him to just take and cycle the capture latch release button in and out several time trying to - doing his best to bind it up against anything he can find there in the way of the internal surface of the bushing. I guess you're telling me that he was unable to.

00 12 06 56 CMP Okay. Well, we hadn't really run that specific test. We'll try that.

00 12 11 12 LMP Houston, we're bringing Al back through. We cannot force it to malfunction at all. So, you'll have to think about it overnight.

00 12 11 20	CC	Roger, 14. We'll do that. We recommend that after you get Al back on the command module side, you reinstall the drogue in the command module hatch and keep the probe over in the command module. We believe we've seen enough TV data for the time being, so you can shut down the television at your convenience. And we would like to get photographic documentation of the capture latch release button, of each capture latch hook, and of any areas of scratches or visual damage on the probe, Ed.
00 12 11 59	LMP	Okay.
00 12 12 14	CMP	And, Houston, the docking rule index is plus 0.9.
00 12 12 20	CC	Understand. Plus 0.9 on docking roll.
00 12 12 25	CMP	That's affirmative.
00 12 12 27	CC	Roger. Very good.
00 12 12 47	CC	And, Stu; this is Houston. You're cleared to start getting set up for PTC at your convenience. We'll be watching the rates; and, on this first PTC initiation, we'll probably want to go very close to the full 20 minutes of rate damping, although we expect that on subsequent ones during the mission, we'll have a better feel for it and just be able to cue you as to when to initiate the roll based on the rates that we're observing. Over.
00 12 13 20	CMP	Okay, understand. And we don't mind waiting 20 minutes.
00 12 13 24	CC	Roger.
00 12 15 21	CC	Apollo 14, this is Houston. When you do close the hatch in the LM, we'd like you to give us a mark so we may confirm the FLOODLIGHTS, OFF, over.
00 12 15 33	CDR	Roger; stand by.
00 12 15 37	CC	Roger. We weren't intending to rush you on it. Just when it happens, give us a yell.
00 12 15 43	CDR	Wilco.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 12 31 08	CC	Apollo 14, Houston.
00 12 31 12	LMP	Go ahead.
00 12 31 13	CC	I've got a comm configuration for you set up in here for PTC.
00 12 31 20	LMP	Okay, Fredo. Standby.
00 12 32 11	LMP	Okay, Fredo. Go ahead.
00 12 32 13	CC	Okay. You can set the HIGH GAIN PITCH and YAW indicators to PITCH, minus 52, and YAW, 270 degrees, and then select OMNI Bravo.
00 12 32 33	LMP	Roger. 52, 270, up to Bravo.
00 12 32 37	CC	Okay. And then TRACK to MANUAL, and WIDE BEAMWIDTH.
00 12 32 47	LMP	You have it.
00 12 32 48	CC	Okay, Ed.
00 12 34 16	LMP	(Cough) Houston, Apollo 14.
00 12 34 20	CC	Go ahead, 14.
00 12 34 23	LMP	Roger, Fredo. We were busy with the probe at 11 hours, and we're inquiring about turning off the waste storage vent valve and shifting our heater configuration on the O_2 tanks.
00 12 34 59	CC	Okay, Ed. WASTE STORAGE VENT can go to CLOSE and the heater configuration, 1 and 2, to OFF; 3 to AUTO.
00 12 35 12	LMP	So be it.
00 12 35 56	CC	And, Apollo 14; Houston.
00 12 35 59	LMP	Go ahead.
00 12 36 01	CC	Did you all by chance vent the batteries back at 11 hours, then?

00 12 36 05	LMP	Negative, Fred. I am getting ready to do that now.
00 12 36 09	CC	Okay, Ed. I was going to suggest you do that before we get the PTC, so we get all that closed up.
00 12 46 19	CMP	Houston, 14.
00 12 46 21	CC	Go ahead, 14.
00 12 46 25	CMP	Okay, Fred. Al's closed the LM hatch and he verified the floodlights went out - went out before the hatch closed.
00 12 46 37	CC	Okay. They say saw it here on the power - -
00 12 46 40	CMP	That may have been - Say again.
00 12 46 44	CC	They saw it here, too, on the power, I guess.
00 12 46 49	CMP	Okay. And I'd like to clarify one thing. Seemed like Bruce implied that we would keep the probe in - in here with us, and we'd just like to store it in the - in the drogue for the night. It's so easy just to open the hatch and get it back out again if we want to dissect it tomorrow or something.
00 12 47 27	CC	Yes, that sounds all right, Stu.
00 12 47 30	CMP	Okay.
00 12 47 42	CC	And, 14; Houston,
00 12 47 45	CMP	Go ahead.
00 12 47 47	CC	Okay, I'd like to verify that you have the WASTE STOWAGE VENT to CLOSE now.
00 12 48 22	CMP	Okay. That's verified, Fred. We're still venting the battery.
00 12 48 28	CC	Okay.
00 12 56 35	LMP	Houston, 14.
00 12 56 38	CC	Go ahead, 14.

00 12 56 41	LMP	Fredo, the battery vent seems to have stopped at a reading of about 2 and a half volts. It dropped very quickly to that and it's been staying there. Can you tell if the vent is complete?
00 12 56 53	CC	Stand by 1.
00 12 57 12	LMP	Sorry about that; 0.25.
00 12 57 18	CC	Okay. Did you correct that, Ed, and say 0.25?
00 12 57 22	LMP	That's right; 2 and a half units, Fredo; 0.25 volts.
00 12 57 26	CC	Okay.
00 12 57 38	CC	Okay, 14. That reading will be okay.
00 12 58 02	CC	14, Houston. Did you copy? The 0.25 reading is good enough, Ed.
00 12 58 09	LMP	Thank you, Fredo. And battery vent is terminated.
00 12 58 13	CC	Okay.
00 13 11 08	CC	14, Houston.
00 13 11 11	LMP	Go ahead.
00 13 11 13	CC	Okay. If you can give us ACCEPT there, we'll pump you up a state vector and I have P37 block data for you.
00 13 11 25	LMP	Okay. Stand by 1.
00 13 11 36	LMP	There's P00 and ACCEPT.
00 13 11 41	CC	Okay.
00 13 12 23	LMP	Okay, Fredo. Go ahead with the P37.
00 13 12 27	CC	Okay. Stand by 1.
00 13 13 04	CC	Okay, Ed. P37 block data: 025:00; 4971; minus 165; 069:12; 035:00; 7548; minus 165; 068:35.
00 13 13 40	LMP	Hold it, Fredo.

00 13 13 41	CC	Okay.
00 13 13 44	LMP	I thought you were reading me a P37 block data.
00 13 13 49	CC	That's what it says.
00 13 13 53	LMP	All right. Let's start over again. GETI.
00 13 13 55	CC	Okay. GETI, 025:00; 4971; minus 165; 069:12. That's GET at 400K.
00 13 14 22	LMP	Roger. 025:00.
00 13 14 24	CC	Go ahead.
00 13 14 26	LMP	How many are you going to read me up?
00 13 14 28	CC	Four of them, Ed.
00 13 14 31	LMP	Okay. Didn't understand. Press on.
00 13 14 35	CC	Okay. The next one: 035:00; 7548; minus 165; 068:35; and the third one is 045:00; 5725; minus 165; 092:58; and the last one, 060:00; 5242; minus 165; 117:02.
00 13 15 23	LMP	Okay. 025:00; 4971; minus 165; 069:12; 035:00; 7548; minus 165; 068:35; 045:00; 5725; minus 165; 092:58; 060:0 [sic]; 5242; minus 165; 117:02.
00 13 16 02	CC	Okay. And remarks. The second through the fourth set are, Ed, the 35-hour, 45-hour, and the 60-hour block data assumes a midcourse 2.
00 13 16 27	LMP	Understand. 35, 45, and 60 hours assume midcourse 2.
00 13 16 33	CC	That's affirm, Ed. And we're still watching your rates here. We'll give you the word when we're ready for the PTC.
00 13 16 41	LMP	Thank you.
00 13 20 17	CC	And, Apollo 14; Houston. You can go back to BLOCK on the computer.
00 13 20 23	LMP	Okay.

00 13 20 28	CMP	Okay. And, Fred, we got the hatch back in, and when I put the probe up for stowage, I looked again at that pyro cover that Bruce had asked me about before, and I can't see anything wrong with the probe anywhere.
00 13 20 44	CC	Okay.
00 13 24 24	CC	14, Houston.
00 13 24 27	LMP	Go ahead.
00 13 24 30	CC	It looks like you quit moving around in there, Ed. The rates are down. I guess y'all can crank up PTC.
00 13 24 39	LMP	Okay.
00 13 24 40	CMP	Be right with you, Fred.
00 13 24 43	CC	No hurry.
00 13 26 06	CC	14, Houston.
00 13 26 09	LMP	Go ahead.
00 13 26 11	CC	Just a reminder. You might make sure you've - brushed your teeth and all that kind of stuff before tucking her in there, before you crank up that PTC.
00 13 26 23	LMP	Roger.
00 13 40 57	CMP	Houston, 14.
00 13 41 01	CC	Go ahead, 14.
00 13 41 04	CMP	Okay, Fred. I'm going to spin it up. I'm going to use B/D roll if that's agreeable with you.
00 13 41 11	CC	Okay. That will be fine.
00 13 41 14	CMP	Okay.
00 13 44 06	CMP	And, Houston; 14.
00 13 44 09	CC	Go ahead.

00 13 44 11	CMP	Hey, Fred, I guess we've already said everything we can to try to help you all out on that probe. We're sitting here trying to run back over. I want to make sure that we're not overlooking something that might give you a clue. And, when we did our docking, as - as I was thrusting plus-X and then Al hit the retract, he said the talkbacks came back barber pole for - a time period; you know, like a couple of seconds before - and then went gray again when we got the - the dock. Now I'm just tossing that in. I think we called that, but I just wanted to make sure we've covered everything.
00 13 44 59	CC	Okay. We - we had already gotten that, Stu, from your previous comments.
00 13 45 07	CMP	Okay. I just thought maybe there in the rush of things, you know, we might not have got it, and I can't think of anything else to - to add, I guess.
00 13 45 29	CC	Okay, Stu. I guess we got nothing else on the drogue/probe business. Just wanted you to verify that you get the LiOH canister changed, and your PTC startup looks good.
00 13 45 46	CMP	Okay, we got the LiOH changed at about 13:07.
00 13 45 56	CC	Okay.
00 13 57 48	CC	14, Houston.
00 13 57 52	LMP	Go ahead, Houston.
00 13 57 53	CC	Okay. You can terminate battery charge now.
00 13 57 57	LMP	Okeydoke.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 14 06 53	CC	14, Houston.
00 14 06 57	CDR	Go ahead.
00 14 06 58	CC	Okay, for some reason, we're showing your PTC has gone out of the - gone out of the box, there; so in a bit, here, we're going to need to reinitialize, but would like to continue with the roll here until we get in good shape on the OMNIs again.
00 14 07 18	CDR	Roger. ... wait until we finish this P52.
00 14 07 23	CC	Roger.
00 14 11 09	CC	14, Houston.
00 14 11 12	CDR	Go ahead.
00 14 11 15	CC	Okay, whenever you get a chance, after the 52 there, I guess you can stop the PTC and reinitialize; we're in good OMNI; read you now.
00 14 11 26	CDR	Okay.
00 14 11 46	CC	And, 14; Houston. We're not really sure what caused the PTC to diverge. It looked like a pretty good start unless you either vented something or maybe something continued to vent from a while back.
00 14 12 05	CDR	That's the more likely - we had a continuing vent.
00 14 12 09	CC	Okay.
00 14 13 03	CDR	Houston, Apollo 14.
00 14 13 06	CC	Go ahead. And we got your NOUN 93.
00 14 13 10	CDR	Oh, gosh. Did you give them the torquing time of 14:12:50?
00 14 13 15	CC	Okay.
00 14 25 53	CC	14, Houston.
00 14 25 57	CMP	Go ahead.

00 14 26 01	CC	14, we're having a little trouble with data dropout in your present position. We'd like OMNI Charlie.
00 14 26 24	CMP	Say again, Fred, will you? You busted up on that one.
00 14 26 27	CC	Okay, Stu. We're having data dropouts. We'd like OMNI Charlie.
00 14 26 38	CMP	Okay, Fred. Try us again real slow. You're - you're just coming in syllables.
00 14 26 44	CC	Okay. We would like OMNI Charlie, OMNI Charlie.
00 14 26 52	CMP	Okay.
00 14 27 11	CMP	Okay, there's OMNI (cough) OMNI Charlie. How's that?
00 14 27 14	CC	Okay. How do you read me now?
00 14 27 17	CMP	Okay. You're loud and clear.
00 14 27 19	CC	Roger. We were having some data dropouts on HIGH BIT RATE there, Stu, and we - before we get ready to crank up PTC, we'll have you go back to Bravo then.
00 14 27 33	CMP	Okay.
00 14 33 54	CC	14, Houston.
00 14 33 58	CDR	Go ahead, Houston.
00 14 33 59	CC	We're showing O_2 flow pegged high down here. Just wondered if you're getting that on board, too.
00 14 34 10	CDR	Yes, we are, Fredo.
00 14 34 13	CC	Okay.
00 14 34 14	CDR	We thought we'd stopped all - stopped all of the venting, but we apparently are still venting somewhere we're not aware of.
00 14 34 19	CC	Okay.
00 14 38 43	CC	14, Houston.

00 14 38 47 CDR Go ahead, Fredo.

00 14 38 49 CC Just a question. Did I understand you to say that you had checked, and you got all of your vents closed up now?

00 14 39 01 CDR That's affirmative, Fredo. We're looking right now to see if we can find where this is going. Stand by to mark.

00 14 44 13 CC 14, Houston. Did you change anything now? We're seeing the O_2 flow dropping off a bit.

00 14 44 24 LMP Did you see any marked change? We just ... - -

00 14 44 33 CC Well, it was up over 0.9 there, Ed, and it's down around 0.7. Gone back up now, though; 0.8 something now.

00 14 45 22 CC 14, Houston.

00 14 45 26 LMP Go ahead, Houston.

00 14 45 29 CC Okay. Our - original thoughts were that it might be a 'ducer. If you haven't already done so, you might run through ECS MAL la and see how you come out of that one.

00 14 45 55 LMP Well, Fredo, we can see the venting right now. We think we've got an actual problem.

00 14 46 01 CC Okay. What side of the spacecraft, 14?

00 14 46 09 LMP Now it's coming out the port side.

00 14 46 14 CC Okay, the port side.

00 14 51 53 CC 14, Houston.

00 14 51 58 LMP Go ahead, Houston.

00 14 51 59 CC Okay. We saw it drop off. I guess you cycled the REGs, Ed. So that would indicate the 'ducer's okay. You might check again the valve on top of the urine receptacle and make sure that guy is closed off.

00 14 52 17 LMP Yes, we're rechecking those now. ...

00 14 52 21	CMP	Yes, Fred, I did that. And, in fact, I even closed the - the waste management dump just to see if Myrtle was leaking, but it didn't do any good.
00 14 52 31	CC	Okay.
00 14 55 59	CC	14, Houston.
00 14 56 03	LMP	Go ahead, Houston.
00 14 56 05	CC	Okay. You seeing any more venting overboard at this time?
00 14 56 12	CMP	That's affirmative, Fred. I was just sitting here watching it - just - it - it comes in spurts. Just about 30 seconds ago, we got a nice splash, and there's some right now. It looks like it's coming, you know, from over in the area of the - of the normal dumps.
00 14 56 32	CC	Roger.
00 14 58 56	CC	14, Houston.
00 14 59 00	CMP	Go ahead.
00 14 59 02	CC	Gee, that oxygen flow looked like it had settled down there around 0.4, and then all at once it started - it jumped up again there just a half a minute ago or so. And, it looks like it's back down again. Did you all move anything else in that area?
00 14 59 21	CMP	Yes, Fred. We went back, cleaning up after that malfunction, and we had the WATER GLYCOL valves OFF and the emergency REGS, and SUIT DEMAND; we didn't see any effect when we went through it. And then we just went and opened them up again, hear?
00 14 59 42	CC	Okay.
00 14 59 45	LMP	It's settled down on our meter at 0.6 pounds an hour now, Fredo.
00 14 59 52	CC	Okay.
00 15 01 51	CC	14, Houston.

00 15 01 55	LMP	Go ahead, Fredo.
00 15 01 56	CC	Say, I guess we're happy with that O_2 flow you got now. It looks pretty stable, and the vehicle rates look okay to crank up a PTC again. We think we've got a handle on what happened except in - what really caused the first O_2 FLOW HIGH. Must be something you readjusted.
00 15 02 26	LMP	I don't know that we can have a good answer for you. Stu and I were just talking about we think quite possibly the - urine dump is leaking. We got it cycled now and shut clear off. Let's see if that helps any.
00 15 02 42	CC	Okay.
00 15 08 39	CC	And, 14; Houston. We'd like OMNI Bravo.
00 15 08 44	LMP	Okay.
00 15 11 23	CDR	Houston, this is Al. We're going to presleep checklist now. We thought we'd drop off a little bit early tonight.
00 15 11 32	CC	Okay.
00 15 12 02	LMP	Houston, we're bringing direct O_2 valve on to pump the cabin up to 5.7 now.
00 15 12 08	CC	Okay.
00 15 16 03	CC	And, 14; Houston.
00 15 16 07	CMP	Go ahead, Houston.
00 15 16 10	CC	We're configured down here to take the E-memory dump any time. Stand by 1. I'm going to check the - how the OMNIs are.
00 15 16 30	CMP	Okay, Fred. We ought to have you now. How do you read?
00 15 16 38	CMP	Houston, 14. How do you read?
00 15 16 40	CC	Okay. Loud and clear, Stu. Stand by 1.

00 15 16 44	CMP	Okay.
00 15 16 46	CC	Okay. We're ready now, Stu, for the E-memory. They're all set.
00 15 16 54	CMP	Okay.
00 15 17 15	LMP	Houston, onboard readouts, if you're ready to copy.
00 15 17 18	CMP	Okay, Fred, here comes the VERB 74. ... 4. Now.
00 15 17 27	CC	Okay. Go ahead, Ed.
00 15 17 31	LMP	Okay. BAT C is 37. PYRO BAT A, 37 45; PYRO BAT B, 37 45; RCS A, 88; B, 90; C, 87; D, 91.
00 15 17 54	CC	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

00 15 37 32	CMP	Houston, do you read 14?
00 15 39 05	CMP	Houston, do you read 14?
00 15 39 09	CC	Go ahead, 14.
00 15 39 17	CC	Go ahead, 14; Houston here.
00 15 39 52	CC	Apollo 14, Houston. How do you read?
00 15 40 25	CC	14, Houston. How do you read?
00 15 40 47	CMP	Houston, do you read 14?
00 15 40 50	CC	14, Houston. Read you loud and clear.
00 15 42 25	CMP	Hello, Houston. How do you read 14?
00 15 42 28	CC	14, Houston. How do you read me?
00 15 42 31	CMP	Oh, you're loud and clear. There was a lot of static and no reception on - I guess that other antenna.
00 15 42 39	CC	Okay. We had to drop Madrid and try to reacquire there to get you back. Could you verify that you are on OMNI Bravo there, Stu?
00 15 42 52	CMP	That's affirmative; OMNI Bravo.
00 15 42 56	CC	Okay.
00 15 43 00	CMP	And if you don't have anything else for us, we're about to secure here.
00 15 43 06	CC	Stand by 1, Stu.
00 15 44 32	CC	14, Houston.
00 15 44 35	CMP	Go ahead, Houston.
00 15 44 37	CC	Just one more thing, I'd like to confirm the H_2 fans, OFF.
00 15 44 52	CMP	Okay. Well, they were on; they're off now, Fred.

00 15 44 57	CC	Roger, Stu. Guess you can take the rest of the day off.
00 15 45 02	CMP	Okay.
00 16 02 07	CC	14, Houston.
00 16 02 14	CMP	Houston, did you call 14?
00 16 02 17	CC	Yes. Right, Stu. One last thing. Looks like maybe an O_2 tank number 1 heater is on. Tank 2 switches should be number 1 and 2, OFF; number 3 on AUTO.
00 16 02 37	CMP	Okay. 3 is AUTO, and 1 and 2 O_2 tanks are OFF.
00 16 02 46	CC	Okay. We'll leave you alone, then.
00 16 02 50	CMP	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 01 57 55	LMP	Houston, Apollo 14.
01 01 58 01	CC	Roger, Apollo 14. Good evening.
01 01 58 06	LMP	Good morning, how are you? Or is it afternoon?
01 01 58 10	CC	I'm fine. How are you up there?
01 01 58 13	LMP	We're just great, thank you.
01 01 58 20	LMP	We're up and brushed our teeth and shaved, and we're just looking forward to a fine day.
01 01 58 26	CC	Roger, Ed. We saw somebody get up and walk in his sleep and work the DSKY there about an hour ago.
01 01 58 33	LMP	Yes. That's right.
01 01 58 37	CMP	Just need to get a little practice, Gordon.
01 01 58 39	LMP	He just had a restless finger.
01 01 58 41	CC	Okay. We've got a site handover coming up in about a minute and a half.
01 01 58 49	LMP	Roger. We'll wait for that, and then I'll go ahead and give you the complete propulsion checks and postsleep checklists.
01 01 58 58	CC	Okay, Ed.
01 02 02 06	LMP	Houston, 14.
01 02 02 09	CC	Go ahead, Ed.
01 02 02 12	LMP	I have some dosimeter readings for you.
01 02 02 15	CC	Okay. We've handed over, and - I'm ready to copy here - postsleep.
01 02 02 22	LMP	Okay. Alan dosimeter, 16037; Stu is 01034; mine is 05038.
01 02 02 39	CC	Roger. We got Al 16037, Stu at 01034, and you with 05038.

01 02 03 50	CC	Apollo 14, Houston.
01 02 03 53	LMP	Okay, Houston. I read you now.
01 02 03 55	CC	Roger. I think we rotated between a couple antennas there. Got you loud and clear now.
01 02 04 01	LMP	For my sleep, I slept for about 4 hours straight and then another 2 or 3 intermittently, and I feel very good.
01 02 04 10	CC	Roger.
01 02 04 16	CDR	Now, about the same for me and feel like ...
01 02 04 22	CC	Al, this is Houston. You're very very weak. Would you repeat?
01 02 04 28	CDR	Okay. I had a sleep cycle about the same for me. I slept soundly for 4 or 5 hours, and then intermittently for another 2 - and we feel excellent up here.
01 02 04 43	CC	Roger, Al. For some reason, you're not nearly as readable as Ed is, and it sounds like - well, I guess I can't really say what the problem is there on - on your mike. You're getting a lot of - interference when you start and stop a transmission - I got no suggestion on what to do to improve it.
01 02 05 11	CDR	Okay. How do you read this?
01 02 05 13	CC	That's a lot better, Al.
01 02 05 17	CDR	Okay. The mike was a long way away from my mouth. ... Did you get the sleep report?
01 02 05 26	CC	I think we got it. Four to 5 hours good sleep and a little bit intermittent after that. Is that about it?
01 02 05 34	CDR	That's correct. The general condition is excellent.
01 02 05 40	CC	Al, you're still - breaking up. I really can't give you a good description of what - is wrong, but - you're just not very readable.

01 02 05 56	LMP	Okay. Stand by on that one, Houston. We'll work on it.
01 02 05 59	CC	Okay, Ed.
01 02 06 01	LMP	And, Houston. I'll go ahead and - start charging BAT A with your concurrence, and we have changed the LiOH canister.
01 02 06 09	CC	Roger. That's - affirmative. You can go ahead with that, and - also give us the - LM/CM DELTA-P as shown at the 27 hours there, when it's convenient.
01 02 06 26	LMP	...
01 02 06 36	CMP	And, Gordon, this is Stu. How do you read?
01 02 06 39	CC	You're loud and clear, Stu.
01 02 06 42	CMP	Okay. I guess on my sleep I'll split it with you about half. I'll say I got 5 hours.
01 02 06 49	CC	Roger.
01 02 06 55	CMP	My mattress was hard.
01 02 06 57	CC	Roger. When you're ready to copy, I have some words on - some changes we've figured out for the flight plan.
01 02 07 14	LMP	Stand by a minute.
01 02 07 36	LMP	Okay, Houston. Go ahead with your changes in the flight plan.
01 02 07 40	CC	Okay. Before we start, one reminder is that - when you went to sleep, we didn't get any presleep checklist. If there was anything - out of the ordinary there, we'll - presleep report that was - and - we'll take any - Stand by, I'm getting some words from the surgeon here. Okay. Just disregard it. It's sort of - We'll need the - both the pre- and postsleep reports from here on out. Okay, on the flight plan, if you're ready.
01 02 08 25	LMP	Okay. Go ahead.

01 02 08 28 CC — Roger. We're going to delay the launch vehicle systems debriefing until 28 hours. And - the P23, which is scheduled at 28:30, we're going to cancel, which will save us some RCS. On - along that line, the results of the last P23 that Stu did, the horizon that he shot at was 28 plus or minus 5 kilometers, and - that's right on the preflight values so an update will not be required. And your average error for pointing error was 3 arc-minutes, which rank is right in there with the best ever recorded, and - the expert gives you a pat on the back, Stu, and said it was an outstanding job.

01 02 09 33 CMP — Ah, Jove! Thank you, Gordon.

01 02 09 37 CC — Okay. On with the flight plan. The DELTA-V test and null bias check and the P52, we're going to delay that until 29:10 GET.

01 02 10 01 CDR — Okay. So far, I have that we do the launch vehicle debrief at 28 hours to [sic] 27 hours. We're delaying the null bias and the P52 at 28:10 until 29:10; We're cancelling the P23 at 28:30.

01 02 10 20 CC — That's affirmative, Al. And - and then further after that, we're going to delay the exit of PTC until 29 and 55. And when we do exit PTC, go right into the midcourse 2 pad attitude.

01 02 10 45 CDR — Okay. PTC to 29:55 and then set up for midcourse 2.

01 02 10 51 CC — Roger. And on all other activities will be nominal, except - on waste water dump - you want - We want you to dump to zero percent quantity.

01 02 11 05 CDR — Okay. Dump the waste water to zero.

01 02 11 08 CC — Okay. We have one additional question for the launch vehicle systems performance debriefing. We can either give it to you now so you can think about it, or wait until you get around to it to give it to you. Your choice.

01 02 11 27 CDR — We will take it now.

01 02 11 30 CC — Okay. The question is, you announced during the docking attempts that you thought the booster was maneuvering a little bit. We'd like you to expand on the direction of the maneuver: the type of maneuver, lateral or oscillating, or any other words to that effect; the approximate time the maneuver was first observed, whether it was before the first docking attempt, between the first or second, or if you can relate it to any other activity; any observed vents from the launch vehicle during the maneuver; and anything else unusual or unexpected that you noticed. Over.

01 02 12 18 CDR — Okay, question number 10. Describe the type, direction, and the time relation of the booster maneuvers during docking, and any events that we noticed during maneuvers.

01 02 12 28 CC — Roger; and I was just thinking as I read it that, on that time, we can probably go back on the tape and find out when you mentioned it as far as tying down the time accurately, and that might be easier for us to get than you.

01 02 12 42 CDR — Okay, that would probably help us; thank you.

01 02 12 44 CMP — Hey, that - that's no sweat, Gordon. I - I remember the - the comment when I made it, and what the circumstances were.

01 02 12 51 CC — Okay, Stu. I think that takes care of all the words they got for you right at the moment.

01 02 13 43 LMP — Houston, 14.

01 02 13 45 CC — Go ahead, Ed.

01 02 13 49 LMP — Our LM/CM DELTA-P is 0.3, and I'm standing by for a command module consumables update.

01 02 13 57 CC — Roger, Ed. Copy 0.3. We don't have the figures on that update, yet. One thing I didn't mention is that - we are planning to do a midcourse 2, as is shown in the flight plan and that - we'll do it such that it will require a clock update as scheduled at about 54 hours and 30 minutes in the time line.

01 02 14 25	CMP	Okay.
01 02 14 28	CC	It'll be a roughly 40-minute - -
01 02 14 30	CMP	Looks like we -
01 02 14 33	CC	- - roughly a 40-minute - -
01 02 14 34	CMP	Say again, Gordon. How much?
01 02 14 37	CC	It'll be roughly 40 minutes, and I still haven't got used to which direction it is. Actually, it's like - going into daylight saving time. It'll - move your clock ahead.
01 02 14 53	CMP	T_{ephem}. Okay, Gordon. Looks like we get to - send that update - after all.
01 02 14 59	CC	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 02 28 20	CC	Apollo 14, Houston. Over.
01 02 28 22	LMP	Go ahead, Houston.
01 02 28 25	CC	Ed, I've got that consumables update now, if you're ready to copy.
01 02 28 37	LMP	All right; go ahead.
01 02 28 39	CC	Roger. GET, 26:00; RCS total, 86; quad A, 85; quad Bravo, 86; quad Charlie, 86; quad Delta, 87; H_2 tank 1, 87.98 percent; H_2 tank 2, 85.7 percent; O_2 tank 1, 93.4 percent; tank 2, 92.6 percent; tank 3, 54.6 percent. Over.
01 02 29 45	LMP	Okay, I read back GET at 26 hours; RCS total, 86 percent; quad A, 85; B, 86; C, 86; D, 87; hydrogen tank 1, 87.98; 2, 85.7; oxygen tank 1, 93.4; 2, 92.6; 3, 54.6.
01 02 30 23	CC	Roger, Ed. Your readback is correct. And we have had considerable discussion today about the docking probe. There are still four questions as a result of all these discussions that we would like to put to you - the crew. It'll probably take some discussion to answer them. There's no hurry. Don't let us interrupt breakfast there. When you're ready, we'd like you to take these questions and comment on them.
01 02 30 44	LMP	Okay, Gordon. We'll probably be through here in another 45 minutes, and we'll jump right into that one then.
01 02 30 50	CC	Roger.
01 02 49 59	LMP	Houston, Apollo 14.
01 02 50 01	CC	Apollo 14, Houston. Go ahead.
01 02 50 07	LMP	Say, Gordon, do you have any choice news items for us today?

01 02 50 13 CC Guys, I think you all been making all the news. I haven't heard anything very significant and don't have any good summaries for you right now.

01 02 50 23 LMP Okay.

01 02 52 36 CC Apollo 14, Houston.

01 02 52 42 LMP Go ahead.

01 02 52 43 CC I do have one story here, I'll read from the front page of The Houston Post, this morning's edition. The headline is, "Mrs. Shepard ate an omelet during docking problem." And the first paragraph, it's dateline Cape Kennedy, Florida; "Mrs. Louise Shepard sat in her motel room eating an omelet while her husband and the two other Apollo 14 astronauts worked with a faulty docking latch that for a time threatened their moonflight."

01 02 53 24 LMP She was sure calmer than we were.

01 02 53 27 CC Roger.

01 03 20 15 LMP Houston, Apollo 14.

01 03 20 17 CC Apollo 14; this is Houston, your friendly Maroon Team on station. Go ahead.

01 03 20 24 LMP Well, Hello, Bruce. How you doing today?

01 03 20 26 CC Okay, Ed. How about yourselves?

01 03 20 29 LMP Great, thank you. Bruce, these questions that are being proposed on the probe operation, should I copy them, or shall we just let you go ahead and talk about them and then we'll get back to you?

01 03 20 40 CC Well, I think probably the easiest thing to do would be to start going through them one at a time, and, if you feel like you need more time to discuss it or to recall - the exact things you went through, why we can just take the time as we go along. There's no big rush on it. It'd probably be easier than your trying to prepare a formal report or something and voice it down.

01 03 21 11 LMP Okay.

01 03 21 12	CC	And we're just finishing up the - -
01 03 21 14	CDR	We'll be - -
01 03 21 16	CC	We're just finishing up - -
01 03 21 17	CDR	It'd be a little while before we're ready to go that way.
01 03 21 19	CC	Okay. We're just finishing up the change-of-shift briefing down here and it'll probably be 5 or 10 minutes at least before we're ready to roll on it, too.
01 03 21 30	LMP	That's good.
01 03 21 32	CMP	Hey, Bruce, did you get a good night's sleep? You put in a hard day yesterday.
01 03 21 36	CC	Yes. I got up about 1:30 or 2 o'clock this afternoon. Felt real good.
01 03 21 44	CMP	Roger.
01 03 21 49	CDR	We're happy to discover there really is a ... after all. We're constantly reminded of it.
01 03 21 53	CC	That there really is a what, after all?
01 03 21 59	CDR	...
01 03 22 00	CC	Yes, how about that; that's a beautiful one.
01 03 22 04	CMP	Hey, Bruce, would you pass on to Ray that it was not 100 percent at the bench check.
01 03 22 12	CC	That's to Ray, that it was not 100 percent at the bench check. You mean the equipment - -
01 03 22 17	CMP	...
01 03 22 18	CC	- - equipment loaded on board was not completely represented at the bench check?
01 03 22 24	CMP	That's affirmative.
01 03 22 26	CC	We've got the backup crew - -

01 03 22 28	CMP	I don't know why, but we - -
01 03 22 29	CC	We've got the backup crew commander standing here monitoring the system.
01 03 22 34	CMP	We seem to be finding a few things around that we didn't see at our bench check and a few crew-preference decals.
01 03 22 43	CC	Yes. How was breakfast, by the way?
01 03 22 48	CDR	It was great. We ate every scrap.
01 03 22 52	CMP	Hey, it sure was.
01 03 22 54	CC	Yes. And I found my headset all right this morning, too, but there was a little difference from last night.
01 03 23 03	CMP	Okay. You keep us posted on that headset.
01 03 42 13	CDR	Houston, 14.
01 03 42 16	CC	Apollo 14, this is Houston. Go ahead. Over.
01 03 42 21	CDR	We're standing by for the booster launch phase discussion and the probe discussion any time you're ready to go.
01 03 42 27	CC	Roger.
01 03 44 36	CMP	Houston, 14.
01 03 44 45	CC	Go ahead, 14.
01 03 44 48	CMP	Say, Bruce, how far away is S-IVB from us?
01 03 44 53	CC	Stand by; I'll see if I can get you a figure on that.
01 03 44 57	CMP	Yes, and on the same subject, have you got any - say, give us a roll angle during PTC and some place to point the optics. I wonder if we could see it.
01 03 45 14	CC	Okay. I'll see if we can get that.
01 03 49 11	CC	Apollo 14, this is Houston.

01 03 49 16	CMP	Go ahead.
01 03 49 18	CC	Roger. We'd like to pick up the discussion on the docking probe situation now, if you're ready.
01 03 49 26	CMP	Okay, stand by just 1 here. ...
01 03 50 19	CMP	Okay, Bruce. I guess we're all hooked up and ready to go.
01 03 50 34	CC	14, this is Houston; go ahead.
01 03 50 38	CMP	Roger. I think we're all hooked up and ready to go.
01 03 50 43	CC	Roger. I guess number 1 question would be, is - was there ever more than one bottle selected on the docking probe, and if so, which ones.
01 03 50 57	CDR	That's negative. ... primary one, and that's the one we used.
01 03 51 03	CC	Roger; very good. How many times was the EXTEND/RELEASE position of the docking probe extension retraction switch operated, and for when and about how long was it held in these positions? Over.
01 03 51 23	CDR	Well, it was operated per flight plan for the initial extension, and the dock latch worked normally. We felt a jar, a good solid thump, but it went on out and then it was not operated again until after the problem started. At the ground suggestion, we went to EXTEND/RELEASE and then back to RETRACT - I think twice - no more than twice.
01 03 51 57	CC	Okay, so - grand total, I guess we could say that you've had three cycles to the EXTEND/RELEASE position; the one nominal one, and the two after the problem started developing? Is that correct?
01 03 52 12	CDR	Let's call it no more than four, Bruce. We did one of them on our own, so one normal and no more than three additional.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 03 52 21 CC Roger. We copy.

01 03 52 24 CMP And, Bruce, no response at all except for the first one, which went normally.

01 03 52 31 CC Okay, on the first one there, you were actually causing the probe to extend, were you not?

01 03 52 38 CMP That's affirmative. We extended it, and, as Al said, we heard her clunk in and the talkbacks did their thing, flashed barber pole and then went to gray, as advertised.

01 03 52 50 CC Okay, then on the subsequent ones about all we'd be operating is the capture latch cocking motor.

01 03 53 00 CMP Okay.

01 03 53 01 CC They probably wouldn't feel that in the form of a mechanical shock or anything like that. And - -

01 03 53 06 CMP Roger.

01 03 53 08 CC You may want to kick this next one around before you answer us on it and make sure you got all the details lined up. We'd like you to go through the procedure in as much detail as you can on the final docking, including the switch position, talkback indications, the dynamics, the order of your contact with the - with the LM drogue, the plus-X thrusting, the barber poles, the bottle selection, and the actual probe retraction. I think you mentioned yesterday that you had a 3-second delay in probe retraction, and we'd like to know when that 3-second delay was measured, starting, that is, from throwing the switch or from some other event. Over.

01 03 53 57 CDR Okay. I'll start off by saying that all the switches were per checklist. And, of course, those were one of the first things that we verified at - when the problem occurred, at your suggestion as well as our own. And - everything was normal up to the point where Stu made his first contact. I'll let him take it on in from there.

01 03 54 23 CMP Okay, Bruce, why don't we just back up a little bit, and you - you asked for the specific one where we got the - the docking, but let's go back to the first one, and everything looked just real fine coming in on it. I'd say the - the whole docking operation was just so much like the CMS that it was hard to believe. I mean the - the procedures, and the view, and the response of the vehicle, and I'd say I had 2/10ths of a foot per second closing speed. And then, the reaction when I hit the drogue was just exactly like the - you know, the docking trainer that we had where you didn't hit the capture latches, but you just went in and banged into the drogue?

01 03 55 11 CC Roger. The one over there in building 5?

01 03 55 15 CMP Yes. That's the exact response I got. On the first one, I - I klonked into it and - you know - and then I could tell that I was slipping out, and, of course, Al didn't call the barber pole. So, at that time, I did the natural thing and jabbed it with a little plus-X, and drove it into the drogue, and we were lined up good. I was holding plus-X and the - the alinement - you know - still good on the - on the target just like - you know - you can do in the docking trainer. Okay, and then I realized that it hadn't made contact, so I let her back off. At that time we called you, and I said, "Well, I'll try it again," and increase the velocity. And, on this one, I'm estimating that my contact velocity was about a foot per second. Now, it might have been a little less than that. As you know, a foot-per-second closing looks like you're going to run right through the thing, so - but I would - I've looked at a lot of these on the simulator and I'd say that probably the second one was right at a foot per second. And got the - got the same response - and I really can't remember whether that's the one where you told me to try plus-X after I hit or not. You know, I had already done that on the first one, but anyway, if this was the one, then I hit - you said, oh 3 seconds; I held 4, and no - no luck at all. We came back out. At that time, I suggested we fall back, regroup, and talk about it. And then, y'all pretty much know the story then. You suggested

that we try it again with everything normal, and I guess the second time there was - I contacted and I - that was not the time I held the plus-X. It was the next one on your suggestion. Yes, the second one I - I did it on my own and then you - on the third one you said, let's try a normal docking and hold 3 seconds, and I did that and held 4. And, also, it was after the second docking that I noticed the radial scratches and - and at that time, that's when I became convinced that from the action and then seeing the scratches, that the docking latches were not giving and were indeed locked, instead of the cocked position. Okay, so we went through that one as you suggested, and I held plus-X 4 seconds and - we're right in - right in the drogue - you know - holding steady. And then we came out and then down to - to the last time - -

01 03 58 16 CC Stu?

01 03 58 17 CMP I came in, I'd say probably about a tenth, maybe 0.15, in that area, two-tenths, maybe a little less, contacted it and, at contact, the - the attitude stayed fairly good. There was maybe a degree and a half, 2-degree pitchup movement on the COAS. I then applied the plus-X and held it. At that time, I put it in the center of the drogue, and the COAS and the reticle and the translation were all just looking real good, and so I gave the cue to Al to retract, and he hit the RETRACT switch at that point. And then I let him take it from there.

01 03 59 06 CC Stu, before you press on, where in this sequence of dockings did you actuate the EXTEND/RELEASE switch position again? Over.

01 03 59 20 CMP Okay. It would be after the second attempt. We - It was per your suggestion - the ground suggestion, and we went through the extend/release - in through there - No, wait a minute, we tried it ourselves after the second one, didn't we? Okay, consensus here is, after the first one, we went back to OFF and then back to RETRACT. And then after the second one, we went to EXTEND and then back to RETRACT.

01 04 00 05	CC	Okay, and did you do anything with the EXTEND/ RETRACT switch after the last unsuccessful docking but prior to the final successful one?
01 04 00 48	CDR	I don't think we did, Bruce. We did - We told you everything we did with that switch. ... from RETRACT to OFF and then back to RETRACT again.
01 04 01 04	CC	Okay, now, in going through this sequence, did you ever move the docking probe retract, that is, the BOTTLE SELECT switch off of PRIMARY 1; that is, did you recycle that switch or do anything in this sequence? Or did you just leave it in that position once you'd initially selected it?
01 04 01 25	CDR	Well, we don't touch that switch until we get the capture latches. We stay to the OFF position until - -
01 04 01 32	CC	Okay. Roger. Copy. Okay. So we're coming up on the final successful docking here, and you told us that you got this 1-1/2, 2 degrees pitchup on the COAS that looked pretty good. You applied plus-X and held, and I think that's where I broke in. Go ahead.
01 04 01 56	CMP	Okay, and then on the plus-X then that - that brought the - you know - the COAS right down and the alinement - then everything was fine and translation was - was real good all the way except - except like I say, for that - you know - small pitchup - a degree and half or whatever it was, right at contact as the - as the probe sliding into the drogue.
01 04 02 27	CC	Okay, and did you - -
01 04 02 28	CDR	And when - when Stu called out RETRACT, I went to RETRACT position on PRIMARY 1. And it looked pretty normal from there. Just long enough - to - for you - to say to yourself, "Well, it hasn't worked." And then it went barber pole and gray and simultaneously there we got the feeling that we'd hard docked. So it's probably about a 3-second time period from the time I went to PRIMARY 1 until I had barber pole, and approximately a second later after that, to gray and the hard dock.

01 04 03 09 CC Okay. Stand by.

01 04 05 25 CC 14, Houston.

01 04 05 29 LMP Go ahead.

01 04 05 31 CC Roger. Were you thrusting plus-X all the time from initial contact until the time that you got the hard docking? Over.

01 04 05 40 CMP That's affirmative, Bruce. Once I got her in the drogue - you know, we'd talked among ourselves, and we told Al to hold off until I'm thrusting and I'm satisfied with the alinement. So when we made contact and I thrusted and it looked like we were - Everything was good, and I - I held a positive plus-X all the way until we got the - the latches.

01 04 06 08 CC Okay, now. From contact, when you started thrusting plus-X, did you feel anything after the initial contact that would indicate that you'd moved on in and seated the probe in the center of the drogue? Specifically, do you feel that at the time that you selected RETRACT, the probe head was in such a position in the drogue that you should have already been in a barber pole position on the talkbacks? Over.

01 04 06 40 CMP Well, Bruce, the - the probe was obviously in the drogue, but - you know - there's no way of knowing. But the feeling among us here and - my feeling is that, no, I don't think we had capture latch lock until after we went to PRIMARY. Now, I - You know, I'm sure y'all have looked at it and you've got people down there tearing the probe apart, but I don't even know if it's physically possible. But I don't feel that we had any capture latches in that hole until that last operation when we went to PRIMARY and drove the beauty in there.

01 04 07 25 CC Okay. Do you feel like the - the probe head was in such a position - do you feel like the position of the probe head changed on you any after you went to PRIMARY?

01 04 07 38 CMP No. No. I was watching the - the LM - I was plus-X-ing and Al called "PRIMARY," and we started closing on it and there was no movement; no.

01 04 08 17 CC Okay. We copy. No movement after - after you started the plus-X and got yourself seated in there until such time as the bottle fired; that is, no - no more closing movement. Is that correct?

01 04 08 34 CMP That's affirmative. As far as I can - you know - tell, we were there, thrusting, holding steady - Okay, do you read me, Bruce?

01 04 08 47 CC Roger. Reading you loud and clear, Stu.

01 04 08 51 CMP Okay. And - you know, we got - We're sitting steady in the drogue, plus-X, everything looking fine. We hit the RETRACT switch and we start moving together. I didn't hear anything nor see any action until we heard the latches close.

01 04 09 11 CC Roger. But while you were sitting there then - the talkback was gray and then 3 seconds after you went to PRIMARY, approximately, it went barber pole and the nominal sequence started.

01 04 09 22 CDR Well, I was looking at the talkbacks, and that's about the only thing we saw as we pointed out before. About 3 seconds after the initiation of the primary contact - of the PRIMARY RETRACT switch to the 1 - number 1 position, they went barber pole for perhaps a quarter or a half a second and then went gray simultaneously with the hard dock.

01 04 09 46 CC Roger.

01 04 09 56 CMP Hey, Bruce?

01 04 09 57 CC Go ahead, Stu.

01 04 10 00 CMP Okay. And on that one, we've sort of hassled this out. I guess it's something we need - We're probably going to get to, but we - Yesterday, you know, we called it a ripple fire and we felt like we had them all, which we did; but it really felt like the - the latches - we got a couple or, you

know, it's hard to say how many; but we got some latches and then at some discrete time, maybe a quarter of a second or something like that; then we got the rest of them in a ripple. So, I think we got the docking latches in two distinct times, separated by, you know, a very small amount. But at least it was enough to say it was not one continuous ripple fire.

01 04 10 48 CC — Okay, Stu. We copy that and I guess one last point on this - this final docking sequence. Did the closure of the two vehicles start when you selected PRIMARY and continue for some period of time with the barber pole indication appearing during this period of closure, or did the flash to barber pole and then back coincide with the beginning of the closure for hard docking?

01 04 11 19 CMP — Hey, let us talk about that one for a second, Bruce.

01 04 11 21 CC — Roger.

01 04 11 44 LMP — Bruce, let me give you my opinion from the right seat. We're coordinated, I think, on the way this happened. I saw us move in as in previous attempts. We hit, moved just a little bit to improve alinement as the drogue forced the probe toward the center, and we started to bounce - it looked like we bounced - started to bounce back out. Stu hit the plus-X thrust and held it for what appeared to be right in the middle of the drogue with thrust. He called the RETRACT. Al hit the RETRACT, and a moment after that, it seemed like we started to move together. Al then called barber pole, called gray, and we were moving together continuously during this time; and then I heard the - the fire go off on the - the latches making.

01 04 12 42 CC — Okay. We copy that, Ed. Thank you.

01 04 12 46 LMP — No. We did not [Answering CDR or CMP].

01 04 12 54 CC — And I wonder if you could comment on the thrusting activity immediately after contact for each docking.

01 04 13 06 CMP — Okay. As I said on the first one, I - was going along - -

01 04 13 12 CC — I think we're referring - We're referring more to the nature of stable - attitude control or stabilization thrusting other than the plus-X. I think you've pretty well covered the plus-X for us.

01 04 13 24 CMP — Oh, that's the only thrusting I did. That's all it took to - to aline it. I did no other movements either with the RHC or the THC after contact except plus-X.

01 04 13 36 CC — Okay. We copy that.

01 04 13 39 LMP — Bruce, the probe was sufficiently close to the center of the drogue on each of those contacts. I believe that the marks that we pointed out to you on television yesterday represent the initial contact of the probe. It could not have been more than an inch and a half or 2 inches from the center of the drogue at that time on any of the contacts.

01 04 13 57 CC — All right. It looks like Stu was right in there in the center from what we could see on the - the TV last night on those contacts.

01 04 14 06 LMP — That's affirmative. It looked the same way out the right window.

01 04 15 50 CC — 14, this is Houston. In the process of making the docking yesterday, we advised you to check some circuit breakers, which you did. Did you at any time cycle any of these circuit breakers, that is, open and then reclose them? Over.

01 04 16 14 CMP — Okay. All we did was check them. That's the group 4 and the docking probe circuit breakers. I just checked them, you know, by pushing on them; but, no, we did not pull any and then push them back in.

01 04 16 28 CC — Okay. We copy. And that about winds up our queries on the docking-probe situation. We'll be ready to go on the - the launch-vehicle debrief here in a minute or so.

01 04 16 40 CDR — Okay, Bruce.

01 04 16 43 CMP — Okay.

01 04 18 37 CC 14, Houston.

01 04 18 41 LMP Go ahead, Houston.

01 04 18 43 CC Roger. Last night on the docking probe removal, after you took the preload off the probe, could you tell whether the probe head was, in fact, locked into the drogue at that time or not?

01 04 19 06 CMP No - I - It - it appeared to be, Bruce. I took the preload off. In fact, I think Al made that question and we both looked up around at the probe head to see if we could see anything that looked unusual about it or whether it looked like it was out or anything, and - and it did not. Everything looked - looked normal.

01 04 19 36 CC Could you - could you feel and tell whether the head of the probe was locked into the drogue or not?

01 04 19 49 CMP No. I guess the answer to that would be we don't know.

01 04 20 11 CMP But now, I guess as you've realized, after I collapsed the - the probe, it definitely was.

01 04 20 20 CC Okay. You say after you collapsed the probe, the head of the thing was definitely locked in there?

01 04 20 28 CMP Yes. It was hanging in there and I had to apply a little tug to - to get it out. I went right by the decal on the checklist, and I think you asked at that time about the force that it took to bring it out; and it appeared, you know, reasonably normal for the first time that I had done it in - in zero g. It didn't appear to be anything funny about it.

01 04 21 04 LMP Bruce, let's make it clear. There's no question about the capture latches being through the drogue. But the question of whether they were locked or not is the one we don't know the answer to.

01 04 21 16 CC Right. That, of course, is the question that we were trying to get out here just now.

01 04 25 54	CC	Apollo 14, this is Houston. At GET of 28 hours and 30 minutes, you are approximately 1180 nautical miles. That's 1 1 8 0 nautical miles away from the S-IVB. If you'd care to look for it, we suggest you use a P52 program with a star code of zero and load the - the following numbers in NOUN 88, if you're ready to copy.
01 04 26 25	CMP	Go ahead.
01 04 26 27	CC	Roger. NOUN 88 values are 1, minus 31505, minus 87189, minus 37491. Read back. Over.
01 04 26 46	CMP	Okay. We'll plug in minus 31505, minus 87189, minus 37491.
01 04 26 57	CC	Roger. Your readback is correct and we'll probably, at the end of the launch vehicle systems debriefing here, have some more numbers for you if you want to - if you don't acquire on this first pass.
01 04 27 10	CMP	Okay.
01 04 27 12	CC	And we're ready to press on with the debriefing. If you've got your flight plan handy, you can just proceed down through the questions, and we'll interrupt if we find anything that's unclear or, if you prefer, I can ask them to you in a panel-discussion-type thing and you can answer back. Over.
01 04 27 36	CDR	We'll go ahead with the ... flight plan. Stand by 1 minute.
01 04 27 40	CC	Roger.
01 04 28 17	CDR	Okay, Houston. On question number 1, regarding the changes in noise level, the only change in noise level that we noticed was during the first part of the launch on the S-IC, when we had the initial noise of ignition and the buildup in noise during MAX q. And, of course, the associated -
01 04 28 52	CC	14, Houston. I think we're coming up on an antenna switchover for you. You seem to be fading down into the mud.

01 04 29 01 CDR Okay.

01 04 29 18 CDR Are you reading, now, Houston?

01 04 29 21 CC Okay. We're reading you better signal strengthwise, Al. We still seem to be getting a little bit of breakup from your comm carrier. Can you reposition the mike? See if that helps any.

01 04 29 33 CDR Okay. I have the mike right in front of my mouth right now. Is that better?

01 04 29 37 CC Roger. I think we better take it from the top again.

01 04 29 46 CDR Okay, from the top. The only significant change in noise level we noticed was, as mentioned, due to the burning of the engine in the atmosphere, that is, the ignition, of course, a buildup of noise there. And the noise level increased through MAX q, and then a dropoff. Other than that, with respect to the noise itself, we had no problems at all in our communications at any time during the stages of the flight. Does that satisfy everybody on 1?

01 04 30 26 CC That's affirmative. Press on.

01 04 30 33 CDR Okay. Number 2. On the S-IC, we noticed no significant changes in noise level and vibration, other than what we just discussed. S-IC we felt was a real fine ride, nothing unexpected. The S-II, we noticed a change in vibration, a sort of a slight pogo, which started at 8 plus 40. Nothing of very - of any great magnitude. And on the S-IVB to orbit burn, we noticed no significant changes in the noise and vibration level. We noticed nothing unusual on S-IVB during TLI ignition. However, we did notice the beginning of a slight hum, low hum, or buzz toward the end of the TLI burn. That's it for number 2. Do you have any questions there?

01 04 31 50 CC We have no questions right now on that, Al. We're closing our loop down here with the Huntsville Operations Support Center, so it takes us a - a few seconds to a minute or so to get a response

back. Why don't you press on with the question number 3? If we get any queries, why, we'll reopen the previous ones.

01 04 32 11 CDR — Okay. On number 3, nothing unexpected in the way of transients on which we had not been briefed. As a matter of fact, it went pretty much according to the way we had expected it through all the events mentioned in question 3, that is, ignition and staging, engine shutdown, mixture ratios, and so on. We did experience a little more abruptness with the cut-off of S-II. The S-II SECO, I think, we ... a little more than we expected. Otherwise, everything was pretty much the way we'd kind of planned them. Question 3.

01 04 32 59 CC — Roger. Question 4.

01 04 33 02 CDR — Okay. Stu is ready for you on question 4.

01 04 33 05 CMP — Okay, Bruce. I got a good look at that shroud, of course, stationkeeping with the S-IVB, and you couldn't see all of it; but, as we moved around, you could see a good portion of it back around behind the - the LM and every place that I could see and Ed also and Al - Al was looking through the hatch window part of the time, and everything looked just tight as a drum. We saw no loose pieces of the shroud anywhere. Nothing out of the ordinary, and after SEP - as the - I mean after ejection and the booster came into view - came into my window pretty much of a head-on view, and we were out a little ways, but there was no - no visible damage at all to the shroud at any time. And, like I say, I think we got a real good look at it the time we spent around it.

01 04 34 07 CC — Roger. We copy.

01 04 34 12 CDR — Okay. Going on to - going on to number 5. We experienced good communications throughout the entire powered flight and launch. We've been able to hear the ground on all the calls, and we had no comm problems at all.

01 04 34 36 CC — Roger.

01 04 34 37 CDR How about you, Jim? Any comm problems from us?

01 04 34 44 CC Negative. We experienced no comm problems.

01 04 34 51 CDR Okay, question number 6. Was there visible venting? Stu, do you want to take over, now?

01 04 34 57 CMP Okay. We didn't see any - anything unusual other than those that you called; and when you called the venting while we were stationkeeping, well, of course, it came on, rather beautiful sight. And the only other thing was when you gave a mark for the APS evasive burn, why, I noticed the booster venting and it appeared to be the same area as it had been venting during the stationkeeping phase; and the answer came back that that was expected, and so forth; and that was the only thing out of the ordinary. Other than that, everything was fine and all the other vents you called.

01 04 35 46 CC Okay, on to number 7. I guess that one may still be open.

01 04 35 52 CMP Yes, I was just trying to whip off a fast answer for you on that one, but we don't have any. So I guess that Al will tell you the last time that we - we saw it.

01 04 36 04 CDR Well, I guess the last time we saw the S-IVB was with the eyeball ... that is, and it was during the propulsion venting. It was kind of a tough angle for us to see because of - it was just very low on the edge of window number 1. However, the sun angle on it was good; it was stable when it was venting, as near as I could tell, approximately, a couple of miles away. We took a few pictures of it with the Hasselblad, so we may be able to see the beautiful conical-shaped pattern coming from the venting; but as far as control was concerned, it was going in the right direction and appeared to be stable.

01 04 36 48 CC Roger. We copy.

01 04 36 59 CDR Okay, number 8. Stu, you want to take that one?

01 04 37 03 CMP — Okay, I guess the guidance obviously was good and the velocity was - was real fine. It looked like, during the - during the boost phase, they were running a - maybe 2, 2 and a half miles, maybe 3 miles low along my profile, looked rather consistent; but we obviously arrived at the right place, so the - and the velocity cut-offs were right on the money and the TLI guidance, I think, was within 10 feet, 17, or something like that. You've got the numbers, but it looked real good, and the only thing I can comment there was it looked to me like we were going into Earth orbit insertion maybe a couple or 3 low, pretty much on the profile.

01 04 37 54 CC — Roger.

01 04 37 55 CMP — All the way on the profile I should say.

01 04 38 05 CDR — Okay, are you ready for number 9?

01 04 38 08 CC — Roger. Go ahead with number 9.

01 04 38 13 CDR — Okay. The ORDEAL ball at ignition was as advertised at 8 and a half degrees. After ignition, went to the normal pitchdown, the ball settled down very close to zero; and, as the burn progressed, eased on up to about a plus-1 degree; then, slowly on back to zero; then, close to the pitchdown, just prior to - to the cut-off. And I would say somewhere around 2 or 3 degrees negative, that is at 357 and 358 on the ball, prior to cut-off.

01 04 38 58 CC — Okay, and we've got one more write-in, question number 10; and it's based on -

01 04 39 07 CMP — Okay, I'll take that one, Bruce.

01 04 39 12 CC — Okay.

01 04 39 13 CMP — Okay, Bruce. That - that came from my comment. And as we were stationkeeping and watching the venting, it looked to me like the booster had picked up a little right yaw as - as I looked at it. I meant - moving left on me, but then I just mentioned, it looked like it was moving over a little; but then, later on, I decided that that

was just the scatter of the two vehicle's dead bands because the IU - the S-IVB dead band all the time was solid as a rock, even during the venting. And after all that venting, when I went back to - to try the other dockings, I expected to have to change my attitude a little bit. And as it turned out, the attitude was still - you know - right within a degree, so that was just a call that appeared to, at that time. But the S-IVB vented from both sides and it was steady. And I think I was just picking up the movement of the dead bands of the two vehicles.

01 04 40 20 CC Okay, Stu; thank you.

01 04 40 24 CMP Roger.

01 04 40 35 CC And while the Huntsville people are closing the loop here, we had previously given you a flight-plan update concerning your waste water dump at 30 hours plus 15 minutes, and our update was that you dump to zero percent. We'd like now to modify that to a nominal dump to 25 percent on the waste water. Over.

01 04 41 01 CDR Okay, we are now modified; 25 percent it shall be.

01 04 41 05 CC Roger; out.

01 04 41 09 LMP Could you tell me about Al's comm? You mentioned some dropouts in EKG prior to launch. Apparently you're still not seeing those. Are they in any way associated with these voice dropouts you talked about today?

01 04 41 30 CC Stand by, please.

01 04 43 01 CC 14, this is Houston. Our belief is that there's no correlation at the present time between your earlier EKG problems and the current degraded comm through Al's comm carrier. We would like to suggest when you have the chance that Al try using the spare comm carrier, and see if that improves communications.

01 04 43 26 LMP Okay, we'll shift over.

01 04 44 53 CC — 14, this is Houston. We've received some inquiries regarding your answer to question number 2. The Huntsville Operations people would like to get a little more detail on the slight hum or buzz. Was it actually an acoustic or audible noise, or was it felt through the structure of the spacecraft, and can you give us approximately the time that it commenced and duration, that is, did it proceed until TLI cut-off?

01 04 45 36 CDR — Stand by 1, Houston.

01 04 45 37 CC — Roger.

01 04 46 14 CMP — Okay, Bruce. I think the noise is kind of hard to describe, I guess, and maybe make ourselves clear, but it definitely was not an acoustic buzz. It was a high frequency buzz that we felt through the structure; and, I'd say, it probably started - and this is an approximation - say 2 minutes into the TLI burn.

01 04 46 43 CC — Okay. And continued through the balance of the burn?

01 04 46 48 CMP — Pretty much so, yes. Just about the same level. I wouldn't say that it increased any significant amount.

01 04 46 57 CC — I realize this is sort of hard to put your finger on. Is there any way you can quantify the level, or give us some feeling for how much of - how high the level was?

01 04 47 18 CMP — No. No, I think that's pretty tough, Bruce. In fact, you know - the - the burn was going so well and the ride was so smooth that - you know we - we had time to - to pick it up. I suspect that, you know, it was low enough level that if you had something else on your mind, you wouldn't even have noticed it.

01 04 47 45 CC — Did this - did this just sort of start abruptly, or build up from the background, do you think?

01 04 47 55 CMP Well, Ed feels it was a buildup and I'm not sure. So let's vote that it was a buildup then. That seems to be a majority. And it just came on kind of slow and came up and stayed at low level and - and was there.

01 04 48 13 CC Okay. And the only other question we got back in is at 8 plus 40, this pogo-type thing that you mentioned was - Could you give us a little more detail on direction of motion of it and amplitude. Any more elaboration you have on that would be appreciated.

01 04 48 33 CMP Okay. I guess I called out the time on that one in the cockpit. I - It was no doubt but what it was a slight pogo and I think it was longitudinal; and as far as amplitude, I'm trying to think back to some of those pogo tests I wrote on the shake table, but they were of such high level that I wouldn't - couldn't compare them to this. But, it was a pogo; it started to slip out that time because when I - when I felt it, I looked at the clock and it was not - -

01 04 49 34 CC 14, Houston. We had an antenna changeover here and - -

01 04 50 11 CC 14, Houston. How do you read?

01 04 50 28 CC 14, Houston. How do you read?

01 04 51 13 CMP Okay. How do you read, Bruce?

01 04 51 15 CC Loud and clear, Stu. How do you read me?

01 04 51 18 CMP Oh, you're 5 square. The static's died down, and - As I was saying, there was no question but what it was a low amplitude pogo starting right at 8 plus 40. However, the magnitude was low enough that it was not affected - did not affect any of our voices; and, you know, a fairly low level will - will do that, so I'd - I'd say, you know, it was pretty small. It was not of any concern, but picked it up just because - you know - thinking about pogo, I guess.

01 04 51 56 CC Roger. Thank you.

01 04 52 02	CC	And, Stu, did that last all the way until shutdown of the S-II, or did it die back out?
01 04 52 22	CMP	Bruce, I can't give you a positive answer; none of us can. My impression is it was there all the way, but that data really isn't a very good input.
01 04 52 33	CC	Okay. Thank you. I believe this concludes our discussion on the booster questions.
01 04 52 40	CMP	Okay.
01 04 55 37	CC	14, this is Houston.
01 04 55 41	CMP	Go ahead, Houston.
01 04 55 43	CC	Okay. Just a little status on the probe situation. We have no further queries on the docking probe at this time. The conclusions of our ground analysis are that the system is now working nominally. And our current intention is that you are GO for the lunar landing and all subsequent events. If we have any further commentary or further discussion on the subject, why, we'll get back to you later on it. With respect to midcourse correction number 2, we plan for that to take place at the nominal time which is about 30 hours 36 minutes GET. And it'll be about 71 feet per second, which is also close to nominal. We're planning a GET update of some 40 minutes tomorrow at the nominal time in the flight plan of about 54:40. Over.
01 04 56 42	CMP	Okay. We got that, Bruce, and are we going to leave this Earth dark-side dim-light photography in?
01 04 56 53	CC	That's affirmative, Stu.
01 04 56 56	CMP	Okay.
01 05 00 29	CDR	Houston, that is Al. I've changed the TCU heads. How does this sound, any better?
01 05 00 37	CC	Would you give us a short count on that, Al?
01 05 00 42	CDR	Okay. 1, 2, 3, 4, 5, 4, 3, 2, 1. Over.
01 05 00 48	CC	Roger. That sounds a lot better to me.

01 05 00 52 CDR Okay. We'll take mine and make it the spare.

01 05 00 55 CC Roger.

01 05 01 13 CC Al - Al, are you using the lightweight comm carrier now or the Snoopy hat?

01 05 01 20 CDR Using the lightweight at the moment.

01 05 01 22 CC Roger. Thank you.

01 05 10 54 CMP Houston, 14.

01 05 10 55 CC Go ahead, 14.

01 05 10 58 CMP Okay. The DELTA-V check went fine. And the - on the null bias check, we had a minus 100 to start, minus 99.6 at the end.

01 05 11 08 CC Minus 100 and minus 99.6. And I have your midcourse correction 2 pad here, whenever you're ready to copy.

01 05 11 20 LMP Okay. Stand by 1.

01 05 11 57 CDR Okay. And I'm ready to copy.

01 05 12 18 CDR Houston, Apollo 14. Ready to copy - your pad.

01 05 12 22 CC Go ahead - 14, this is Houston with the midcourse correction 2 pad. SPS/G&N burn: 64213, plus 1.02, minus 0.23; T_{ig} 030:36:07.01; minus 0025.9, plus 0004.4, plus 0066.4; roll, 282; pitch, 354; 298; NOUN 44, N/A; DELTA-V total, 0071.4; 0:10; 0066.5; 25; 278.5; 39.0. The balance of the pad is N/A. GDC aline, Sirius and Rigel; roll aline 230, 170, 002; no ullage. In the burn attitude, S-BAND HIGH GAIN ANTENNA pointing angles: PITCH, minus 22; YAW, 0; WIDE BEAM, MANUAL mode; LM weight, 33647. Your burn time to the nearest tenth of a second is 10.3 seconds for use in checking ball valve operation. Over.

01 05 14 31 CDR Okay. I read back ... SPS/G&N: 64213, plus 1.02, minus 0.23; 030:36:07.01; minus 0025.9, plus 0004.4, plus 0066.4; 282, 354, 298; N/A; 0071.4; 0:10; 0066.5; 25; 278.5; 39.0. The rest N/A; Sirius and

Rigel; 230, 170, 002; no ullage; HIGH GAIN ANTENNA in burn attitude; PITCH, minus 22; YAW, 0; WIDE BEAM in MANUAL; LM weight, 33647; at burn time, 10 - 10.3.

01 05 15 54	CC	Roger, Houston. Readback correct.
01 05 15 58	CDR	Thank you.
01 05 16 22	CC	14, Houston. We've had a correction to the YAW angle for the S-band pointing. That should be plus 8 degrees. Over.
01 05 16 36	CDR	Roger. The S-band pointing is PITCH, minus 22; YAW, plus 8.
01 05 16 41	CC	Roger; out.
01 05 20 01	CC	Roger. We have them, 14.
01 05 20 06	CMP	Okay, and they were torqued at 29 plus 20.
01 05 20 09	CC	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 05 43 17	CC	Apollo 14, this is Houston.
01 05 43 22	CMP/LMP	Go ahead.
01 05 43 23	CC	At your convenience, we'd like POO and ACCEPT and we'll uplink you a new state vector, target load, and the PIPA, and IRIG bias updates. Over.
01 05 43 42	CMP	Okay. You have it, Houston.
01 05 43 44	CC	Roger. They're on their way. And at the same time, we'd like to give you one minor flight-plan update. Due to your later lift-off time, on page 3-32, The Flight Plan, "Darkside Dim Light Photography," we have a new value of longitude over 2 for you.
01 05 44 07	CMP	Okay. Go ahead.
01 05 44 10	CC	Roger. The old value is minus 42.500; new value, minus 47.500. Over.
01 05 44 25	CMP	Okay. Longitude over 2 is now minus 47.500.
01 05 44 31	CC	Roger. And I've been asked to remind you that, in connection with the midcourse burn number 2, if there is stratification in the oxygen tanks, you may get a CRYO LOW PRESS light as this is reduced. Over.
01 05 44 47	CMP	Roger.
01 05 51 42	CC	14, Houston. Your computer.
01 05 53 06	CMP	Houston, 14. Have you finished with the uplink?
01 05 53 08	CC	14, affirmative. How are you reading us now? We passed up "computer's yours."
01 05 53 17	CMP	Okay, I guess we must have missed it during the ... and we're terminating PTC here in about 2 minutes.
01 05 53 24	CC	Roger. Out.

01 05 54 18	LMP	Houston, Apollo 14.
01 05 54 21	CC	Go ahead, Ed.
01 05 54 24	LMP	We see a NOUN 81, DELTA-V's by 1/10th ... the pad. Which is correct?
01 05 54 36	CC	Apollo 14, Houston. We understand the onboard value is correct, and - that's an R_2 that you're concerned about?
01 05 54 48	LMP	Yes. We've never seen NOUN 81s round off like that.
01 05 54 56	CC	Okay. We'll have an explanation for you in a second.
01 05 55 01	LMP	Okay.
01 05 56 12	CC	Houston - Apollo 14, Houston.
01 05 56 18	LMP	Go ahead.
01 05 56 20	CC	Roger. On your query on NOUN 81, 4.3 is the number it was actually uplinked to the spacecraft. There is no problem involved with the spacecraft rounding off numbers or anything of that sort. The maneuver that was passed to you on the maneuver pad was generated from one computer reading a 4.35 which was rounded upwards by the FDO to 4.4. A separate computer processed the information leading to the automatic uplink, and they rounded down to 4.3. Over.
01 05 56 59	LMP	Okay. Those computers ought to talk to each other.
01 05 57 05	CC	Roger. Out.
01 06 14 34	CC	14, this is Houston.
01 06 14 37	CMP	Go ahead, Houston.
01 06 14 39	CC	Roger, Stu. We're looking at your DSKY display here and - noticed it was a little different from the pad burn attitudes. We believe that if you go back and reload NOUN 48 with the pitch

and yaw trim values that we sent up on the pad, which are for the combination CSM/LM, and then redo P40, you'll get better agreement with the pad values for attitude.

01 06 15 06 CMP Okay.

01 06 27 19 CC Apollo 14, this is Houston.

01 06 27 25 CMP Go ahead, Hous - Houston.

01 06 27 28 CC Roger. You can go ahead and terminate charging on battery Alfa at this time.

01 06 27 34 CMP Okay.

01 06 27 46 CMP 14 to Houston. We're in position standing by for a GO for MCC-2 burn.

01 06 27 53 CC Roger; you are GO.

01 06 27 57 CMP Roger.

01 06 37 06 CMP Okay, Houston. That was a mighty good burn there. The residuals - There'll be no trim required.

01 06 37 12 CC Roger. Out.

01 06 38 01 CC 14, for your information, we showed the actual burn time to be 10.0 seconds. Over.

01 06 38 43 CMP Hey, Bruce, that was really great. The CMS was never like that.

01 06 38 48 CC Roger.

01 06 38 55 CMP Houston. At the end of the burn we're showing fuel, 002; oxidizer, 989; unbalance, 300 decrease.

01 06 39 06 CC Okay. Understand. Fuel - -

01 06 39 08 CMP And DELTA-V -

01 06 39 19 CMP And, Bruce, DELTA-V_c, minus 4.1.

01 06 39 23	CC	Okay. Delta-V_c, minus 4.1; fuel, 100.2; oxidizer, 98.9; and unbalance is 300 decrease. Is that correct?
01 06 39 38	CMP	That's affirmative. And if you didn't get the residuals, they're plus 0.2, minus 0, and minus 0.1.
01 06 39 47	CC	Roger. We copy.
01 06 44 16	CC	14, this is Houston. We've reviewed the chamber pressure and the SPS engine operation from this last midcourse on the strip charts, and it looks real fine. We'll have some more words for you - for you - later on the reconciliation of the burn times in tenths of seconds. We're curious as to what value you got with your stopwatch. Over.
01 06 44 41	LMP	I showed about 10.2, Bruce.
01 06 44 45	CC	Understand, 10.2. Over.
01 06 44 48	LMP	That's affirm.
01 06 44 51	CMP	Hey, Bruce. Why do the strip charts show us P_C, two banks?
01 06 45 00	CC	We're going to have to convert from percentage of thrust to PSI, Stu. We'll be right at you.
01 06 45 08	CMP	Oh, no sweat. Don't want to cause you any trouble. I was just curious.
01 06 45 11	CC	They're doing it anyway. Just, we hadn't gotten it accomplished for this burn yet.
01 06 45 17	CMP	Okay. Just wanted to calibrate my gage.
01 06 45 25	CC	You might check your middle gimbal angle, Stu, for the maneuvering.
01 06 45 30	CMP	Roger. We - we're eyeballing it.
01 06 50 26	CC	14, this is Houston. For your information, when starting the PTC spinup, we'll use quads Alfa and Delta. Over.

01 06 50 39	CMP	Okay. We'll use Alfa and Delta for the spinup.
01 06 52 11	CC	Apollo 14, this is Houston. Your average chamber pressure for this last burn was 100 psi even.
01 06 52 21	CMP	Okay, the average was 100 even. Thank you.
01 06 52 25	CC	Roger. Out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 07 14 26	CMP	Houston, 14.
01 07 14 29	CC	Go ahead, 14.
01 07 14 32	CMP	Okay, Bruce. I tell you, I'm sure not seeing what I expected to on this - dark side of the Earth through the sextant here. The angles that - that you gave me lined up the - the optics pretty much over on the edge of the dark side all right. But through the - through the sextant, there's still a lot of light coming in, and I - with that high-speed black and white, I don't see why we're not going to wipe it out. I - I guess I really expected to see pretty much darkness through the sextant here.
01 07 15 22	CC	Okay. Stand by.
01 07 15 25	CMP	Okay. And there's another strange thing on the sextant on this sighting, Bruce. We got a - -
01 07 15 31	CC	Stand by.
01 07 15 33	CMP	Okay.
01 07 20 34	CC	14, this is Houston.
01 07 20 39	CMP	Go ahead, Houston.
01 07 20 42	CC	Roger. We've been advised that there was some illuminated area of the Earth expected to be visible in the field of view for this dim-light photography. What we'd like you to do is to go ahead using the nominal angle; take your three exposures; and then, if it's agreeable to you, we'll have a new set of shaft and trunnion angles for you and you could squeeze off three more. Over.
01 07 21 11	CMP	Okay. No sweat. I'll press ahead and take some photos.
01 07 21 17	CC	Roger. Press on.
01 07 21 51	CC	14, Houston. In your original transmission, did you say that you could see any of the

illuminated portion of the Earth through the sextant eyepiece or just that you had some scattered light coming in? Over.

01 07 22 04 CMP — I've got quite a bit of scattered light. It's negative on seeing any of the - of the lit portion. I - Manually, you know, I've driven it over to the terminator and then the CMC pulls it back to the dark side. We're pointed on the dark side, but there sure is a lot of light showing.

01 07 22 26 CC — Okay. We copy.

01 07 24 13 CC — 14, Houston. Have you already mounted the camera on the sextant adapter? - or to the sextant?

01 07 24 19 CMP — That's affirmative, Bruce. I'm in the middle of the first frame I have, but it's no sweat to change. I can do anything you want.

01 07 24 25 CC — No, no. Don't do that, because we'd have to squeeze off more film at that 24 frame per second prior to dismounting it.

01 07 24 34 CMP — Okay.

01 07 26 11 CMP — Okay, Bruce. I've finished the - the 1-minute, the 20-second, 5-second exposures, and I'll just hold here until you give me some more angles if that's what you want.

01 07 26 22 CC — Okay, Stu. What we'd like you to do is in your longitude over 2 for a P22, just put in minus 42.5, which was the - the value that was originally in the flight plan before we updated you and run three more exposures and that will wind it up.

01 07 26 45 CDR — Okay. We'll enter that in ... 2 like it was originally in the flight plan and repeat.

01 07 26 55 CC — Roger. Out.

01 07 34 50 CMP — Okay, Bruce. I completed the - the pictures. I put the sextant back on and looked at our second one and it's - it's going to be just about the same.

01 07 35 04	CC	Roger, Stu. I think that wraps up the requirements for the dim-light photography.
01 07 35 11	CMP	Roger.
01 07 35 12	CC	And just to clear up the situation that I created on giving you a quad Alfa Delta. We are recommending Alfa and Charlie for the PTC spinup and your option on the quads that you used for rate damping.
01 07 35 30	CMP	Okay. We figured that's what you meant.
01 07 50 40	CC	Apollo 14, this is Houston. Over.
01 07 50 44	CDR	All right, Houston. Go ahead, Houston.
01 07 50 47	CC	14, Houston. You can secure the high gain antenna at this time. We recommend a PITCH of minus 5 - -
01 07 50 52	CMP	Go ahead, Bruce.
01 07 50 53	CC	We recommend a PITCH of minus 52 degrees, YAW of 270 for securing the high gain antenna. Request OMNI Bravo for PTC. Over.
01 07 51 13	CDR	Houston, this is Apollo 14. We're reading you loud and clear. Go ahead.
01 07 51 16	CC	Apollo 14, this is Houston. You may secure the high gain antenna now. PITCH, minus 52; YAW, 270. Request OMNI Bravo for PTC. Over.
01 07 51 32	CDR	Houston, 14. That's what you have.
01 07 51 35	CC	Roger.
01 08 02 36	CC	Apollo 14, this is Houston. Stand by for an important announcement.
01 08 02 45	CMP	Roger. Standing by.
01 08 02 47	CC	Roger. You're GO for PTC spinup now.
01 08 02 58	CMP	What would we do without you, Bruce?

01 08 03 17	CMP	Hey, Bruce. How come we haven't heard any news, like who won at Daytona and things like that?
01 08 03 25	CC	Well, we tried for one news summary and most of the news came out to be on the subject of Apollo 14. We figured you guys were probably the ones that had the inside scoop on that, so we'll give a stab at another one.
01 08 03 38	CMP	Yes. Tell us what's going on at the races at Daytona.
01 08 03 42	CC	Okay. Give us a couple of minutes and we'll have some word for you.
01 08 03 48	CMP	Oh, no sweat. Just at your convenience.
01 08 29 10	CC	Apollo 14, this is Houston.
01 08 29 13	CDR	Go ahead, Houston.
01 08 29 21	CC	If the workload isn't too heavy up there for you, we've got another set of NOUN 88 values for sighting on the S-IVB, if you're interested.
01 08 29 34	LMP	Okay, stand by and I'll copy them down.
01 08 30 20	LMP	Okay, Houston. Go ahead.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 08 30 23	CC	Roger, 14. NOUN 88: minus 34293, minus 85901, minus 38013. Over.
01 08 30 48	CMP	Okay, Bruce, you back with us?
01 08 30 49	CC	Yes, I'm still with you.
01 08 31 00	CC	14, Houston. How do you read?
01 08 31 05	CMP	Hello, Houston. How do you read? 14.
01 08 31 08	CC	14, we're approaching an antenna switchover period here. Let me give you a call again in a minute.
01 08 31 45	CMP	Hello, Houston. How do you read, 14?
01 08 31 48	CC	14, Houston. Loud and clear. How me? Over.
01 08 31 52	CMP	We're back with you. How about giving me R_3 again, please?
01 08 31 56	CC	Okay, R_3 is minus 38013. Read back. Over.
01 08 32 04	CMP	Okay, reading you back from NOUN 88: minus 34293, minus 85901, minus 38013.
01 08 32 16	CC	Roger; readback correct. These are calculated for a GET of 32 hours 45 minutes, but should be valid from the present up to about 33:45. You will be able to see the S-IVB when your spacecraft roll angle is between 85 degrees, that's 085 degrees and 020 degrees. If you do see it through the sextant, we'd like you to try to take some pictures, using the same techniques as on the dim-light photography per camera advance, same film magazine, same exposure times, if you concur. Over.
01 08 33 01	CMP	Okay, sounds great. I understand this is set up for a time of 32 plus 45:00, however, it ought to be good now and we ought to be able to hack it when our roll is between 085 to 020. And if we lap the big moose, we'll take some pictures of it using the same magazine and the same procedures as the Earth dim light that we just finished.

01 08 33 31 CC Roger; Roger.

01 08 39 17 CC Hello, 14, this is Houston. Be advised that the S-IVB is tumbling at a rate of one tumble - that is, one 360-degree tumble - about every 4 and a half minutes, so that the intensity of the object may vary if you see it out there. And even if you don't, we've been considering the speed of the film. We'd like to take some pictures. Perhaps it would show up on photography if you can't see it with the naked eye. And another item, your phase plane plot for PTC - It looks like you've established a very good PTC here. It's curving back around toward the center. We think it's going to hold for quite some time. And we'd like to get battery Alfa on CHARGE at your convenience. Over.

01 08 40 13 CMP Okay, Bruce; copy that. When we get around to the right roll angle, we'll give a GO on the S-IVB. Copy about the PTC, and we'll start a charge.

01 08 40 23 CC Roger.

01 08 54 51 CC Do you see anything out there, Stu?

01 08 54 57 CMP Well, we're just now coming out from behind the LM. Looks like I've got something here in the sextant. Let me pull her in the center and see what it looks like.

01 08 55 48 CMP Well, Bruce, I've got two things in the sextant and - You know, it could either be a faint - faint star - I don't see any - any tumbling on them yet, but 4 and a half minutes isn't that fast either.

01 08 56 13 CC Roger. We copy.

01 08 56 27 CMP Okay, I've lost one of them due to the light coming into the sextant. And I'm about to lose - lose the other object, whatever it was.

01 08 58 18 CC 14, Houston. We got a little sports news for you.

01 08 58 26 CMP Okay, go ahead. You're just in time for dinner.

01 08 58 31 CC Would you rather I croon something soothing to you, like background music, or Ravel's Bolero or something?

01 08 58 39	CMP	Negative on the music. We got all that we need here. You can just croon some good sport news.
01 08 58 47	CDR	Why don't you hold on a minute and let Ed get his headset on?
01 08 58 51	CC	(Laughter) It's not that detailed.
01 09 00 36	CDR	Okay, Houston. Everybody's on the line.
01 09 00 39	CC	Okay, I don't know if it was really all that earthshaking. I've got the results of the Daytona races. It was won by Pedro Rodriguez from Mexico with his partner Jackie Oliver in a Porsche, and they completed 688 laps of the 3.81-mile course there at Daytona in 24 hours. Ronnie Bucknum and Tony Adamowicz were second in a Ferrari, and Lamak Donohue-David Hobbs team was third. In winning the event, Rodriguez and Oliver averaged over 109 miles per hour for the 24-hour period. And Sunday's Andy Williams - San Diego Open Golf Tournament, Californian George Archer took the honors with a 7-under-par score against his closest competitors, Dave Eichelberger and Jack Nicklaus. Archer ended up with a 65 and $30,000 in prize money. Over.
01 09 01 47	CDR	Okay, very good. Thank you. Keep up the good news.
01 09 01 50	CC	Roger. You can tell Ed to take his headset back off now.
01 09 32 36	CC	Apollo 14, Houston.
01 09 32 40	CDR	Go ahead, Houston.
01 09 32 42	CC	Roger. We took up a collection here in the Control Room and bought a newspaper, and we got a couple more items, if you are interested.
01 09 32 51	CDR	Great. Take up another collection and you might buy two.
01 09 32 56	CC	Oh, we'll buy you a morning paper, too, a little later. On the Daytona race, a few more details. Reading into the article Rodriguez and Oliver divided the driving chores up about equally - -

01 09 33 13	CMP	Bruce, hold up just a second.
01 09 33 19	CMP	Hold it a second.
01 09 33 20	CC	Roger.
01 09 34 54	CMP	Okay, Bruce. ... Proceed.
01 09 34 57	CC	Okay. Stand by.
01 09 35 45	CC	Apollo 14, Houston.
01 09 35 48	CMP	Go ahead.
01 09 35 50	CC	Roger. Back in the Daytona, it says that Rodriguez and Oliver divided - -
01 09 36 20	CC	14, Houston. How do you read now?
01 09 36 43	CC	Apollo 14, Houston. How do you read now?
01 09 36 48	CDR	Loud and clear, Bruce. Go ahead.
01 09 36 50	CC	Okay. Let me try it once more with vigor. Back in the Daytona Race, "Rodriguez and Oliver, dividing up the driving chores about equally, had built up a lead of 213 miles at one point in the race. But trouble struck with about 3 hours left when the car's transmission failed as Oliver was motoring around with not a care in the world. Two Ferraris — the one driven alternately by Bucknum and Tony Adamowicz of Wilton, Connecticut, and another under command of two-time U.S. road racing champion Mark Donohue and David Gobbs of England — had survived the long night but were out of it as long as the Porsche held together. Oliver brought the powder-blue car into the pit, and he and Rodriguez spent an agonizing 93 minutes watching their lead wiped out as crewmen feverishly made repairs. Bucknum gained the lead 70 minutes from the end and Donohue pulled into striking distance before crew chief John Wyer could get the Porsche rolling again. Rodriguez bolted back to the course a half mile behind Bucknum, whose Ferrari was spitting fire and having trouble getting through the turns. The Mexican hotshot needed less than two laps around the 3.81-mile layout to catch Bucknum and was never in serious trouble again."

01 09 38 19 CMP Damn. That's a good summary, Bruce.

01 09 38 22 CC Yes. I ought to be a sportswriter.

01 09 38 37 MCC Yes. That was very interesting, Bruce. And the next item here is a headline that says "Apollo NUMBER 4900 TO ORBIT EARTH."

01 09 38 54 SC (Laughter)

01 09 38 56 MCC "The Aerospace Defense Command has entered Apollo 14 as number 4900 in its records of Earth-orbiting satellites. The ADC, housed inside Cheyenne Mountain, is providing NASA with information on satellites passing near Apollo 14 during its journey to the Moon." Just thought you might be interested in that.

01 09 39 19 MCC Well, they say always better late than - -

01 09 39 22 CMP Well, ... It's Fred-ly! (Laughter)

01 09 39 25 MCC It's better to be number 4900 than not to be at all (laughter). And, meanwhile, today at New York, "The doors of baseball's Hall of Fame swung open for seven oldtimers elected by a veterans' committee after the regular ballot of the Baseball Writers Association of America had failed to name any moderns to the shrine. Legendary pitcher Rube Marquard, who shares the record of 19 consecutive victories in a single season, and George M. Weiss, the executive genius who guilt the New York Yankees into an awesome powerhouse from the late 1940's, led the advance of the oldtimers. Also named were outfielders Harry Hooper, Joe Kelley, and Chick Hafey, first baseman Jake Beckley, and shortstop Dave Bancroft. Marquard, who won 201 games pitching mostly for the New York Giants and Brooklyn Dodgers from 1908 to 1925; Hooper, who hit .281 in 16 American League seasons; and Kelley and Beckley, both pre-1900 stars, were named as 'real oldtimers' whose careers ended by 1925."

01 09 40 39 MCC And here's another startling bit of news - from London. The headline says, "Subway riders arrive; can't get out of station." "More than a dozen passengers were trapped in a London subway station for more than an hour early today when the staff

locked up and went home." That sound familiar? "When the passengers got off the last train on the Bakerloo line, at the Midavale station in Paddington, they found exits blocked by steel shutters and the station deserted. Police were called and they in turn contacted London subway officials. A spokesman for the London transport said it would investigate the incident. London Subway Service shuts down from about midnight 'til 5 AM."

01 09 41 36 LMP Could happen to anyone, anyplace.

01 09 41 40 CC Also in the news is this other item from London. That D-day is less than 2 weeks away. They're referring here to the day when England changes to decimalized currency. "A government agency coordinating the switch says everything is going smoothly. 'Our latest survey has shown that since November there has been an incredible improvement in the extent to which people are familiar with the decimal equivalents,' a Decimal Currency Board spokesman said Sunday. On February 15, the new pound, worth $2.40, officially will become worth 100 new pence."

01 09 42 21 CC And next on the agenda here. "Vehicles are called the top noisemaker." Dateline is from Paris. "Motor vehicles are the chief source of city noise, and only governments can do anything about it. This opinion is the result of a 2-year study by the consultant group on transportation research of the Organization for Economic Cooperation and Development." Incredible! (Laughter) "This problem is worldwide."

01 09 43 02 LMP Seems like you two have a good handle on world events, important world events.

01 09 43 08 CC From Lourenco Marques, Mozambique, this item. "Fresh floodwaters have poured into Portuguese East Africa's cyclone-stricken lowlands today, hampering rescue efforts for thousands of flood victims already marooned 4 days. The central government said 135,000 persons lived in the worst-affected area around Quelimane, administrative capital of the central Zambesia province. Only 24,000 people have been rescued, but Zambesia Governor Lieutenant Gen - Lieutenant Colonel David Ferreira declined to estimate the death toll." Good night, Fred.

01 09 43 45	MCC	Very good. Good night, Bruce.
01 09 43 50	CMP	Tremendous! (Laughter)
01 09 43 57	CDR	Very nicely done. Very nicely done.
01 09 44 01	CC	We had to censor the best parts.
01 09 44 05	CDR	Say again.
01 09 44 07	CC	We had to censor the best parts.
01 09 44 11	CDR	That's too bad.
01 09 44 18	CDR	There will be a daily showing, I assume.
01 09 44 23	CC	Oh, (laughter), we'll see what we can do.
01 09 50 00	CMP	Houston, 14.
01 09 50 05	CC	Go ahead, 14.
01 09 50 08	CMP	Hey, Bruce. I'm going to take some pictures of this S-IVB area this time around. Do you want me to have the two strips at 24 frames per second for 2 seconds and everything just like on the other sequence?
01 09 50 26	CC	That's affirmative, Stu.
01 09 50 30	CMP	Okay.
01 09 50 59	CC	14, Houston. If you feel like doing a little paperwork here, I've got an update to the inflight erasable load procedure as a result of the new PIPA bias and gyro compensation uplinked to you just prior to midcourse 2.
01 09 51 23	CMP	Okay, stand by 1, Bruce.
01 09 51 59	CMP	Okay, Bruce, go ahead.
01 09 52 03	CC	14, Houston. Page 9-4 in the G&C checklist, load A for Albuquerque. Under identification number 03, the old value is 77143; new value, 76674. OID 05: old, 00110; new, 00320; OID 07: old value, 76745; new value, 77417; OID 11: old value, 00477; new value, 006 - make that 00063. Read back. Over.

01 09 53 18 CMP Okay, under column A, 03, 76674; 05, 00320; 07, 77417; and 11, 00063.

01 09 53 39 CC Roger; readback correct. For cyrogenic hydrogen management, we'd like to turn the heater in Hydrogen tank number 2 off, and our calculations show that your pericynthion altitude is currently 67 miles. As the period of our tracking improves, we expect this to work down towards about 60 nautical miles. And we have a question for you. Have you noticed any cosmic ray flashes during your last sleep period or at other times when the command module was darkened? Over.

01 09 54 24 CDR One at a time, Houston. You say HYDROGEN 2 HEATER, OFF? Over.

01 09 54 30 CC Roger; H_2 tank number 2 HEATER, OFF. We'll call you when we want it back to AUTO or ON.

01 09 54 37 CDR Okay, it's OFF now. And yea, verily, saw a few flashes. I'm not quite sure what they're ascribed to; but, nevertheless, we saw flashes during the sleep period last night.

01 09 54 51 CC Okay, was this - -

01 09 54 55 CDR Unfortunately, we were a little bit - we were a little bit too tired to conduct any sort of measured experimenter data with them, but maybe we will get around to that in the next few days.

01 09 55 08 CC Roger. One question, would you say that you were dark-adapted when you saw these, or did you see them before you were well dark-adapted?

01 09 55 21 CDR I will speak for myself. I didn't start seeing them until after I woke up, 3 or 4 hours after going to sleep.

01 09 55 28 CMP Hey, Bruce, I had a comment I noticed on that last night. I'd wake up several times and I'd turn on the light to take a look around PTC and that O_2 flow that's been troubling us; and then I'd close my eyes again, and I'd see some flashes real soon after I had been looking at these lights. Now they were rather subdued lights, but you know - I certainly wasn't totally dark-adapted.

01 09 56 05 CC Okay, what sort of lights were you using, the floodlights or the integrals?

01 09 56 12 CMP Using the integrals mostly; on several occasions, I did have the floods up to check, and then I'd turn them back off again. And it didn't seem to matter much.

01 09 56 26 CC Okay, thank you, 14.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 10 07 09	CC	14, Houston. For your information. The program alarm was a 404 trunnion angle greater than 90 degrees. No problem.
01 10 33 33	CC	14, Houston.
01 10 33 38	CMP	Go ahead, Fred.
01 10 33 40	CC	I wonder if you can verify for us that you have H_2 tank number 1 to AUTO and H_2 tank 2 to OFF.
01 10 33 52	CDR	That's verified.
01 10 33 55	CC	Okay.
01 10 45 00	CMP	Houston, 14.
01 10 45 04	CC	Go ahead, 14.
01 10 45 08	CMP	Okay, Fred. We just went through the Hycon and everything checked out real fine and we ended up with magazine W on it.
01 10 45 20	CC	Okay. Copied. And, you ended up with magazine W.
01 10 45 26	CMP	Roger. That's per the plan.
01 10 45 45	LMP	Fredo, do they want these times - of these - at this point?
01 10 45 51	CC	That's affirm, Ed. I guess they'd like the times and they'd like how many frames you used off the other MAG that was on there.
01 10 46 02	LMP	Okay. MAG V as in Victor. We started with frame zero and ended with frame 9, before resetting the counter. The LTC clock is on day 764 and 07:30 corresponds to GET of 34:26:42.
01 10 46 34	CC	Okay. Copied.
01 10 47 34	LMP	Say, Houston. We could play a lot of tic-tac-toe in the next two or three pages of the flight plan.

01 10 47 48	CC	Say again, Ed.
01 10 47 54	LMP	I said, the next three pages of the flight plan are very bare. We can play tic-tac-toe all afternoon on those.
01 10 48 01	CC	All afternoon, huh?
01 10 48 09	CC	It's about 02:00 down here.
01 10 48 14	LMP	- - we just had lunch a few minutes ago; it's afternoon.
01 10 48 17	CC	Okay.
01 10 48 24	CC	Yes, I have to agree with you about the next few pages. They do look pretty slim.
01 10 52 50	CC	14, Houston.
01 10 52 54	LMP	Go ahead.
01 10 52 58	CC	The photo people would like - -
01 10 52 59	LMP	Go ahead, Fredo.
01 10 53 00	CC	Yes, the photo people would like to know if y'all got the S-IVB pictures using the dim-light Earth-side settings there, and about when you did that - if you remember.
01 10 53 16	LMP	Stand by. We took some pictures. Whether we got them or not remains to be seen.
01 10 53 26	CC	Is that a pun?
01 10 53 27	LMP	Roger. Say again.
01 10 53 38	LMP	Those pictures were completed at 34:03:25, and they were on magazine J for Juliett.
01 10 53 50	CC	Okay. You got them at 34:03:25 on MAG Juliett.
01 11 10 20	CC	14, Houston.
01 11 10 40	CC	Apollo 14, Houston.
01 11 11 32	CC	Apollo 14, Houston.

01 11 13 46	CC	Apollo 14, Houston.
01 11 13 52	CDR	Go ahead, Houston.
01 11 13 56	CC	Okay. I have a - an LOI minus 5 hour flyby maneuver pad for you that we owe you about this time.
01 11 14 11	LMP	Roger. LOI minus 5 flyby.
01 11 14 15	CC	You got the good book out, ready to copy?
01 11 14 24	LMP	That's affirmative; let her rip.
01 11 14 26	CC	Okay. SPS/G&N, 63526; plus 0.90, minus 0.33; 076:59:31.54; plus 0382.3, minus 0104.3, minus 0008.4; 246, 208, 062; N/A; plus 0021.2; 0396.4; 0:56, 0391.2; 22, 211.7, 08.7.
01 11 14 32	CDR	Hold it, Fredo.
01 11 14 34	CC	Okay.
01 11 14 36	CDR	Start back with DELTA-V_T, please.
01 11 14 40	CC	Okay. Delta-V_T, 0396.4, and 0:56, 0391.2; 22, 211.7, 08.7. The next three lines are N/A. Then NOUN 81 - NOUN 61 are minus 27.86, minus 168.02; 1149.8, 36159. And the last item, GET .05g at 165:12:25. Under comments, GDC aline, set stars, Sirius and Rigel, are alined 230, p aline, 170; yaw aline, 002; no ullage. And the burn is SPS docked based on the PTC REFSMMAT.
01 11 17 32	LMP	Okay, I think I missed two items sent over: the NOUN 47 weight, and the H_P figures there.
01 11 17 43	CC	Okay, the NOUN 44 is at - apogee was N/A; perigee, plus 0021.2.
01 11 18 00	LMP	Roger. NOUN 47, the weight?
01 11 18 03	CC	Okay. Weight, 63526.
01 11 18 22	LMP	Okay. On the LOI minus 5, SPS/G&N: 63526; plus 0.90, minus 0.33; at 067:59:31.54; plus 0382.3, minus 0104.3, minus 0008.4; 246, 208, 262; H_A is N/A, plus 0021.2; 0396.4, 0:56,

0391.2; 22, 211.7, 08.7; boresight star, N/A; NOUN 61, minus 27.86, minus 168.02; 1149.8, 36159; 165:12:25. Sirius and Rigel at 230, 170, 002; no ullage. It's an SPS docked burn with PTC REFSMMAT.

01 11 19 42	CC	Okay, Ed. Everything's okay, except two items. Apparently the one of us got our flip flops wrong here. For the attitude block, yaw should be 062, and the NOUN 33 hours should be 076.
01 11 20 21	LMP	Roger. The hours are 076; NOUN 33; and yaw is 062.
01 11 20 30	CC	Okay, good readback.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 12 11 39 CC 14, Houston.

01 12 11 45 LMP Houston, 14. Go ahead.

01 12 11 49 CC I just wanted to see if you all are still around there. You all been looking out the window lately back in this direction? Seen anything interesting?

01 12 12 01 LMP No, I haven't looked out for a while. Got something interesting for us to look at?

01 12 12 07 CC I was asking you - if you had seen anything from that vantage point. Pretty dark down here where I am right now.

01 12 12 25 LMP It's been an hour or so, Fred, since I took a look at either back in your direction or at the Moon. Let me see if I can see where you are now.

01 12 12 58 CC Guesstimation on the terminator ought to be somewhere around India, Pakistan; somewhere in that - along that line.

01 12 13 09 LMP Okay.

01 12 14 29 LMP Houston, 14. We have the Moon out the hatch window right now, Fredo.

01 12 14 37 CC Okay.

01 12 14 41 LMP And I presume then that the Earth is probably out the port telescope at this moment.

01 12 14 51 CC I guess you'll have to wait about another 20 minutes or so for it to come up in the hatch.

01 12 14 57 LMP Roger. Yes, I suspect also it's down just a little bit too far for us to see.

01 12 15 07 CC Let's see, how big a Moon are you seeing there? Is it about not quite a half or something?

01 12 15 16 LMP Roger. It's short of a half; and, for size, it appears about like an orange held at - short of - just short of arm's length. ... subtends about a degree and a half now, a little less.

01 12 15 38	CC	Roger. And the board here has you at about 135,000 out now.
01 12 15 52	LMP	Okay, that'll make it slightly over a degree then, I guess.
01 12 16 26	LMP	As you already know, Fred, the Moon starts to take on a little bit of brown - grayish colors about this point, as opposed to being so very bright as it appears from the Earth. You can start to see a little bit of texture here.
01 12 16 48	CC	Yes, that's a good word to remember, that texture business.
01 12 16 55	LMP	Yes.
01 12 18 00	LMP	And, Fred, I have the monocular on the Moon now out window 5, and it - it's really starting to look very interesting from this point of view.
01 12 18 21	CC	They ought to look a little better in a couple of days.
01 12 21 35	LMP	Houston, 14.
01 12 21 38	CC	Go ahead, 14.
01 12 21 45	LMP	I have the Home Planet out the hatch window now, and where did you say the terminator is?
01 12 21 52	CC	Oh, guesstimation is somewhere between the Sudan and India.
01 12 22 01	LMP	Roger.
01 12 22 06	CC	And, looking at your position, overhead here, you ought to have the Philippines - mainland, the Far East in sight.
01 12 23 14	LMP	As a matter of fact, I do, Fred. There is quite a bit of cloud cover, and I'm having a little difficulty identifying landmasses. I'll be able to pick it up by the next time around ...
01 12 23 26	CC	Okay.
01 12 24 21	CC	And, 14; Houston.

01 12 24 30 LMP Go ahead.

01 12 24 31 CC Yes. I was trying to give you a sunrise terminator there, Ed. I guess from your - I got some pictures here that tell me that what you're probably looking at is the sunset terminator, and that's running right through Australia and right across the coast of China.

01 12 24 51 LMP Okay. Roger. That makes a lot more sense of it; I'm pretty sure I had the Australian Continent down at the bottom of my lighted area, and looking up across the Philippines. And there's a great deal of cloud cover in that area, but there are a few islands standing out. I believe that I can see the southern tip of India standing out without too much cloud on it.

01 12 25 23 CC Roger. India should be right about at the - the edge.

01 12 25 30 LMP Roger.

01 12 27 08 LMP Houston, 14.

01 12 27 13 CC Go ahead, 14.

01 12 27 16 LMP Is there still a semisizable tropical storm off the east coast of Australia?

01 12 27 26 CC Hey, I'll ask somebody about that one, Ed.

01 12 27 36 LMP Part of it seems to be in darkness right now, but I seem to be seeing about half of a very large - circulating airmass.

01 12 27 47 CC Roger, Ed.

01 12 30 46 LMP ...

01 12 30 51 CC Okay, stand by, Ed. We've got kind of a bad comm right now.

01 12 32 25 LMP Houston, Apollo 14. Are you there?

01 12 32 27 CC Okay, I think we may be back on good OMNI now, Ed. Go ahead.

01 12 32 34	LMP	Okay, I didn't have ...
01 12 32 42	CC	Say that last again, Ed.
01 12 32 45	LMP	I say, I don't have very much viewing time on either the Moon or the Earth. As it swings past the window, it's very low; and I - we don't have - just a few minutes on each window. But it's a most inviting and magnificent view. I'm very glad we have Earth as a Home Planet. I hope we can keep it so it's inviting.
01 12 33 11	CC	Roger, Ed. Yes, again looking up at the big board I can - need to get about another 40,000 miles or so, then you'll be more directly in the Earth/Moon plane, and you ought to have them pretty much centered in the window about then.
01 12 33 33	LMP	Okeydoke. Thank you.
01 12 39 59	LMP	Houston, Apollo 14.
01 12 40 04	CC	Go ahead, Ed.
01 12 40 09	LMP	Roger, Fred. I'm watching - out the rendezvous - right-hand rendezvous window at the thermal skin on the LM. Right now - and it is in full-Sun outside my window - and I observed as the Sun came directly onto it ... bands of heat and then cools off and pops back into shape again as the - it starts to cool off on the next cycle. It's - it gives a rippling effect as the Sun passes across it. It's very interesting.
01 12 42 34	CC	14, Houston.
01 12 42 38	LMP	Go ahead.
01 12 42 40	CC	Okay, I heard a little bit of your onset there, Ed, before OMNI B got us again with the bad comm there. And, I guess LM-8 got built just like LM-7, because I noticed that same sort of a thing there.
01 12 43 00	LMP	Yes. I guess that's what it's all about. The thermal protection - expands from the heat and contracts. And, this is sure doing it on each cycle.

01 12 43 13 CC With respect to your weather question awhile ago, Ed, they say they do have a weak cyclonic storm to the west of Australia, but they're not showing anything to the east; and I - maybe I misunderstood, I thought you said you saw it over by the sunset terminator to the east.

01 12 43 39 LMP Roger. It appeared to me by the sunset terminator ... a very - well, like a donut-shaped cloud but several thousand miles across. It might have been too large for just the tropical storm they're talking about. Couldn't be very widespread circulation.

01 12 44 01 CC Yes, I guess they need to go look out the window down there, too.

01 12 44 07 LMP Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 13 30 34	CC	Apollo 14, Houston.
01 13 30 39	CDR	Go ahead, Houston.
01 13 30 41	CC	Okay. We're ready to suspend battery charge on A.
01 13 30 50	CDR	Okeydoke.
01 13 30 52	CC	All filled up again.
01 13 30 56	CDR	Glad to hear it.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 15 00 42	CDR	Houston, 14.
01 15 00 45	CC	Go ahead, 14.
01 15 00 49	CDR	At 39 hours, the LM/command module DELTA-P is reading 0.75.
01 15 00 58	CC	Roger. 0.75.
01 15 01 04	CDR	Check.
01 15 08 26	CC	14, Houston.
01 15 08 31	CDR	Go ahead, Houston.
01 15 08 33	CC	Is Ed around with a headset on?
01 15 08 40	LMP	Affirmative.
01 15 08 42	CC	Okay, Ed. I'm not - -
01 15 08 45	LMP	I'm listening, Fredo.
01 15 08 47	CC	Yes. I'm not maybe clear on a question you had earlier about the ball valves with respect to time in the burn on MCC-2, but I do have some data here. And I think the crux of it is - is that if you use a few of the ball valves visually showing full OPEN to full CLOSED, you'll be shifting your - what your're actually starting and stopping your clock by about a quarter of a second from the actual chamber pressure. But the total DELTA-Time is very close. On that burn, you would have clocked 10.15 versus 10.2 via P_C.
01 15 09 49	LMP	Okay. You say had we measured P_C, we would have clocked 10.15. Is that affirm?
01 15 09 57	CC	No. You'd have - from 90 percent P_C down to 10 percent, you'd got 10.2 seconds. And if you'd started your watch with BANK A full OPEN to the BANK A needle showing full CLOSED, you'd measured 10.15. Except in the time - absolute time scale,

you would have started and stopped your watch one-quarter second to the right. Because there is a lag in the - what I'm telling you is there - -

01 15 10 30	LMP	Okay.
01 15 10 31	CC	There's a lag in those needles moving by about a quarter of a second from what the actual chamber pressure is.
01 15 10 39	LMP	Okay. I understand.
01 15 50 47	CC	14, Houston.
01 15 50 52	CDR	Go ahead, Houston.
01 15 50 54	CC	I know you'll be happy to hear that we won't have a need to do the uplink here at 39:40. The state vector looks in great shape as is.
01 15 51 13	CDR	Very good. Glad to hear that. You're right.
01 15 51 18	CC	We won't have to work that in this busy schedule here.
01 15 51 27	CDR	Okay. We'll proceed to the next item.
01 16 10 45	CC	14, your NOUN 93.
01 16 10 51	CDR	Okay, 93.
01 16 11 05	CDR	04, 11, 00.
01 16 11 10	CC	Roger. 040, 11, 00.
01 16 13 25	CC	14, Houston.
01 16 13 30	CDR	Go ahead, Houston.
01 16 13 31	CC	Okay. The PTC is divergent enough that it's not going to make it through the next upcoming sleep period. So we'd like for you to stop at about zero roll, and we'll reinitialize. In the interim, you can do any venting or dumping you might have to do and - before cranking it up again.

01 16 13 48	CDR	... at the moment with the food and everything. We'll probably catch you the next ... around.
01 16 14 06	CC	Okay. Okay. And either zero or 180 roll will be okay.
01 16 14 16	CDR	Okay.
01 16 15 40	CC	And, 14; Houston. Who's duty cook tonight?
01 16 15 47	CDR	Ed Mitchell's in the pantry right now.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 16 26 38	CC	Apollo 14, Houston.
01 16 26 44	CDR	Go ahead, Houston.
01 16 26 46	CC	Okay. We'd like H_2 - H_2 tank number 2 to AUTO.
01 16 26 53	CDR	Okay. H_2 number 2 going to AUTO now.
01 16 26 56	CC	Okay, that's a heater switch, Al.
01 16 26 59	CDR	Got it, Fredo.
01 17 32 45	CDR	Houston, 14. We are ready with our crew status report and with the VERB 74.
01 17 32 55	CC	14, Houston. Got a new CAP COMM now. Stand by 1 before you start that - report.
01 17 33 04	CDR	Okay.
01 17 36 07	CDR	And - Houston, 14.
01 17 36 10	CC	14, Houston. Go ahead.
01 17 36 14	CDR	Okay, Gordon. Fred made his comment before you left, I guess you're - wanting us to reestablish PTC before we sack out. Is that affirm?
01 17 36 24	CC	Affirmative.
01 17 36 27	CDR	Okay.
01 17 39 05	CC	Apollo 14, Houston.
01 17 39 10	CMP	Go ahead, Houston.
01 17 39 13	CC	Roger. We're waiting for a good OMNI to come up before starting that E-memory dump. One reminder is to complete all dumping before you - try to start the PTC again. And - a question. With respect to the O_2 FLOW HIGH alarms you had yesterday and any that you might have had since, we're wondering if you're doing anything - different than normal procedures as far as the - waste

management overboard drain or any other - outside drains that control O_2 flow high problem. Over.

01 17 39 56 CMP — That's a negative on the - procedures. We're not doing anything unusual there. And, we haven't had any problems today. The O_2 flow you saw a minute ago was when we were pumping up the cabin to 5 7. And - as far as the ones that - we had yesterday, we really don't have that psyched out.

01 17 40 12 CC — Roger, Stu.

01 17 40 29 CC — 14, Houston. We're ready for the E-MOD dump.

01 17 40 35 CMP — Okay, Gordon. VERB 74, and coming at you.

01 17 40 42 CC — Roger.

01 17 41 07 CC — Apollo 14, Houston. We're ready to copy your crew status report and onboard readouts. Over.

01 17 41 24 CDR — Okay. With respect to the crew status, it's excellent. We have a negative medical report. BAT C is 37.0; PYRO A, 37.2; PYRO B, 37.2; RCS A, 87; RCS B, 89; C, 86; D, 88. Now, we've taken it over 41:00:00.

01 17 48 56 CC — Roger, Al. Would you say BAT - C voltage again?

01 17 49 03 CDR — 37.0.

01 17 49 05 CC — Roger. We copy all those.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

01 17 58 05	CC	Apollo 14, Houston. Over.
01 17 58 10	CMP	Go ahead, Houston.
01 17 58 12	CC	Roger. We're within rate limits and looks like a good place to start the roll rates for PTC.
01 17 58 22	CMP	Okay. We're going to hang loose here for a few minutes before we spin it up.
01 17 58 27	CC	Roger, Stu.
01 17 59 13	CC	Apollo 14, Houston.
01 17 59 19	CMP	Go ahead, Houston.
01 17 59 21	CC	Stu, when you do get ready to spin up, let us know before you do, and we'll catch it at a good point to start it and give you a GO. Over.
01 17 59 31	CMP	Okay. That sounds like a good plan. We want to make sure that we've got all the activity quieted down before we spin up.
01 17 59 39	CC	Roger.
01 18 28 40	CMP	Houston, 14.
01 18 28 43	CC	Apollo 14, Houston. Go ahead.
01 18 28 47	CMP	Okay, Gordon. I think we're through with our - all our venting - for the present time. And any time you say, we'll spin up.
01 18 28 56	CC	Okay. Stand by. I guess we want to wait here a little bit.
01 18 29 02	CMP	Okay.
01 18 41 35	CC	Apollo 14, Houston. It looks good now for starting spinup.
01 18 41 41	CMP	Okay, Gordon, we'll give it a go.
01 18 55 44	CC	Apollo 14, Houston.

01 18 55 51 CDR This is 14, go ahead.

01 18 55 55 CC Roger. I'm sorry to have woken you up if you'd dozed off, but we'd like you to check the S-BAND NORMAL MODE VOICE switch, OFF, and try to go on to sleep then.

01 18 56 08 CDR Okay. Stand by.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 02 53 51	CDR	Houston, Apollo 14.
02 02 54 27	CDR	Houston, Apollo 14.
02 02 54 29	CC	Apollo 14, this is Houston. Go ahead.
02 02 54 35	CDR	Good morning, Bruce. We're reading you loud and clear. We've completed our postsleep checklist. We have the readouts for you when you're ready to copy.
02 02 54 46	CC	Roger. Go ahead with the postsleep checklist.
02 02 54 52	CDR	Okay. The checklist is complete. We have the following readings: for dosimeter, Al, 16041, slept 5 hours; Stu, 01038, slept 7 hours; Ed, 05038, slept 6-1/2 hours.
02 02 55 21	CC	Okay, 14. Understand. Al 16041 and 5 hours; Stu 01038, 7 hours; Ed 05038, 6-1/2 hours. Over.
02 02 55 38	CDR	That's correct.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 03 03 10	CC	Apollo 14, this is Houston.
02 03 03 23	CDR	Good morning, Bruce. Go ahead.
02 03 03 26	CC	Roger. I don't want to interrupt your eat period, but when you have a convenient time, I have a - plan update for you. It's a fairly lengthy one. Nothing in the immediate future though.
02 03 03 37	CDR	Okay. Stand by. Roger, stand by for about 5 minutes or so, and be advised we completed the LiOH canister change at 5:00 hours and the LM/command module DELTA-P at 50:59 plus 0.95.
02 03 03 57	CC	Understand 0.95 for the DELTA-P at 50:59.
02 03 04 07	CDR	That's affirm.
02 03 04 12	CMP	Hey, Bruce, I'll take that flight plan update. Proceed.
02 03 04 15	CC	Okay, Stu, here we go. You may want to just get out the flight plan and mark out the items as we go along, or you can copy it down, either way.
02 03 04 27	CMP	No, I'd rather work on the flight plan. You give me the right places to go.
02 03 04 31	CC	Okay. Up through 59:20, that's 59 plus 20, everything is nominal. And from there on, you take the LM/CM DELTA-P vent at 59 hours and 25 minutes and move that up to 59 hours even.
02 03 05 05	CMP	Okay, we'll move the LM/command module DELTA-P vent up to 59 even.
02 03 05 10	CC	Roger. Take the P52 that occurs at 59:45 and move it up 10 minutes to commence at 59:35. Over.
02 03 05 29	CMP	Okay. We'll shoot a P52 at 59:35.
02 03 05 33	CC	Roger. At 60 hours and 20 minutes, you have an O_2 fuel cell purge and a waste water dump listed. We want to move those up to 59 hours and 50 minutes. That's 59 plus 50.

02 03 06 45	CC	You still with me, Stu?
02 03 06 47	CMP	Okay, Bruce, I moved the fuel cell purge. Yes, I was just ... making - getting it all in here, Bruce. Moved the fuel cell purge and the waste water dump to 59:50.
02 03 06 56	CC	Roger. Delete midcourse correction number 3. Over.
02 03 07 05	CMP	Jolly good. We'll strike out midcourse 3.
02 03 07 09	CC	Okay. Now, everything scheduled between the times of 60 plus 55 and 64 plus 10 should be scheduled 1 hour earlier. And if you look at 64 plus 10, the breakpoint there comes after the VERB 48, and we're going to have a write-in that says establish PTC at 63:10, and LiOH canister change comes at the nominal 64:12. Over.
02 03 07 50	CMP	Okay. Let me - -
02 03 07 53	CC	Well - -
02 03 07 54	CMP	- - read this one again, then. Everything from 61 hours to 64:10 is moved up an hour. Is that affirmative?
02 03 08 03	CC	Roger. Starting with the prepared transfer items per LM Activation Checklist and all that stuff.
02 03 08 11	CMP	Okay, we'll move that up 1 hour.
02 03 08 44	CMP	Okay. I've got that. Everything from 61 to 64:10, move up an hour.
02 03 08 50	CC	Roger. Stand by a second.
02 03 09 22	CC	Roger, Stu. At the time of 63:10, following the LM housekeeping activities, reestablish PTC. Over.
02 03 09 50	CMP	Okay, we go to PTC at 63:10.
02 03 09 54	CC	And perform the lithium hydroxide canister change at the nominal currently scheduled time of 64:12, and pick up the normal flight plan timing in sequence afterwards. Over.

02 03 10 23 CMP Okay. We'll change the canister at 64:12 on time and then be back on the flight plan.

02 03 10 32 CC Roger. And I have a 51-hour consumables update for you, if you're ready to copy back at 51 hours.

02 03 10 41 CMP Stand by 1.

02 03 10 58 CMP Okay, let her rip, Bruce.

02 03 11 07 CC How do you read me, Stu? I think we're in the process of changing antennas.

02 03 11 12 CMP I read you 5 square. I'm ready to copy.

02 03 11 15 CC Okay. GET of 51 hours even; RCS total, 84 percent; Alfa, 84; Bravo, 83; Charlie, 84; Delta, 84; H_2 tank 1, 79.3, 79.7; O_2 tanks, 92, 91, 45. Over.

02 03 11 56 CMP Okay, got you at 51 hours; total, 84; Alfa, 84; Bravo, 83; Charlie, 84; Dog, 84; H_2, 79.3, 79.7; O_2, 92, 91, and 45.

02 03 12 15 CC Roger. And you may be interested in knowing that at the present time you are only 20 pounds of RCS fuel below the nominal; so, you're really gaining on it there.

02 03 12 28 CMP I'm sorry, Bruce. You - you busted up; would you start over again, please?

02 03 12 36 CC Roger. With respect to total RCS fuel, you are only 20 pounds below the planned RCS budget at the present time, and you are 2 - -

02 03 12 49 CMP Okay. That's broken up pretty badly. I can read we are 20 pounds below nominal.

02 03 14 17 CC Okay, Stu, how do you read now?

02 03 14 20 CMP Okay. I'm back with you, and I copied the 20 pounds.

02 03 14 24 CC Roger. And that's really closing in on the nominal there. A couple of other items that came up while you were asleep is that we're going to go ahead and exit PTC for the LM housekeeping, since we want to have the TV up for it. And - we'll just go ahead and dump the waste water, anyway; or, wait a minute -

wait a minute, I'll run that by again. We need to dump the waste water, which will ruin PTC; consequently, we're going to come out of PTC for the LM housekeeping and have a good TV attitude to boot. One item is that I believe you went to sleep with 16:20 showing on the DSKY, which was continuously updating during your sleep period; and unless you have strong feelings otherwise, we would rather have a blank display up on the DSKY to keep from cycling the little read switches all the time. And another flight plan item, at 55 hours even or thereabouts, we intend to request another set of photographs of the S-IVB from you using the data acquisition camera and the sextant. We'll have an updated NOUN 88 for you later on. Over.

02 03 15 48 CMP Okay, and say that time again, Bruce.

02 03 15 51 CC Roger; 55 plus 00. Over.

02 03 15 57 CMP Okay, and we'll blank the DSKY.

02 03 16 02 CC Okay. No need to blank it now - -

02 03 16 04 CMP For sleep that is.

02 03 16 05 CC Roger.

02 03 16 06 CMP No, I understand. For sleep - for sleep we'll put it to rest.

02 03 16 10 CC Roger, Roger. And when you all get your breakfast well prepared and you're feeling in a jovial mood up there, why, we'll proceed with the Bruce and Bo show on the morning news.

02 03 16 29 CMP Okay, hang on till we all get tuned in. We sure wouldn't want to miss that.

02 03 16 35 CC It'll be a couple of minutes yet. We just got the paper here, and we're editing it right now.

02 03 16 43 CMP Okay. ... IVB, Bruce; I was thinking about that what you - I could see through the sextant. You know, I had two - it looked like two dim stars in the - in the sextant at that pointing attitude. And, I didn't see any tumbling motion at all on

either one of them. And they were separated probably by - roughly half to three-quarters of a degree; I'd say 0.5 to 0.6 of a degree separation between the two, but I really couldn't see anything that would determine whether I was looking at the S-IVB or a star, a faint star.

02 03 17 36 CC Roger. We copy, Stu - -

02 03 17 38 CMP I really expected the - I guess I really expected the S-IVB to be a little brighter than either one of the two objects that I looked at.

02 03 17 53 CC Okay, stand by a second, please.

02 03 19 26 CC 14, Houston, Stu.

02 03 19 31 CMP Go ahead.

02 03 19 32 CC Yes. We've just received the intelligence down here that your family is having lasagna for your breakfast. Over.

02 03 19 42 CMP Oh, man; that's - that's good timing.

02 03 19 45 CC We thought you'd enjoy hearing about it.

02 03 19 55 CMP There's nothing better for breakfast than lasagna, unless it's a sausage-onion sandwich.

02 03 20 02 CC (Laugh) Very good.

02 03 38 26 LMP Houston. Apollo 14.

02 03 38 30 CC Go ahead, 14.

02 03 38 35 LMP Roger, Bruce. I have a few observations about the light flash experiment that I'd like to pass on, and perhaps you can generate some information from it that might be useful to us.

02 03 38 49 CC Would you stand by a minute, please, Ed.

02 03 38 53 LMP Okay. Standing by.

02 03 39 50 CC Apollo 14, this is Houston. Ed, go ahead with your commentary on the cosmic ray light flashes,

and we'll digest what you've got and give you our views back probably in a couple of hours. Over.

02 03 40 05 LMP — Okay, Bruce. First of all, let me say we all decided to try to dark-adapt, and run the experiment, or at least part of it, last night. I think our experience was that we probably saw one flash after dark-adapting and promptly fell asleep before we saw any more. At least that's true in my case. I think Al and Stu stayed awake a bit longer. However, I think we have seen only three types of flashes so far. What we would probably call a star, a supernova, and a flash - or rather and a streak - and I think that I have seen some - I for - don't recall a name we tagged to them, but reminiscent of the lightning flashing in - in behind the clouds. Those are the only ones that we have really identified, and it takes awhile to realize what you are seeing, because it happens so quickly that it takes a little bit of practice before you can really recognize these things. I think perhaps after watching them for another period or so, we will be a little more experienced at it and be able to do a more creditable job of dark-adapting and getting the sort of data that would be liked. My experience is that even the so-called star, the supernova, are not as clean a phenomena, or clear a picture, as I had in my mind that they would appear. There still - still seem to be at least two flashes; maybe a bright flash, followed an instant later by a more subdued flash, or perhaps a halo-like effect. It doesn't seem to be - there does not seem to be a set pattern in each case. Sometimes it's a very clear single flash. Sometimes it seems followed by a halo; sometimes it seems followed by an adjacent flash. I guess that's about all I have to say at the moment.

02 03 42 28 CC — Roger, Ed. I think we've copied all of that ...

02 03 42 29 CMP — I'd like to add a few - - I'd like to add a few comments on that too, Bruce.

02 03 42 37 CC — Go ahead.

02 03 42 41 CMP — Hey, Bruce. Do you read?

02 03 42 42 CC Roger, 14. Go.

02 03 42 46 CMP Okay, Bruce. I'd like to make - You know, you asked yesterday about whether we saw them before we were dark-adapted. So, last night I took my flashlight and shined it in both of my eyes; and, of course, you know, that should ruin your - any dark-adaption that you would have. And in fact, you know, you got the - the residual glow in your eye for a minute and then closed them and, in one case, less than a minute, I had started seeing the flashes. And on the second time around, I'd say it's probably around 2 minutes before I started picking them up.

02 03 43 30 CC Okay, Stu. And were you seeing - when you started seeing them, did you see a number of flashes? Ed reported, I think he saw just about one before he fell asleep.

02 03 43 40 CMP Well, what we did was we set the timer on 20 minutes, and I heard the timer go off and by that time I had only seen four or five flashes that I could recall. However, at some other periods during the night - That isn't when I did the flashlight routine; that was later on - more toward this morning when I started playing with the flashlight - and I - in one case, I saw one and then followed not too long after that by four or five and then - haven't really picked up any pattern on that. You may see one and then three or four, and you may see one and wait awhile. I can't really - it's a little difficult to time in the dark, you know, and get a feel; and, as far as the types of them - -

02 03 44 32 CC Okay. We're switching antennas, Stu.

02 03 44 34 CMP Three types. However, my super - supernova, there's explosions in one, and very rare; I'll see a - a - a discrete pinpoint of light for a minute, and then the streaks I've noticed are all - what I would consider over at the periphery of my - of my vision. It - it appears that almost all the streaks are right along the edge of my eye, and I get the - get the impression that the majority of these are running, say longitudinal with the axis

of my body. And it seems rare that I see a streak that's right - right in the center of my vision.

02 03 45 29 LMP This is Ed. I'm - I have had a little different experience than Stu has. I don't think that I have seen quite as many streaks as he seems to. But I have seen some that appear to be going from right to left, near the center of the field of vision. However, I have mostly been concentrating on trying to identify the types, as opposed to locating them and getting their frequency. I did observe one right after we started to dark-adapt, about 20 seconds. But nothing after that. And, as I say, I think I fell asleep sometime within a couple of minutes after that.

02 03 46 15 CC Do we have any observations from the Commander?

02 03 46 22 LMP No. He's busy cooking breakfast right now.

02 03 46 24 CC Oh, Roger. And I guess we just went through an antenna switchover; and we've got some news here, if you all ready.

02 03 46 39 CDR I have only one comment. I think the echo of the other - on the light flashes. They do seem to be random, sort of a showery-type pattern. They are visible in a darkened cabin within a very few minutes after turning the lights off - probably as small a time as 1 or 2 minutes. And I've - as far as the characteristics of the flashes are concerned, I've observed about what the other guys have.

02 03 47 06 CC Roger. We copy, Al.

02 03 47 37 CC 14, Houston. Are you interested in some news?

02 03 47 42 LMP Roger. Press on.

02 03 47 48 CC Okay. From the sports world, "Marquette's streaking Warriors continued to hold forth as the Nation's top-ranked college basketball power, Monday while unbeaten Southern California displaced defending champion UCLA in a runner-up spot. Houston, 15 to 3, is a newcomer to the top 20. The Cougars, who play Long Island U in Madison Square Garden Thursday night, move into the number 18 spot. USC and

UCLA will collide Saturday at Southern Cal." Too bad we don't have a TV uplink for you.

02 03 48 30 LMP It'd be pretty nice.

02 03 48 39 CC 14, this is Bo Bobko. How do you read?

02 03 48 42 LMP Good morning, Bo; loud and clear. How are you?

02 03 48 45 CC Just fine, sir. This is Washington, Associated Press. "The Food and Drug Administration said tests on compressed fish products such as frozen dinners, fish sticks, and fish cakes show mercury content well below the danger level. The FDA said Monday, 'More than 80 samples contained an average mercury level of 0.06 parts per million. Under FDA guidelines, fish with a half part per million is withdrawn from the market.' "

02 03 49 19 LMP Seems reasonable to me.

02 03 49 22 CC "The chill blast of a February norther blew into Texas Monday, dropping the temperature sharply after the summer-like weather which closed out last week. January's last day saw temperatures in the 90's in several points in deep-south Texas. And it was one of the dryest months ever back here in Houston - in Texas. The Dallas weather station, for example, measured 0.16 - that's 16/100ths - of an inch of rain against the normal 2.32 inches for January."

02 03 50 00 CC "The Rarest Atom Particle Reported Found," New York, Associated Press. "Physicists from the University of California reported Monday, they have discovered the rarest and the most elusive of the nuclear particles within the atom. They found the particle's track in a photograph of a nuclear interaction, an inch-long footprint it left during its brief lifetime of 15 billionths of a second. The particle is called the antiomega-minus baryon part - antiparticle, the mirror image of matter as we know it on Earth. The discovery is related to the idea that somewhere out there in space there are galaxies made up of antimatter, just as galaxies or star clusters, such as the one we live in, the Milky Way, is made up of matter."

02 03 50 50 CMP Hey, Bo. I think I saw one of those just go by the window.

02 03 50 56 CC Grab it, quick.

02 03 51 00 CC Hey, Stu - -

02 03 51 01 LMP How long did you say the track was that - Bo - how long did they say the track was that they had seen?

02 03 51 09 CC "An inch-long footprint it left during its brief lifetime of 15 billionths of a second," they said. "We had a standing offer of a case of champagne to whoever found it, Goldhaber said. When I get back to the lab I have to deliver."

02 03 51 27 CC Do you think Stu qualifies for one also?

02 03 51 34 CMP Aw, let it get away, Bruce.

02 03 51 38 LMP Hey, that's a pretty great piece of news.

02 03 51 40 CC Okay. "On Wall Street, investors bought heavily on Monday giving the Dow-Jones Industrial Average its highest single-day gain of the year. The Dow-Jones average of 30 industrial stocks closed up at 877.81, up 9.31 points, for the biggest one-day jump in '71. Trading was heavy throughout the session, with the New York Stock Exchange ticker backed up a minute or more several times during the day. The tape was 3 minutes late at the close."

02 03 52 19 CC Washington, UPI. "The administration is considering a pollution tax, such as a levy on emissions of air-polluting sulphur dioxides, in an effort to give industry an incentive to clean up, President Nixon's Economic Report said Monday. The report, prepared by the President's council of economic advisors and sent to Congress under Mr. Nixon's signature, said a tax may be a more effective way to control pollution than direct Government regulation."

02 03 52 52 CC "At 9:03 tonight, the Apollo 14 crew will begin operating under NASA's own version of daylight

savings time. The readjustment of the mission clocks will bring the flight back to the actual real time - parentheses - Greenwich mean time - parentheses - for activities as scheduled in the flight plan. At 9:03 p.m., the flight will be 54 hours into the mission. However, under the nominal flight plan, the 54-hour mark should have been reached at 8:23. To correct this, the crew will move their mission elapsed time clock ahead 40 minutes to coincide with the real-time clock."

02 03 53 37 CC This is by Francis Dobbs, Austin. "A bill creating an upper level college at Clear Lake as a branch of the University of Houston has been approved by the Senate Education Committee. The bill, introduced by Senator Chet Brooks of Pasadena, will create the University of Houston Clear Lake Campus primarily to serve six area junior colleges. A proposed 360-acre campus is adjacent to the Manned Spacecraft Center. The proposed college must be started immediately, Hoffman said, for two reasons. To be of service to San Jacinto Junior College, Alvin Junior College, Brazosport Junior College, Lee Junior College, College of the Mainland, and Galveston Community College and to help limit enrollment at the University of Houston's main campus to 30,000." And then on later it says that the University of Houston Clear Lake would accept students with 56 or more semester hours and would offer degrees to the master's level.

02 03 54 38 LMP That's pretty interesting news.

02 03 54 39 CMP Yes.

02 03 54 40 CC Rochester, New York. "Brooks Robinson, outstanding player in the World's Series with his glove and bat, was named Monday night as winner of the 21st Annual Hickok Professional Athlete of the Year Award. The 33-year-old third baseman of the baseball champion Baltimore Orioles won by a large margin over another veteran, 43-year-old George Blanda, quarterback of pro-football Oakland Raiders. Robinson, who hit 428 in the World's Series and made a series of spectacular fielding plays in the five-game triumph over the Cincinnati Reds, received 62 of the 146 first-place votes by a panel

of sports writers and newscasters." And that winds up the news for this evening down here, this morning up there. Goodnight or morning, Bo.

02 03 55 29 CC I'm going home and have dinner.

02 03 55 35 CDR I thank you guys.

02 03 55 38 LMP Still don't understand that bit about changing the time on the Apollo 14 crew. I can't figure what those guys are doing.

02 03 55 51 CMP Hey, that was a good newscast. You know you're pretty high in the ratings up here.

02 03 55 57 CC Okay. Thank you. Appreciate it.

02 04 02 33 CC 14, this is Houston. When you're configured in a suitable VHF mode for the S-170 bistatic radar frequency check, give us a call; and then, we'll secure the S-band uplink for about 5 minutes on you. There's no great rush involved in this.

02 04 02 52 CMP Okay. We'll start configuring now and give you a call.

02 04 02 55 CC Roger.

02 04 03 22 LMP Roger, Houston. We're configured on the flight plan at 52 hours. Standing by.

02 04 03 29 CC Roger. We're going to go ahead and secure our S-band uplink.

02 04 03 44 CC Belay that, 14. We're going to wait until your rotation in PTC brings us around to the point where we can utilize OMNI Bravo for the frequency measurement. I'll give you a call just prior to our turning off the uplink.

02 04 03 58 LMP Okay, Bruce.

02 04 05 41 LMP Houston, 14. Speaking of daylight saving time, our Sun comes up very regularly every 20 minutes.

02 04 05 48 CC Roger. We copy. That's probably not unreasonable for the small-size planet you're in right now.

02 04 19 07	CC	Apollo 14. This is Houston. We're going to secure the S-band uplink for approximately 4 minutes - 5 minutes at this time. If you need us for anything, just give us a call. We can still receive you. We still have TM, and we would bring the uplink back up. Over.
02 04 19 25	LMP	Roger. You're turning the S-band off now. Is that affirm?
02 04 19 29	CC	Roger. We are turning the uplink portion of the S-band off at the present time.
02 04 19 38	LMP	Okay.
02 04 19 39	CC	Roger. Out.
02 04 27 42	CC	Apollo 14. This is Houston. On S-band, we have the uplink back up. We would like to leave the VHF configured as is, however, until we give you another call about 20 minutes from now. Over.
02 04 29 43	CC	Apollo 14, Apollo 14, this is Houston. How do you read?
02 04 29 49	CMP	You're loud and clear, Bruce; 14.
02 04 29 51	CC	Roger. As you may gather, we have the uplink back up at this time. We'd like to remain in the existing VHF comm configuration until we give you another call, however. That'll be about 20 minutes from now. Over.
02 04 30 05	CMP	Okay. We're easy to get along with. We'll stand by in this configuration.
02 04 30 09	CC	Roger. Out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 04 36 43	CC	Apollo 14, this is Houston. Over.
02 04 36 48	LMP	Go ahead.
02 04 36 49	CC	Roger, Ed. Down at the Cape, there's a Thor Delta with a NATO communications satellite on it that is about 1 minute and 40 seconds from ignition. If you're in such an attitude that you can view the Cape, you might try a P22 and pick it up in the sextant. Latitude, 28.5; longitude, over 2, 45.5. I say again, 28.5 and 45.5. That's your option. Over.
02 04 37 26	LMP	Okay. I don't think we're going to be around in time. Al's looking at the Earth out the window 5 right now.
02 04 37 33	CC	Okay. Maybe you could try the monocular. But that probably doesn't hold much hope.
02 04 37 40	LMP	Okay. - -
02 04 37 41	CC	You want me - -
02 04 37 42	CMP	Yes, he's got the monocular out now and that's 28.5.
02 04 37 45	CC	Roger. 28.5 latitude - -
02 04 37 46	CDR	Say again those coordinates - -
02 04 37 48	CC	Latitude, 28.5; and longitude over 2, 45.5.
02 04 37 55	CMP	Okay. 28.5, 45.5. We'll try it. And Al's looking with the monocular now.
02 04 38 03	CC	Roger. Longitude over 2 is negative 40.5; negative 40.5.
02 04 38 12	CMP	Okay, minus 40.5.
02 04 38 34	CC	Okay, Stu; 3, 2, 1, ignition, down at the Cape.
02 04 38 46	CMP	Okay. I - I didn't get the optics on; the Earth wasn't quite around. It just went out of the number 5 window just before you come.

02 04 38 59	CC	Roger. We just thought we'd send the info up, in case you happened to be in a handy attitude.
02 04 43 42	CC	Apollo 14, this is Houston.
02 04 43 47	CDR	Go ahead.
02 04 43 48	CC	Roger, Al. We thought you might be interested in knowing that we have a Dr. House down here at the Surgeon's console for a few minutes watching the progress of the mission.
02 04 44 03	CDR	Good evening, William. Glad to have you aboard.
02 04 44 07	CC	He's waving back.
02 04 44 13	CDR	Tell him everything is fine, Bruce.
02 04 44 17	CC	He Rogers that.
02 04 56 59	CC	14, this is Houston. We've concluded the VHF measurements. You can turn VHF RANGING, and the VHF switches, OFF.
02 04 57 11	CDR	Okay, thank you.
02 05 11 34	CMP	Okay, Bruce, did you get the torquing angle?
02 05 11 37	CC	That's affirmative, Stu. And do you have a time for us?
02 05 11 46	LMP	Hello, Houston; 14.
02 05 11 51	CC	14, this is Houston. Loud and clear. We have your torquing angles. Do you have the time for us?
02 05 12 00	CC	Apollo 14, Apollo 14, this is Houston; can you read?
02 05 12 06	CMP	Okay, read you loud and clear, Bruce. Did you have lockup? Did you get the torquing angles?
02 05 12 12	CC	Roger; we've got the torquing angles. Do you have a time at which you torqued for us?
02 05 12 18	CMP	Roger; that was 53 plus 11 plus 30.

02 05 12 23 CC Roger. Out.

02 05 30 39 CC Apollo 14, this is Houston. We'd like to get battery Bravo on CHARGE now. Over.

02 05 30 46 CDR Okay. Will do. Battery Bravo.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 06 34 45 CC Apollo 14, this is Houston. Over.

02 06 34 51 LMP Go ahead.

02 06 34 53 CC 14, Houston. I've got a string of pads here for you, starting off with our flight-plan update and then a little later a T_{ephem} update and two maneuver pads. When you're ready to copy, let me know.

02 06 35 10 LMP Roger, Bruce. Some figures here - we're just finishing up on the experiments. We'll be ready in a minute.

02 06 37 54 CDR Houston, Apollo 14 is ready to copy.

02 06 38 00 CC Roger, 14. On the flight-plan update, at 55 plus 40 PGET LOU, we'd like to perform some more S-IVB dim-light photos while in PTC using P52 with the following NOUN 88 unit vectors. Now - Stand by.

02 06 38 45 CC 14, this is Houston. How do you read?

02 06 38 53 CDR Okay. We're reading loud and clear.

02 06 38 57 CC Okay. Did you copy any of that?

02 06 39 03 CDR Just how do you read us; that's the first part we got.

02 06 39 06 CC Any of the flight-plan update?

02 06 39 12 CDR Negative. We haven't ...

02 06 39 41 CDR Houston, 14. We're not reading you.

02 06 39 44 CC Okay. How now, 14?

02 06 39 48 CDR Okay, go ahead.

02 06 39 49 CC Beautiful. All right, flight-plan update at 55 plus 40 PGET LOU, perform S-IVB dim-light photos while in PTC using P52 with the following values for NOUN 88. R_1: minus 47607, minus 79244,

minus 38131. Camera procedures and film magazine will be identical to those for the Earth dark-side photos. The S-IVB should be visible in the sextant between roll angles of 078 degrees down to 005 degrees. Over.

02 06 40 55 CDR — Okay. At elapsed time of 055:40, we will again take the S-IVB photographs in the P52, NOUN 88, minus 47607, minus 79244, minus 38131, using camera magazine and Earth side - Earth dark-side photographs. The sextant roll angles including 078 down to 005.

02 06 41 26 CC — Roger. Readback correct. And that 55:40 time is the post-GET lift-off update time and - we're preparing to give you a lift-off time update now.

02 06 41 40 CDR — Understand. That's the new time.

02 06 41 42 CC — Roger.

02 06 42 10 CC — 14, Houston. T_{ephem} update. Over.

02 06 42 16 CDR — Go ahead.

02 06 42 18 CC — Roger. T_{ephem}: OID 03, 00006; identifier 04, 35223; identifier 05, 16020. The DELTA in time is 40 minutes 02.9 seconds added to GET and subtracted for a T_{ephem}. Over.

02 06 43 03 CDR — Okay. The update identifier 03 is 00006; identifier 04, 35223; identifier 05, 16020, the DELTA-T, 40 minutes 02.9 seconds, add to GET.

02 06 43 24 CC — Houston. Roger. Out. And I have an update to your lift-off plus 60 pad.

02 06 43 41 CDR — Okay, go ahead.

02 06 43 43 CC — Okay. On P37 lift-off plus 60, 060:00, 5381, minus 165, 117:00. Over.

02 06 44 07 CDR — Roger. GETI is 060:00, 5381, minus 165, 117:00.

02 06 44 19 CC — Readback correct. I have a change to the previously passed SPS/G&N flyby pad P30 for you. Over.

02 06 44 33 CDR Okay. Go ahead.

02 06 44 34 CC Roger. The time of T_{ig}, NOUN 33 should be 077:39 minutes 34.44 seconds, and down at the bottom of the pad, GET of .05g should be 165:52:28, and both of these last pads assume the GET update. Over.

02 06 45 07 CDR Okay. NOUN 33 of the LOI minus 5 is 077:39:34.44 and GET is 0 - .05g, 165:52:28. The rest remains the same.

02 06 45 27 CC Roger. Readback is correct.

02 06 45 44 CC 14, Houston. We observe you're in POO. If you can give us ACCEPT, we will send you a state vector update to improve your pointing accuracy for the S-IVB photography and a lift-off time update to adjust the GET in accordance with the pads that we've passed you. Over.

02 06 46 03 CDR Okay.

02 06 46 23 CC And, 14, we're going to hold off for a few minutes here on the uplink until we get a good antenna switchover and then we'll be coming at you.

02 06 46 34 CDR Roger. Understand.

02 06 47 09 CDR Houston, Apollo 14. The metal composite specimen number 4 has been cooked and cooled and recorded.

02 06 47 18 CC Thanks a lot.

02 06 53 56 CC 14, this is Houston. The uplink is completed. I expect you'll want to reset your mission timers.

02 06 54 06 CDR Okay. We'll do that. And we'll also call 17 06 so you can look at T_{ephem}.

02 06 54 13 CC Okay. Thank you.

02 06 57 41 CDR Houston, Apollo 14. Would you check R_3 T_{ephem} for us?

02 06 57 47 LMP My update was 16020.

02 06 57 54 CC Okay. Stand by. Be glad to -

02 07 06 35 CC Apollo 14, this is Houston. Over.

02 07 06 38 CDR Go ahead.

02 07 06 40 CC Okay. I've got a few words on the T_{ephem} situation. Probably the most significant - -

02 07 06 49 CDR Go ahead.

02 07 06 50 CC - - Probably the most significant part of the whole discussion is that both values of T_{ephem} are correct, and the way that they arrive at this is as follows. The left-hand-most digit of the octal representation of T_{ephem} is coded to include a sign. If you break the left-hand-most digit down into the 3 binary bits, the first bit being zero represents positive. The first bit being a one represents negative. In the value of T_{ephem} update on the pad, you'll notice that in the R_3 load it was 16020 which is a positive 16020. In the value that you read out of the command module computer, you will notice that R_2 was one least significant digit larger than the pad value, that is, 35224. An R_3 having the left-hand-most digit of 5 was, in reality, equal to a minus 16017, which is then subtracted from the one-digit-larger value of R_2. Does that make sense to you all? Over.

02 07 08 26 CDR Affirmative. In other words, you want us to leave the loads the same.

02 07 08 28 CC Roger. Either load is correct. The command module computer does not force a positive sign or a negative sign on the octal value but accepts whatever it happens to come up with. So either load is correct. Over.

02 07 08 46 CDR Okay. Assuming we have no more updates, how would you like us to update the T_{ephem} into the LM - Using the 1706 values?

02 07 09 21	CC	14, this is Houston. I'll catch you when signal strength comes back up.
02 07 09 27	CDR	Okay.
02 07 12 13	CC	14, this is Houston.
02 07 12 16	SC	Go ahead.
02 07 12 18	CC	Roger. Back on the question of which set of T_{ephem} to load. You can load either one in the LM. If you want a recommendation, we recommend the - the pad value, but either one would be satisfactory. Over.
02 07 12 40	CDR	Okay. We'll call 1706 when we make our load. Thank you.
02 07 12 44	CC	Roger.
02 07 17 21	CMP	And, Houston; 14.
02 07 17 24	CC	Go ahead, 14.
02 07 17 28	CMP	Okay, Bruce. We've got something in the sextant with those angles. It could be the S-IVB. It's right off to the edge in the sextant field of view and being tracked by the CMC on those angles. And I'll look at it again on the next pass, and then - take some pictures of it after that.
02 07 17 49	CC	Okay, Stu. Very good. Could you tell that the object was tumbling, or anything like that, do you think?
02 07 17 57	CMP	I'll - I'm going to look at it again.
02 07 18 04	CC	Roger.
02 07 18 48	CC	14, this is Houston. For your information, the major tumble motion now has a period of 5 minutes and 46 seconds on the S-IVB. Over.
02 07 19 02	CMP	Okay. Thank you.
02 07 36 36	CMP	Houston. 14.

02 07 36 39 CC All right. Go ahead, 14.

02 07 36 44 CMP Okay. Yes. You really got the S-IVB boresighted with those angles. Now, the other cycle around - I picked up a star that's also in the field of view, and the S-IVB is tumbling, and you can see it right at the start when it comes in on this one, and then it disappears and comes back in right toward the end. So we're definitely locked in with those pointing angles; it's got the S-IVB right near the center of the sextant, and what I picked up the first time around evidently is a star, and it's over toward the edge of field - of the field of view.

02 07 37 28 CC Okay. And - understand you're going to try to see that the next time around, huh?

02 07 37 35 CMP Yes. We'll try to get some pictures - I guess I'll try to - I think I'll look at it one more time and try to get a time frame or roll angle where it's visible in the sextant and then try to take the pictures at that time.

02 07 37 54 CC Okay. It - that sounds good. It isn't going to be going anywhere.

02 07 37 59 CMP Okay. No, we'll be hanging around here for a while.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 07 40 03	LMP	Houston, 14.
02 07 40 07	CC	Go ahead, 14.
02 07 40 11	LMP	I just wanted to say good morning, Fred. Haven't talked to you today.
02 07 40 15	CC	Well, good morning. Isn't quite good morning yet.
02 07 40 58	LMP	Houston, 14.
02 07 41 00	CC	Go ahead, Ed.
02 07 41 04	LMP	Hey, Fredo, remember yesterday I was talking about the oil-canning effect of the heat contracting and - the heating and cooling of these panels.
02 07 41 18	CC	Roger.
02 07 41 22	LMP	And remember you said it looked like same thing that - that was happening to LM-7?
02 07 41 28	CC	That's affirm.
02 07 41 31	LMP	Okay. I just wanted to let you know that I think our oil-can wrinkles are prettier than LM-7's oil-can wrinkles.
02 07 41 40	CC	Okay.
02 08 02 05	CMP	Houston, 14.
02 08 02 09	CC	Go ahead, 14.
02 08 02 13	CMP	Hey, Fred, just for curiosity sake, how far away is the S-IVB?
02 08 02 18	CC	Stand by, Stu.
02 08 09 27	CC	14, Houston.
02 08 09 31	CDR	Go ahead.
02 08 09 34	CC	Do you have any estimate of how far the S-IVB is away there, Stu?

02 08 09 45	CMP	Stand by 1.
02 08 11 34	CMP	Hey, Fred; Apollo 14.
02 08 11 37	CC	Go ahead.
02 08 11 41	CMP	Okay, after looking through the optics and judging the size and its relative motion through the celestial sphere, I'd estimate it at 2178 miles from us.
02 08 12 00	CC	Well! You might replace the rendezvous radar yet. The number they gave me was 2400 nautical miles. And it has an R-dot going away about 1 nautical mile a minute.
02 08 12 17	CMP	Okay.
02 08 34 55	CC	Apollo 14, Houston.
02 08 35 02	LMP	Go ahead, Houston.
02 08 35 04	CC	Okay. Have you verified the ATT SET switch in GDC?
02 08 35 28	LMP	Okay. It's verified there, Houston.
02 08 35 31	CC	Roger, Ed.
02 08 49 05	CC	Apollo 14, Houston.
02 08 49 10	CMP	Go ahead, Houston.
02 08 49 11	CC	Okay. If you can give us POO and ACCEPT, we'll pump up a CMC clock update.
02 08 49 20	CMP	Okay, POO and ACCEPT.
02 08 52 04	CC	Apollo 14, Houston. The computer's yours.
02 08 52 08	CMP	Okay, thank you.
02 08 53 04	CC	14, Houston.
02 08 53 14	LMP	Go ahead, Houston.
02 08 53 15	CC	Okay, FAO would like to know about when Stu took the S-IVB pictures and how much - you got remaining on that sequence camera MAG.

02 08 53 30	LMP	Okay, just stand by 1.
02 08 53 49	CMP	Okay, Fred. I took them in sort of reverse order but using pretty much the same procedures as that dim light. However, I think I'm going to end up with streaks on the film because you know the way the CMC tracks the objects; but at 57 hours even, I took - I ran 2 seconds at 24 frames per second, 5/100th. Then I took one frame at 1/60th for 20 seconds, one frame at 1/60th for 5. And then at 57:20, I took one frame at 1/60th for 50 seconds and had to cut it off there; I couldn't get a full minute. And then ran off another strip, and I'm calling it 78 percent left on the magazine.
02 08 54 39	CC	Okay, Stu. I copied all of that; thank you.
02 08 54 48	CMP	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 09 11 41 CC Apollo 14, Houston.

02 09 11 47 CMP Go ahead, Houston.

02 09 11 51 CC Got a little configuration change for you on panel 226. We'd like to get O_2 TANK 50-WATT HEATER, number 3, MAIN A, open.

02 09 12 11 CMP Okay. Let's run that again now. It's O_2, the 50-WATT HEATER on O_2 TANK 2.

02 09 12 18 CC Negative. O_2, 3, MAIN A. 3 MAIN A, Stu. And the reason is, they want to look at a couple of cycles - with just two elements of the heaters going rather than three.

02 09 12 38 CMP Okay. So on O_2 TANK 3, we pull the MAIN A 50-WATT HEATER.

02 09 12 48 CC That's affirm. And we'll stay with that configuration through the evening, so they can get at least three or four cycles on it.

02 09 13 02 CMP Okay.

02 09 34 17 CC 14, Houston.

02 09 34 26 LMP Go ahead.

02 09 34 28 CC Okay. There's a request from down here to run through a little four-step exercise in having Al check his electrode leads and see if we can find anything early here, so we got time to do something about it before you'll get around to the suiting up part of it. And I guess that's at Al's convenience in the next few hours, whenever he thinks he can work it in, maybe.

02 09 35 07 LMP Okeydoke. We're finishing up lunch right now. Let Al think it over and see when he wants to try to do it.

02 09 35 12 CC Okay.

02 09 43 25	CC	Apollo 14, Houston.
02 09 43 39	LMP	Go ahead, Houston.
02 09 43 41	CC	Okay. We're ready to terminate charge on battery B.
02 09 43 48	LMP	Okay, Fredo.
02 10 03 10	CDR	Houston, 14.
02 10 03 17	CC	Okay, 14, stand by 1 until I get a little better comm. I - I can hardly read you now.
02 10 04 28	CC	14, Houston. How do you read now?
02 10 04 34	CDR	Okay, read you loud and clear. This is Al. I understand you - you're still having a problem with my sensors.
02 10 04 42	CC	Negative, Al. The situation is - you did have the problem for launch, and then it mysteriously went away. And what they'd like is a visual inspection of the gear to see if we have anything that looks abnormal that we might think about fixing at this time, rather than wait until just before suit-up time, where we'd like to not fiddle with anything.
02 10 05 17	CDR	I have - I've checked all the sensors, Fredo. They all seem to be firmly in place. They don't appear to have moved. I did have some garble in the gober cable at one time, and that has been changed and now you can compare gober cables. That might have made the difference. I can switch back to that and take a check on that one if you want to.
02 10 05 39	CC	No, that - I don't think that's necessary. I might just tell you what they had in mind here and see if you - kind of covered all of the - the places they wanted you to check. Around each of the electrodes, they wanted to know if you had any of the paste that appeared to leak out that you could see stain under the large round pieces of tape you got over them, was the first item. Then, another inspection thing was to look at the solder joints, that's the areas that had the little plastic sleeves over them, to see if you could see anything

that appeared to be cracked or coming loose in there. And I guess the last inspection item was the - in your biobelt to check that the top and bottom connectors on the blue - the little blue EKG signal conditioner was all tight.

02 10 06 48 CDR Okay. We have one that appears to have leaked a little bit. It's the bottom one on the sternum.

02 10 06 57 CC Okay, the bottom one on the sternum. Okay, and I guess the only other square, which should be pretty easy to fill here, Al - he's looking at your data now - is to sequentially put some firm pressure on each of the three sensors for about 10 seconds, giving a call down when you're applying the pressure.

02 10 07 31 CDR Okay. Understand you're ready now?

02 10 07 35 CC That's affirm. They're looking at your data now.

02 10 07 41 CDR Okay, in the top section of the sternum, I am pressing down the one closest to the right shoulder, now.

02 10 07 47 CC Okay.

02 10 07 50 CDR And I'm releasing on that one, now.

02 10 07 54 CC Okay.

02 10 07 55 CDR On the top of the sternum, I'm pressing down the center one, now.

02 10 07 59 CC Roger, Al.

02 10 08 02 CDR And releasing now.

02 10 08 03 CC Okay.

02 10 08 04 CDR Okay. And the bottom - on the bottom of the sternum, the one who appears to have leaked a little bit, I'm pressing down, now.

02 10 08 15 CC Okay.

02 10 08 17 CDR And releasing, now.

02 10 08 20	CC	Roger.
02 10 08 22	CDR	...
02 10 08 29	CC	Okay. I think that fills all the items I got here, Al.
02 10 09 34	CDR	Okay. This is Al, Houston. Understand that we're cleared to continue with the present harness and cable configuration.
02 10 09 49	CC	Yes. For the time being that - that's the word, Al. But they're going to look at the data. I guess the bottom one you pushed on showed more change than the others, and I - they're going to look at it awhile and decide if they want to do anything about that bottom one, I guess.
02 10 10 10	CDR	Okay.
02 10 13 38	LMP	Houston, 14.
02 10 13 49	CC	14, Houston.
02 10 14 03	LMP	Houston, Apollo 14.
02 10 14 04	CC	14, Houston. I can barely make you out there. Go ahead.
02 10 14 31	CC	Okay, 14. Houston. You should be all right now. Go ahead.
02 10 14 38	LMP	Okay, Fredo. Inquiring about the LM/command module DELTA-P pass at 59 hours, is that number 2.7 still good since we have already been in the LM and had a problem with our probe?
02 10 14 58	CC	Stand by 1.
02 10 15 32	CC	14, Houston. The answer is the 2.7 number is a good one.
02 10 15 40	LMP	Roger. Roger.
02 10 25 47	CDR	Apollo 14. We have the null bias check, if you're ready to copy.
02 10 25 53	CC	Okay. Go ahead, Al.

02 10 25 57 CDR At the end of the 100 seconds, it was reading minus 98.9.

02 10 26 08 CC Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 10 50 01 CDR Houston, 14. O_2 heaters configured per flight plan?

02 10 50 06 CC Roger, Al.

02 10 58 42 CC Apollo 14, Houston.

02 10 58 48 CDR Go ahead, Houston.

02 10 58 49 CC Okay, Al. First, we got some words for you on the - replacing this lower ECG sensor, and it'll be just taking it off and cleaning it and replacing the same one.

02 10 59 08 CDR Okay.

02 10 59 09 CC Okay. The materials that you're going to be needing are all in the medical kit over in R-8, and what you'll need is one of those large pieces of tape and one of the rings - rings that fit on the sensor. And the paste that's in the plastic bottle. And all these are in the kit.

02 10 59 32 CDR Okay.

02 10 59 35 CC Okay. And you can do this at your convenience, Al. There are just a couple of things that we wanted to make sure you get cautioned on. I'll go ahead and go through the procedures here and if there's anything that you want gone over again, well, just holler. First, remove the tape and the sensor, and clean your skin with one of the wet wipes. And then wipe the paste from the inside of the sensor. Wipe the sensor itself out first, and then pull off the old piece of tape. That's that double stickyback. It looks like that round, double stickyback Scotch tape. Pull that off after you've cleaned the sensor out. Then take the new ring, and pull off one of - one of the pieces of cardboard on the ring, and put it on and leave the other side covered. Then put the - then put the paste in the sensor. And after you've got the paste in there level, pull the other side off so that its stickyback is showing and put it back on your - put it back on your skin then.

02 11 00 51	CDR	Okay. I understand. I'll give you a call if I have any questions. That sounds pretty good.
02 11 00 56	CC	Okay.
02 11 01 14	CC	14, Houston.
02 11 01 19	LMP	Go ahead.
02 11 01 20	CC	Okay. We'd like you to put off doing the water dump. In a little bit here, I'll have the flight-plan update with some instructions to shoot some pictures when we have you do that.
02 11 01 38	LMP	Okay. You caught me just in time. I was on my way to the dump valve now.
02 11 01 42	CC	Read your mind, Ed. Which dump was that? - -
02 11 01 47	CMP	Okay. Did you get the torquing angles, Houston?
02 11 01 51	CC	We got them.
02 11 01 55	LMP	Okay. I trust you're going to put if off until after we've finished with the LM and the TV show, et cetera. Is that right, Fredo?
02 11 02 02	CC	Yes. I think the pictures they're wanting are from the LM side.
02 11 02 09	LMP	Okay.
02 11 02 14	CMP	And Fred, the time on that torquing was 59:41:10.
02 11 02 21	CC	Okay. 59:41:10.
02 11 02 25	CMP	Roger.
02 11 09 51	CC	14 to Houston.
02 11 09 55	LMP	Go ahead.
02 11 09 57	CC	Hey, I got a flight-plan update for you here and a whole bunch of words on shooting the water from the LM.
02 11 10 10	CMP	Okay, go ahead. I'm ready for the flight-plan update.

02 11 10 13	CC	Okay. At 60 hours and 40 minutes where you've maneuvered a TV attitude, we need to change the roll angle to 069; and as a result of that, we also change the HIGH GAIN angles to minus 66, PITCH; and YAW, 105.
02 11 10 50	CMP	Okay, Fred. I got the HIGH GAIN angles of a minus 66 and 105; and say the new attitude for TV.
02 11 11 00	CC	Okay, it's - the only thing changed is the roll angle to 069, so it will be 069, 090, 000.
02 11 11 12	CMP	069, 090, 000; minus 66, 105.
02 11 11 19	CC	Okay. Now - now some words on the water dump. Like to delay the waste water dump to 62 hours and 30 minutes rather than the 59:50 that it had previously been set at.
02 11 11 44	CMP	Okay, I got it. Waste water dump at 62:30, and say after that.
02 11 11 49	CC	Okay, the after that was just a scratch out the 59:50 you had before. Now some words on the - -
02 11 11 58	CMP	Okay.
02 11 11 59	CC	- - on the camera operation. Al and Ed should take over to the LM with them magazine F out of the B-8 cushion and borrow your 18-millimeter lens out of the command module.
02 11 12 29	CMP	Okay, and they'll take magazine F out of B-8 and I guess I'll let them borrow my 18 millimeter to take in the LM.
02 11 12 38	CC	Okay, just might make sure they give it back to you. But when they get it over there they can stick it on the LM deck and - -
02 11 12 47	CMP	They'll have to sign a receipt.
02 11 12 50	CC	- - Yes. And put the following settings required on the LM deck. f/8, 1/250th, 11 feet, and 24 frames a second.

02 11 13 13	CMP	Okay, put the 18 millimeter on the LM deck and set her up f/8, 1/250th, 11 feet, and 24 frames per second.
02 11 13 22	CC	Okay. And to run the camera, of course, they're going to need the SEQUENCE CAMERA circuit breaker closed, and that actually fits in pretty well if they just do all this business right where that's called out on page 116, step 9, of the Activation List.
02 11 13 54	CMP	Okay. They'll need the SEQUENCE CAMERA circuit breaker in and we're talking about page 116, step 9.
02 11 14 03	CC	Roger. And if that doesn't quite aline with the flight-plan time I give you, that 62:30, it isn't going to matter that much anyway.
02 11 14 14	CMP	Okay.
02 11 14 15	CC	Okay. Now they need a cue from you, Stu, to let them know when you're going to start the dump. And what they'd like them to do is have the camera pointing through the docking window of the LM, the upper window, right at the vent and run it 20 seconds' worth at 24 frames.
02 11 14 48	CMP	Okay. They'll boresight on the vent and run her 20 seconds at 24 frames.
02 11 14 54	CC	Okay, then they'd like to change the frame rate to one and run the camera for another 20 seconds.
02 11 15 15	CMP	Okay. Change to one frame per second and run 20 seconds.
02 11 15 21	CC	Okay. After that chore, they can rest a while and wait until you get down to the end of the water dump, Stu, and you can kind of give them the word when you're ready to shut her off. And then they'd like them to shoot the vent again at 24 frames a second for 10 seconds.
02 11 16 03	CMP	... vent ...
02 11 16 10	CC	Stand by 1, Stu, we got pretty bad comm now.
02 11 17 37	CC	And, Stu, how do you read me now?

02 11 17 42	CMP	Loud and clear, Fred.
02 11 17 46	CC	Okay. We left off with them shooting 24 frames for 10 seconds when you turn the valve off.
02 11 17 56	CMP	That's affirmative.
02 11 17 57	CC	Okay. Then they're to change the frame rate to one frame per second and run the camera for at least 60 seconds or until cloud particles are no longer visible. But I guess if neither of those two events happen in that time, they're not to run it longer than about 180 seconds' worth.
02 11 18 33	CC	In other words, they're trying - they'd like to get a picture of the last drop distances.
02 11 18 51	CMP	Okay. They'll change to one frame per second for at least 60 seconds or until no vent, and max time will be 180 seconds.
02 11 18 59	CC	Yes, that's it. Then the only thing else is, you can frisk them when they get back and make sure they got your 18-millimeter lens and the MAG F back across, and they should put the 10 millimeter back on the LM camera.
02 11 19 18	CMP	Roger. I'm having Al sign a receipt for the command module property in here before it leaves.
02 11 19 24	CC	Okay.
02 11 19 45	CC	And, 14, we're going to have site changeover here directly. We may lose you for a minute or so.
02 11 19 53	CMP	Okay.
02 11 31 58	CC	And, 14; Houston. Radio check.
02 11 32 04	CDR	Loud and clear. How me?
02 11 32 08	CC	Okay. I guess we've successfully did the switchover.
02 11 35 24	CMP	Houston, 14.
02 11 35 29	CC	Go ahead, Stu.

02 11 35 33 CMP Okay, Fred. I'd like to question you here, since we've had this change in the flight plan, about going to the WIDE DEAD BAND here. If I do that, then it'll be another maneuver back to start the PTC, where if I stay NARROW DEAD BAND, I could be damping the rates when I got ready to start the PTC. Would you smoke that over there and see what you think about that?

02 11 35 59 CC Okay. Stand by, Stu.

02 11 46 05 CMP Houston, 14.

02 11 46 09 CC Stand by, 14, until we get a little better comm.

02 11 47 33 CC 14, Houston.

02 11 47 38 CMP Go ahead, Houston.

02 11 47 40 CC Okay, I thought I heard you call a while ago.

02 11 47 46 CMP Houston, do you read 14?

02 11 47 47 CC Okay. I'm reading you about 3 by 3. Go ahead with your message.

02 11 47 57 CMP Hello, Houston. Do you read 14?

02 11 48 12 CMP Houston, do you read 14?

02 11 48 15 CC 14, Houston.

02 11 48 23 CDR Okay, Fredo. We read you loud and clear.

02 11 48 24 CC Okay. We got good signal strength again here.

02 11 48 31 CDR Okay. You're coming in now.

02 11 48 35 CMP Okay, Fred. I didn't hear back from you and I wanted to get to the roll on this time around because it'll be too late the next one. So I'm going to go ahead and go in the NARROW DEAD BAND. It looks to me like it would be - we'd save gas that way.

02 11 48 53 CC Okay. He was still trying to crank out some numbers to compare there, Stu.

02 11 49 10	LMP	Fredo. You've faded out again. We've lost you.
02 11 49 15	CC	How do you read now?
02 11 49 31	CC	14, Houston. How do you read?
02 11 49 53	CC	14, Houston. W'd like OMNI Alfa.
02 11 50 21	CC	And - Houston, 14. How do you read now?
02 11 50 28	CMP	Houston, this is 14. You're loud and clear.
02 11 50 31	CC	Okay. The NARROW DEAD BAND looks like it'll save you a little gas there, Stu.
02 11 50 39	CMP	Okay. I didn't hear back from you so I wanted to catch the roll this time around. So I went ahead and went NARROW.
02 11 50 47	CC	Okay.
02 11 50 53	LMP	Houston. I'm on the HIGH GAIN right now. How do you read?
02 11 50 56	CC	Loud and clear, Ed.
02 11 51 01	LMP	How's your PCM?
02 11 51 12	CC	Okay. They say it looks good.
02 11 51 17	LMP	Okay.
02 11 52 14	LMP	Houston, 14.
02 11 52 17	CC	Go ahead, Ed.
02 11 52 21	LMP	At this HIGH GAIN ANTENNA setting - I can - it will not switch over to NARROW DEAD BAND; apparently. I have as much signal strength at MEDIUM as I do in NARROW.
02 11 52 35	CC	Okay. We'll think about that.
02 11 52 56	CC	Okay, 14; Houston. They'd like for you to stay in NARROW.
02 11 53 05	LMP	Roger. That's where I am.
02 11 59 32	LMP	Houston, 14.

02 11 59 34 CC Go ahead.

02 11 59 39 LMP Roger. We're in the process of pressurizing the LM now, as you can probably see. We're holding for the integrity check at this point. I have the television set up and I can turn it on at your command.

02 11 59 56 CC Okay, Ed. Stand by on the TV; we'll see if they're ready.

02 12 00 05 CC Okay. They're all set up, Ed; you can turn it on any time.

02 12 00 12 LMP Houston, I'm transmitting.

02 12 00 35 CC Okay. We got the picture, Ed.

02 12 00 40 LMP Roger, Houston. You should be able to recognize it. There's the Commander's number 1 window. There's its field of view at the moment. And Alan is up in the tunnel working the pressurization procedure. Stuart is coming up from under the Commander's seat - you can see his head starting to come into the field of view now - from stowing items down under the seat. Let's see if I can get a little better picture here for you.

02 12 01 23 CC Yes. Stu's head looks pretty good in color there.

02 12 01 37 CMP You mean that color wheel can handle red, Fredo?

02 12 01 43 CC Yes. It seems to be doing a pretty good job there. I noticed some speckles on the window there. Is that - did y'all end up with a little debris on there?

02 12 01 54 LMP We have a few ice crystals, apparently, that have adhered to it from the various dumps we've made.

02 12 02 01 CMP You know, Fredo, that window was clean as all get out until we started all the dumping.

02 12 02 19 LMP Houston. We're continuing the pressurization procedure. We've just opened up the pressurization valve between the two spacecraft. And we're flowing into the LM from the command module. Give

you a picture if you can see it here. There's our cabin pressure gage, shows your quantity as well. Let's see if I can get it in view.

02 12 02 56 CC — A little dark and out of focus there right now, Ed.

02 12 03 02 LMP — Yes. It's a little too close.

02 12 03 14 CC — Yes. That's a little better, I can now see the - your little card there showing the antenna patterns. But the needles on the gage is a little hard to read.

02 12 03 41 LMP — We'll give up on that, Fredo. Our pressure is equal between the command module and the LM, and we will start removing tunnel hardware at this point.

02 12 04 50 CC — Okay.

02 12 05 15 LMP — And, Houston, we're starting to shoot up into the tunnel here where - Alan Shepard is starting to pull the hatch out - if I can get him to look down for a minute and say hello to the world.

02 12 05 29 CC — Okay, Ed. I can see a form there that I guess is Al. It's - this picture is just a little bit dark. You can see the lights up in the tunnel.

02 12 05 42 LMP — Roger. I think we'll have just a little bit more light once this hatch gets out of the way. We have all of our floodlights on full right now. While they're doing that, let's slide out to the CDR's window and take a look at the Moon, which happens to be right out the window.

02 12 06 19 LMP — Going to coach me a little bit, Fred, as I approach this?

02 12 06 24 CC — Okay, we can see it now; it's right down in the lower right quadrant of the window. The picture, though, we're seeing is a crescent, and it's really not showing too much of the detail, Ed.

02 12 06 54 CC — Okay. Assume you're zooming the camera now, Ed. And we lost the picture of the Moon.

02 12 07 05	LMP	Okay. Let me try it again.
02 12 07 20	CC	Okay. I think what happened when you zoomed, Ed, you ended up pointing above it.
02 12 07 41	LMP	Do you see anything now, Fredo?
02 12 07 43	CC	Okay, it just disappeared out the lower right corner. We had it there for a little while.
02 12 07 55	LMP	Okay. How now?
02 12 07 59	CC	Okay. There, it barely came in the bottom portion of the picture now. Whereabouts is the terminator now? Is that about Tranquility, somewhere in there?
02 12 08 13	LMP	It's past Tranquility, and I think it's - it's approaching zero longitude at this point, I believe.
02 12 08 25	CC	Okay.
02 12 08 26	CMP	A few hours ago we just passed Delta 'Tegnius [?], Fred.
02 12 08 36	CC	Yes. Right, Stu.
02 12 08 41	CMP	Roger. It - I was looking through the sextant there just a minute ago. It - all of Descartes - around Descartes and the Highlands showed up real well and the terminator had just moved on over just past Platte [?].
02 12 09 02	CC	Okay. And for your information, in the audience in the back here, we have most of the family in tonight - this morning down here, I should say.
02 12 09 15	CMP	Yes. 3:15 is a good time of night to have a TV show.
02 12 09 20	CC	Prime time. Yes, that's about right in the center of the picture now.
02 12 09 35	LMP	Okay. I've got full zoom on it, Fredo. And maybe it's too bright. Let's see if I can darken it. It'll improve the picture a little.

02 12 09 44	CC	Yes, you're right. It's so bright, Ed, we're - we have the crescent, but not too much detail on.
02 12 09 54	CC	Yes, that's a little better.
02 12 10 03	LMP	And from our point of view, the Moon appears about the size of a grapefruit, held at the arm's length. It's going to get considerably bigger, and if I don't have the Earth to compare it with at the moment. But I suspect they are about the same size or maybe the Moon is starting to exceed the Earth in apparent size.
02 12 10 34	CC	Okay. And the big board now has you at - -
02 12 10 37	LMP	Okay. We'll go - -
02 12 10 38	CC	- - about - - 180,000 out.
02 12 10 43	LMP	Roger. Okay, I'm going to come back inside. We have now stowed the hatch. And Stu and Al are up starting to bring the probe out. And very soon we'll be able to make the trip into the LM with the camera and see what we can find in there.
02 12 11 06	LMP	We have not, as you can obviously see, rehearsed this. Our procedures are new to us, going into the LM for the first time. And, as a matter of fact, we were a little bit rushed getting the pressurization procedure complete in order to get in on time. We'll be ready here in about 2 minutes to move on into the LM, I think.
02 12 11 33	CC	Okay, Ed.
02 12 11 35	LMP	And, now, let's go back inside the command module.
02 12 12 37	CC	Okay. Are we looking up in the tunnel area now, Ed? It's pretty dark right now.
02 12 12 45	CMP	Yes, I'll be bringing the probe out - -
02 12 12 47	LMP	Yes, I'm trying to, Fred, but it's dark. Just 1 second, I'll see if I can improve the light situation for us.
02 12 12 53	CC	Roger.

02 12 13 26	LMP	Okay. You're looking directly up into the tunnel now. The probe has been released from the drogue, and Stu will be bringing it straight down through the tunnel.
02 12 13 38	CC	Yes. We got that picture in pretty good now. We can see it coming on down.
02 12 14 20	LMP	Okay, Houston. Al and Stu are taking the probe down under the right-hand couch now.
02 12 14 31	CC	Roger, Ed.
02 12 14 56	CC	Yes, we can see Al in the picture now.
02 12 15 01	LMP	Okay. He's probably clearer for you than he is on our monitor. It's a little dark in here.
02 12 15 12	CDR	You can look up the tunnel and see the drogue ..., Ed, and I'll go and pick it up for you.
02 12 15 28	LMP	Okay. You're looking directly at the drogue now, which is gray in color and which has a hole in the center above the capture latches.
02 12 15 51	CC	In our color pictures here, the opening in the drogue looks red in color. Like a big red eye.
02 12 16 04	LMP	Okay. And Alan has it out and he's starting to come down the tunnel with it. That's probably a little dark for you, but he's coming down anyhow.
02 12 16 18	CC	Okay, and we've temporarily, I hope, lost our picture down here, Ed.
02 12 16 26	LMP	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 12 17 20 LMP Fred, do you have your picture back yet?

02 12 17 22 CC Negative, Ed.

02 12 18 04 CC And 14, the problem with the loss of picture is on our end of the street.

02 12 18 12 LMP Okay. Tell me when you have it back and we're ready to go through into the LM.

02 12 18 21 CC Okay.

02 12 19 05 CC And, Ed, Houston. You may continue the commentary, I guess. It's being received out at the site and being recorded; we're just not getting it - plumbed into here.

02 12 19 21 LMP Okay. While we were just holding up here, Alan has slipped on through into the LM and is opening up the window shades and turning on the lights, so that as we go in, we will have some lights to give you a little better picture. I'm waiting here until - to get your picture back before I start in; however, if you would like, I'll go ahead and go into the LM.

02 12 19 48 CC Stand by 1, Ed. Okay, Ed. They don't have an estimate right now. We might wait a couple of minutes; and then, I guess, if we haven't got it back, you can proceed.

02 12 20 09 LMP Okay. Okay, Alan's coming back through the tunnel now and it will be clear here in a minute.

02 12 21 12 LMP Houston, while we're waiting for your picture to come back and, since it is being recorded at the site, we will take a quick station break and let Alan give us a commercial for Apollo 14.

02 12 21 30 CC Okay.

02 12 21 44 CDR Okay. Apollo 14 is progressing very nicely. As you can see, we're now right on schedule. And it looks as though the first midcourse correction is going to put us in for the lunar orbit insertion burn - very close. We're - we're currently preparing to go into the LM as Ed has told you; and, so

far, everything is working very well in the command module. We're very pleased with the way the systems are working. Everything is quiet, going along extremely smoothly, and we have a happy little ship here. Everyone is well. Everyone is resting well. We're adapting to weightlessness, I think, very rapidly. And everything is going along very smoothly at this point.

02 12 22 40 CC Roger, Al. And we have a picture back now. It's just a little bit on the dark side, but we can see you quite well.

02 12 22 52 LMP Okay, Fredo. We'll start on in.

02 12 23 03 LMP Okay. How's that?

02 12 23 07 CC Hey, that's a good picture, Ed.

02 12 23 12 CDR Okay. We're starting through the tunnel.

02 12 23 21 CDR Why don't you show the docking latches while you go by, Ed. See how they look on the television. Can you see the docking latches, Fredo?

02 12 23 29 CC Roger. We can see those, Ed. We can see on down to the tunnel and the top of the ascent engine cover.

02 12 23 41 LMP Okay. I think it's significant that, in spite of our problem the other day, that when Stu - Stu finally got us into the docking ring that all of them snapped shut, which is - was very well lined up. And our docking index, as you know, cost us a case of beer, I think, because it's within 1 degree.

02 12 24 14 CC Okay. And you might let us know, Ed, how you find the fit through the tunnel there.

02 12 24 23 LMP Okay. I'm sliding through.

02 12 24 26 CMP Hey, was that question from Joe?

02 12 24 33 CC I'm not sure he'd own up to it.

02 12 24 39 LMP Okay. I'm through the tunnel, and I'm right at the top of the LM. I'm shining the - showing the camera down on the main console on the Commander's side. How's that picture, Fredo?

02 12 24 54	CC	Okay. That looks very good, Ed.
02 12 25 00	LMP	And let's see. I'll turn it around. I'll go ahead and go on down and twist around, and maybe we can look out the window.
02 12 25 30	LMP	And, we're now inside the LM.
02 12 25 50	CC	Thank you, Ed.
02 12 25 54	LMP	Can you see that, Fred?
02 12 25 56	CC	Yes, we see what looks to be a patch there, Ed.
02 12 26 04	LMP	Is it good enough for you to read it?
02 12 26 12	CC	Is it something like beep, beep or -
02 12 26 17	LMP	How did you ever guess?
02 12 26 23	CMP	Must be some prompting from the ground.
02 12 26 32	CC	Okay. And, Ed, a good portion of your swing here, the picture is a little bit on the dark side. You might try opening it up just a little bit more.
02 12 26 45	LMP	Roger. I've had it open all the way, Fredo.
02 12 26 50	CC	Well, I guess you can't do any better than that.
02 12 27 15	CC	Did you find the LM pretty clean, Ed, when y'all first came aboard or was anything loose in there?
02 12 27 27	LMP	No, both spacecraft, Fredo, have been immaculate. I think we have found one washer floating along about 1 day ago, and we have seen nothing that was foreign to the spacecraft either before or since that time. And, as I say that, I see one floating by me right now. It may be the same washer.
02 12 27 56	CDR	Yes, I'd like to point out that Ed is talking about something external to the spacecraft. The cabin above the command module and the LM are extremely clean. We've been very pleased with the way they've looked.
02 12 28 10	CC	Very good.

02 12 28 14 CMP Yes, I think from what we've heard along the line, we actually expected maybe to see a few more nuts and bolts. I think a lot of credit goes to check-out crew and everything because this spacecraft is really in good shape.

02 12 28 38 LMP And, Fredo, I'm passing the camera back to Alan in the command module. We don't have enough light in here to really give you a good picture. And there's not much help from the outside since the Sun is behind us right now.

02 12 28 53 CC Roger, Ed. I - we got a pretty good picture of you down in the tunnel right now.

02 12 29 08 CMP Hey, Fred. Did you hear that last comment I made about the crew and how clean the spacecraft was?

02 12 29 15 CC Roger, Stu.

02 12 29 18 CMP Well, that was planted, you know, for all the authorized people that worked on the spacecraft. You know, we're really unindated [sic] with un-authorized objects in both spacecraft. I think Ed was showing you one up there, but if you could see this. I don't know if any of the backup crew is down in there tonight or not. But - okay, how about - about here - ... But, they've left their calling card.

02 12 29 57 CC Okay, we have a pretty good picture of that, Stu. And, they are here.

02 12 30 05 CMP Okay. Tell them we sure appreciate every compart-ment that we open up having one of these come floating out of it.

02 12 30 18 CC They aim to please.

02 12 30 34 LMP Stu, you want to take the camera? Perhaps you can move it on up to the window. I don't know how much light there is, but sure is a good shot of the Moon out there. You might try again with the monitor so you can see what it looks like to them.

02 12 30 46 CMP Well, we'll give it a go.

02 12 31 03	CC	Okay, we can see the Moon again in the number - number 1 window. It's down in the lower left corner now, Stu. Hey, that's about right in the center.
02 12 31 35	CC	Okay, that's - the picture's a little distorted now, Stu. It's a little bright.
02 12 32 01	CMP	Okay, that ought to help it a little.
02 12 32 04	CC	Yes, that's about right. It's still hard to see in this picture - much in the way of detail of the features - any features on the surface. Right at the terminator, we can pick up a few craters; but, other than that, it's really hard to see very much.
02 12 32 34	CMP	Okay. Yes, I didn't think it was going to show up too much there, Fred, because that's really the way it looks with the eye. It's just now starting, you know, to get into the area where the larger craters would show up.
02 12 33 18	CC	Okay, we've got a good picture of Al there, now.
02 12 33 24	CMP	Okay, he's got the transfer items that he's taking up into the LM for the activation, and he might just give you a word on what they are.
02 12 33 36	CDR	The purpose of the excursion into the LM at this time is to check out some of the communications, do a little housekeeping, look - generally look the vehicle over, and also, in this particular case, we are going to take some pictures of the command module while we're there. This is done during the flight on the way to the Moon to save time, so that when we actually go into the LM for the final time prior to the descent, there will be less things to do. So, I have a package of things here in my hand which I'll now be taking up into the LM and will proceed on with our housekeeping tasks up there.
02 12 34 21	CC	Okay, we can see him heading out with the package in hand there.
02 12 34 40	CMP	Okay, is there enough light up in there, Fred? You getting the picture?

02 12 34 44 CC Roger, Stu.

02 12 34 48 CMP Okay.

02 12 34 50 CC Looks like running an obstacle course in the early going, getting by all the hoses.

02 12 34 58 CMP You got it.

02 12 35 15 LMP And, Fredo, I'm starting back through the tunnel now to pick up the rest of the equipment. We have several 16- and 70-millimeter camera MAGs that are being transferred over. We'll pick those up and be right back with you.

02 12 35 32 CC Okay, Ed.

02 12 36 34 CC Okay, I guess the picture I'm looking at now, as you're pointing back into the LEB in the area where the optics would be. And I can see the radiation meter back there.

02 12 36 47 CMP Yes. Yes. That's affirmative, Fred; I'm just really trying to get the camera out of the way there for a minute. Ed's got the other film magazine. He's headed back up into the LM now.

02 12 37 17 CC Yes, Ed fits through there quite easily. I guess zero g really does help.

02 12 37 28 CMP (Laughter) ... no comment.

02 12 37 38 LMP If you're commenting on what I think you're commenting on, it was totally uncalled for, Fredo. And, Houston, we are both - Al and I are both in the LM now with all of our transfer items, and we will proceed to go ahead and give it a checkout as per the time line.

02 12 38 00 CC Roger, Ed.

02 12 38 26 CMP Okay, Fred. I'll try to move up here, and maybe we can look over the shoulder a little bit.

02 12 38 32 CC Okay. I can see a moving back and forth; I guess your head is down through now.

02 12 38 52	CMP	Okay, we're going to get a picture of it all up here, Fred. I'm up ahead by the LM hatch now, trying to watch them work in the LM; but it doesn't look like it's going to be bright enough.
02 12 39 14	CC	Yes. It's - it's a pretty dark picture now, Stu.
02 12 39 20	CMP	Yes, I'm afraid that's not going to show up. If we had a little light, I guess we need a little Sun through the LM window.
02 12 40 00	LMP	Well, Houston, I guess Fred and I'll have to give you a show from - I mean Stu and I'll have to give you a show from that side. It's too dark over here.
02 12 40 10	LMP	...
02 12 40 16	CC	Okay. And you're cutting in and out there, Ed.
02 12 40 26	LMP	Okay. How now? Is that better?
02 12 40 29	CC	Okay. You're loud and clear now.
02 12 40 35	CDR	Fred, this is Al. As you know, we have the probe and drogue out. Is there anybody that - who's interested in taking a look at those, or are you pretty well satisfied that just taking still - still pictures of it from here on out will do the trick?
02 12 40 53	CC	Okay, Al. The word is the pictures should suffice. I - They're not that - particularly interested in another look right now.
02 12 41 06	LMP	Okay. Is there anything else you'd like to see before we sign out for the evening?
02 12 41 26	CC	Okay, Ed - Al. The - I guess the answer is no to your last question.
02 12 41 35	LMP	Okay. In that case, we'll sign off from Apollo 14. We appreciate the opportunity to show you around the spacecraft and a little bit of the LM; and I hope that next time you see the LM, it'll have more light, so you'll be able to see it better.
02 12 41 52	CC	Thank you very much.

02 12 44 50	CMP	Hey, Houston, 14.
02 12 44 51	CC	Go ahead, 14.
02 12 44 55	CMP	Okay, Fredo, do you want me to stay on the HIGH GAIN here or go to OMNI Charlie?
02 12 45 03	CC	They would like you to stay on HIGH GAIN.
02 12 45 08	CMP	Okay.
02 12 45 15	CC	Okay; and, Stu, would you pass one word on down to Al and Ed?
02 12 45 30	CMP	Yes, I can do that.
02 12 45 32	CC	Okay. Would you tell them to - to give us a call before they proceed on page 1-15, where they're going to turn on the - the comm and get a GO from us and make sure we've got good lock on the S-IVB.
02 12 45 54	LMP	Roger. Fredo, I'm still on the comm. I understood.
02 12 46 07	CC	Okay, and I guess when you get there, Ed, just check with us, and - and I'll make sure they're set up good on the IU before you press on.
02 12 46 27	LMP	Okay, Fredo.
02 13 12 35	CC	14, Houston. You still there?
02 13 12 41	CMP	That's affirmative. Go ahead.
02 13 12 43	CC	It's just pretty quiet. Just wanted to see if you were still around.
02 13 12 52	CMP	That's affirm.
02 13 14 43	CMP	Houston, 14.
02 13 14 45	CC	Go ahead, 14.
02 13 14 51	CMP	Okay, Fredo, I guess - sitting here looking, the next hour - we - You'd originally said we're going to go into PTC at 62:10. I don't know if that was before you came up with the waste water dump or not; we don't really want to start that before the waste water dump, do we?

02 13 15 13	CC	That's right, Stu. The time - Let's see, I show on the flight-plan change here is 63:10, establish PTC. I'll recheck that. Stand by.
02 13 15 37	CMP	Okay. You're - you're right, Fredo. 63:10, okay.
02 13 15 47	CC	Okay, Stu; but, in any case, you're right, not before the water dump.
02 13 15 54	CMP	Yes, that - that was my mistake. I had marked that in and before I'd moved everything up an hour, and I've got it back over there in the right place, and I did mark it off. Thank you.
02 13 16 08	CC	And, 14, while we're talking about PTC, Stu, I'd like B/D roll selected before you crank it up.
02 13 16 27	CMP	Okay, we use B/D roll.
02 13 21 34	CC	14, Houston.
02 13 21 40	CMP	Go ahead.
02 13 21 42	CC	You got any idea, Stu, where they are in the Good Book, so we can maybe begin and be warned about the IU business?
02 13 21 54	CMP	Stand by. I'll check.
02 13 22 11	CMP	Okay, they're finishing up 111, Fredo.
02 13 22 15	CC	Okay, 111.
02 13 41 21	CMP	Okay. Just a second here.
02 13 41 57	LMP	Okay, Houston; Apollo 14. We're switching to LM power at 62:21:14.
02 13 42 05	CC	Roger, Ed.
02 13 45 15	LMP	Houston, the - the ED BUS BAT A is reading 37 volts; BAT B, 37 volts.
02 13 45 22	CC	Roger. Both of them 37 volts, Ed.
02 13 45 28	LMP	That's affirm.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 13 53 04	CMP	Yes, I need you to turn on your - -
02 13 53 22	CC	14, how do you read? Houston.
02 13 53 28	CMP	I read you 5 square, Fredo.
02 13 53 34	CDR	Hey, Fred, when you get a minute, I need a VHF A check.
02 13 53 42	CDR	Okay.
02 13 53 44	CC	Okay. And we'd like high taps on the LM.
02 13 53 53	CMP	Okay. High taps on the LM.
02 13 53 57	CDR	Okay. We're going to get them to them.
02 13 54 08	CC	Okay. I guess we're reading Antares now, loud and clear.
02 13 54 15	LMP	Okay. And we're checking out the ... - -
02 13 54 16	CDR	Hello, 14, Fredo. This is Antares. Do you read loud and clear?
02 13 54 22	CC	Too many of you are speaking at once there. Say again, Antares.
02 13 54 28	CDR	Okay. I was just giving you an estimated check from Antares.
02 13 54 37	CC	Roger. Loud and clear, and go ahead, Kitty Hawk.
02 13 54 46	CMP	Disregard, Fred.
02 13 54 48	CC	Okay.
02 13 55 17	LMP	Okay. Your first one is 20 seconds at 24 frames a second, and then 20 seconds at 1 frame per second. Then, when you get near the end, when you're going to shut it off, you want 10 seconds at 24 frames per second, and then 1 frame per second as it peters off.

02 13 55 36	CC	That's correct, Ed. Except they didn't want to run it any longer than 180 seconds, which is pretty close to 3 minutes.
02 13 55 51	LMP	Yes. I've got it.
02 13 56 26	LMP	Can you see it?
02 13 56 27	CDR	Oh, boy, it's not there.
02 13 56 35	CC	And, Ed, or Antares, just a reminder. You're on SPA DOWN NOISE BACKUP now, so you're hot-mike.
02 13 56 48	LMP	Roger. Suspected that. Thank you.
02 13 56 54	LMP	We're holding up, Fredo, on our procedures until Al finishes getting the waste water dump pictures.
02 13 57 01	CC	Okay.
02 13 57 33	LMP	It probably does.
02 13 57 35	CDR	Yes.
02 13 57 53	LMP	Houston, from the LM, this water dump looks like a snow storm.
02 13 58 02	CC	Yes. That's the way I figured it would look.
02 13 58 27	LMP	Fred, were you getting your LO bit rate? If so, I'll switch you over to HI.
02 13 58 33	CC	Stand by 1.
02 13 58 44	CC	Okay. Okay, Ed. It looks good here. LO bit rate, you can go to step 3.
02 13 58 55	LMP	Roger. There's HI bit rate.
02 13 59 20	CC	Okay. We got HI bit rate now, Ed.
02 13 59 29	LMP	Roger. Going step 4.
02 13 59 39	LMP	Houston, how do you read Antares?
02 13 59 41	CC	Okay. I read you loud and clear, Ed.

02 14 00 29	CC	And, Antares; Houston. We're ready for step 5.
02 14 00 36	LMP	Roger. And, Houston; this is step 5. How do you read Antares?
02 14 00 44	CC	Antares, we're reading you loud and clear on LO bit rate, now.
02 14 00 56	CDR	Roger, standing by.
02 14 01 50	CC	Antares, Houston. We're ready for step 6, now.
02 14 01 59	CDR	Roger.
02 14 02 41	CC	Antares, Houston. How do you read?
02 14 02 48	LMP	Okay, Fredo, loud and clear. How me?
02 14 03 02	CC	Okay, it's not bad at all. I'd say you're loud and clear, also.
02 14 03 16	LMP	Roger.
02 14 03 21	CC	Antares, Houston. We're ready for step 7, now.
02 14 03 34	LMP	All right, Houston. How do you read Antares?
02 14 03 38	CC	Okay, Antares, Houston. Read you loud and clear.
02 14 03 46	CDR	Roger, Houston. Kitty Hawk, Antares, how do you read VHF A?
02 14 03 49	CMP	Ed, how do you read on A?
02 14 03 52	LMP	Loud and clear, Stu.
02 14 04 02	CC	Antares, Houston. We're ready for step 8 now.
02 14 04 07	LMP	Roger, Fredo. Stand by 1.
02 14 04 49	LMP	Kitty Hawk, Antares. How do you read VHF A, now?
02 14 05 43	LMP	Houston, Antares. How do you read?
02 14 05 47	CC	Antares, Houston. Read you loud and clear.
02 14 06 02	LMP	Okay, I guess I'm ready for step 8, now.

02 14 06 07	CC	Okay, you're GO for step 8.
02 14 06 09	LMP	Okay, now. Roger. How do you read, now?
02 14 06 15	CC	Read you loud and clear, Ed.
02 14 06 41	CC	Okay, Ed. Everything looks good down here.
02 14 06 46	LMP	Okay, Fredo. Stand by - We're still having trouble - not getting our VHF turned up.
02 14 06 55	CC	Roger.
02 14 07 09	CMP	Okay. It's B SIMPLEX.
02 14 07 11	LMP	Okay, how me?
02 14 07 23	LMP	Kitty Hawk, Antares. How do you read me on VHF B?
02 14 07 46	LMP	Kitty Hawk, Antares. How do you read VHF B?
02 14 08 27	LMP	Kitty Hawk, Antares. How do you read, now?
02 14 09 07	CC	Antares, Houston. We'd like a readout on BAT 5 and 6 - voltage.
02 14 09 21	LMP	Stand by, Houston.
02 14 09 50	CC	Kitty Hawk, Houston. We're ready to dispense with the water dump, now.
02 14 09 58	CMP	I've already shut it off, Fredo. I'm just coming back up, now.
02 14 10 03	CC	Okay.
02 14 10 04	LMP	Kitty Hawk, Antares. Read you loud and clear.
02 14 10 06	CMP	Okay, you're 5 square. Let's try A.
02 14 10 09	LMP	Okay.
02 14 10 13	CMP	How do you read on A, Ed?
02 14 10 16	LMP	Kitty Hawk, Antares. Read you loud and clear on A. How me?

02 14 10 19	CMP	You're 5 square.
02 14 10 21	LMP	Okay. We check out finally.
02 14 11 08	LMP	Houston, Antares. BATs 5 and 6 are reading 36 and a half and 37 volts, respectively.
02 14 11 16	CC	Okay. Copied, Antares.
02 14 12 43	CMP	Okay, Ed. Can I turn - Do you want me to turn the VHF, OFF?
02 14 13 09	LMP	Houston, Antares.
02 14 13 12	CC	Go ahead, Antares.
02 14 13 15	LMP	We're going to skip the OPS checkout until Al gets through with his camera work. And I'm going to go ahead with the comm deactivation. We'll pick the checkout up shortly.
02 14 13 24	CC	Okay, that'll be all right.
02 14 13 37	LMP	Okay. Antares is going off the air for a couple of days.
02 14 21 36	CC	Kitty Hawk, Houston.
02 14 21 42	CMP	Go ahead, Houston.
02 14 21 44	CC	Is Ed still downstairs?
02 14 21 49	CMP	Yes. They're both down there.
02 14 21 51	CC	Okay.
02 14 21 54	CDR	We just transferred to - we just transferred to command module power. Be coming back up in a minute.
02 14 22 02	CC	Roger, Antares. I got - I got a question there. I was wondering if Ed recalls back on step 1, on comm activation, if he had to switch the antenna - S-BAND ANTENNA switch, was it already in AFT or did he move it to FORWARD and then back to AFT?

02 14 22 29	CDR	Okay. Stand by.
02 14 22 46	CDR	Okay, this is Antares talking through Kitty Hawk's transmitters. We found the S-BAND ANTENNA switch in AFT as the checklist called for, and he did not move in for step 1.
02 14 24 01	CC	All right.
02 14 29 23	CC	Antares, Houston.
02 14 29 30	CDR	Okay. This is Antares. Go ahead.
02 14 29 42	CC	Okay, Al, are you back in the Kitty Hawk, now?
02 14 29 49	CDR	No, I'm still in Antares, but I'm using Kitty Hawk cable.
02 14 29 54	CC	Roger. The question is, we've got you back on - Antares - back on command module power, and they're showing about 2 amps high. And, the question is, has the reconfiguration been complete as per the initial activation status chart for circuit breakers back on 13 and 14 yet?
02 14 30 26	CDR	That is affirmative, per checklist.
02 14 30 28	CC	Okay.
02 14 33 23	CDR	Houston, Antares.
02 14 33 27	CC	Go ahead, Antares.
02 14 33 32	CDR	The OPS checkup complete. The source pressure on the CDR's reading 6200; lowest pressure on LMP is reading 6000.
02 14 33 46	CC	Okay. Copy now. CDR's 6200; LMP, 6000.
02 14 42 56	LMP	Houston, Antares.
02 14 43 01	CC	Go ahead, Antares.
02 14 43 05	LMP	We rechecked our circuit breaker configuration, and we found that EPS DC BUS VOLT, panel 11, was out. It is now in.

02 14 43 21 CC Roger.

02 14 45 29 CC Antares, Houston. Over.

02 14 45 36 LMP Go ahead, Houston.

02 14 45 38 CC I was just looking through the checklist on page 1-18; under the 64-hour callout, it shows that EPS DC BUS VOLT circuit breaker back open. It comes after you check the circuit breaker charge, up at the top of the page. So I guess that DC VOLT should be open.

02 14 46 09 LMP Okay, stand by 1.

02 14 48 03 CDR Houston, Antares.

02 14 48 07 CC Go ahead, Antares.

02 14 48 12 CDR Okay. I think our checklist is finally in phase with your checklist, and the DC BUS VOLT circuit breaker, panel 11, is out.

02 14 48 21 CC Roger, Al.

02 14 50 30 CC Apollo 14, Houston.

02 14 50 36 CDR Go ahead.

02 14 50 38 CC That current in the LM seems to be dropping down. It's down to about an amp, now. It's looking pretty normal. So we don't think any more effort trying to find out the cause of it is worthwhile. Over.

02 14 50 55 CDR Okay. As I say, I think we're finally in phase now. We - The - the last item we did was turn out the floodlights which probably helps the situation. The - the LM hatch is now closed, and both Ed and I are clear of it.

02 14 55 13 CC Roger.

02 14 55 34 CC Apollo 14, Houston.

02 14 55 41 CMP Go ahead.

02 14 55 44	CC	Roger. If - if it's convenient to get to, we'd like to know how much of that magazine Foxtrot you used taking pictures of the water dump.
02 14 56 05	CMP	Okay, Al says he used one-third of the magazine.
02 14 56 08	CC	Roger, Stu; one-third.
02 15 01 39	CMP	Houston, 14.
02 15 01 42	CC	14, Houston. Go ahead.
02 15 01 46	CMP	Okay, Gordon, I guess you're going to give me a call when it's okay for PTC, huh?
02 15 01 55	CC	That's right. Down a little, we'll take a look and see how your rates look.
02 15 05 13	CC	Apollo 14, Houston. You look good now; you're clear to spin it up.
02 15 05 21	CMP	Okay, thank you.
02 15 05 30	CC	Also, we'd like OMNI Bravo, and you're clear to secure the high gain antenna.
02 15 05 39	LMP	Roger. Bravo.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 15 34 17	CC	Apollo 14, Houston. Over.
02 15 34 27	LMP	Go ahead, Houston.
02 15 34 30	CC	Roger. We're watching your PTC, and it doesn't look too good. It's heading right on out of the box. We lost data just as you started to spin up with that antenna switchover. It was poor timing on our part. So we're not sure just how the start went, but we're sure this one isn't going to work. So, at your convenience, if you'll restart another - or redamp the rates and stand by for our GO for another startup. Over.
02 15 35 13	LMP	Okay, Houston. Stand by.
02 15 35 40	CC	14, Houston.
02 15 35 45	LMP	Go ahead.
02 15 35 46	CC	If you stop near a roll angle of either zero or 180, that will give us better high bit rate to watch your rates.
02 15 35 58	LMP	Okay. Stu's coming up to the top now.
02 15 36 02	CC	Roger.
02 15 36 37	CMP	Okay, Gordon. I'm up here. That one didn't take, huh?
02 15 36 41	CC	No. It just headed right on out to the limit for some reason, Stu.
02 15 37 03	CMP	Okay, Gordon. How do you read?
02 15 37 05	CC	Loud and clear, Stu. Go ahead.
02 15 37 11	CMP	Okay. So that one didn't take, huh?
02 15 37 14	CC	Negative. It went right straight on out toward a limit on our plot here. We didn't get a good read-out of the - of the initiation of it, because we had that antenna switchover right at the time. I'll stand by until we get through this - into the next OMNI here.

02 15 37 41	CMP	Okay.
02 15 38 33	CC	Stu, this is Houston. How do you read now?
02 15 38 39	CMP	Okay. You're loud and clear.
02 15 38 41	CC	Okay. I mentioned to Ed if you'll stop the roll on near zero or near 180, we'll have good antenna angle for high bit rate and can watch the rates that way.
02 15 38 58	CMP	Okay.
02 16 24 08	CC	Apollo 14, Houston. Over.
02 16 24 13	CMP	Go ahead, Houston; 14.
02 16 24 16	CC	Roger. As you're sitting there, your high gain is pretty well pointed at us. We'd like to bring it up to watch the start of this next attempt at PC - PTC. Would you go to AUTO - and then select HIGH GAIN?
02 16 25 12	CMP	Okay, Gordon, it looks like we've got the HIGH GAIN.
02 16 25 15	CC	Roger. We have it.
02 16 27 51	CC	Apollo 14, Houston. You have a GO to start the spinup.
02 16 28 02	CMP	Okay, thank you.
02 16 30 13	CC	14, Houston.
02 16 30 18	CDR	Go ahead.
02 16 30 20	CC	It looks to us like you might have missed one jet enable, Delta-2. Do you have roll coupled?
02 16 30 34	CMP	Roger. Thank you, Gordon.
02 16 31 23	CC	14, Houston. Your rates are still good, if you want to give her a start.
02 16 31 29	CMP	Okay. Thank you.
02 16 33 10	CC	Apollo 14, Houston. Over.

02 16 33 15	CMP	Go ahead, Houston.
02 16 33 17	CC	We're showing the O_2 flow up a little bit to eight-tenths and suggest you might look around at the - all the overboard drains, valves, and make sure they're tightly secured. Over.
02 16 33 34	CMP	Okay. Thank you.
02 16 40 57	CC	Apollo 14, Houston. Give us OMNI Bravo, and you're clear to secure the high gain antenna.
02 16 41 06	CMP	Okay.
02 16 43 20	CC	Apollo 14, Houston. Over.
02 16 43 26	CDR	Go ahead.
02 16 43 29	CC	We see that the cabin pressure, which was down to near 5, is back up to 5 dec - 5.1, and the flow rate is decreasing now. Does this help you - give you any clues as to what the problem might have been? Did you find any loose valves? Over.
02 16 43 56	CDR	No, not as yet. We're having a problem with a sticky Myrtle. We're working ... equipment problem right now.
02 16 44 04	CC	Roger, Al.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 17 00 22 CC Apollo 14, Houston. Over.

02 17 00 28 CMP Go ahead.

02 17 00 38 CMP Go ahead, Houston.

02 17 00 40 CC Roger. I have a short shopping list of items for you here. First of all, the state vector on board there is in good shape and no update will be required as scheduled at 66 hours.

02 17 00 59 CMP Okay.

02 17 01 00 CC And it's looking like midcourse 4 will be about 3.5 feet per second - 3-1/2 feet per second. And one question, on the lens - the 18-millimeter lens that you took over to use to take the pictures of the water dump. Just to help us keep track of where things are, did you bring that back and restow it in the command module? Over.

02 17 01 36 CMP That's affirmative, Gordon. The lens is back and stowed in the command module, and understand midcourse 4 will be about 3.2.

02 17 01 46 CC Stu, that's 3.5, but that's close enough as - as close as we can tell now. The PTC is looking good. It's hanging in there and, well, maybe its too early to predict; it looks like it's going to take this time. There is some - an O_2 heater reconfiguration shown at 65.10 in the flight plan to do and the presleep items on the checklist, and that's all we have before you retire for the day. Over.

02 17 02 29 CMP Okay. We just, about 10 minutes ago, configured the heaters, and we're going to press into the presleep here momentarily.

02 17 02 40 CC Roger.

02 17 19 18 CMP Houston, Apollo 14.

02 17 19 31 CC Apollo 14, Houston. Were you calling? You are very weak. Over.

02 17 19 39	CMP	That's affirmative, Gordon. I'm ready for an E-memory dump. Can you take it with this comm?
02 17 19 47	CC	I'm reading you just barely, Stu. Stand by. I'll check if we can take the E-MOD in this kind of antenna configuration.
02 17 20 25	CC	Stu, we're going to have to wait a couple of minutes until a better antenna gets up.
02 17 20 33	CMP	Okay.
02 17 21 18	CC	Apollo 14, Houston. We are ready at this time for the E-MOD. Over.
02 17 21 27	CMP	Okay, Houston. Here it comes. And, Gordon, I've got some onboard read-outs when you're ready.
02 17 21 42	CC	Okay. Go ahead.
02 17 21 47	CMP	Okay, battery C, 37.0; pyro battery A, 37.4; pyro battery B, 37.4. RCS: Able, 87; Baker, 87; Charlie, 85; Delta - Delta, 86.
02 17 22 21	CC	Roger, Stu. We copied all those.
02 17 22 36	CMP	And, Gordon, for a crew status, we're all in good shape and no medication.
02 17 22 43	CC	Roger, Stu.
02 17 25 26	CC	14, Houston.
02 17 25 31	CMP	Go ahead, Houston.
02 17 25 33	CC	Looks like we've got the dump complete. And one question from EECOM. With this data configuration right now, he can't really tell if you cycled all the cryo fans. He just wanted a confirmation that you had. Over.
02 17 25 49	CMP	That's affirmative. The fans were cycled.
02 17 25 53	CC	Okay. Thank you.
02 17 37 31	CDR	Houston, 14 is signing off for the evening.
02 17 37 35	CC	Roger, Al. Pleasant dreams to you all.

02 17 37 41 CDR Thank you.

02 18 26 33 CC Apollo 14, Apollo 14, this is Houston. Over.

02 18 27 11 CC Hello, Apollo 14. Apollo 14; this is Houston. Over.

02 18 28 11 LMP Houston, this is Apollo 14. Houston, Apollo 14. How do you read?

02 18 28 16 CC Okay, Ed. You are loud and clear. Sorry to disturb you, but we have been watching some parameters on the ECS. We watched the cabin leak down to 5.1 the last we saw and we've also noticed a - that the main REGs have opened as a result, and your O_2 flow has been steadily increasing; last time we had high bit rate, it was about 4/10ths of a pound per hour. The PTC is being disturbed, but it still - is stable. We wanted to alert you to try to troubleshoot this leak before we throw the PTC out of bounds. What we'd like you to do is check all the overboard drain valves, one at a time. And, this time, we would like to try to tie down precisely which - which valve is the guilty one and so we would like - as you either tighten them or jiggle them or whatever you can think of - to do to the valves, do each one individually and give us time to watch the flow rate and see if we can tie it down. Over.

02 18 29 46 LMP Okay. Stand by.

02 18 30 13 LMP Houston, the WASTE MANAGEMENT DUMP valve is going to OFF at this point.

02 18 30 20 CC Roger.

02 18 32 54 LMP Houston, Apollo 14.

02 18 32 58 CC Apollo 14, Houston. Go ahead.

02 18 33 03 LMP Gordon, did you notice a step increase of the flow rate, or has it just been a gradually increasing thing over the last hour or so?

02 18 33 13 CC It's been a gradual increase; however, just - We've been watching the data after you told us you closed

the WASTE MANAGEMENT OVERBOARD DRAIN, and we're seeing it drop down. That may be the culprit right there. Can you verify the configuration that you were in? Did you have the cap on the Myrtle; was that closed? And was the WASTE MANAGEMENT OVERBOARD DRAIN open? Prior to our waking you up? Over.

02 18 33 43 LMP Well, the WASTE MANAGEMENT DRAIN ...

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

02 18 35 30	CC	Apollo 14, Houston. Over.
02 18 35 37	CC	Apollo 14, Houston. Over.
02 18 35 44	LMP	Houston, 14. Go ahead.
02 18 35 46	CC	Okay, Ed. We missed your answer to my question completely during the OMNI switchover there. Over.
02 18 35 56	LMP	Roger. Your last question about the configuration of the waste management drain to the Myrtle?
02 18 36 01	CC	That's affirmative; that question.
02 18 36 07	LMP	Okay. I guess - the Myrtle - the waste management system had been in use several times for the last hour, and if you saw changes probably fluctuating up and down, it was undoubtedly due to that system.
02 18 36 24	CC	I see. You've used it several times?
02 18 36 31	LMP	That's affirmative.
02 18 36 34	CC	That's - I mean - that's since - since you signed out for the night, is that right?
02 18 36 40	LMP	That's affirmative.
02 18 36 41	CC	Right.
02 18 36 42	LMP	Right now the drain is closed, and it had been closed, reopened, and closed, at least twice since we signed off for the night.
02 18 36 55	CC	Roger.
02 18 40 18	CC	Apollo 14, Houston.
02 18 40 23	LMP	Go ahead.
02 18 40 25	CC	The O_2 flow has - dropped back down now. It's not come down; it - it still appears that the main REGs may be flowing a little bit. What we suggest is that you use the DIRECT O_2 to pump the cabin

back up to 5.7, and then go on back to sleep and we'll try not to bother you. The PTC looks like it should hold okay through the sleep period.

02 18 41 03 LMP Okay, Gordon. That's fine.

02 18 45 31 CDR Houston, this is Al.

02 18 45 37 CC 14, Houston. Go ahead.

02 18 45 48 CDR Hello, Houston. This is Al.

02 18 45 51 CC Roger, Al. We read you weak. Go ahead.

02 18 46 12 LMP Houston, 14.

02 18 46 15 CC Ed, this is Houston. Go ahead.

02 18 46 33 LMP Hello, Houston. Apollo 14.

02 18 46 35 CC Apollo 14, Houston. Loud and clear now. Go ahead.

02 18 47 04 CC Apollo 14.

02 18 47 05 LMP Houston, Apollo 14. Do you read?

02 18 47 06 CC Roger, Apollo 14. This is Houston. You're loud and clear. Go ahead.

02 18 47 13 LMP Okay. Two items. First of all, Al's got a sensor replaced. He wanted the medics to take a look at it, and pump the cabin up, shut off the DIRECT O_2, and that flow is down to 2/10ths now.

02 18 47 30 MCC Roger. Okay, yes, advise them we're still in LOW BIT RATE and there will be a few minutes or a few seconds here before we can get HIGH BIT RATE.

02 18 47 45 CC 14, Houston; we're going to have to wait until we rotate around to an - an antenna angle that we can get HIGH BIT RATE before we can check that sensor, but we'll give you a call in a minute or two when we're ready.

02 18 48 00 LMP Okay.

02 18 48 49 CC 14, Houston. CDR's biomed data looks very good, according to Dr. Berry himself.

02 18 49 00	LMP	Okay. I just changed the paste in the sensor and put a new sticky washer on the electrode ...
02 18 49 11	CC	Okay. They're - they're willing to sign you up for a permanent job at doing that, if you'd like to after the flight.
02 18 49 23	LMP	Well, we'll discuss it.
02 18 49 38	CDR	Houston, 14. If you're satisfied then, I'll return my comm configuration to the sleep configuration.
02 18 49 44	CC	Okay. Let me make one quick check here.
02 18 49 58	CC	Well, I guess that's all we've got. We'll say good night once again.
02 18 50 05	LMP	Thank you, Gordon.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 03 05 18	CC	Apollo 14. Apollo 14, this is Houston. Over.
03 03 05 57	CC	Apollo 14. Apollo 14, this is Houston. Over.
03 03 06 17	LMP	Houston, Apollo 14. Good morning. How do you read me?
03 03 06 21	CC	Roger. Good evening, Apollo 14. Loud and clear.
03 03 06 27	LMP	Good morning, Bruce. Do you have a consumables update for me?
03 03 06 30	CC	Roger. Are you ready for it?
03 03 06 35	LMP	Okay. Any time you're ready to give it.
03 03 06 37	CC	Okay. Consumables update - -
03 03 06 39	LMP	Good morning.
03 03 06 40	CC	- - GET of 75 plus 33. RCS total, 83 percent; quads, in order, 83, 83, 82, 84 percent; hydrogen, 72.4, 72.8; oxygen, 89, 87, and 38.
03 03 07 57	LMP	Houston, 14. Do you read me?
03 03 08 00	CC	Roger, 14. Reading you loud and clear now. We had another antenna switch. Over.
03 03 08 07	LMP	Roger. I lost you after the first hydrogen tank.
03 03 08 11	CC	Okay. Hydrogen tank 1, 72.4, 72.8; oxygen, 89, 87, 38. Over.
03 03 08 30	LMP	Roger. I got your ...
03 03 08 37	CC	Say again your last, Ed.
03 03 08 42	LMP	Roger. I only got the first oxygen tank. Try me again on 2 and 3.
03 03 08 46	CC	Okay. Tank 2, 87 percent; tank 3, 38 percent. Over.
03 03 08 56	LMP	Roger. I got 75:33; RCS total, 83; quads are 83, 83, 82, 84; hydrogen, 72.4 and 72.8; oxygen, 89, 87, 38.

03 03 09 13 CC Roger. Are you all eating breakfast up there now?

03 03 09 16 LMP Our - We're starting. The cooks are in the kitchen at the moment. Our radiation readings for last night - or rather for this morning are 16045 for Al, 1042 - 01042 for Stu, and 05038 for Ed.

03 03 09 43 CC Roger. 16045 for Al, 01042 for Stu, 05038 for Ed, and how about quantity of sleep? Do you have any comments on that? Over.

03 03 09 57 LMP Roger. For Al, 6 hours; Stu, 6-1/2; and for Ed, 6-1/2.

03 03 10 11 CC Roger, Ed. And Ed, when you - when you all feel prepared, we've got quite an extensive batch of paperwork to pass up to you here.

03 03 10 26 LMP Okay, Bruce. Stand by 1.

03 03 10 29 CC Roger.

03 03 10 33 LMP Is it all going to be associated with the flight plan?

03 03 10 36 CC Well, let's see. We got - we got a comment on the T_{ephem}. We've got a flight-plan update. We've got a docking probe status report. We've got a pericynthion plus 2 abort pad. We will have an LOI abort chart in numbers - criterion update. We'll have some questions for you on the cosmic ray flashes. And when it comes in, we'll have a procedure for you for checking out the ascent stage battery number 5 in the LM. Over.

03 03 11 11 CC Also the sports news and commentary on midcourse 4.

03 03 11 18 LMP Okay. Why don't we get the flight plan first, so that we can kind of see where we're going. And then we'll string the others out throughout and after breakfast.

03 03 11 29 CC Okay. Actually, I think you were looking over my shoulder, because the flight-plan update is about the simplest of the whole bunch. What we're aiming towards here - -

03 03 11 41 LMP We are looking over your shoulder.

03 03 11 45 CC (Laughter) What we're aiming towards here is getting you into the LM shortly after midcourse correction 4 - to do a little more systems detective work on ascent battery 5. Make everybody feel a little warmer down here. And, of course, the rest of the LM is still in 4 O shape. At 76 hours in the flight plan, we'd like you to pressurize the LM as required. Over.

03 03 12 31 LMP Okay. 76 hours, pressurize the LM as required.

03 03 12 35 CC Roger. At 77 hours, plus 45 minutes, which is right after midcourse 4, maneuver to Moon-view attitude. And that attitude is presently contained in the flight plan at 78 plus 55 and is roll 352, 110, 311. Over.

03 03 13 13 LMP Roger. Maneuver to Moon-view attitude, and say again the angles. I understand that's at 77:45, right after midcourse 4.

03 03 13 21 CC Roger. Angles are 352, 110, 311, and they're currently in the flight plan at 78 plus 55.

03 03 14 11 CC You still there, Ed?

03 03 14 19 LMP That's affirmative. Okay, I have moved it from 78:55 to 77:45.

03 03 14 25 CC Roger. And this is a good attitude for LM communication on AFT OMNI. And the procedure that we'll have for you later on will have the S-band up for telemetry but not for voice, so you want to use AFT OMNI? At 78 hours, or from 78 hours to 80 hours even, we have blocked out for LM checkout of the ascent batteries so you can plan on IVT to the LM at about 78 hours and be back out by 80. Over.

03 03 15 02 LMP Okay. Understand that the attitude we're going to is good for the LM AFT OMNI, and we will IVT to the LM at 78 hours for a battery-5 checkout and be back - plan to be back by 80 hours.

03 03 15 16 CC Roger. And meanwhile, back in the command module, Stu can press on with the rest of the normal command module activities, such as the P52 and all that.

03 03 15 27 LMP Okay. You're going to have some good words on the ascent battery 5 for me, you say, in a little while.

03 03 15 34 CC Yes, indeed. Joe Engle was just over in the LMS here in Houston running through the thing, and it's a fairly - fairly long procedure as far as handwriting goes, but relatively straightforward, and we'll cover it for you in detail.

03 03 15 53 LMP Okay.

03 03 15 59 CC Would you like a general breakdown on what we plan to do?

03 03 16 06 LMP I'll stand by until you're ready to read it out, but maybe you can give me a summary before.

03 03 16 10 CC Roger.

03 03 16 22 LMP Okay. Ready for the next item.

03 03 16 24 CC Okay. This is the docking probe status summary. The conclusion down here is that, on your final successful attempt, the probe's spring started to compress slightly, followed by capture latch engagement. And the dock latch went barber pole, and then the bottle fired and retraction was normal, although the time was somewhat shorter due to the continued firing of the service module RCS. The talkback operation during initial extension and final docking plus the accelerometer data, the capture latch release mode occurrence during the extensions, all indicated normal extension, capture, and retract sequence. Some consideration was given to the possibility that the RCS thrusting compressed the probe until the docking latches engaged, but this would have required more force than the RCS provides. As we mentioned yesterday, we are still GO for the mission. Over.

03 03 17 31	LMP	Okay. And I think I'd like to have you repeat that after Al and Stu get on the headsets so that I won't have to write the whole thing down. I think they'd like to hear it.
03 03 17 40	CC	Okay. How about a pericynthion - -
03 03 18 21	LMP	Go ahead, Bruce.
03 03 18 23	CC	Okay, Ed. We're getting a lot of noise on the downlink right now. Let's stand by until after we shift antennas again.
03 03 20 06	CC	Okay, 14. How do you read now?
03 03 20 12	LMP	Loud and clear, now, Bruce. Okay, our status at the moment - we're going to hold the probe report until Al and Stu get on the headsets. Let's press on. What's the next thing you have?
03 03 20 23	CC	Okay. Pericynthion plus 2 abort pad, standing by; P30.
03 03 20 52	CC	Are you ready for the P30 pericynthion plus 2, Ed?
03 03 21 01	LMP	Okay. LOI plus 2.
03 03 21 04	CC	Roger. Pericynthion plus 2 abort pad. SPS/G&N, 63, 300, plus 0.90, minus 0.33; T_{ig}, 084:35:20 - -
03 03 21 29	LMP	Bruce, hold it a minute.
03 03 22 00	LMP	Okay. Would you start over again now for me, please?
03 03 22 03	CC	Wilco, Ed. This is a pericynthion plus 2 abort pad. SPS/G&N, 63, 300, plus 0.90, minus 0.33, T_{ig}, 084:35:20.03, minus 0711.5, minus 0053.1, minus 1276.8, roll N/A, 084 pitch, yaw N/A. The rest of the pad is N/A. This is an SPS docked burn and the attitudes are based on the landing site REFSMMAT. Read back. Over.
03 03 23 22	LMP	Okay. It's pericynthion plus 2. SPS/G&N, 63, 300, plus 0.90, minus 0.33, 84:35:20.03, minus 0711.5, minus 0053.1, minus 1276.8, roll N/A, pitch 084, yaw N/A, or is that 000. The rest of the pad is N/A. SPS docked, landing site REFSMMAT. Over.

03 03 24 04 CC Roger. I now have your midcourse-4 pad. I - I think you're losing ground on me down here. They seem to be piling up faster than we can get them read up.

03 03 24 15 LMP Okay. Bruce, on the angles on that one. The roll was N/A, pitch was 84, and yaw was zero. Is that correct?

03 03 24 22 CC Yaw was N/A. Actually, if you want the numbers, roll would be 356 and yaw would be 009. We understood there was a previous agreement that you were just going to use pitch for checking, and you would take the roll and yaw as computed by P40. Over.

03 03 24 48 LMP Okay. All right, press on.

03 03 24 57 CC Okay. Let me hold off on this midcourse-4 pad a minute. I can give you just a second's worth of discussion on the thing. It's coming out to 3.8 feet per second, and this is very close to your SPS minimum impulse. It'll be 0.69 seconds of burn time compared to your guaranteed 0.50 min impulse, and when you get down to DELTA-V_c the value of 2/10ths is what they want set in the counter. Over.

03 03 25 40 LMP Okay. Understand that.

03 03 25 49 CC Okay. Midcourse correction number 4. SPS/G&N, 63, 375, plus 0.90, minus 0.33, T_{ig}, 077:38:13.98, minus 0001.6, minus 0002.8, plus 0002.1, roll 011, 249, 325, NOUN 44 N/A, DELTA-V_T 0003.8, 0:01, 0000.2, sextant star 01, 173.2, 33.5, GDC align Sirius and Rigel; 230, 170, 002, no ullage; HIGH-GAIN ANTENNA angles, PITCH plus 32, YAW 290, NARROW BEAM, AUTOMATIC mode. Read back. Over.

03 03 27 41 LMP MCC-4, SPS/G&N, 63, 375, plus 0.90, minus 0.33, and 077:38:13.98, minus 0001.6, minus 0002.8, plus 0002.1, plus - or rather 011, 249, 325, NOUN 44 N/A, 0003.8, 0:01, 0000.2, 01, 173.2, 33.5, Sirius, Rigel at 230, 170, 002, no ullage, HIGH-GAIN ANTENNA angles, PITCH plus 32, YAW 290; you want it on NARROW and AUTO.

03 03 28 46	CC	14, Houston. Readback correct.
03 03 30 38	LMP	Houston, 14. How do you read now?
03 03 30 45	CC	Okay. When you have a chance we'd like POO and ACCEPT Ed. And we'll uplink you the midcourse-4 target load and a new state vector. Over.
03 03 31 20	LMP	Okay, Bruce. You have POO and ACCEPT.
03 03 31 26	CC	Okay, Ed. You may recall our discussion on T_{ephem} last evening, with regard to the sign of the quantity in R_3. We've had a request down here that you, on the CMC and LGC, load in the T_{ephem} from the pad that we passed you. That is the - the quantity using all positive signs. Do you still have that handy?
03 03 31 58	LMP	Let me doublecheck.
03 03 32 24	LMP	Roger. Those are the numbers 00006, 39223, and 16020. Is that affirmative?
03 03 32 32	CC	Roger, that's the one.
03 03 32 36	LMP	Okay, we'll load these in after while.
03 03 32 39	CC	Let us finish with the uplink first.
03 03 32 54	CC	Okay, Ed. We have a - a rather detailed change to the LOI Mode I DPS abort chart and numerical data. This is found in the flight plan in the Contingency Checklist, and the numerical stuff is on one of your cue cards. It'd probably be easiest if you broke out the flight plan, say, and went through it with me.
03 03 33 27	LMP	Okay. Did you get my readback on the midcourse-4 pad?
03 03 33 39	CC	Uh - -
03 03 33 46	LMP	It sounded to me like you dropped out before I finished reading it back.

03 03 34 01 CC Yes. As far as - as far as I can tell, I got all of it. I recall definitely down through Sirius and Rigel, and I believe I recall your reading the HIGH-GAIN ANTENNA angles back, and I got - so I'll Roger for that.

03 03 34 17 LMP Okay, thank you.

03 03 34 57 LMP Okay, Bruce. Give me a few words on the DPS abort changes before we start giving the actual numbers.

03 03 35 08 CC Okay, you have a change in the DPS DELTA-V available line due to a different engine model, change in the spacecraft weight, and a change in the usable propellant from the time that this curve was calculated. You have a change in the two other lines, which are the LOI plus 2-hour and LOI plus 30-minute abort DELTA-V based on the change in your obit from the nominal plan. This all backs up to the 40-minute-late lift-off. And the numerical changes are a consequence of that, also. Over.

03 03 35 53 LMP Okay. Let's start through them slowly then and see if we can correct them.

03 03 35 59 CC Okay.

03 03 36 05 CC Over here in the DPS DELTA-V available line, the left-hand intercept is at abort DELTA-V of 1966 feet per second at LOI DELTA-V of zero. The right-hand intercept on the vertical dashed line comes at an abort DELTA-V of 2130 and the LOI DELTA-V of 725. Then connect the two intercepts together with a straight line. Over.

03 03 36 48 LMP Okay. Stand by. The first one is 1966. Let's just take them one at a time, and I'll plot them.

03 03 36 54 CC Roger.

03 03 37 05 LMP And you say the - the right-hand intercept is 21 what?

03 03 37 11 CC Is 2130, 2130, and it falls on that vertical dashed line at 725. It separates Mode I from Mode II.

03 03 37 24 LMP I got it.

03 03 37 26	CC	Okay, connect them up.
03 03 37 34	CC	14, Houston. The computer's yours.
03 03 37 46	LMP	Okay, I'm in BLOCK. Give me the next line now.
03 03 37 51	CC	Roger. In the LOI plus 2-hour abort DELTA-V region, the left-hand intercept is at 1477 feet per second. Over.
03 03 38 10	LMP	Copy, 1477.
03 03 38 13	CC	Roger. And the right-hand end point is at 2026 abort DELTA-V, and LOI DELTA-V of 238. It should intercept your DPS DELTA-V available line where it crosses the boundary between the Mode I 2 hour and the Mode I 30 minutes. Over.
03 03 38 38	LMP	Roger. Took care of that, and let me draw that one.
03 03 38 48	CC	Okay. You ready for the next one?
03 03 38 59	LMP	Okay. Ready for the next one.
03 03 39 01	CC	Okay. Over in the LOI plus 30-minute abort region, the left-hand intercept, with the boundary between Mode I 2 hour and Mode I 30 minutes, occurs at abort DELTA-V of 1517 and LOI DELTA-V of 238. Over.
03 03 39 20	CC	And we're going down in the mud again, Ed. I'm going to wait for the antenna changeover before we continue with that one.
03 03 39 31	LMP	Okay. I've got you at 1517 for the first one.
03 03 42 01	CC	Okay, 14, Houston. We're coming back in now. I confirm 1517 for the left-hand edge, and the right-hand intercept is at abort DELTA-V of 2395 on the 725 DELTA-V magnitude dashed line. Over.
03 03 42 24	LMP	2375. Is that correct?
03 03 42 27	CC	Negative. 2395. Over.
03 03 42 32	LMP	Okay. 2395.
03 03 43 26	LMP	Okay, Bruce. Have that line plotted.

03 03 43 29 CC Okay. And all three of those lines ought to be pretty close to parallel to the existing lines; you concur?

03 03 43 37 LMP Yes, they sure are.

03 03 43 41 CC Okay. Over to the numerical data. Come on over to the - the little block there and, on the second line down under burn time starting out with 0 plus 33, Mode I, loose, it should be zero plus 33 through 1 plus 19, and DELTA-V_M is 238 through 570. Over.

03 03 44 24 LMP Okay. The burn - the burn - burn time from 033 to 115 should be 033 to 119, and the corresponding DELTA-V_M is 238 to 570.

03 03 44 40 CC Roger. Next line down. The burn time is 1 plus 19 through 1 plus 40, and the burn time is - or the DELTA-V_M is 570 through 725. Over.

03 03 45 02 LMP Okay. We change from 119 to 140 and DELTA-V_M is 570 to 725.

03 03 45 11 CC Roger. On the next line down, you change 1 plus 39 to 1 plus 40, so it reads 1 plus 40 through 2 plus 41. Over.

03 03 45 23 LMP Okay. One - The next line is 140 to 241.

03 03 45 27 CC Okay, now down below it, you've got a column for updated times. And I'll read you the updated times.

03 03 45 38 LMP Okay.

03 03 45 41 CC Okay. GET of LOI ignition: 82 plus 36 plus 47, 83 plus 06 plus 47; roll: 127, 264, 348; CSM IMU angles GET abort ignition, 84 plus 36 plus 47. The next block down under LM FDAI angles, the T_{ig}: 84 plus 36 plus 47; 170, 261, 000.

03 03 46 47 LMP Okay. And Bruce, the only time I think I've missed is the CSM IMU angles at LOI plus 30.

03 03 46 56 CC Okay. 83 plus 06 plus 47. Over.

03 03 47 09	LMP	Okay. I read back GET and LOI ignition update is 82:37:47; the LOI plus 30 is 83:06:47; CSM IMU angle for LOI plus 2 is for a time of 84:36:47; and the LM angles for that time are - the LM FDAI angles for that time are 80 - 84:36:47; and they're 170, 261, 000.
03 03 47 46	CC	Okay, Ed. The readback is correct except that you omitted the roll, pitch, and yaw angles under CSM IMU angles for LOI plus 30.
03 03 48 01	LMP	Roger. I didn't hear them. Are they - they the same?
03 03 48 04	CC	Okay. Roll and yaw are the same. Pitch has changed from 263 to 264. Over.
03 03 48 20	LMP	Oh, those. Okay, I thought I read them to you, Bruce. I have them: 127, 264, and 348.
03 03 48 27	CC	Roger. Readback is correct, and we've got some news whenever you're ready.
03 03 48 34	LMP	Okay. Let's hold off and let the other guys get on the headsets and have some news, while I get some breakfast.
03 03 48 42	CC	Okay, and those changes need to be made in the Contingency Checklist, the flight plan, and on your cue card.
03 03 48 52	LMP	Roger. We'll do it.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 03 59 19	CC	Apollo 14, this is Houston. We would like you to reload T_{ephem} prior to midcourse 4; over.
03 03 59 29	CMP	Okay, Bruce; we'll reload T_{ephem}. I'll do that right now. And the DELTA-V test went real well, and the null bias check with a minus 100 at the start, and went to a minus 98.4.
03 03 59 48	CC	Roger, we copy.
03 03 59 58	CC	Did you say 98.4, Stu?
03 04 00 04	CMP	That's affirmative; 98.4.
03 04 00 06	CC	Roger.
03 04 02 17	CMP	Okay, Bruce, I reloaded. And there it is if you'd like to check it and make sure we're all squared away.
03 04 02 23	CC	Okay, stand by. Roger, we concur, Stu; it looks good.
03 04 02 32	CMP	Okay.
03 04 04 16	CC	Apollo 14, Ed. This is Houston. Do you have a copy of the LM Activation Checklist in the command module at this time, or did you leave both of them in the LM? Over.
03 04 04 31	LMP	Yes, I've got them - -
03 04 04 32	CDR	We have them here in the command module.
03 04 04 34	CC	Roger. Thank you.
03 04 11 23	CMP	Okay, Bruce. The torquing angles are on the DSKY, and I'll be torquing at 76:51:30.
03 04 11 34	CC	Roger, Stu.
03 04 11 51	CC	Okay. It looks good from down here, Stu.
03 04 11 56	CMP	Okay.

03 04 29 22	CMP	Houston, 14.
03 04 29 25	CC	Go ahead, 14.
03 04 29 30	CMP	Okay, Bruce. Looking over the flight plan, we moved up that maneuver to the Moon-view attitude, and I'm going to go the way I did back here right after midcourse 4 instead of where it shows over at 78:50 if you all agree.
03 04 29 50	CC	Roger. We concur.
03 04 29 55	CMP	Okay.
03 04 39 27	CMP	Houston, 14.
03 04 39 32	CC	Go ahead, 14.
03 04 39 37	CMP	Okay. The pad value for DELTA-V_c is 0.2, and you all gave us that before we ran our null bias check. Is that - is that still a good value?
03 04 39 53	CC	Yes, that's still a good number, Stu.
03 04 39 58	CMP	Okay.
03 04 43 54	CC	14, Houston.
03 04 43 59	LMP	Go ahead.
03 04 44 00	CMP	Go ahead, Houston.
03 04 44 02	CC	Okay. We'd like to get the high gain, whenever you can crank it up.
03 04 45 39	LMP	Houston, 14 on the high gain. How do you read?
03 04 45 44	CC	Loud and clear, Ed.
03 04 45 48	LMP	Okay.
03 04 50 00	CC	14, Houston.
03 04 50 04	LMP	Go ahead, Houston.
03 04 50 06	CC	Okay. Your high gain is oscillating a bit there. Want you to try another acquisition there, Ed?

03 04 50 17	LMP	Roger, Fred. We've tried it twice, and it's still doing it. I'll give it one more go.
03 04 50 22	CC	Okay.
03 04 51 38	LMP	Houston, 14. That seems to be the best we could do. It's still oscillating. Got another suggestion?
03 04 51 45	CC	Stand by, Ed.
03 04 52 52	LMP	14, Houston.
03 04 53 03	CC	Okay, Ed. Suggestion is to take the SERVO ELECTRONICS switch, panel 2; go to SECONDARY; and then try REACQ.
03 04 53 15	LMP	Okay.
03 04 53 58	LMP	Okay, Houston. I think we've finally got it up on the fourth attempt.
03 04 54 05	CC	Okay, Ed.
03 04 57 32	CDR	Okay, Houston. We got about 40 seconds to burn. We're ready to go on time.
03 04 57 37	CC	Roger, Al.
03 04 58 19	CDR	Okay, we had a good burn.
03 04 58 21	CC	Roger, Al.
03 04 59 44	CDR	Okay, Houston. 14 with a burn report.
03 04 59 48	CC	Okay. Go ahead, Al.
03 04 59 53	CDR	DELTA-V_c, minus 2.6; and the fuel and oxidizer, no appreciable change.
03 05 00 07	CC	Okay DELTA-V_c, minus 2.6; and the fuel/OX, no change.
03 05 00 17	CDR	That's correct.
03 05 02 33	CC	14, Houston.
03 05 02 37	LMP	Go ahead.

03 05 02 38	CC	We would like AUTO on the HIGH GAIN now, Ed. And just one other question. Did you mean you tried four times on the SECONDARY SERVO ELECTRONICS to get locked up?
03 05 02 53	LMP	Yes, it was about that, Fred. It could be that I wasn't giving it enough delay time before I tried something else when it was in the NARROW position. But I thought I was, and I don't know what I did differently on the last attempt that did work than the previous attempts which didn't work.
03 05 03 12	CC	Okay. You tried to lock up in NARROW rather than WIDE. Is that correct?
03 05 03 23	LMP	Roger. I went from WIDE to MEDIUM to NARROW.
03 05 03 25	CC	Okay.
03 05 09 41	CDR	Houston, 14. The LM/command module DELTA-P is zero. We're starting to remove the tunnel hardware.
03 05 09 48	CC	Roger, Al.
03 05 10 01	CC	And are both Al and Ed on the headsets now?
03 05 10 08	CDR	That's affirm.
03 05 10 10	CC	Okay. Looking at - -
03 05 10 11	LMP	Yes, we're all on, Fredo.
03 05 10 14	CC	Okay. Looking at the procedure here for the business in the LM, looks like the better way to handle it, rather than have you write it all down, is for me to just give it to you on a step-by-step basis after you're in the LM and set up and ready to go. And I'll just have somebody, Joe here, checking me off as we do it.
03 05 10 46	CDR	Okay. We'll let you know when we're in there, and we'll keep command module comm in there.
03 05 10 51	CC	Roger, Al.

03 05 12 20	LMP	Houston, 14.
03 05 12 24	CC	Go ahead, Ed.
03 05 12 27	LMP	Just a quick comment in passing. The Moon is out my rendezvous window right now, and it seems to be growing noticeably in size. We've reached that point where the - we're running downhill very rapidly toward it.
03 05 12 43	CC	Roger, Ed. Showing you about - oh, it looks like about 205,000 out, now.
03 05 12 53	LMP	Roger.
03 05 14 49	CMP	Hey, Fred, old boy, this Moon-view attitude is just what it says. It's got her framed right in the hatch window.
03 05 14 59	CC	Incredible.
03 05 15 03	CMP	Yes, that's just like everything else. You all do good work.
03 05 26 20	LMP	Houston, Apollo 14.
03 05 26 22	CC	Go ahead, 14.
03 05 26 27	LMP	Okay, Fredo. I'm through the tunnel and ingressing the LM at this point. What's about the first thing you want me to head for?
03 05 26 37	CC	Okay, I'll let Joe talk to you here and kind of give you a few words on the big picture. And then we'll start in.
03 05 26 47	LMP	Okay.
03 05 26 49	MCC	Okay, Ed. What this is going to amount to is an abbreviated - a very abbreviated powerup, and we will transfer to LM power; so, Stu, you can stand by, and we'll get our own times on that. Now, Ed, if we have a comm problem any time during this - and we are out of configuration - just get the activation checklist and go to page 1-17 and complete the deactivation from that point on.

03 05 27 38	MCC	And, Ed, if you're ready to go now, we'll start through here.
03 05 27 47	LMP	Okay, Joe. How about giving me a quick overall picture of the problem as you saw it from the ground. I didn't see much of anything here that was indicative of a problem.
03 05 27 56	MCC	Okay. Just a second here.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 05 28 11	CC	Okay, Ed. I wanted to get the values correct here. TM picked up about 3/10ths of a voltage - of a volt low on battery 5, which gave some concern, and, primarily, we just want to verify that perhaps we're not - we don't have a gage that's giving us that much of a difference, rather than the battery itself.
03 05 28 37	LMP	3/10ths of a volt?
03 05 28 39	CC	Yes. That's affirmative. That's open-circuit voltage, Ed.
03 05 28 44	LMP	As I recall, we read - Roger. As I recall, we read them off a half a volt different, 36 and a half to 37. Is that right?
03 05 28 54	CC	Roger, Ed. That was half a volt onboard, and the telemetry showed the 3/10ths down here.
03 05 29 04	LMP	Okay.
03 05 29 05	CC	Okay. And essentially, Ed, what we're going to do is put the - put both batteries on an open bus to read out both bus and battery voltages. And, if we're not satisfied with the readings at that point, we'll go ahead and load up the LMP bus and - put a load on it rather - and then check the battery performance both by itself and sharing a load on the LMP bus.
03 05 29 26	LMP	Okay. I understand what you're going to do.
03 05 29 38	CC	Okay. Let's press on, and I'll read the items off in checklist fashion. And I'll read one or two items at a time, Ed, depending on if they're in the same proximity, and wait for your verification.
03 05 29 58	LMP	Okay. I'm ready.
03 05 29 59	CC	Okay. Up front, let's turn the FLOODLIGHTS to ALL.

03 05 30 07	LMP	FLOODLIGHTS are at ALL.
03 05 30 08	CC	Okay. Window shades, down.
03 05 30 16	LMP	That's in work.
03 05 30 51	LMP	Okay. Window shades are down.
03 05 30 52	CC	Okay. And back on ECS panel now. The DESCENT WATER and DESCENT OXYGEN, both OPEN.
03 05 31 09	LMP	WATER and O_2 are OPEN.
03 05 31 11	CC	CABIN REPRESS to AUTO.
03 05 31 17	LMP	CABIN REPRESS going to AUTO.
03 05 31 20	CC	And on panel 16, CABIN REPRESS circuit breaker, closed.
03 05 31 27	LMP	REPRESS breaker, closed.
03 05 31 29	CC	Okay. And, Kitty Hawk, we're ready to transfer to LM power now, and if you'll give us the mark, we'll get the time.
03 05 31 43	CMP	Okay, Joe, on my mark; 3, 2, 1
03 05 31 49	CMP	MARK.
03 05 31 53	LMP	I have power.
03 05 31 55	CC	Okay, Ed. We've got it. And now on panel 11 and 16. The TRANSLUNAR BUS TIE breakers, both closed.
03 05 32 13	LMP	TRANSLUNAR BUS TIES are closed.
03 05 32 15	CC	Okay. On panel 11, SIGNAL CONDITIONER 1, closed.
03 05 32 26	LMP	CONDITIONER 1's closed.
03 05 32 28	CC	Over on the other side on 16, SIGNAL CONDITIONER 2, closed.
03 05 32 36	LMP	Closed.
03 05 32 38	CC	Okay. Under EPS, the DISPLAYS and the DESCENT ECA control, both closed.

03 05 32 50	LMP	Okay. EPS DISPLAYS and DECA - DESCENT ECA control, closed.
03 05 32 55	CC	Okay. Now verify the DESCENT BATTERIES, all four talkbacks are on LOW and the DESCENT BATTERY talkback is gray.
03 05 33 03	LMP	That's verified. That's verified.
03 05 33 06	CC	Okay. On panel 16, under COMM, PRIMARY S-BAND, both breakers, closed, and the PMP, closed.
03 05 33 20	LMP	Okay. COMM, PRIMARY S-BAND power amp TRANS-MITTER/RECEIVER and PMP, closed.
03 05 33 27	CC	Okay. And while we're doing this, you can keep your eye on that bus voltage - whether or not we need to go to high taps.
03 05 33 36	LMP	Okay.
03 05 33 37	CC	Okay. Still on 16, the PCM/TE breaker, closed.
03 05 33 47	LMP	PCM/TE, closed.
03 05 33 49	CC	Okay. And on 16, ASCENT ECA and ASCENT ECA CONTROL, both closed.
03 05 33 58	LMP	Okay, ASCENT ECA, CONTROL, closed.
03 05 34 09	CC	Okay, Ed. Now, on your audio panel on the LMP side, S-BAND T/R to T/R.
03 05 34 20	LMP	S-BAND T/R, T/R.
03 05 34 22	CC	And under COMM, under the S-BAND, PM, PRIME, PRIME, OFF, PCM.
03 05 34 36	LMP	Okay, PM, PRIME, PRIME, OFF, PCM.
03 05 34 38	CC	Okay. And then OFF/RESET on your RANGE.
03 05 34 41	LMP	... Okay. OFF/RESET, then 27 volts. Let's switch to high taps.
03 05 34 47	CC	Okay. Very good.
03 05 35 02	LMP	Okay, I'm on high taps.

03 05 35 05	CC	Okay. Very good. Now on your TELEMETRY, Ed, we'll want OFF and HI.
03 05 35 17	LMP	And OFF and HI. You have it.
03 05 35 21	CC	Okeydoke. Now, on the S-BAND ANTENNAS, you might take a quick check and see which is your best OMNI there.
03 05 35 40	LMP	Well, since we don't have those meters powered up, I don't have anything to tell by.
03 05 35 47	CC	Okay. We've got data now, Ed. Thank you.
03 05 35 53	LMP	Okay. I'm on AFT.
03 05 35 55	CC	Okay, now stand by 1; we'll see if we're ready to press on here.
03 05 36 15	CC	Okay, Ed. We're ready to press on, and, for your information on telemetry here, we're still showing that ASCENT about 3/10ths of a volt low, ascent 5. Okay, Ed. We're ready to pick up now on panel 11. EPS CROSS TIE BALANCE LOADS, open.
03 05 36 40	LMP	Okay. EPS CROSS TIE BALANCE LOADS, panel 11.
03 05 36 46	CC	That's affirmative.
03 05 36 47	LMP	Is open. That makes them both open, now.
03 05 36 50	CC	Okay. Now we're going to turn off BATTERIES 3 and 4, so BATTERY 3 and 4 HI VOLTAGE to OFF/ RESET. And you may get a dc feeder-fault light here.
03 05 37 05	LMP	BAT 3 and 4, you want the OFF/RESET. I have bos - both BALANCE LOADS and BUS - CROSS TIE BUS, open. In other words, you want to dump the COMMANDER's BUS. Is that correct?
03 05 37 18	CC	That's affirmative.
03 05 37 21	LMP	Okay. Here they go. And I have a feeder fault.
03 05 37 30	CC	Okay. You do have a feeder fault?

03 05 37 35	LMP	I have a feeder-fault light.
03 05 37 37	CC	Yes, that's what I mean. Okay. Very good. Now on panel 11, Ed, they want to open all the circuit breakers on panel 11, except SIGNAL CONDITIONER 1, the DC BUS VOLT, and both BAT FEED TIE breakers.
03 05 37 54	LMP	Okay. I want them all open except SIGNAL CONDITIONER 1, the DC BUS VOLT. Is that affirm?
03 05 38 01	CC	That's affirmative.
03 05 38 06	LMP	Okay. It's open. We never got it closed. I'm closing it now.
03 05 38 28	LMP	Okay, Joe, I'm - Say again the ones you want closed.
03 05 38 33	CC	Okay, Ed. We have four that we want closed. They are the SIGNAL CONDITIONER - SIGNAL CONDITIONER 1, BAT BUS VOLTS, and both BAT FEED TIE breakers.
03 05 38 52	LMP	Say, you're breaking up. Give me the last three again. I have the SIGNAL CONDITIONER, but I still don't get the last three.
03 05 38 58	CC	Okay. The DC BUS VOLTS and both BAT FEED TIE breakers.
03 05 39 09	LMP	Okay. Both BAT FEED TIES, DC BUS VOLTS, and the SIGNAL CONDITIONER. I'm now pulling the RENDEZVOUS RADAR HEATER, the STANDBY breaker, the LANDING RADAR HEATER breaker, ANNUNCIATING/DOCKING/COMPONENT lighting breaker, IMU STANDBY, DESCENT ECA, TRANSLUNAR BUS TIE. I now have four bus - four circuit breakers closed, the remainder open.
03 05 39 47	CC	Okay. And you have the IMU STANDBY breaker open. Is that affirm?
03 05 39 52	LMP	That's affirm.
03 05 39 59	CC	Okay, Ed. Our next step now. We'd like to bring BATTERY 5 BACK UP, ON.
03 05 40 11	LMP	Okay, BATTERY 5 BACK UP COMMANDER FEED is ON.

03 05 40 14	CC	Okay, very good. And onboard there, if you'd compare both your battery and bus voltages and give us a readout, please.
03 05 40 25	LMP	Okay, BATTERY 5 is reading about 35.8, and the COMMANDER's BUS is reading 35.8.
03 05 40 43	CC	Okay, Ed. BAT 5 BACK UP, OFF.
03 05 40 50	LMP	BAT 5 BACK UP, OFF.
03 05 40 56	CC	Okay, Ed. BATTERY 6 NORMAL, ON.
03 05 41 03	LMP	BATTERY 6 NORMAL is ON.
03 05 41 07	CC	Very good, now give us battery and bus voltages, please.
03 05 41 12	LMP	Okay, I read 36 on the bus, 36 on the battery.
03 05 41 24	CC	Okay, Ed. Now, BATTERY 5 BACK UP to ON, and when you do it, see if BATTERY 6 pulls any of BATTERY 5 load.
03 05 41 36	LMP	Okay, stand by.
03 05 41 49	LMP	BATTERY 6 BACK UP, ON now. And, looks like the volt on - the voltage on 6 rose just a little bit, and I see no change in current. It appears that it's sharing the load; they're both at 36 plus.
03 05 42 12	CC	Okay. Now let me verify, Ed. You do have BATTERY 5 on BACK UP and BATTERY 6 on NORMAL.
03 05 42 19	LMP	That's affirm.
03 05 42 21	CC	Okay. Stand by 1 now, and let us look at the stuff here.
03 05 42 30	LMP	With your concurrence, I was looking at 6 when I brought 5 BACK UP, ON. Let me shift it - my TEMP MONITOR - POWER/TEMP MONITOR - and watch 5 and cycle them, if that's okay.
03 05 42 53	CC	Okay, Ed. First could you verify ASCENT ECA CONTROL breaker is closed, please.

03 05 43 02	LMP	That's affirm, ASCENT ECA CONTROL is closed.
03 05 43 07	CC	Okay. And the ASCENT ECA breaker, also.
03 05 43 13	LMP	That's negative.
03 05 43 18	CC	Okay. We'd like ASCENT ECA closed on 16, Ed.
03 05 43 26	LMP	Okay. You've got it.
03 05 43 33	CC	Okay, Ed. Now we'll take - we'd like you to take BATTERY 6 to OFF momentarily and then back to NORMAL power, and you can watch BATTERY 5 voltage there on your monitor.
03 05 43 46	LMP	Okay, BATTERY 6 coming OFF.
03 05 43 57	LMP	Now when I cycle BATTERY 6, the BATTERY 5 voltage comes up when BATTERY 6 is brought on the line. It drops down when BATTERY 6 is off the line. However, by watching 6, I do not see any current drain.
03 05 44 14	CC	Yes, we concur. We're seeing the same thing here, Ed. And stand by just a moment in this configuration now.
03 05 44 40	CC	Okay, Ed, next function. Let's take BATTERY 5 BACK UP - correction - BATTERY 6 NORMAL FEED, OFF.
03 05 44 50	LMP	BATTERY 6 NORMAL is OFF.
03 05 44 55	CC	And BATTERY 5 BACK UP, OFF.
03 05 44 59	LMP	BATTERY 5 BACK UP, OFF.
03 05 45 09	CC	Okay, Ed. We can turn BATTERY 3 HI VOLT and BATTERY 4 HI VOLT back ON now?
03 05 45 21	LMP	Okay, BATTERY 3 HI VOLT is ON. BATTERY 4 HI VOLT is ON.
03 05 45 32	CC	Okay, Ed - -
03 05 45 34	LMP	... 5 VOLTS.

03 05 45 37	CC	Okay, very good. Okay, Ed. If you have your activation - Do you have your activation checklist there with you?
03 05 45 48	LMP	That's affirmative.
03 05 45 49	CC	Okay, go ahead and configure panel 11 now as per page 1-3, and I'll have four changes when you - when you get the breakers configured there.
03 05 46 16	LMP	Okay. Configuring panel 11 as per 1-3.
03 05 46 21	CC	Okay, very good.
03 05 48 14	CC	Okay, Ed. And give me a call when you get panel 11 configured there.
03 05 48 30	LMP	Okay, Joe. It's complete.
03 05 48 32	CC	Okay, very good. Now I've got four breakers I'd like for you to change on 11. The CROSS TIE BALANCE LOAD breaker, open.
03 05 48 53	LMP	Okay. CROSS TIE BALANCE LOADS is open.
03 05 48 55	CC	TRANSLUNAR BUS TIE, closed.
03 05 49 05	LMP	TRANSLUNAR BUS TIE, closed.
03 05 49 07	CC	SIGNAL CONDITIONER 1, closed.
03 05 49 24	LMP	Okay. SIGNAL CONDITIONER 1, closed.
03 05 49 26	CC	Okay. And GLYCOL PUMP 2, closed.
03 05 49 50	LMP	Okay. I've closed the following circuit breakers, in addition to 13: SIGNAL CONDITIONER 1, GLYCOL PUMP 2, TRANSLUNAR BUS TIE, and I've opened the CROSS TIE BALANCE LOADS.
03 05 50 03	CC	Okay, very good, Ed. What we want to do, now, is put some loads on the LMP BUS for the load test. Now you can go over to panel 16, Ed. And on panel 16, I'd like the - under INSTRUMENTATION - the SIGNAL SENSOR, closed.
03 05 50 36	LMP	Okay. It's closed.

03 05 50 37	CC	Okay. Under ECS, DISPLAYS, closed.
03 05 50 45	LMP	ECS DISPLAYS, closed.
03 05 50 47	CC	And under HEATERS, the RCS SYSTEM A and B, all four heaters - circuit breakers, closed.
03 05 51 01	LMP	Okay. Under HEATERS, RCS SYSTEM A/B-2 QUADS 1, 2, 3, 4 are closed.
03 05 51 07	CC	Okay, very good. Now back on panel 11 we have AC BUS A and B, BUS TIE INVERTER breakers, all four of them, closed.
03 05 51 23	LMP	Okay. AC BUS A and B, I've closed the four BUS TIE INVERTER breakers.
03 05 51 28	CC	Okay. Under AC BUS A, the AC BUS VOLTS, closed.
03 05 51 37	LMP	AC BUS VOLTS, closed.
03 05 51 40	CC	Okay. Under AC B, the SYSTEM ENGINEER WINDOW HEATER, closed.
03 05 51 54	LMP	Okay. SE WINDOW HEATER's closed.
03 05 51 56	CC	And under AC BUS A, the COMMANDER's WINDOW HEATER, closed.
03 05 52 05	LMP	Okay. COMMANDER's WINDOW HEATER, closed.
03 05 52 09	CC	Okay, now if you'd scurry back over to the other side under 16, we have EPS INVERTER 2, closed.
03 05 52 23	LMP	EPS INVERTER 2, closed.
03 05 52 27	CC	Okay, Ed. Now if you'll check the AC BUS and turn on INVERTER 2 - turn INVERTER switch to number 2.
03 05 52 41	LMP	Okay, Joe. And I'm reading right at the high end of the green band. Just under 38 volts indicated.
03 05 52 48	CC	Okay, very good. Now, turn your MONITOR to BATTERY 1, and we'd like the RCS SYSTEM A/B-2 QUAD HEATERS, all four, to the MANUAL position, Ed.

03 05 53 10	LMP	Okay. They're in MANUAL.
03 05 53 13	CC	Okay. Now let's bring BATTERY 5 NORMAL switch ON.
03 05 53 21	LMP	Okay, stand by. BATTERY 5 NORMAL is coming ON.
03 05 53 37	CC	Okay, very good.
03 05 53 39	LMP	And BATTERY 5 seemed to have picked up - picked up about 12 amps indicated.
03 05 53 46	CC	Okay.
03 05 53 52	LMP	And is sharing the load with 1 and 2, apparently.
03 05 53 57	CC	Okay, looks good. And stand by just a few more seconds, Ed.
03 05 54 24	CC	Okay, Ed. Now let's start bringing - taking the descent batteries off. First of all, we'd like BATTERY 1 to OFF/RESET.
03 05 54 37	LMP	BATTERY 1, OFF/RESET.
03 05 54 40	CC	Okay. And let's remain in this configuration for a few seconds here.
03 05 55 30	CC	Okay, Ed, now bring BATTERY 2, OFF/RESET.
03 05 55 44	LMP	Okay. BATTERY 2 is OFF, and BAT 5 is carrying the whole load at 30 amps.
03 05 55 50	CC	Yes. Looks good here.
03 05 55 57	LMP	Looks good to me.
03 05 56 00	CC	Okay. Give us about a minute here, Ed, and we'll press on to the next step.
03 05 56 07	LMP	Okay. Sure have a good - Moon view out the Commander's window here.
03 05 57 02	CC	Okay, Ed. We're ready to press on now. Let's turn BATTERY 6 BACK-UP, ON.
03 05 57 12	LMP	Okay. BATTERY 6 BACK-UP is ON.

03 05 57 18	CC	Okay. We'll remain here for a few seconds and take a look at her - -
03 05 57 21	LMP	... Okay. 5 and 6 seem to be sharing the load.
03 05 59 11	CC	Okay, Ed. Now BATTERY 6 BACK UP, OFF.
03 05 59 19	LMP	Okay. It's OFF.
03 05 59 22	CC	Very good. Now, let's take BATTERIES 1 and 2 HI VOLT to ON.
03 05 59 37	LMP	Okay. 1 and 2 HI VOLTS are ON.
03 05 59 39	CAPCOM	Okay. BATTERY 5 NORMAL, OFF/RESET.
03 05 59 44	LMP	5, OFF/RESET.
03 05 59 46	CC	Okay. Now on the circuit breakers over there, the RCS SYSTEM A/B-2 QUADS, all four breakers, open.
03 06 00 02	LMP	All four, open.
03 06 00 05	CC	Okay. You can turn all four heater switches to the OFF position.
03 06 00 13	LMP	That's completed.
03 06 00 15	CC	Okay. Now turn the INVERTER switch, OFF.
03 06 00 25	LMP	Okay. It's OFF.
03 06 00 27	CC	Okay and INVERTER 2 breaker, open.
03 06 00 31	LMP	That's completed.
03 06 00 34	CC	Okay, Ed. Now let's finish deactivating here - that wasn't that looks like a good check. Can - on your audio panel, you can turn your S-BAND T/R, OFF.
03 06 00 51	LMP	It's OFF.
03 06 00 59	CC	Okay. And I guess we want to stand by here just a moment, Ed.
03 06 01 11	LMP	Okay.

03 06 01 45	CC	What we're doing right now, Ed, is just watching the open circuit voltage on that TM here for a few minutes to make sure it's stable.
03 06 01 55	LMP	Okay.
03 06 02 03	LMP	And using up good juice as well.
03 06 02 06	CC	(Laughter) Yes.
03 06 04 58	LMP	Houston, 14. Can we press on and get powerdown? We're using juice.
03 06 05 03	CC	Yes. We're just about ready to press on, Ed. Okay, Ed. We're going now with the intercomms, S-BAND PM, OFF, OFF, OFF.
03 06 05 19	LMP	Okay.
03 06 05 24	CC	And your RANGING to OFF/RESET.
03 06 05 25	LMP	Okay. You have PM, OFF, OFF, OFF, OFF, OFF/ RESET.
03 06 05 31	CC	Okay. And TELEMETRY, OFF, and LO.
03 06 05 35	LMP	Okay. You have OFF and LO.
03 06 05 37	CC	Okay, on 16 circuit breakers, Ed. Under EPS, CROSS TIE BALANCE LOADS, open.
03 06 05 47	LMP	Okay. CROSS TIE BALANCE LOADS are open.
03 06 05 50	CC	Okay, and you can select low taps on batteries.
03 06 06 04	LMP	Okay. Low taps on the batteries.
03 06 06 05	CC	Okay, Ed. Now you can go back to that activation checklist and configure the - both circuit breaker panels as per page 1-3 and 1-4 and I'll stand by. And if you will, give me a call when you're finished with that.
03 06 06 24	LMP	Okay.
03 06 07 40	LMP	Panel 11's configured.

03 06 07 42	CC	Very good, Ed. Okay, Stu. If you're ready, you can transfer back to CSM power now, and we'll get the time, if you'll give us a mark.
03 06 07 54	LMP	Hold it just a second. I still haven't got 16 configured yet, Joe.
03 06 08 01	CC	Oh, okay. Stand by, Stu.
03 06 09 16	LMP	Okay, Joe; it's completed. Stu's transferring power.
03 06 09 19	CMP	Okay, Joe. Here it comes back to the CSM. 3, 2, 1 -
03 06 09 26	CMP	MARK.
03 06 09 30	CC	Okay, Stu. We've got it. Thank you very much. Okay, Ed, now on your ECS panel, you can close the DESCENT WATER and OXYGEN.
03 06 09 50	LMP	Completed.
03 06 09 51	CC	Okay. CABIN REPRESS closed.
03 06 10 02	LMP	The CABIN REPRESS is closed.
03 06 10 04	CC	On panel 11, on your circuit breakers the EPS, DC BUS VOLT, open.
03 06 10 15	LMP	It's open.
03 06 10 17	CC	And on panel 16 under ECS, CABIN REPRESS, open.
03 06 10 24	LMP	It's open.
03 06 10 25	CC	Okay. You can roll the window shades back up now, Ed.
03 06 10 43	LMP	Okay. The window shades are going up, and the old Moon is sure getting big in the Commander's - Commander's window at this point.
03 06 10 51	CC	Okay. Very good. You're not very far from there, on the chart up here, that's for sure. Okay, Ed, on panel 3, FLOODLIGHT, OFF.

03 06 11 00	LMP	Growing noticeably in the last hour.
03 06 11 05	CC	Okay. We copy that. And on panel 3 now, FLOODLIGHT, OFF.
03 06 11 18	LMP	Okay. It's OFF.
03 06 11 22	CC	Okay, Ed, the CABIN RELIEF and DUMP OVERHEAD to open.
03 06 11 50	LMP	Verify, it's open.
03 06 11 52	CC	Okay. Now you can IVT back to the command module, and close the hatch behind you. And we thank you very much.
03 06 12 02	LMP	Okay. Is everybody satisfied with the checkout, Joe? Are we GO?
03 06 12 05	CC	Yes. It looks good, Ed.
03 06 13 36	LMP	Okay. The LM hatch is secured.
03 06 13 41	CC	Okay. Very good, Ed.
03 06 13 57	CC	And, Ed, we'll have some more elaborate words for you on those batteries. The battery 5 holds the load real good. It stands up under the load real good. I think they want to evaluate a few more parameters here, and so far it looks like there's nothing to worry about.
03 06 14 18	LMP	Okay, Joe. Thank you.
03 06 14 28	CDR	Houston, 14. Shall we put the hardware back in the tunnel?
03 06 14 33	CC	Okay. Stand by, Al.
03 06 14 53	CC	Apollo 14, this is Houston. Roger, Al, you can go ahead, and put the hardware back in and get back into normal configuration.
03 06 15 03	CMP	Okay. That's in work.
03 06 15 04	CDR	Okay. Will do.

03 06 44 43	CC	14, Houston.
03 06 44 49	CDR	Go ahead.
03 06 44 51	CC	Okay, we'd like POO and ACCEPT, and we'll pump you up the state vector, preliminary target load and REFSMMAT.
03 06 45 24	CC	Did you copy, 14?
03 06 45 30	CDR/LMP	We've got it.
03 06 45 32	CC	Okay.
03 06 51 39	CC	14, Houston. The computer is yours now.
03 06 51 45	CDR	Okay.
03 06 58 23	CC	14, Houston.
03 06 58 28	LMP	Go ahead.
03 06 58 30	CC	Okay, I have a preliminary LOI maneuver pad ready.
03 06 59 28	LMP	Okay, Fredo. I'm ready to copy your preliminary LOI-1 pad.
03 06 59 35	CC	Okay, it's SPS/G&N, 63306, plus 0.90, minus 0.33; 082:36:46.55; minus 2801.9, minus 1105.3, minus 0227.3; 351, 258, 326; 0172.3, plus 0058.4; 3020.6, 6:12, 3013.1; 12, 288.3, 27.1; and the rest of the column N/A. Star 15, Sirius, and star 12, Rigel.
03 07 01 15	CC	Okay, on the zero mark, the set stars R-aline, 127; P-aline, 148; Y-aline, 015; no ullage; LM weight, 33675.
03 07 01 51	LMP	Fredo, would you give me the minutes of NOUN 33 again, please?
03 07 01 57	CC	Okay, 36.
03 07 02 05	LMP	Okay, it's an LOI preliminary SPS/G&N, 63306, plus 0.90, minus 0.33; 082:36:46.55; minus 2801.9, minus 1105.3, minus 0227.3; 351, 258, 326; 0172.3, plus 0058.4; 3020.6, 6:12, 3013.1;

12, 288.3, 27.1; the rest NA. Set stars, Sirius and Rigel, at 127, 148, 015; no Ullage; LM weight, 33675.

03 07 03 05 CC Okay, Ed; was good readback.

03 07 03 14 LMP Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 07 03 19	CDR	And, Houston; 14. Did you get the 93s and the torquing time?
03 07 03 26	CC	We've got the 93s, Al, but we need the torque time.
03 07 03 34	CDR	Okay, 079:39:20.
03 07 03 40	CC	Copy, 079:39:20.
03 07 06 24	CC	14, Houston.
03 07 06 30	CDR	Go ahead.
03 07 06 31	CC	Al, while you still maybe got that pad book handy, I got a TEI-4 pad ready to come up.
03 07 07 04	CDR	Okay. Go ahead with your pad.
03 07 07 07	CC	Roger. TEI-4: SPS/G&N; 38242; plus 0.90, minus 0.33; 091:17:38.52; plus 3903.4, plus 0706.3, minus 0165.8; 181, 069, 012. Rest of column N/A. Ullage four jets, 14 seconds. Other remarks: assumes burn undocked, and assumes no DOI. Okay and - -
03 07 08 04	CDR	TEI-4 and SPS/G&N - -
03 07 08 19	CC	Okay, I've got one correction before you read back, Al. They gave me the docked pitch and yaw trim, the NOUN 48s, and I need to change those on you right now. Okay. The pitch should be minus 0.57, and the yaw trim, plus 0.40.
03 07 08 58	CDR	Okay, I have it as follows: TEI-4: SPS/G&N, plus 38242; minus 0.57, plus 0.40; 091:17:38.52, plus 3903.4, plus 0706.8. I need DELTA-V_Z; 181,069,012; four-jet ullage, 14 seconds, burn undocked.
03 07 09 38	CC	Okay, Al. NOUN 81, I maybe heard you wrong. DELTA-V_Y, first, should be plus 0706.3; and the DELTA-V_Z, minus 0165.8, and the last remark is "assumes no DOI."

03 07 10 12	CDR	All right, will repeat DELTA-V_Y, plus 0706.3, and minus 0165.8; last remark, "assumes no DOI."
03 07 10 23	CC	Okay. Good readback.
03 07 16 53	CC	14, Houston.
03 07 16 58	CDR	Go ahead, Houston.
03 07 17 00	CC	Okay, if Ed's got a minute there, I'd like to proceed through a little bit of looking at the high gain.
03 07 17 13	LMP	Okay, Fredo. Just 1, please.
03 07 17 15	CC	Okay.
03 07 17 31	LMP	Okay, I'm ready. What do you want to do?
03 07 17 33	CC	Okay, first match your dial of pitch and yaw indications with what you're reading on the indicators.
03 07 17 56	LMP	Okay.
03 07 17 57	CC	Now, MANUAL and WIDE.
03 07 18 09	LMP	Okay, you have it.
03 07 18 11	CC	Okay, put the HIGH GAIN SERVO ELECTRONICS switch back to PRIMARY, and after that go through another normal acquisition.
03 07 18 25	LMP	Okeydoke.
03 07 18 35	LMP	It locked up, immediately, Fredo.
03 07 18 38	CC	Very good.
03 07 18 44	LMP	The only thing different than what it was doing this morning was that, it was not increasing signal strength immediately upon going to MEDIUM or NARROW.
03 07 18 53	CC	Roger, Ed.
03 07 18 56	LMP	And - and, of course, it seemed to be oscillating after that. It's steady now.

03 07 19 03 CC Okay.

03 07 29 50 CC 14, Houston.

03 07 29 54 CDR Go ahead.

03 07 29 57 CC Is everybody on the line now, Al, so I can pass up this docking probe status?

03 07 30 06 CDR Stand by 1.

03 07 30 08 CC Okay.

03 07 30 34 CDR Houston, can we give you a call in about 20 minutes?

03 07 30 38 CC Okay.

03 07 44 52 CDR Houston, 14. I have the null bias check figures for you.

03 07 44 57 CC Go ahead, Al.

03 07 45 03 CDR Okay, we went from minus 100, to minus 985.

03 07 45 13 CC Okay, we got that, Al.

03 08 07 01 CDR Houston, Apollo 14. We're ready for the discussion of the probe, now.

03 08 07 07 CC Okay, Al. Okay, the conclusion down here is that on your final attempt, the probe spring started to compress slightly, followed by the capture latch engagement talkbacks going barber pole. The bottle then fired and the retraction looked normal, although the time was somewhat shorter due to the contingent firing of the command module RCS jets. The talkback operation during the initial extension in the final docking, plus the accelerometer data, and also the look-see at the capture latch release motor currents during the extension, all indicated a normal extension, capture, and retract sequence. Some consideration, Al, was given to the possibility that the RCS thrusting compressed the drogue/probe maybe until the docking latches engaged, but the final word was that this would require more force than the

RCS could provide. And I guess the most important fact is - as discussed yesterday, we're GO for the mission.

03 08 07 53 CDR Okay. Do you suggest any special docking technique for the final docking and rendezvous?

03 08 09 03 CC Yes, we're, we're still - -

03 08 09 04 CDR I'm thinking of course in - -

03 08 09 08 CC Okay, we don't have any - -

03 08 09 09 CDR - - I'm thinking, of course, in terms of the different masses.

03 08 09 12 CC Roger, Al. We don't have any procedure ready at this time. We're still thinking about the possibilities, and we'll have that ready for you before the time.

03 08 09 28 CDR Okay.

03 08 09 30 CMP Hey, Fred?

03 08 09 31 CC Go ahead.

03 08 09 35 CMP Okay, could we hit that again, now? I guess I don't understand why - why it didn't work on the other - on the other docking.

03 08 09 49 CC Yes, I guess we don't have that answer for you, Stu.

03 08 09 57 CC All, all we can say is - -

03 08 09 59 CMP Are - are we saying that the - -

03 08 10 04 CC Yes. We can't explain the preceding attempts, but all we're saying is that the one that worked looked normal.

03 08 10 19 CMP Okay, I guess I disagree with it looking normal, but the probe sure does look good now. Are you saying there's no correlation between the retraction and the - I mean, using the retract bottle and getting the docking?

03 08 10 54 CC Stand by 1, Stu.

03 08 11 22 CC Okay. I'm not sure if I'm answering the question you, you, asked, Stu, but what the data showed is that the - the bottle had fired, and started to pull things in before you all actually worked the switch and maybe you thought the reverse was true.

03 08 11 48 CMP What? Let me see - say that again, Fred. I don't understand that one.

03 08 12 01 CC Okay, I guess there's a distinction in, maybe your impressions, and what the data said was that you did get captured, normally before the bottle was fired. Did you all have a different impression?

03 08 12 21 CMP Yes. Stand by 1.

03 08 12 31 CMP Yes, Fred, our impression was that - see the talkbacks going barber pole, which would indicate the capture by the latches - didn't happen until, oh, I think as Al said the other time, several seconds after he hit the RETRACT switch.

03 08 13 01 CMP Hey, but we're not trying to talk you out of anything that - we think the probe is - is - fine, we just want to make sure we're clarified on the procedures.

03 08 13 13 CC Okay, Stu.

03 08 29 56 CC 14, Houston.

03 08 30 01 CMP Go ahead, Houston.

03 08 30 03 CC Okay. We'd like POO and ACCEPT, and we'll get you in the final vector and target load.

03 08 30 15 CMP Okay, Fredo. You got it.

03 08 30 17 CC Okay. And I'm ready with the LOI pad now.

03 08 30 23 LMP Stand by 1, Fredo.

03 08 30 39 LMP Just a minute, Fred. Is this going to be a correction to the previous pad, or a complete new pad?

03 08 30 44	CC	Well, it's a final one, and I think there's enough difference, you probably ought to use another sheet there.
03 08 30 57	LMP	Okay.
03 08 31 04	LMP	Ready to copy.
03 08 31 06	CC	Okay. SPS/G&N; 63306; plus 0.90, minus 0.33; 082:36:42.70; minus 2804.9, minus 1103.5, minus 0227.0; 351, 258, 326; 0169.3, plus 0058.1; 3022.7, 6:12, 3015.2; 12, 288.3, 27.1. The rest of column N/A, and all the comments in the set stars information is the same as before.
03 08 32 32	LMP	Okay. On the LOI pad, SPS/G&N; 63306; plus 0.90, minus 0.33; 082:36:42.70; minus 2804.9, minus 1103.5, minus 0227.0; 351, 258, 326; 0169.3, plus 0058.1; 3022.7, 6:12, 3015.2; 12, 288.3, 27.1; the rest, N/A, and set stars and ullage, and LM weight remain the same.
03 08 33 41	CC	Good readback, Ed.
03 08 33 52	CC	And, 14; Houston. The computer's yours.
03 08 33 58	CDR	Okay, Houston. Good.
03 08 34 47	CC	14, Houston.
03 08 34 52	LMP	Go ahead.
03 08 34 54	CC	Ed, if you have any problem acquiring with the high gain back at LOS - or AOS - in AUTO, just put her in MANUAL and WIDE, and we can get the dump and everything there.
03 08 35 10	LMP	Okay, Fredo. Will - will do.
03 08 36 09	CC	14, Houston. When you can work it in, I got the map updates for REV 1.
03 08 36 17	CMP	Okay, Fredo. I'm ready to copy.
03 08 36 20	CC	Okay. LOS, 82:23:58; 180: 82:38:30; AOS with, 82:56:27; and AOS without, 82:49:15.

03 08 36 50	LMP	Okay, Fredo. 82:23:58; 82:38:30; and the one we'll use 82:56:27; and 82:49:15.
03 08 37 03	CC	Good readback.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 08 42 05	CC	14, Houston.
03 08 42 10	LMP	Go ahead.
03 08 42 12	CC	Okay. When you get to the - or it's convenient in here, Ed - when you're fiddling with the O_2 heater switches, we'd like the 50-WATT HEATER breaker on 226 for tank 3 that you have open, we'd like that one closed now.
03 08 42 53	LMP	You have it, Fredo.
03 08 42 55	CC	Okay.
03 09 03 10	LMP	Houston, Apollo 14. How do you read now?
03 09 03 12	CC	Loud and clear, Ed.
03 09 03 17	LMP	Okay, I am on OMNI Charlie.
03 09 03 20	CC	Okay, Ed.
03 09 03 24	LMP	Say again.
02 09 03 25	CC	Okay, Ed. Copied OMNI Charlie.
03 09 03 30	LMP	Okay.
03 09 03 32	CDR	And, Houston, we're in burn attitude.
03 09 03 35	CC	Roger. In burn attitude.
03 09 07 53	CMP	And, Houston; 14. The sextant star check is real good.
03 09 07 58	CC	Roger, Stu.
03 09 13 20	CC	14, Houston. We've got your V_Gs and P40, and they look mighty fine.
03 09 13 28	CMP	Okay.
03 09 13 29	CDR	Okay.
03 09 13 33	LMP	How you doing today, Ron?

03 09 13 34	CC	Hey, real good.
03 09 27 17	CC	Hey, 14; Houston.
03 09 27 22	LMP	Go ahead.
03 09 27 24	CC	Okay, Ed. We're still showing the O_2 flow up a little bit for about an hour now. I just wondered there. You still venting something maybe?
03 09 27 34	LMP	We turned it off a few minutes ago. It should be coming down shortly.
03 09 27 37	CC	Okay, Ed.
03 09 27 39	CMP	It's already started to drop down Fredo. I think it'll be down normal real soon.
03 09 27 45	CC	Okay.
03 09 32 28	CC	14, Houston.
03 09 32 34	CDR	Go ahead, Houston.
03 09 32 35	CC	Hey, Al. Everything looks good down here and you have a GO for LOI.
03 09 32 43	CDR	Thank you. We'll give it a GO for LOI.
03 09 43 03	CC	14, Houston.
03 09 43 09	LMP	Go ahead.
03 09 43 11	CC	Okay. We're about 45 seconds now to LOS, Ed. We'll see you on the other side.
03 09 43 20	LMP	Roger, Fredo. Thank you.
03 09 58 --		BEGIN LUNAR REV I

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 10 16 25	CDR	Houston, Apollo 14.
03 10 16 29	CC	Go ahead, 14.
03 10 16 33	CDR	Okay, Fredo. We had an extremely fine burn, the burn report as follows: burn time, 6 plus 11; residuals, 0.3 plus zero, and zero; DELTA-V_c, minus 7.3; 0351; oxidizer, 349.
03 10 17 19	CC	Okay, 14. We copied. Wonder if you can give us a reading on the unbalance.
03 10 17 30	CDR	Okay. It was decrease 40, 4 0.
03 10 17 37	CC	Roger, Al. Decrease 4 0.
03 10 17 44	CDR	Roger. This is really a wild place up here.
03 10 17 53	CMP	Hey, Ron, you're not going to believe this. It looks just like the map.
03 10 18 01	CC	Hey, that's great, Stu.
03 10 20 58	CMP	Houston, 14.
03 10 21 00	CC	Go ahead.
03 10 21 05	CMP	Okay, Fredo; you might tell Ron there that, at this Sun angle, things look real good. Picked up that landmark 1 on the zero phase. Our zero phase target, no sweat, and landmark 2, I got the A part of that one, at least.
03 10 21 29	CC	Hey, Stu, that sounds great, by golly. It looks like our orbit - orbital science is off to a good start then.
03 10 21 39	CMP	Yes. For now, anyway. I think we'll probably get better as time goes on, but it really looks - it really looks great as far as picking up all the targets that we looked at so long.
03 10 23 55	CDR	Houston, 14.
03 10 23 56	CC	Go ahead, 14.

03 10 24 01	CDR	Well, this really is a wild place up here. It has all of the grays, browns, whites, dark craters that everybody's talked about before. It's really quite a sight. Ed and Stu are looking at the landmarks to the map, picking up landmarks very easily as we go along the way. And, of course, in the type of orbit we are, the fact that we're climbing away from the surface is very obvious. Of course, that brings more and more of the area in detail. It really is quite a sight. No atmosphere at all; everything is clear up here. Really fantastic.
03 10 25 00	CC	Roger, Al. We copied, and I think you covered all bets with the colors there.
03 10 25 12	CC	Al, I expect that you guys - -
03 10 25 13	CDR	That's because they're all here, Fredo.
03 10 25 21	CC	Al, I expected you to invent a new one on this flight.
03 10 25 27	CDR	Give us - give us a little time. We'll think up something.
03 10 25 54	CC	14, Houston.
03 10 25 59	LMP	Go ahead, Fredo.
03 10 26 01	CC	Ed, can you verify the FLOW VALVE is in INCREASE now?
03 10 26 10	LMP	That's verified. It's in INCREASE. And I put it in INCREASE about 50 seconds before the end of the burn, and left it there.
03 10 26 18	CC	Roger.
03 10 26 29	LMP	Fredo, the - I think the best description - the description that comes to my mind, we mentioned this when we first looked at this thing, is that it looks like a plaster mold that somebody has dusted with grays and browns, but it looks like it's been molded out of plaster of paris.
03 10 26 55	CC	Roger, Ed.

03 10 29 21	CC	14, Houston.
03 10 29 25	LMP	Go ahead, Houston.
03 10 29 28	CC	Okay. The S-IVB impact should occur in about 8 minutes. We'll give you the word on that, when it happens. And the first look at trajectory says you're in a 169.6 by 58.9.
03 10 29 56	CMP	Okay, Fredo. We copy that. And looking out of my rendezvous window now, we've just passed over Sklodowska, and those rays coming out of that bright crater that Ron and I talked about - stand out a lot better than what I expected to see them, Ron.
03 10 30 16	CC	He's listening.
03 10 30 27	CDR	Fredo, I copy 168.6 by 56.9. Is that correct?
03 10 30 33	CC	No. The numbers were 169.6 by 58.9.
03 10 30 42	CDR	Okay. 169.6, 58.9. Thank you.
03 10 31 36	CMP	And, Fredo, you might pass on to Ron there, while he's listening, that I was on the wrong side of the cockpit there for old King. I couldn't tell anything about the rays coming down from Bruno. Maybe next time around.
03 10 31 53	CC	Okay.
03 10 33 12	CMP	Okay, we're just now passing over Ansgarius and La Perouse. The cone in Behaim is more rounded, I guess, than what I expected - expected to see. ..., you know, was talking about it being large and quite rounded. It is that - it's a little more subdued than what I expected to see.
03 10 33 37	CC	Roger, Stu.
03 10 33 51	CMP	And I can see off to my right here Humboldt coming up, and it's just as impressive as it is in the pictures. One thing that strikes me about it is, the dark areas aren't quite as dark, I guess, as I thought, but we're moving in with a reasonably high Sun here, so they're kind of washing out.

03 10 34 51	CC	And, 14; Houston. Hate to pull you away from the window, but I got a map update and a flight-plan update when you get a chance.
03 10 35 02	CDR	Okay, go ahead.
03 10 35 04	CC	Okay, on the map update, REV 2, 180 degrees at 84:44:53.
03 10 35 24	CDR	Okay, I show 084:44:53 for REV 2 on the map.
03 10 35 33	CC	Roger. That's correct, Al, and in the flight plan at 88:30 -
03 10 35 56	CDR	Okay, go ahead.
03 10 35 58	CC	Okay, change the LTC attitude to roll, 352; pitch, 146; yaw, 355.
03 10 36 16	CDR	Okay, LTC attitude 88:30, 352, 146, 355.
03 10 36 25	CC	Okay, and the reason for the big change is the other angles were for SEF and they should be for BEF, and that's what I just gave you. Next change is at 89:08.
03 10 36 42	CDR	Okay, go ahead.
03 10 36 44	CC	Okay, HIGH GAIN angles should be PITCH, minus 46; YAW, 194.
03 10 36 58	CDR	Okay, I show minus 46 and 194.
03 10 37 03	CC	Okay, that's it, Al.
03 10 37 07	CDR	Thank you, Fredo.
03 10 37 47	LMP	Fredo, as interesting as this is from orbit, it sure makes one eager to get - to want to get at Cone Crater now. I'll bet it's wild down there.
03 10 38 04	CC	Okay, I missed your first there, Ed. What'd you say about Cone Crater?
03 10 38 10	LMP	I said, as interesting as this is from orbit, all it does is whet your appetite to get to Cone Crater.

03 10 38 18	CC	Roger, Ed.
03 10 38 26	CDR	I guess in 3 days I haven't brainwashed him where the real science is done, Fredo.
03 10 38 38	CC	Okay.
03 10 38 43	CDR	His arms aren't long enough to bring him back from there.
03 10 38 46	CMP	Okay, you can really get the attitude rate as we're climbing up here to apogee, Houston, and we're climbing right up with Langrenus there.
03 10 38 59	CC	Roger, Stu. And we just had S-IVB impact.
03 10 39 07	CMP	Okay.
03 10 39 30	CMP	And we're - you get the feeling here, climbing up, that we're almost going up vertically here over Langrenus. It's staying right in the window and that rooster tail coming out of Petavius B is very evident as it swings up across and passes up by Langrenus.
03 10 39 52	CC	Roger, Stu.
03 10 40 33	LMP	From this particular location, looking out the window number 5, you can see the upper end of the Sea of Fertility, and it's interesting that the only way I can tell the demarc - line of demarcation is an albedo change. At this moment, I can't tell you what causes the albedo change except - it's not apparent - except that the Sea of Fertility is much darker and then it changes into the much lighter region up to the north.
03 10 41 10	CC	Roger, Ed.
03 10 42 47	LMP	Say, Ron, old Goclenius looks just like the picture. You can see the rille going right across the rim and stretching on up; ... did his job well.
03 10 43 02	CC	Okay.
03 10 44 33	CC	14, do you read Houston?

03 10 44 37	CMP	Go ahead, Houston; you're loud and clear.
03 10 44 39	CC	Okay. Just radio check, Stu.
03 10 44 43	CMP	Okay.
03 10 44 45	CC	We lost our displays down here, and just want to make sure we hadn't lost anything else.
03 10 44 54	CMP	... - okay ... -
03 10 44 55	LMP	Al's trying to get us to get on with it; we're trying to gawk at the same time.
03 10 45 32	CMP	Okay, we're just starting to pick up the edge of Nectaris now, coming across with the - can't quite see up far enough to - oh, yes, there's ole Daguerre 66, just like - just like a neon sign out there.
03 10 45 52	CC	Okay, Stu, and we're looking at the tracers on the Apollo 12 seismometer, and it's essentially still looking undamped.
03 10 46 09	LMP	Still vibrating - -
03 10 46 10	CMP	... Great.
03 10 46 11	LMP	Hello, Fredo.
03 10 46 12	CC	Yes, that's right, Ed.
03 10 46 21	CMP	Is it essentially like neutral stability, Fred, or they coming down on it?
03 10 46 28	CC	It looks like, if anything, Stu, maybe they're still building a little bit.
03 10 46 39	CMP	Ah so.
03 10 47 02	LMP	There's Theophilus, Stu, there at the top of the window; can you see it?
03 10 49 49	LMP	You know, Fred, I get the impression that, just from looking at the real thing, these craters are a lot fresher than the photographs led me to believe. I'm very surprised at how fresh many of them look.

03 10 50 04	CC	Roger, Ed.
03 10 51 19	LMP	We've just been remarking up here, Fredo, how easy it is to find these landmarks. They just stand right out for you. It's really magnificent.
03 10 51 28	CC	Let's hope Cone and Triplet and Doublet show up the same way.
03 10 51 38	LMP	You're right.
03 10 52 49	CMP	Hey, Fredo, my first impression as I - How do you read, Fred?
03 10 52 57	CC	I read you loud and clear, Stu. Go ahead.
03 10 53 02	CMP	Okay. First impression of the Theophilus and Cyrillus is - much difference in age than what I expected. Of course, Theophilus being the younger, but it's much more so than what I really expected - to see, and we hope to get some good photos of the line between the two there; but it's pretty amazing how much more subdued Cyrillus is.
03 10 53 42	CC	Okay, we copied that, Stu. And, we're up with you on the chart now, too.
03 10 53 51	CMP	Okay.
03 10 54 04	CMP	Okay. And we're just approaching Descartes now, Fredo. I'm looking out of my rendezvous window, and four of those too-bright craters on either side of the landing site. Just - it's so plain. I guess I'm surprised at the detail - that you can see. Of course, the Sun angle is dropping down a little here, but I thought probably at Descartes, the two bright lead-ins - but - you can see many, many of the fine - the fine craters in between them. And, of course, Dollond, Dollond E, and Kant, they're all just very vivid. But, the - the detail you can see from this altitude of the Descartes sites are rather amazing.
03 10 54 54	CC	Roger, Stu. I hope the LTC captures the same detail, a little greater maybe.
03 10 55 05	CMP	Roger. And it'll be a little lower, too.

03 10 57 28 CMP Fredo, I - At this point, we're start to pick up a few shadows on the edges of the craters, but the crater chain coming out of Abulfeda - really can't see much difference in albedo between the crater itself and a good bit of the surrounding territory.

03 10 57 45 CC Okay, Stu.

03 10 59 49 LMP Okay. We're crossing over Albategnius and we can look up and see Ptolemaeus; yes, it's coming in to the hatch window now. That's very stark. I'm very impressed by the different - by albedo differences here, Fredo, that I - that I assume from photographs are really more Sun angle problems or photographic problems. But, by golly, there's some that are really here that I never expected. They must indicate contacts of some sort that may be very subtle on the surface; but I actually believe they're there, if one can find them.

03 11 00 36 CC Roger, Ed. Do you mean - you talking in terms of large scale or small scale, like within crater floor?

03 11 00 50 LMP No, I'm thinking of a little larger scale than that. But there are some in the crater floors that are very surprising, too. There's so many things that I assumed from maps were more photographic peculiarities rather than real life, but, by golly, I think they're here.

03 11 01 08 CC Roger, Ed.

03 11 01 17 LMP I think, given time, we could find flows and different units that may very well be covered with a great deal of regolith that we - we're seeing suggestions of them in albedo differences and textural differences that are clearly visible from this altitude.

03 11 01 38 CC Okay.

03 11 01 50 CMP I've noticed some lineations in some of the - the big craters that are suggestive of - well, I'm not sure it's of the sloping type of circular lineations

that you see in craters. I guess, to be safe, I ought to guess that - so I'll be safe and not say any more. I did see lineations that were surprising to me.

03 11 02 18 CC — These close to the wall, Ed, or down within the floor of the crater itself?

03 11 02 25 LMP — Well, all up and down the wall of a few craters; I don't recall which ones now - back along our track here a few miles.

03 11 03 04 LMP — Looking down at the Crater Herschel, for example, Fredo, on the - Let's see, on the western wall. To me, it appears as though it's really a solid chunk from - the rim down to the first slope, or the - where it breaks slope. Of course, this is a long ways away to be talk - making talk like that. However, it seems - it gives one the impression of being very hard solid rock ...

03 11 03 36 CC — Okay, we copied, Ed. Herschel's west wall looks like essentially one unit.

03 11 03 47 LMP — That's affirmative.

03 11 05 02 CC — And, 14; Houston. The 12 seismometers are still going. The traces right now look maybe to be almost neutral.

03 11 05 17 CMP — Okay.

03 11 05 49 CMP — Okay, Fredo. We just passed over Mosting A, which we'll get a better look at next time around, and the baby crater chain stands out real vividly and just starting to get a pretty low Sun angle here, so any albedo differences about those will be hard to tell now. You can see the dark halo spots along the rilles in Alphonsus, however, very vividly.

03 11 06 20 CC — Roger, Stu.

03 11 06 41 LMP — As we approach the terminator, Fredo, with some fairly high crater walls and high country - with these long shadows, it really looks rugged.

03 11 07 07 CC — Roger, Ed.

03 11 07 18 CC Yes. Guess right about the terminator; you're starting to look into the eastern edge of the Fra Mauro formation. Is that what it looks like, Ed?

03 11 07 29 LMP Yes, that's it. That's affirmative, Fredo. Unfortunately, the landing site, I think, is definitely in darkness. It's probably a little bit too far to the south for us to even see that area too well. A crater, Gambart, we can just see the - the Gambart - we can just see the eastern rim of it. The western rim is just barely lighted, but the rest of it's in darkness.

03 11 07 57 CC Roger, Ed.

03 11 08 03 CDR Of course, this Sun angle makes it pretty obvious ... deposit of some kind. You can see the difference in texture very easily from a low Sun angle.

03 11 08 14 CC Roger, Al.

03 11 08 17 LMP That's affirmative. You can see the streaks - the streaks that we've talked about are really there. They seem to lead right back toward the Imbrium area and the Copernican area.

03 11 08 36 LMP That's the most stark - desolate-looking piece of country I've ever seen.

03 11 08 48 CC Roger, Ed.

03 11 09 54 LMP We're almost directly over the terminator now, Fredo. And looking right down into these craters and these features that are right on the terminator. And even knowing it, it is a terminator, and knowing what you're supposed to see, it's very difficult to make out exactly what you are looking at.

03 11 10 15 CC Roger, Ed.

03 11 11 00 LMP With our current dark adaptation, it looks like you could walk along that surface into the darkness and fall into nothing. There's absolutely nothing there. Perhaps when we are some - a little better dark adapted, you see Earth - features in earthshine, but we can't right now.

03 11 11 17	CC	Roger, Ed.
03 11 11 44	CMP	Hey, Fredo, we sure picked a clear day to arrive; there's not much haze in the air at all. We can see all the way to the horizon.
03 11 11 53	CC	Incredible.
03 11 12 44	LMP	I guess we better make the boss happy and get on with the chow. ... knock off our descriptions at this point.
03 11 12 54	CC	Okay, Ed, you'll get another chance to look at it a couple of REVs later, a little lower.
03 11 13 05	LMP	Roger. There sure is a lot to see. You could spend a lot of time talking about it.
03 11 39 09	LMP	Houston, Apollo 14.
03 11 39 13	CC	Apollo 14, Houston. Go ahead.
03 11 39 18	LMP	Oh, hello, Gordon. Any words for us before we go over the hill?
03 11 39 27	CC	Yes, sir. Just getting ready to call you. The Orange Team is now at your service. And I have a change - slight change, to the TEI-4 pad. If you'll get that one out, I'll give them - give you the change numbers.
03 11 39 36	CMP	Hey, Gordon, I'm having an orange drink in favor - in honor of the Orange Team.
03 11 39 40	CC	Very good.
03 11 40 26	CC	Ed, if you're ready to copy, we have about 1 minute to get this in.
03 11 40 31	LMP	Go ahead.
03 11 40 33	CC	I'll just read the change numbers. The weight changed slightly, new weight is 38230; new T_{ig} time, 091:16:06.90; NOUN 81, plus 3907.1.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 12 05 --		BEGIN LUNAR REV 2
03 12 24 43	CC	Apollo 14, Houston. How do you read?
03 12 24 49	LMP	Hello, Houston; 14. Loud and clear.
03 12 24 53	CC	Roger, Ed. You're loud and clear. And I've got a few pads for you when you get a chance to copy.
03 12 25 02	LMP	Okay. Give me a second.
03 12 25 18	CMP	Gordon, if it's the landmark tracking pad, I'm ready to copy.
03 12 25 22	CC	Okay. Before you do, if you give us POO and ACCEPT, we'll give you a new state vector, and I have the Mosting A pad, ready to go.
03 12 25 44	CMP	Okay. POO and ACCEPT. Go ahead.
03 12 25 47	CC	Roger. T_1 is 85:39:35; T_2, 85:46:39; TCA, 85:51:39; and T_3 is 85:54:09; north, 8 nautical miles. Over.
03 12 26 22	CMP	Okay. Gordon, copy. 85:39:35, 85:46:39, 85:51:39, 85:54:09; north, 8 miles.
03 12 26 36	CC	Roger. Your readback is correct; and next page, I have map update REV 3.
03 12 26 46	CMP	Let her rip.
03 12 26 48	CC	LOS, 86:29:12; 180: 86:53:05; AOS, 87:15:06. Go ahead.
03 12 27 12	CMP	Okay. Copy 86:29:12, 86:53:05, 87:15:06.
03 12 27 21	CC	Roger. That's correct, and, about three pages on, the H-3 landmark pad if ready.
03 12 27 34	CMP	Go ahead.
03 12 27 36	CC	Okay. T horizon is 87:49:48; TCA, minus 20 seconds at 87:51:47. Over.

03 12 27 55 CMP Okay. Copy for H-3, 87:49:48; 87:51:47.

03 12 28 02 CC Readback's correct there. We got stopped about halfway through the update to the TEI-4 pad. If you or Ed is ready, I can finish that one off.

03 12 28 17 LMP Roger. I'm ready. Go ahead, Gordon.

03 12 28 20 CC Okay. Did you copy the T_{ig} time?

03 12 28 25 LMP Roger. ... is 91:16:06.90.

03 12 28 32 CC That's correct. A new NOUN 81, plus 3907.1, plus 0703.8, minus 0081.8; and change the roll to 182. Pitch and yaw remain the same, and everything I didn't read is the same as the first version. Over.

03 12 29 08 LMP Okay. NOUN 81. But first of all, the weight was 38230; and that T_{ig} 91:16:06.90; NOUN 81, plus 3907.1, plus 0703.8, minus 0081.8; and roll, 182; pitch, 069; yaw, 012.

03 12 29 38 CC Roger, Ed. That's all correct. That's all the updates I have at the moment, though we're still standing by on the TEI-5 pad. You may keep that page ready when - we'll have it shortly.

03 12 29 55 LMP Roger.

03 12 30 00 CC And we're through with the uplink. The computer's yours.

03 12 30 08 CMP Okay. Thank you.

03 12 31 08 CC Apollo 14, Houston. We're standing by - your null bias reports.

03 12 31 18 LMP Roger.

03 12 31 22 CMP Okay. It will be about 2 minutes, Gordon. I had to restart it in.

03 12 31 26 CC Roger.

03 12 33 15 CMP Houston, 14 with the null bias.

03 12 33 17 CC Go ahead.

03 12 33 21 CMP Okay, minus 100 at the start; minus 99.4.

03 12 33 30 CC Roger, Stu.

03 12 51 46 CC Apollo 14, Houston. I have the DOI and TEI-5 pads, when you're ready to copy. Over.

03 12 51 57 LMP Okay. Stand by 1.

03 12 52 14 LMP Okay, ready to copy.

03 12 52 17 CC Okay. I'll start with the DOI. SPS/G&N; 38155; plus 1.45, minus 0.71; T_{ig} is 086:50:54.97; NOUN 81, minus 0206.4, minus all balls, minus 0003.6; attitude is 000, 281, 000; NOUN 44, 0058.8, plus 0009.1; 0206.4; burn time, 020.8, that's 20.8; DELTA-V_c 0199.6; 11, 199.0, 33.9; all the rest of the items on the pad are N/A. Comments: GDC alines at the stars, Sirius on the zero degree mark and Rigel. Sirius is star 15; Rigel, 12. R-aline, 127, 148, 015. Ullage, four jets, 1.4 seconds. Other comments: The DELTA-V counter should read minus 6.7 at cut-off. Over.

03 12 55 26 LMP All right. DOI, SPS/G&N; 38155; plus 1.45, minus 0.71; 086:50:54.97; minus 0206.4, minus all zips, minus 0003.6; 000, 281, 000; 0058.8, plus 0009.1; 0206.4; 020.8; 0199.6; 11, 199.0, 33.9; the rest N/A. Sirius on the zero degree line and Rigel with 127, 148, 015; Ullage is four jets, 14. And, other remarks, DELTA-V counter - it should read minus 6.7 at cut-off.

03 12 56 44 CC Roger, Ed. The readback correct. I'm ready with the TEI-5.

03 12 57 27 LMP Okay. Proceed with the TEI-5 pad.

03 12 57 30 CC Roger. TEI-5; SPS/G&N; 36697; minus 0.63; plus 0.21; 092:30:20.01; NOUN 81 is plus 3023.5; plus 1091.5; minus 0171.2; 182, 107, 021. Ullage, four jets, 11 seconds. Under comments: Number 1, burn is undocked, and number 2, assumed DOI. Go ahead.

03 12 58 57	CC	And before you start your readback, Ed, a reminder to Stu; about 30 seconds now to T_1 for Mosting A.
03 12 59 08	CMP	Okay. Thank you, Gordon.
03 12 59 14	LMP	Okay. TEI-5 pad: SPS/G&N; 36697; minus 0.63, plus 0.21; 092:30:20.01; plus 3023.5, plus 1091.5, minus 0171.2; 182, 107, 021; four jet, 11 seconds. Under remarks: Number 1, it's an undocked burn; number 2, it assumes DOI.
03 12 59 51	CC	Roger, Ed. That's all correct.
03 13 00 11	CC	Ed, I have one more comment for you.
03 13 00 19	LMP	Go ahead.
03 13 00 21	CC	We noticed on the last burn when we played back the data, that you started the recorder about 12 minutes prior to the burn. For this one, we'd like you to wait until about 1 minute prior to the - to the burn to start the recorder so that we can get a quicker playback on the data for verification of the burn after AOS. Over.
03 13 00 46	LMP	Okay, we'll give you this one real late.
03 13 00 48	CC	Thank you.
03 13 05 34	CC	Stu, this is Houston. It's time to start the DAC.
03 13 05 42	CMP	Roger. Thank you, Gordon. ...
03 13 06 25	CC	And you have about 10 seconds to T_2.
03 13 06 31	LMP	Okay. Thank you ...
03 13 13 48	LMP	Houston, 14.
03 13 13 50	CC	Go ahead, Ed.
03 13 13 55	LMP	We have a beautiful sight on the crater Eratosthenes, Timarcus [sic], Wallace. Timarcus [sic], I mean Timocharis, is just as - just on my horizon as we approach the terminator. Eratosthenes is about halfway to the horizon. They're very stark. Magnificent, though.

03 13 14 24	CC	Roger.
03 13 14 36	CC	And, Stu, you're by T_3 now. We're standing by - the magazine percentage.
03 13 14 48	CMP	Okay, stand by 1.
03 13 15 11	CMP	Okay, Gordon. The magazine now reads 77; and, just for info, I lost the landmark about 20 seconds earlier than what it shows. But we got a good track on it. I lost the T_1 plus 14, plus 18.
03 13 15 31	CC	Roger, Stu. Understand 77 percent in MAG Bravo.
03 13 15 42	CMP	That's affirmative.
03 13 17 48	CMP	Houston, 14.
03 13 17 51	CC	Go ahead.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 13 18 05	CC	14, Houston. Go ahead.
03 13 18 15	CMP	Houston, 14.
03 13 18 17	CC	Roger, 14. We're reading you loud and clear. Go ahead, Stu.
03 13 19 02	CMP	Houston, 14.
03 13 19 05	CC	14, Houston. Loud and clear. Go ahead.
03 13 19 16	CMP	Hey, Gordon, how do you read 14?
03 13 19 18	CC	Stu, you're loud and clear. How do you read me?
03 13 19 24	CMP	Okay. You're 5 square. Is 060 still the roll attitude you want us on this VERB 49 maneuver?
03 13 19 33	CC	As far as I know. I'll recheck, here.
03 13 19 57	CC	That's affirmative. 060 roll, Stu.
03 13 20 03	CMP	Okay.
03 13 26 25	LMP	Houston, 14. I have you on the high gain.
03 13 26 30	CC	14, Houston. Go ahead.
03 13 26 34	LMP	Roger. I have you on the high gain, locked up.
03 13 26 38	CC	I hear you loud and clear.
03 13 30 23	CMP	Okay, Houston. P52 complete. Did you get the torquing angle?
03 13 30 28	CC	That's affirmative, Stu. And - -
03 13 30 31	CMP	And the time was 86.1? And the time was 86:10:15.
03 13 30 41	CC	Roger. And, if you'll give us POO and ACCEPT, we'll give you a new state vector and a target load.
03 13 30 51	CDR	Okay, you've got it.
03 13 30 53	CC	Thank you.

03 13 34 09	CC	14, Houston.
03 13 34 13	CMP	Go ahead.
03 13 34 15	CC	The computer is yours, and we're standing by to watch P30 and P40. We noticed on the high gain that the signal strength's a little different. Did you change any configuration on the comm or - and - and did you change position of your squelch on the last high-gain acquisition? Over.
03 13 34 35	LMP	... of. We're at standard lunar comm and I don't know if we've done anything differently.
03 13 34 45	CC	Okay, Ed.
03 13 34 47	LMP	We can recheck everything, but it'll take a minute.
03 13 36 10	LMP	14.
03 13 36 13	CC	Go ahead, Ed.
03 13 36 17	LMP	All the comm switches are where they were set on the backside. Nothing's been changed except acquiring with the high gain. I did switch the - the SQUELCH ENABLE when we were on OMNI and I was looking for you - for a good OMNI during the maneuver.
03 13 36 36	CC	Roger, Ed.
03 13 39 14	CC	Apollo 14, Houston. You are GO for DOI.
03 13 39 20	CDR	Okay. GO for DOI. Thank you.
03 13 46 42	CC	Apollo 14, Houston. Give us OMNI Charlie.
03 13 47 14	CC	Apollo 14, Houston.
03 13 47 19	LMP	Okay, Houston. There you are; go ahead.
03 13 47 21	CC	Okay, read you loud and clear, Ed. And about 2 minutes to LOS; a minute and 45, now.
03 13 47 29	LMP	Okay.

03 14 14 --		BEGIN LUNAR REV 3
03 14 35 13	CC	Apollo 14, Houston. Over.
03 14 35 19	CDR	Houston, Apollo 14.
03 14 35 21	CC	Loud and clear, Al. A lot of people standing by to hear how it went.
03 14 35 27	CDR	Okay. The burn went essentially normally. Burn time was 20.6 seconds with the following residuals on the G&N shutdown: plus 0.6, plus 0.2, zero; DELTA-V_C, minus 6.2. With me?
03 14 35 51	CC	Roger. Copied burn time, 20.6; a plus 0.6, plus 0.2, and a zero; and DELTA-V_C, minus 6.2.
03 14 36 08	CDR	That is correct. Fuel, 31.7; oxidizer, 31.4; unbalance, decrease 90.
03 14 36 21	CC	Roger, Al. And, 14; Houston. We'd like you to go to POO, please.
03 14 36 57	CDR	Okay. POO.
03 14 37 00	CC	Thank you. We'll have a look at the V_G.
03 14 37 02	CDR	Do you want ACCEPT?
03 14 37 05	CC	Negative.
03 14 37 06	CDR	Okay. And CMC orbit was - okay. And CMC orbit was 10.4 by 58.8.
03 14 37 16	CC	Roger.
03 14 41 31	CC	14, Houston. The computer is yours now.
03 14 41 38	CDR	Okay.
03 14 41 50	CDR	Okay.
03 14 43 17	CC	Apollo 14, Houston. You have a stay. We're still evaluating the orbit to give you the precise numbers. Over.
03 14 43 28	CDR	Good show. That sounds good to us. We're here.

03 14 43 31	LMP	We all thank you.
03 14 43 34	CMP	And, Gordon, are we clear to start our maneuver then?
03 14 43 39	CC	That's affirmative.
03 14 46 24	CC	Apollo 14, Houston.
03 14 46 29	CDR	Go ahead, Houston.
03 14 46 31	CC	We've got you in a 9.3 by 59.0.
03 14 46 43	CDR	Okay. Sounds pretty good; 9.3 by 59.0.
03 14 46 48	CC	Roger.
03 14 47 07	CDR	I guess we could make it down from here tomorrow.
03 14 47 10	CC	Roger.
03 14 50 23	LMP	Houston, 14.
03 14 50 27	CC	Go ahead, Ed. You're just ... now. We're just about to lose the antenna.
03 14 51 05	LMP	Houston, Apollo 14.
03 14 51 08	CC	Roger, Ed. Go ahead.
03 14 51 13	LMP	Okay. Now for the first time we saw an earthrise over the LM; we're sighting at you along the right-hand rendezvous window, and it's a beautiful sight to see the Earth from here. And you are - just have risen over the LM number 4 quad - no, number 1 quad.
03 14 51 41	CC	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 14 57 04	LMP	Houston, 14.
03 14 57 07	CC	Go ahead, Ed.
03 14 57 13	LMP	Looks like we're getting mighty low down here. It's an entirely different sight from the higher altitude. We're coming across the - we're just now over the Crater Gutenberg. At this point, it's out my back window.
03 14 57 30	CC	Roger. We're following your course on the map here.
03 14 57 32	LMP	Those brown rocks - those brown mountains look like they have a nice soft blanket on them from altitude. They look very harsh, but the regolith looks smoother and more hummocky than quite so angular and sharp.
03 14 58 00	CC	Roger.
03 14 59 24	LMP	Houston, we're just along side the Crater Isidorus at this point, and we're trying to follow this on the smaller chart.
03 14 59 34	CC	Roger.
03 15 07 08	CC	Apollo 14, Houston. Over.
03 15 07 13	LMP	Go ahead, Houston.
03 15 07 15	CC	In about 4 minutes, you'll be at your minimum altitude, which should be about 40,000 feet above the terrain. We're wondering how things look down there.
03 15 07 33	LMP	Well, I'm glad to hear you say we're that high. It looks like we're quite a bit lower as a matter of fact - below some of the peaks on the horizon, although that's only an illusion.
03 15 07 49	CC	Roger.
03 15 07 50	LMP	The surface appears to be a lot smoother down here where we can see - closer to the detail and, of

course, particularly at this higher Sun angle, it appears to be a softer surface, but it certainly is an unusual sensation flying this low.

03 15 08 13 CC Roger.

03 15 08 18 LMP Houston, it looks like that I'm looking right up the angular rille by - in the Crater Hipparchus. This - this country down here is really rugged at this altitude. The rille looks like to me a drop had been dropped down 10,000 feet. It was just another map [?].

03 15 08 52 CC Roger, Ed.

03 15 09 18 CC Stu, you're about 25 seconds from picking up H-3.

03 15 09 28 CMP Okay, thank you. I'm looking.

03 15 10 49 LMP Houston, the scale is so deceiving we could be 500 feet in the air from the way this terrain looks ... Scale it down a little bit.

03 15 10 59 CC Roger.

03 15 11 34 LMP I'm looking down inside the Crater Mosting.

03 15 11 42 CC Roger. And, Stu, your TCA, minus 20 seconds now.

03 15 12 00 LMP Mosting is a bench crater with an almost vertical drop on the east side of it. ... one side ... the west side. And it looks like solid rock on both sides.

03 15 12 17 CC Roger.

03 15 12 18 LMP And, soft regolith near - rubblely at all.

03 15 12 23 CC Roger.

03 15 12 24 CMP Okay, Gordon. How do you read?

03 15 12 26 CC Loud and clear, Stu.

03 15 12 30 CMP Okay. Well, that turned out to be a piece of cake. At a very low angle, Ed, located by coming off of points B and BA and about 51:05 or 51:10 on this clock, the elevation angle was enough that I could

pick up Main Street. And, just for your info, using high speed, I could track it just smooth as glass all the way through even though we're in inertial attitude. And, it looks relatively easy. I think 14-2 ought to really be a piece of cake.

03 15 13 11 CC Roger; sounds good.

03 15 13 33 CMP Gordon - the optics, even at this low altitude, tracking the landmarks is rather phenomenal. You can just keep it right on there at high speed, just as smooth.

03 15 13 49 CC Roger, Stu.

03 15 14 09 CC Stu, Ron is with me here. He was curious about how good the initial pointing accuracy of the optics is. Over.

03 15 14 21 CMP Okay. Well, it - I think it was right on the money. When they first came up, it was pretty bright, and the background release on H-3, that ridge right behind it, did not show up out in the flat surface as much as I would have hoped. And, of course, I've got the LM there, too. I couldn't pick it up until the trunnion got down to about 31 or 32 degrees. The optics were right in the area. I think they were a little high. But, I came off, like I say, off of Mosting B and BA, and got - I picked it up at a fairly low elevation, I believe. And, then as soon as we came upon them a little bit, why we're right there. And, then I - then I tracked them with the high speed and I never gave it back to the CMC.

03 15 15 14 CC Roger.

03 15 17 26 CC Ed, this is Houston. And I have a map update for you, REV 4.

03 15 17 36 LMP Okay. Go ahead.

03 15 17 39 CC Roger. The 180 time is 88:46:55. LOS and AOS are within a minute. Over.

03 15 17 55 LMP Okay. LOS and AOS within a minute, and the 180 is 88:46:55.

03 15 18 02	CC	That's correct.
03 15 18 05	CMP	And, Houston, Houston; 14.
03 15 18 08	CC	Go ahead.
03 15 18 12	CMP	Okay, Gordon. Even without being dark adapted, just coming off with my eye glued on the optics coming across the Sun, you can see a very definite horizon through the optics here in earthshine. And - can pick out the - the rims of the - of the bright - bright craters and craters that do have bright rims on them. And - I'm sure if you were really dark adapted you could see quite a bit through the optics scanners.
03 15 18 51	CC	Roger, Stu. That's - that's interesting.
03 15 19 06	CDR	Of course, with the naked eye, you can see excellent horizon and earthshine. I'm looking, for example, to the south at the moment and have a very clear horizon in that direction.
03 15 19 17	CC	Roger, Al.
03 15 19 30	LMP	And, Houston, looking to the north, we see the same view. It's a very sharply defined horizon. I can see the stars. I got a - a very soft gray, well-lit surface below without too many features. You can't see sharply, just - not distinctly; but nothing's probably lost.
03 15 19 56	CC	Roger.
03 15 25 02	CMP	Okay, Gordon, the angles were torqued at 88:05 and I guess you got them.
03 15 25 10	CC	Roger. 88:05. We got them.
03 15 28 13	CC	Apollo 14, Houston.
03 15 28 18	LMP	Go ahead, Houston.
03 15 28 20	CC	We'd like a word from you on whether or not you indeed got a guided shutdown on the DOI burn or whether you think you might have beat it slightly. Over.

03 15 28 42	CDR	I thought I made that clear when I gave you the burn report on the G&N shutdown. The DELTA-V switches were turned very definitely after the cut-off of the G&N.
03 15 28 58	CC	Okay, Al.
03 15 29 00	CDR	Your people have put this in full eyeball. We had two pairs of eyeballs watching that very carefully.
03 15 29 11	CC	Roger, Al. Thank you.
03 15 29 20	CMP	Hey, Gordon. I'd say the P_C was falling through about - at a maximum of about 25, when I moved the switches.
03 15 29 31	CC	Roger.
03 15 39 00	CC	Apollo 14, Houston.
03 15 39 06	CDR	Go ahead, Houston.
03 15 39 09	CC	About a minute to go to LOS. And one final reminder for Stu as he sets up the topo camera: don't forget to pull the pit pin.
03 15 39 25	CDR	...
03 15 39 26	CMP	Okay. Gordon. Oh, ye of little faith. But no sweat. I'll holler a reminder.
03 15 39 31	CC	Okay.

END OF TAPE

APOLLO AIR-TO-GROUND VOICE TRANSCRIPTION

03 16 07 --		BEGIN LUNAR REV 4
03 16 29 11	LMP	Houston, Apollo 14. ...
03 16 29 20	CC	Apollo 14, Houston. Go ahead.
03 16 29 25	LMP	Roger. Read you loud and clear here.
03 16 29 28	CC	You're loud and clear, Ed, and - -
03 16 29 30	LMP	We're standing by to copy map updates and photo pads.
03 16 29 33	CC	Okay. You're way ahead of me. Map updates for REV 10. 180 is 100:09:52; the LOS and AOS are within a minute. Over.
03 16 29 55	LMP	Okay.
03 16 30 07	CMP	Okay, Gordon. We've got that; 100:09:52.
03 16 30 12	CC	Okay, Stu. And the LTC photo pad. Target 9, Descartes. I guess we gave you a new attitude some time ago, and we're going to change it slightly to - The latest version is: roll, 344; pitch, 145; and yaw, 350. T-start is 089:34:36. T-stop, 89:40:41. And I read six ranges going down the line. First one is 53.9, 55.2, 47.7, 40.7, 38.0, 34.9. Over.
03 16 31 31	CMP	Okay, Gordon. Reading roll, pitch, yaw: 344, 145, 350. T-start: 089:34:36. T-stop: 089:40:41. Ranges: 53.9, 55.2, 47.7, 40.7, 38.0, and 34.9.
03 16 32 02	CC	Okay, Stu. Readback's correct. I have a TEI-12 pad, when somebody's ready.
03 16 32 33	LMP	Go ahead for TEI-12.
03 16 32 35	CC	Okay. We have a state vector; we'd like POO and ACCEPT, when you can give it to us for that.
03 16 32 48	LMP	You've got it.
03 16 32 50	CC	Roger. Okay, TEI-12, SPS/G&N; 36702; minus 0.62, plus 0.21. T_{ig} is 105:53:44.96;

NOUN 81: plus 3424.3, plus 1176.3, minus 0216.6; 181, 095, 020. Ullage is four jets, 11 seconds. Remark: burn undocked; and number 2 is - assumes no CIRC. Over.

03 16 34 26	LMP	Roger, Gordon. It's TEI-12, SPS/G&N; 36702; minus 0.62, plus 0.21; 105:53:44.96; plus 3424.3, plus 1176.3, minus 0216.6; 181, 095, 020; four jet, 11; burn undocked, and assumes no CIRC burn.
03 16 35 01	CC	Roger, Ed. You make a good stenographer. The readback's correct.
03 16 35 10	LMP	Thank you. Boss tells me I don't have the looks for it.
03 16 35 19	CC	Roger.
03 16 36 07	CC	14, it's your computer.
03 16 36 12	CMP	Okay. We got it.
03 16 53 32	CC	One minute to T-start, Stu.
03 16 53 38	CMP	Roger. Power's on. Man, you got that lead time in just right, Gordon, for the transmission delay.
03 16 53 47	CC	Roger.
03 16 54 44	CMP	And she's running.
03 16 54 46	CC	Roger.
03 16 55 27	CC	Range, 55.2, now.
03 16 55 55	CC	Range, 47.7.
03 16 56 53	CC	Range, forty - - point seven.
03 16 59 12	CC	Change your range to 38.0.
03 16 59 49	CC	Change your range to 34.9.
03 17 01 06	CMP	Okay, Gordon. We got them. Let me write down something here. I want to talk to you about it.
03 17 01 11	CC	Okay.

03 17 01 37 CMP All right, Gordon. We took them, changed the - the ranges by the time - times listed in your call, but there was some strange noises coming out of the - the magazine. Both - both spools worked, and the frame counter ran, and the FMC worked. But there was sort of a clacking noise on the - in the magazine. It came on between frames 140 and 180, then went back to the NORMAL MODE, and then started again at frame 240, and went until the end of the film pass. And I'm reading 420 on the counter, was reading 5 when I started. I used five for the checkout.

03 17 02 26 CC Okay, Stu. There was - was no change in operation when the - It looked like it was taking the pictures okay, just the funny noises. Is that all?

03 17 02 40 CMP Yes. It - it - it did - it did look like it was going all right. Like I say, the film wound up, and the FMC continued to work. However, when I went to STANDBY at the end, the FMC kept trying to drive. And, now the MODE switch in STANDBY, and I turned the power on. Instead of just getting the one flap over to the side, we'll have the FMC like you do normally, it wants to keep driving.

03 17 03 11 CC Okay. Before you fold it up - -

03 17 03 13 CMP No, belay that, Gordon - Hey, belay that, Gordon. It doesn't - FMC does not keep driving, but that noise is - is still in there. May - maybe you can hear it here. I'll - I'll hold the mike down (machinegun-like noise). Okay. I don't know if you can get anything out of that or not, but that's with the sta - MODE switch in STANDBY and the power ON. And, during that period of time, the FMC kicked a couple of times. It initially went off to the side like it does when you apply the power. And then, during that period of time that I had the transmitter down, the FMC did work twice with the MODE switch in STANDBY and power switch ON.

03 17 04 05 CC Okay, Stu, before you fold it all up, if it doesn't get in the way there, why don't you let me check with the back room and see if there's anything they want you to - else they want you to look at there, and I'll get back with you.

03 17 04 23	CMP	Okay. And, another word here, with the - it did - like I - It worked normally up until about frame 140. But now, when I turn the power on; MODE, STANDBY, you get that - that clacking sound, and then intermittently the FMC kicks, and the frame counter moves, and we take a picture.
03 17 04 45	CC	Roger. I understand that all wi - happens in STANDBY.
03 17 04 52	CMP	That's affirm.
03 17 08 10	CMP	Hey, I'm getting a great look at my low-altitude landmarks, Gordon, from this low pass here.
03 17 08 16	CC	Roger, Stu.
03 17 08 28	LMP	Gordon, I can't even attempt to describe this, we're passing over it so rapidly. There's so much here to talk about.
03 17 08 36	CC	Okay, Ed.
03 17 12 48	CMP	Houston, 14.
03 17 12 50	CC	Go ahead, Stu.
03 17 12 55	CMP	Okay. I'm going to go ahead and maneuver to the rest attitude, if you're agreeable.
03 17 13 02	CC	Stand by. I'll check to be sure it's okay with everybody.
03 17 13 21	CC	Okay, Stu. You have a GO to maneuver.
03 17 13 24	CMP	Okay.
03 17 16 47	CC	Stu, this is Houston.
03 17 16 52	CMP	Go ahead.
03 17 16 53	CC	This is probably a - this is probably something you would have mentioned earlier, but we're wondering if there was any hint of that clacking noise on the other magazine that you checked out on translunar coast? Or was this the magazine that you used as checkout on translunar coast? I guess I can look that up myself. Over.

03 17 17 15 CMP Well, to answer your questions, no, there was no sounds like this. I have never heard this on any training camera. It was not on the checkout during translunar coast. It was not on this camera - I mean on this magazine during the checkout. It did not start until approximately frame 140. It stopped at frame 180, and went back to what appeared normal. And it started again on frame 240 and stayed on until the end of the pass, when I was reading frame number 420.

03 17 17 51 CC Okay, right. We got all that copied, and we're still waiting on - on some kind of response from the experts here. So, we'll give you a call when they come back to us.

03 17 18 05 CMP Okay. I'd just like to clarify that it appears - you know that the film wound all right. The frame counter moved, and the - that both the feed, and the take-up spools were turning. And, if it's any problem, it would have been, I suspect, in the FMC. Well now, that shouldn't have been in there. It's got to be in the magazine. I don't really know. I'm going to let you all worry about that one, I guess. But, the - It appeared that the film went through all right.

03 17 18 34 CC Okay. We'll get back with you.

03 17 18 41 CMP Okay.

03 17 21 26 CMP And, Houston; 14. I've got some onboard readouts.

03 17 21 47 CC Okay, 14. Sorry. I was tied up there. Go ahead with your readouts.

03 17 21 53 CMP Okay. BAT C, 37.0; PYRO A, 37.2; PYRO B, 37.2. RCS: Able, 80; Baker, 82; Charlie, 80; Dog, 83.

03 17 22 16 CC Okay, Stu. Cau - got all those, and get a suggested checkout procedures for the LTC. Hear?

03 17 22 33 CMP Okay. Go ahead.

03 17 22 35 CC Okay. Talked to Dale Denais. He thinks its most likely something wrong in the magazine there. And, it could either be a gear train or a clutch in there that could be making and breaking.

He suggests that you get out a magazine Victor once again and put it on there and leave it in STANDBY awhile to verify that it doesn't cycle - or - or the FMC doesn't sweep. And, if that looks okay, then go ahead and run off two or three frames and see if it appears normal.

03 17 23 23	CMP	Okay. I need to put that one on anyway. I'll put on magazine V, and I'll turn the power on and put it in STANDBY and see how it acts, and then run off two or three frames. And, along that line, this magazine, you know, was in STANDBY for a minute there - you know with the power on prior to start, and we got no noises. And I agree with diagnosis there. It - I'm sure it's in the magazine, or relatively sure. It sounded like it; felt like it. And, it did feel like something like a clutch slipping on the thing.
03 17 24 03	CC	Okay. I hope we got the pictures anyway. And, let us know how the other one works.
03 17 24 11	CMP	Okay. I'll smoke on through that and give you a call.
03 17 32 49	CC	Apollo 14, Houston. Would you give us a - an E-MOD before LOS here? You have about 7 and a half minutes to go.
03 17 33 01	LMP	Okay. You want it right now?
03 17 33 02	CMP	Okay. I'll - -
03 17 33 03	CC	Affirmative. We're ready.
03 17 33 04	CMP	- - give it to you now, Gordon.
03 17 33 06	CC	Okay, Stu - -
03 17 33 07	CMP	Okay. Coming down.
03 17 33 58	CMP	14, Houston.
03 17 34 04	CC	Go ahead.
03 17 34 19	CC	Apollo 14, Houston. Go ahead.
03 18 01 --		BEGIN LUNAR REV 5

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 18 22 59 CC Apollo 14, Houston. Over.

03 18 23 05 CMP Go ahead, Houston; 14.

03 18 23 07 CC Okay, Stu, you're loud and clear. That early AOS on the last REV was our mistake. We were misled by a misset clock here in the control room. How did the LTC look to you after you tried the new magazine?

03 18 23 27 CMP Well, I tell you what; we ended up with the same trouble; let me - let me run through and tell you you what it is. Let me get the flight plan out here.

03 18 23 36 CC Okay.

03 18 23 41 CMP Okay, I put MAG B on the camera, and I ran it in STANDBY for about 2 and a half minutes, and everything worked fine. I then went - shot three frames at about - with the intervalometer set on 10, and it worked fine. And then, I thought, well, maybe it's the fast-frame rate; so, I put it on 65 and shot off five or six, and it worked okay. Then, I went to STANDBY and then on to SINGLE-FRAME and punched the single frame and got the same noise. And then, it started - the magazine started actuating in - in STANDBY with the power on. So, I turned the power off, ran the intervalometer back down to 10, turned the power back on; still had the noise. And the magazine appears to follow the intervalometer setting, but it may do this on a random fashion while in STANDBY. And it does move the film, or at least the - both spools move and the counter moves. And it had that same clacking sound - not really a clacking sound, but I guess it's kind of hard to describe; maybe that's as good a term as any. And so, I turned the magazine off. By this time, I had shot 20 - 20 frames - 23 frames and decided that was enough film to waste. I really didn't mean to use that many, but I was trying to check out that 65-per-minute intervalometer setting.

03 18 25 33 CC Okay, Stu, that's a good summary of what you did. Personally, I more mystified than before. And we'll let them work on that some more.

03 18 25 46	CMP	Okay, I guess, in summary, we got the same problem with both magazines. Now - maybe the film is working all right; maybe we are just getting - getting a strange noise in there on the gears or the clutch as you suggested. But we've ended up now with both magazines having the same symptom.
03 18 26 10	CC	Roger, understand. We'll think about it while you are sleeping, I guess, and maybe have some fresh ideas in the morning. For your general information, the - Your pericynthion was slightly high, but it seems to be coming down faster than we anticipated it would with each REV; with the result that at PDI time, you ought to be right on the money, as near as we can tell. So it's pretty good work on that point.
03 18 26 51	CMP	Okay, that sounds real good; I guess I - I was a little surprised at the 0.6 residual from the G&N. You know, the impulse burn was a little lower than that, but I guess somebody - it doesn't bother anybody. And, yes, it looked like a real great burn to us, and it sounds like good news about being right there for PDI.
03 18 27 16	CC	Okay, and one thing for Ed: his biosensor seems to be acting up. We'd like him at his convenience, some time before suiting up tomorrow, to go through the same sort of checkout that Al did earlier in the flight on his sensors. Over.
03 18 27 39	CMP	Okay, I'll pass that on to Ed.
03 18 27 44	CC	Okay, that's all I have on my list at the moment. Over.
03 18 27 54	CMP	Okay, I guess we've got nothing else here. We're going to try to get secured for the big day tomorrow, and we'll be seeing you in the morning.
03 18 28 04	CC	Okay, I'll make one check to make sure we haven't got anything else before we shut up and let you get some sleep.
03 18 28 14	CMP	Okay.

03 18 28 30	CC	Okay, Stu. One - one other thing. We did get that E - E - E-MOD before we went AOS, okay; and, I guess - Wait I just think there - there is one thing. Just stand by.
03 18 28 49	CC	Okay, we would like you to turn the optics off tonight. That should do it. Get a good rest there. Over.
03 18 28 59	CMP	Roger; we'll get the optics off before we go to sleep, and we've been doing that. And yes, I guess, if you've got any other questions on that - on the Hycon, I'd entertain them now to help you with the troubleshooting, but that's about it. We'll see you tomorrow.
03 18 29 18	CC	Okay, good night.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

03 19 56 -- BEGIN LUNAR REV 6

03 21 48 -- BEGIN LUNAR REV 7

03 23 43 -- BEGIN LUNAR REV 8

04 01 37 -- BEGIN LUNAR REV 9

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 02 36 13	CMP	Good morning, Houston. 14 here.
04 02 36 17	CC	Apollo 14, Apollo 14; this is Houston. Roger. Good evening, Stu.
04 02 36 26	CMP	Good evening? It's good morning, Bruce baby.
04 02 36 30	CC	Roger. How'd you all sleep?
04 02 36 47	CMP	And Bruce, I've got a crew status report for you.
04 02 36 50	CC	Okay. Go ahead with your crew status report.
04 02 36 56	CMP	Okay. Al: 6 hours of sleep, dosimeter, 16048; Ed: 6 hours, 01046; and 6 hours, 05038.
04 02 37 12	CC	Okay. Understand 6 hours of sleep each, 16048, 01046, and 05038. Over.
04 02 37 27	CMP	That's affirmative.
04 02 37 30	CC	14, this is Houston. At this time, we would like the CMP and the LMP to swap dosimeters. The LMP dosimeter is inoperative, and we would like to have two active dosimeters on the lunar surface. Over.
04 02 37 47	CMP	Okay. We'll do that.
04 02 38 16	CC	And, 14; this is Houston. Would you confirm a negative presleep status report. Over.
04 02 38 28	CMP	That's affirmative. We went to bed all healthy, no medication, and we're getting up the same way.
04 02 38 35	CC	Roger. Out.
04 02 38 54	CC	Okay. When you're interested, I have about four or five general information-type items to pass up to you all.
04 02 39 06	CMP	Okay, Bruce. This is something - we should all be on the headset for? If it is, we should just wait a few minutes.

04 02 39 14 CC Yes. Why don't we do that? There's no great rush in any of them, but we've got 24 minutes to LOS. And just let me know when you're ready.

04 02 39 26 CMP Okay. I'll take a consumables update, anytime you've got it. We'll get that out of the way, if you want to give it to me now.

04 02 39 33 CC Okay, I'll have the consumables update for you momentarily. In the meantime, we'd like you to read out the HIGH GAIN ANTENNA meters and the HIGH GAIN ANTENNA knobs. It has not been switching to NARROW BEAM at AOS. We're not sure why, right now. We's like to leave the configuration as is and get those read-outs. Over.

04 02 40 10 CMP Okay, Bruce, the -

04 02 40 15 LMP Bruce, this is Ed. I got my biomed on, and I got the sensor corrected. Have the medics take a look at it while you're talking to Stu, please.

04 02 40 23 CC I understand you have your biomed hooked up, and the sensor is connected, and you'd like the medics to look at it.

04 02 40 30 LMP That's affirm.

04 02 40 32 CC We're in LOW BIT RATE right now, Ed. You'll have to hold on a minute.

04 02 40 42 CMP Okay, Bruce, the read-outs on the PITCH meter is 50 degrees, on the YAW meter is 270, on the knob, it's set at 35; and the - PITCH - YAW knob is set at 275.

04 02 41 06 CC Okay, Stu, on pitch, is that plus or minus? Over.

04 02 41 12 CMP Oh, sorry about that. Both are minuses.

04 02 41 15 CC Okay. Meter: PITCH, minus 50; YAW, 270; knob, minus 35 and 275. Over.

04 02 41 27 CMP That's affirmative.

04 02 41 29 CC Okay; coming at you with a consumables update. Over.

04 02 41 36	CMP	And let her rip.
04 02 41 38	CC	At a GET of 99 hours even; RCS total, 74 percent; quads in order, 73, 75, 73, 75; hydrogen, 65, 65; oxygen, 85, 83, 31. Over.
04 02 42 10	CMP	Roger. Copy the GET 99 hours; RCS total, 74; quads, 73, 75, 73, 75; hydrogen, 65, 65; O_2, 85, 83, 31.
04 02 42 27	CC	Roger, out.
04 02 42 43	LMP	Houston, 14.
04 02 42 44	CC	Go ahead, Ed.
04 02 42 48	LMP	Are you going to switch over to HIGH BIT RATE so you can look at this? I'd like to go ahead and start suiting up.
04 02 42 55	CC	Stand by.
04 02 43 17	CC	Apollo 14, this is Houston. We request HIGH GAIN ANTENNA SERVO ELECTRONICS to SECONDARY. Over.
04 02 43 28	LMP	Okay. ... - -
04 02 43 29	CMP	Okay; going to SECONDARY.
04 02 45 11	CC	Apollo 14, this is Houston. Request S-BAND NORMAL, TRANSPONDER, SECONDARY. Over.
04 02 45 22	LMP	Roger. TRANSPONDER, SECONDARY.
04 02 46 08	CC	Apollo 14, this is Houston. How do you read?
04 02 46 14	LMP	Loud and clear. How me?
04 02 46 15	CC	Roger; reading you the same.
04 02 47 00	LMP	Houston, 14.
04 02 47 03	CC	Go ahead, 14.
04 02 47 07	LMP	I'd appreciate an answer on your intentions relative to the sensor.

04 02 47 11	CC	Okay, Ed. Relative to the sensor, we require a HIGH BIT RATE down here in order for the surgeon to get any biomed telemetry. We're attempting to get HIGH BIT RATE at the present time, as evidenced by our request for SECONDARY ELECTRONICS on the HIGH GAIN ANTENNA and the SECONDARY TRANSPONDER. We'll let you know just as soon as we can press on. Perhaps, in the meantime, you could tell us which sensor you think was giving you the problem and what you've done in the meantime to it. Over.
04 02 47 43	LMP	Okay, the lower sternum sensor was leaking, and we replaced it last evening, and it seemed to be the only one that had a chance to be in bad shape.
04 02 47 59	CC	We copy. Out.
04 02 48 01	LMP	... to be the only one that looked like it might be ...
04 02 48 03	CC	Roger out. And -
04 02 48 41	CC	Apollo 14, this is Houston. Request HIGH GAIN, ELECTRONIC - HIGH GAIN ANTENNA, SERVO ELECTRONICS, POWER, PRIMARY; S-BAND NORMAL, TRANSPONDER to PRIMARY, and go to TRACK mode, MANUAL. Over.
04 02 49 47	LMP	Houston, 14. Do you read, now?
04 02 49 49	CC	14. This is Houston. Roger. We're reading you about 5 by 4. Over.
04 02 49 58	LMP	Okay. I've given - given you PRIMARY, SERVO ELECTRONICS; PRIMARY, TRANSPONDER; and what else did you want?
04 02 50 04	CC	Roger. We want to go back to TRACK mode, MANUAL; and we'll use the positions that you have set on the PITCH and YAW dials at the present time.
04 02 50 15	LMP	Okay.
04 02 50 30	LMP	... MANUAL ...
04 02 50 34	CC	Okay. And reading you about 4 by 2 at the present time. Stand by.

04 02 51 28	LMP	Houston. 14. Do you read?
04 02 51 31	CC	Roger, Ed. We're reading you. We'd like you to do a normal manual acquisition, switching back the WIDE BEAM and then coming on over.
04 02 51 42	LMP	Okay.
04 02 53 03	LMP	Houston, I have you on AUTO and NARROW again, and I cannot seem to get the signal strength above about the three-quarter mark.
04 02 53 14	CC	Roger. I'm reading you with a good bit of noise in the background, Ed.
04 02 54 09	CC	Apollo 14, this is Houston. We request you attempt acquisition again using the normal manual procedures. Over.
04 02 54 20	LMP	Roger. Roger.
04 02 56 09	CC	Apollo 14, Apollo 14; this is Houston. We suggest HIGH GAIN ANTENNA angles of PITCH, minus 25; YAW, 280. I say it again: PITCH, minus 25; YAW, 280. Over.
04 02 56 52	CC	Apollo 14, this is Houston. We suggest HIGH GAIN ANTENNA; PITCH, minus 25; that is minus 25; YAW, 280; YAW, 280. Over.
04 02 59 30	CC	Apollo 14, this is Houston. How do you - -
04 02 59 32	LMP	Houston, Apollo 14. How do you read?
04 02 59 34	CC	Roger. Loud and clear, now, Ed. We've got 4 - -
04 02 59 37	LMP	Go ahead, Bruce. You're loud and clear.
04 02 59 38	CC	- - minutes to LOS.
04 02 59 49	CC	Apollo 14 - -
04 02 59 50	LMP	Go ahead.
04 02 59 51	CC	Apollo 14, Stu. We've got 4 minutes until LOS. I have a four-step procedure for testing the lunar topo camera, if you are ready to listen and copy?

04 03 00 06 CMP Stand by 1, Bruce.

04 03 00 08 CC Roger. We're standing by.

04 03 00 24 CMP Okay, go ahead Bruce.

04 03 00 27 CC Okay. With respect to the Hycon, we think this may be a low-current problem. We've been able to duplicate most of your symptoms down here in Building 4 with the other model. What we'd like you to do is - step 1: disconnect all power connectors, inspect, and reconnect. Over.

04 03 01 02 CMP Okay. This baby reads disconnect all power connectors, inspect, and reconnect. And I guess - you know, we - we do that when we put it in and out, if I understand your step right. I mean, they're all disconnected. I guess you mean just look at the pins and so forth. Amplify that just a little bit, Bruce.

04 03 01 23 CC That's correct. We'd just like you to inspect for bent pins, any sort of damage, cracked insulators; anything like that you can find in error. Break, break, for Ed. We are unable to verify your biomed harness at this time. We'd like you to change out biomed harness. Do not suit up, and we'll check it over at AOS, next pass. Over.

04 03 01 48 LMP Roger. Understand. Change out the biomed harness, and do not suit up.

04 03 01 52 CC Roger. You can - you can suit up partially - -

04 02 01 55 LMP Be advised that - okay, understand. Be advised that the HIGH GAIN, I've tried manual procedures and about three-quarters of that signal strength I can get.

04 03 02 02 CC Roger. We copy on the HIGH GAIN. You can suit up partially if you want to take the risk of having to unsuit a little ways. Break, break, for Stu. Step 2: we'd like you to switch nonessential power to opposite MAIN DC BUS, that is, from B to A or A to B, whatever you were on last time. Step 3: reset control box film counter to zero; shutter speed to 1/200th of a second; with magazine removed, visually examine the shutter-curtain slit position. If the slit is visible,

it should not be more than 1 inch from the magazine guide rail. Examine sprocket area for visible tears. Step 4: install magazine Whiskey and actuate single frame. Remove magazine and verify slit is not more than 1 inch from magazine guide rail, if visible. Thirty seconds to LOS. I repeat, switch from nonessential power from BUS B to A or A to B, opposite what you had. Reset control box film counter to zero and shutter to 1/200th; with magazine removed, visually examine shutter-curtain slit position; if visible, slit should not be more than 1 inch from magazine guide rail. Examine sprocket area for visible tears; install magazine Whiskey and actuate single frame. Remove magazine and verify slit is not more than 1 inch from magazine guide rail. We'll talk to you on AOS next time on the results.

04 03 29 -- BEGIN LUNAR REV 10

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 03 53 16 CC Apollo 14. Apollo 14, this is Houston. How do you read? Over.

04 03 53 24 CMP Read you 5 square, Bruce. How me?

04 03 53 27 CC Roger, Stu. We're reading you with a good bit of background noise. We've got a few things to pass up to you, if you're ready to listen.

04 03 53 43 CMP Okay. Stand by just 1.

04 03 53 45 CC Okay. In the meantime, Stu, for you or Ed, we'd like you to try a normal acquisition again on the HIGH GAIN ANTENNA and, if that's NO GO, try acquisition in MANUAL and MEDIUM BEAM width. Over.

04 03 54 05 CMP Okay. Let me get down here and give it a go.

04 03 55 19 CMP Houston, how do you read Apollo 14?

04 03 55 25 CC Okay. Loud and clear, 14.

04 03 55 31 CMP Okay, Bruce; doesn't seem to be doing too good. Still can't get the lock up solid all the way. I'm in AUTO and MEDIUM now, and that's where you want it?

04 03 55 45 CC That's affirmative, 14. And we're checking out Ed's biomed.

04 03 55 54 CMP Okay.

04 03 56 03 CC Okay. In the meantime, an item of general interest on your orbital status. You started out somewhat high and are decaying at a slightly greater rate than predicted. However, the altitude at PDI will still be about 46,000 feet. That's 46,000 feet or 8.3 nautical miles; so your pericynthion's still good. Over.

04 03 56 34 CMP Okay. Sounds like good planning.

04 03 56 59 CC And, Apollo 14; Stu, map update REV 11, if you're ready.

04 03 57 07 CMP Negative. Stand by 1.

04 03 57 22 CC Apollo 14; Ed, this is Houston. You're GO to commence suiting up.

04 03 57 32 LMP Roger, Roger. Thank you, Bruce.

04 03 57 34 CC Biomed's looking good. Apollo 14; Ed, this is Houston. Can you monitor, just for a minute, discussion on the ascent batteries.

04 03 57 51 LMP Roger. I'm on. Go ahead.

04 03 57 53 CC 14, Houston. Our feeling right now is that this is a single-cell problem in ascent battery number 5. If one cell were shorted out entirely and completely discharged, this would drop your terminal voltage by 1.8 volts. The expected voltage, open circuit, at activation is greater than 35.3. I say again, it's greater than 35.3. However, the open circuit voltage will not be our criterion. We will use the Delta in voltage between BATs 5 and 6 underload to evaluate battery 5. If there is more than a 1.8-volt Delta between 5 and 6 - that is, if it should turn out that you have a problem with more than one cell, then battery 5 will be NO GO. Over.

04 03 58 55 LMP Understand, Houston, that if, in subsequent checks, we have more than one cell that shows up bad, battery 5 will be NO GO.

04 03 59 06 CC Roger.

04 03 59 11 CMP Okay. And I'm ready for the REV 11 update, Bruce.

04 03 59 15 CC 14, Houston. REV 11, 180 degrees, 102:03:40. Understand you don't need LOS or AOS; they're close to nominal.

04 03 59 46 CC Apollo 14, this is Houston. I've got a lot of noise in the background now. Did you copy the time for 180, 102:03:40? Over.

04 04 01 01 CC Apollo 14, this is Houston. How do you read now? Over.

04 04 01 38	CC	Apollo 14, this is Houston. How do you read?
04 04 01 44	CMP	Loud and clear, Bruce.
04 04 01 46	CC	Okay. We're reading you again, Stu. We'd like you to go with MANUAL and MEDIUM BEAM width, please.
04 04 01 55	CMP	Okay.
04 04 02 26	CMP	Okay, Bruce. The antenna seemed to oscillate a little bit, there. It's steadied out now with a reasonably good signal - -
04 04 02 31	CC	Say, that looks beautiful. That looks beautiful, Stu.
04 04 02 39	CMP	Okay - -
04 04 02 40	CC	Stu, did you copy the time for 180-degree meridian, 102:03:40?
04 04 02 51	CMP	That's affirmative; 102:03:40.
04 04 02 54	CC	Roger. Were you able to run through the LTC camera checkout procedures 1 through 4, or we fade out on you before you got them?
04 04 03 04	CMP	That's negative on being able to run through them. I didn't even begin to get them copied, Bruce. I guess - I need to - What time frame are you thinking of me troubleshooting that one? Is that something that we need to worry about right now?
04 04 03 18	CC	No, we'll hold off on that.
04 04 03 43	CC	Okay, 14. On the subject of the docking probe situation, for undocking, we anticipate a normal undocking sequence, that is, extension followed by release of the LM. If there should be no release at this time, we request that you hold the RELEASE position of the EXTEND/RELEASE switch and both vehicles thrust minus-X for 3 seconds, and then RELEASE on the - or return the switch to center. Over.

04 04 04 28 CMP Okay. Understand; we're anticipating a normal SEP. If we get on the end of the probe and no release, we'll both thrust minus-X for 3 seconds.

04 04 04 39 CC Roger. While you hold the switch in the RELEASE position. And we've got some other procedures that we'll run through in real time, if the requirement develops, in order to accomplish an undocking. We would like to say at this time, though, that we are not considering blowing the docking ring in order to undock. Over.

04 04 05 06 CMP Okay. That sounds reasonable.

04 04 05 10 CC And is Al listening?

04 04 05 16 CMP Al is not on the headset right now, Bruce.

04 04 05 19 CC Okay. I wonder if you'd pass to him that when he and Ed go over into the LM, they should either carry with them a tool R, that's tool Romeo, from the command module, or, if he should have such a thing as a screwdriver, bit, or something like that available, why that would also suffice. Over.

04 04 05 46 CMP Okay. I'll let him borrow a tool R, I guess, on a hand receipt, and he'll take that over with him.

04 04 05 54 CC Roger. Be sure and get a QC stamp on it.

04 04 06 01 CMP 21 Nancy.

04 04 06 03 CC (Laughter) Roger; 21 Nancy. Hey, a little more background on that - thing that we're looking for, of course, would be an item such as tool R that would enable our crewmen from the LM to depress the capture latch release button on the tip of the probe from the LM side, and tool R will fill this bill, or this other screwdriver, if it were available. Over.

04 04 06 32 CMP Okay. We got you.

04 04 06 36 CC And with respect to docking, again we anticipate normal operation. However, we'd like to add to the normal procedures a LM plus-X thrust of 10 seconds, four-jet RCS, to facilitate or to

give us just a little more of a warm feeling on the docking. Once again, we have some backup procedures that we can run through in real time, if these should prove necessary, and, in order to formalize this, I've got a flight-plan update for the CMP Solo Book and for the LM Time Line Book whenever you all are ready to copy these down.

04 04 07 28 CMP — Okay. Stand by here and let's get out the LM Time Line.

04 04 07 34 CC — Roger. I'll do likewise down here. And we'll make them together.

04 04 07 41 CMP — Okay.

04 04 07 46 CC — And since you don't have a lot going on up there right now, Stu, I wondered if you could give us POO and ACCEPT, and we'll send you up some uplinks. We've got a state vector, a desired orientor REFSMMAT, a - and that's it.

04 04 08 04 CMP — Okay. You have POO and ACCEPT.

04 04 08 15 CC — Okay, Stu. You seem to be fading out a little bit. Are you close enough to the mike?

04 04 08 24 CMP — I - I'm talking right into them, Bruce. You have POO and ACCEPT.

04 04 08 28 CC — Roger. Thank you. And would you return to the NARROW dead band five-tenths of a degree in the DAP, please?

04 04 08 38 CMP — Okay. Stand by 1.

04 04 08 40 CC — That's in reference to keeping the HIGH GAIN pointed right at us here.

04 04 08 46 CMP — Okay.

04 04 09 43 CMP — Okay. I'm NARROW dead band. I'm through with the DSKY if you want to press with the uplink, and looks like we got good signal strength here.

04 04 09 50 CC — Okay. It looks real good here, Stu, and we'll press on with the uplink. And I got my Time Line Book out and we're going to page 14.

04 04 10 01	CMP	Okay. We'll have to stand by on that LM Time Line Book for a little bit here, Bruce.
04 04 10 05	CC	Okay.
04 04 10 15	CC	And back on the subject of the drogue, I guess our analysis down here and all the data that we've been able to come up with indicates that you did, in fact, have a normal retraction on the last attempt. The selection of a bottle did not contribute to the capture in itself, and we've passed you the procedures here that we'd like you to run through.
04 04 10 41	CMP	Okay.
04 04 11 58	CMP	Houston, 14.
04 04 12 00	CC	Go ahead, 14.
04 04 12 06	CMP	Okay, Bruce. I - just something that seems like back from memory in debriefing from 11 - they tried this plus-X on the LM and docking and they got some - if I remember right - some attitude excursions. Is everybody satisfied that the LM can plus-X and everything will be stable?
04 04 12 51	CC	14, this is Houston. Roger. We recalled 11, and the biggest part of the problem there was that both vehicles were actively trying to control attitude. The procedure which we'll be passing up to you has you going into CMC MODE, FREE, prior to the LM commencing its plus-X thrusting. Over.
04 04 13 19	CMP	Okay. So I guess we'll - we'll wait until we get the changes, and then we'll talk about it, if we've got any questions.
04 04 13 25	CC	Roger.
04 04 18 14	CC	14, Houston. I have your CMC REFSMMAT zero time update for you. There is no GET or T_{ephem} update required. Over.
04 04 18 31	CMP	Okay. And I'm ready to copy, Bruce.

04 04 18 34	CC	Okay, CMC REFSMMAT zero zero time is 108 hours 53 minutes 58.00 seconds. And I'll have the TEI-19 pad shortly. You want to go ahead and read back?
04 04 18 53	CMP	Okay, REFSMMAT zero zero time, 108 - 108:53:58.00.
04 04 19 01	CC	Roger, readback correct. I'll be coming at you with the TEI-19 pad in about 10 seconds.
04 04 19 09	CMP	Okay.
04 04 19 35	CC	And if you're ready to copy on TEI-19, I'm ready.
04 04 19 49	CMP	Okay, TEI-19; let her go, Bruce.
04 04 19 53	CC	Roger, Stu. SPS/G&N; 36583; minus 0.66, plus 0.24; T_{ig}, 119:38:09.13; NOUN 81, plus 2903.4, plus 1564.7, minus 0485.2; roll, 179, 120, 029. The rest of the pad is NA. Ullage, four jets, 11 seconds. Remarks: this is an undocked burn. We assume circularization, but no plane change number 1. The lunar longitude that you are crossing at time of T_{ig} is minus 175.8 west longitude. Over.
04 04 21 23	CMP	Okay, TEI-19; SPS/G&N; 36583; minus 0.66, plus 0.24; 119:38:09.13; plus 2903.4, plus 1564.7, minus 0485.2; 179, 120, 029. Ullage, four jet, 11 seconds; undocked, assumed CIRC, no plane change 1; and longitude of T_{ig} minus 175.8.
04 04 22 06	CC	14, this is Houston; readback correct. Out.
04 04 22 14	CMP	Roger.
04 04 24 10	CMP	And, Houston, 14.
04 04 24 12	CC	Go ahead, Stu.
04 04 24 16	CMP	Okay, the LM/command module DELTA-P is 0.8.
04 04 24 22	CC	Houston, Roger. Out.
04 04 25 06	CC	Stu, Houston. How is your viewing attitude up there?

04 04 25 14 CMP It's rather tremendous, Bruce. This - Coming across this low - low orbit is phenomenal, and this attitude is absolutely great.

04 04 25 28 CC I guess that settles that one.

04 04 26 03 CMP I tell you one thing, Bruce; you sure get the impression you're more like about a thousand feet than 45,000.

04 04 26 13 CC I guess the scenery is really clipping along.

04 04 26 19 CMP Yes, and it seems so close. It looks like you can just reach out and touch it.

04 04 26 26 CC The recent input from FAO is that we need the Hycon camera check prior to a GET of 107 hours. That's about 6 hours from now.

04 04 26 42 CMP Okay, prior 107. And we'll sure try to give it a go.

04 04 26 48 CC Roger. And whenever you're ready on the flight-plan update to the CMP Solo Book and the LM Time Line Book, why, we've got it setting down here, but there's no rush.

04 04 27 00 CMP Okay, I can take the CMP Solo Book now, but we might as well get them both together, and it'll be a little bit here. They're getting their suits on.

04 04 27 09 CC Okay. Well, the details of the two are a little different.

04 04 27 20 CMP Okay, lets get me out of the way and take the Solo Book now.

04 04 27 26 CC Okay, on page 52.

04 04 27 43 CMP Okay, go ahead.

04 04 27 47 CC At 144 hours and 08 minutes, it presently reads, "Translate to capture latch," we want to change that to read, "Translate to contact." Over.

04 04 28 11	CMP	Okay, we'll change that "Translate to contact," and hope they're both the same, huh?
04 04 28 16	CC	Roger, Roger. Under that, add in "Report contacts to LM;" and "CMC MODE, FREE." Over.
04 04 28 43	CMP	Okay, and after contact, I'll report contact to LM and go CMC, FREE.
04 04 28 49	CC	Roger. And over there in the "Docking checklist," we want to delete the "CMC MODE, FREE." It says, "Docking checklist at capture, CMC MODE, FREE;" you can delete that.
04 04 29 03	CMP	Okay, I'll delete "CMC MODE, FREE" under the "Docking checklist at capture."
04 04 29 08	CC	And that's it. That wasn't so bad, was it?
04 04 29 13	CMP	No, that was pretty painless.
04 04 29 15	CC	21 Nancy.
04 04 29 19	CMP	Roger.
04 04 31 17	CC	14, Houston.
04 04 31 23	CMP	Go ahead, Bruce.
04 04 31 24	CC	Yes, Stu; we just got word that your family is listening to you, and they're outside looking up at that great big Fra Mauro Moon.
04 04 31 36	CMP	Thank you.
04 04 31 57	CMP	Okay, Bruce; for their benefit - just to pinpoint us, we're approaching the terminator now and the Fra Mauro formation. And I guess of all the views you see, I think it's going to be tough to beat this - going into the terminator at this low altitude. It's - it's really something.
04 04 32 17	CC	It sounds really spectacular. I'm sure we'd all like to be up there with you. I know I would.
04 04 32 24	CMP	Yes, I wish you could be - yes, I wish you could be, after all that hard work.

04 04 32 54 CC Apollo 14, this is Houston. We'd like to try the SECONDARY SERVO ELECTRONICS on the HIGH GAIN ANTENNA and attempt a normal acquisition. If that is unsuccessful, we'll return to the present configuration.

04 04 33 13 CMP All right, Bruce; go on SECONDARY, now.

04 04 33 29 CMP Okay, how do you read, Bruce?

04 04 33 31 CC Loud and clear, Stu. Looks beautiful.

04 04 33 36 CMP Yes. I went SECONDARY, and there was not a glitch in - in anything.

04 04 33 42 CC Are you in AUTO now?

04 04 33 47 CMP Oh, no. I am - I'm sorry. I didn't get the AUTO bit.

04 04 33 50 CC Great.

04 04 33 51 CMP I thought you just wanted SECONDARY on the ELECTRONICS.

04 04 33 56 CC Great. Now that you - -

04 04 33 58 CMP You - you want AUTO MODE? Is that - -

04 04 34 00 CC Now that you've got the SECONDARD SERVO ELECTRONICS up, we'd like you to run through a normal acquisition procedure; over.

04 04 34 10 CMP Oh, okay.

04 04 35 07 CMP 14, Houston.

04 04 35 10 CC Okay, loud and clear, Stu. It looks like it was successful. I understand - -

04 04 35 16 CMP That's negative. I'm back in MANUAL and MEDIUM. What happens when I go to AUTO - the PITCH goes to about a minus 50 and the YAW stays just about the same, but it seems like the AUTO MODE wants to drive the PITCH down to about minus 50; and if I do that in - in - in WIDE BEAM width and then I go to MEDIUM, NARROW, it doesn't seem to have any effect, and the signal strength drops back off.

04 04 35 51	CC	Okay, we copy, Stu.
04 04 35 56	CMP	And I'm back MANUAL, MEDIUM now.
04 04 36 00	CC	Roger. Out.
04 04 44 18	CC	Okay, Stu. We have your torquing angles. You're GO.
04 04 44 46	CMP	Okay, Bruce. Torqued at 101, 24, 20.
04 04 44 50	CC	101, 24, 20.
04 04 48 53	CC	14; Stu, this is Houston.
04 04 48 59	CMP	Go ahead.
04 04 49 01	CC	Roger, Stu. Prior to commencing your maneuver here, which it looks like you're about ready to do, we'll give you an OMNI antenna to select. Once you get to the new attitude, we'd like you to return to MANUAL, MEDIUM BEAM width, and we'll give you PITCH and YAW angles. Over.
04 04 49 19	CMP	All right, we're getting ready to manuever. Have you got the angles?
04 04 49 30	CC	Okay, Stuart. OMNI Bravo while maneuvering, and and the flight-plan angles of a PITCH, minus 80; and YAW, 98, are good.
04 04 49 47	CMP	Okay, OMNI Bravo during the maneuver, and flight-plan angles good when we get there. Thank you.
04 04 49 53	CC	Roger. And with respect to the LM Time Line Book, we'll try to pass this up in real time during the tail end of the rendezvous. You might pass to Al that it essentially makes the Time Line Book agree with what we gave you in the CMP Solo Book - 10 seconds or contact on the thrust X-plus at contact and then confirm docking. Confirm capture report from CSM.
04 04 50 21	CDR	Okay, Houston. We got that. And passing it up later is fine with us.

04 04 50 25	CC	Roger. We just wanted to make sure you were aware of what we had in mind.
04 04 51 16	CC	14, Houston. Six minutes to LOS.
04 04 51 21	CMP	Okay. Thank you.
04 04 56 33	CC	Apollo 14, this is Houston. One minute to LOS.
04 04 56 39	CDR	Roger, Houston.
04 04 56 42	LMP	Okay; 14 is up - on the time line, Houston.
04 04 56 47	CC	Say again?
04 04 56 55	CC	Okay, 14. Down here, we're going to turn over to the good old Gold Team, and the friendly Maroon Team will see you in a few hours.
04 04 57 06	LMP	Okay, stick around. We've got ice cream.
04 04 57 11	CDR	You'll be back for the fun, Bruce?
04 04 57 13	CC	I will; yes, indeed.
04 05 25 --		BEGIN LUNAR REV 11

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 05 46 11	CC	Kitty Hawk, Houston.
04 05 46 18	CMP	Go ahead, Houston; Kitty Hawk.
04 05 46 21	CC	Okay. We're ready with some updates to you - or an uplink rather, if you can give us POO and ACCEPT.
04 05 46 31	CMP	Okay. You've got POO and ACCEPT.
04 05 46 34	CC	And when you've got time, Stu, I've got some DAP data, and the SEP pad's ready.
04 05 46 42	CMP	Okay. Stand by 1.
04 05 47 18	CMP	Okay, Antares. How do you read Kitty Hawk B?
04 05 47 21	LMP	Okay, Kitty Hawk. Antares' LMP reads you loud and clear.
04 05 47 26	CDR	CDR reads you loud and clear, Red.
04 05 47 30	LMP	Let's go VHF A.
04 05 47 32	CMP	Negative. Stand by 1.
04 05 48 14	LMP	Kitty Hawk, Antares. Start count: 1, 2, 3, 4, 5, 4, 3, 2, 1.
04 05 48 18	CMP	Oh, you're loud and clear, now.
04 05 48 19	LMP	Okay. Let's go VHF A.
04 05 48 21	CDR	How about me? Am I loud and clear?
04 05 48 25	CMP	You're loud and clear, fearless one.
04 05 48 27	CDR	Good show, Rojo.
04 05 48 33	CMP	Okay. Go ENABLE.
04 05 48 41	CMP	Okay, Antares. Kitty Hawk on A SIMPLEX. How do you read?
04 05 48 44	LMP	Roger, Kitty Hawk. Antares reads you loud and clear, A SIMPLEX.

04 05 48 48	CMP	You're loud and clear, Ed.
04 05 48 50	CDR	Same here.
04 05 48 51	CMP	You're loud and clear, Al.
04 05 49 06	LMP	Houston, this is Antares. Over.
04 05 49 08	CC	Antares, Houston. Read you loud and clear.
04 05 49 13	LMP	Okay. Stand by.
04 05 49 28	LMP	Houston, PRIMARY EVAP FLOW NUMBER 1, OPEN; 102:15:45.
04 05 49 39	CC	Okay. Copy now.
04 05 49 43	LMP	Okay, and your LM power transfer time was 101:54:02.
04 05 49 51	CC	Roger, Ed. We got it.
04 05 49 56	LMP	And let's have a secondary S-band check.
04 05 50 00	CC	Okay, Ed. We're reading you loud and clear on secondary S-band, and they're ready for primary.
04 05 50 10	LMP	Okay. Let's go primary.
04 05 50 26	CC	Kitty Hawk, Houston. The computer is yours, and are you ready for the updates yet?
04 05 50 46	CMP	Okay, Fred. The computer's mine and go ahead.
04 05 50 51	CC	Let me give you your DAP data first. Your CSM weight is plus 36116. Your gimbal trims: pitch, minus 081; yaw, plus 019.
04 05 51 16	CMP	Okay. The DAP data: weight 36116; minus 081, plus 019.
04 05 51 28	CC	Okay. That's a good readback, and if you've got the pad book out, I'll give you your SEP pad.
04 05 51 38	CMP	Okay - -
04 05 51 39	LMP	Houston, Antares. If you read me, I'll press on.

04 05 51 43	CC	Roger, Ed. You're loud - loud and clear. Press on.
04 05 51 49	LMP	Okay.
04 05 51 50	CC	And, Kitty Hawk, I understand you're ready for a SEP pad.
04 05 51 56	CMP	That's affirmative, Fred. Let her go.
04 05 51 59	CC	Okay. Your NOUN 33 is 104:27:31.00. Pitch is 103. That's it.
04 05 52 17	CMP	Okay. Copy 104:27:31.00; and pitch, 103.
04 05 52 30	CC	Okay. That's good read; and now, I have a P24 landmark track data for you.
04 05 52 44	CMP	Okay. I'm ready to copy.
04 05 52 47	CC	Okay T_1, 104:56:55; T_2, 104:58:33; TCA, 104:59:03; T_3, 104:59:25; 355, 297, and 000; south 6; and use 14-1.
04 05 53 34	CMP	Okay. Copy; this is 14-1; and T_1, 104:56:55; 104:58:33; 104:59:03; 104:59:25; 355, 297, 000; it's south 6; and 14-1.
04 05 54 05	CC	Okay. That was good, Stu; and one more thing, a map update for REV 12.
04 05 54 18	CMP	All right, I'm ready.
04 05 54 20	CC	Okay. The 180-degree point at 103:57:28.
04 05 54 33	CMP	Okay. 103:57:28. Map update, REV 12.
04 05 54 38	CC	Good readback.
04 05 54 42	CC	And one other thing, Kitty Hawk. Could you verify that the docking angle was still plus 0.9?
04 05 54 51	CMP	That's affirmative, plus 0.9.
04 05 54 55	CC	Okay.

04 05 54 59 LMP Houston, Antares. How do you read on the steerable antenna?

04 05 55 02 CC Okay, Antares. I read you loud and clear.

04 05 55 07 LMP Okay.

04 05 55 26 LMP Stu, I'm ready for a gimbal-angle check, here.

04 05 55 31 CMP Okay. Want me to go MIN DEAD BAND and so forth?

04 05 55 36 LMP Roger. Go DEAD BAND, antenna ...

04 05 56 00 CMP Okay. I'm on MINIMUM DEAD BAND, antenna ... plus 00625, plus 11762, ...

04 05 56 21 CDR Okay. I've got ... - -

04 05 56 26 CC And, Kitty Hawk; Houston.

04 05 56 31 CDR - - 02387.

04 05 56 34 CMP Read R_3 again, Al.

04 05 56 36 CDR Okay. You got middle gimbal plus 02387.

04 05 56 39 CMP That's affirmative. Go ahead. Houston, Kitty Hawk.

04 05 56 42 CC Okay. I guess we've got the LM back now. Antares, Houston. Just want to verify you're in AUTO on the steerable.

04 05 56 51 LMP That's affirm, Fredo. I went to AUTO, and it was holding at a signal strength of 3.9, and I looked back over and we're - suddenly we're at 3, and I tried to relock, and I can't get it above 3 except on the OMNI.

04 05 57 12 CC Roger, Ed.

04 05 57 18 LMP If you'll give me a new set of angles, we'll try it again.

04 05 57 21 CC Stand by.

04 05 57 34	CC	Okay, Antares; Houston. We'd like you to try the steerable again, and the flight-plan angles are 116 and 41. Should be good.
04 05 57 45	LMP	Okay. Here we go again.
04 05 58 31	LMP	All right, Houston; Antares. I'm locked back up on the steerable, and that antenna's making a hell of a racket when it drives.
04 05 58 43	CC	Roger, Ed.
04 05 59 15	CC	And, Antares; Houston. We have good lock, now; and we'd like to verify you're in AUTO. And the noise - again, we're not knowing what level you're hearing; there is quite a bit of noise with that antenna.
04 05 59 31	LMP	I understand that. It's just surprisingly much more than I expected, and I am in AUTO. And it seems to be holding at a signal strength of about 3.9, right now.
04 05 59 41	CC	Okay. And, Antares, whenever you get time there to copy, I've got your AGS abort constants ready.
04 06 00 00	LMP	Okay. I'd like to hold those for a minute, Fredo.
04 06 00 03	CC	That would be fine, Ed.
04 06 00 16	LMP	Okay, Stu, we're coarse alined; don't know if I need ATT hold.
04 06 00 22	CMP	Okay.
04 06 02 01	LMP	Okay, Stu. We're ready for a snapshot on NOUN 20s, whenever you are.
04 06 02 07	CMP	Okay. Standing by for your mark.
04 06 02 17	LMP	Okay. 3, 2, 1 -
04 06 02 20	LMP	MARK.
04 06 02 23	CMP	Okay, on your mark, I read plus 00687, plus 11777, plus 02366.

04 06 02 35 LMP Okay. Give them to me again, please. I was copying time GET.

04 06 02 40 CMP Okay. Plus 00687, plus 11777, plus 02366.

04 06 02 56 LMP Okay. NOUN 20s as follows: 00687, 11777, 02366.

04 06 03 06 CMP That's a good readback.

04 06 03 15 CDR Houston, Antares. I'll take the - the AGS control now.

04 06 03 22 CC Roger, Antares. And we copied the NOUN 20s down here.

04 06 03 31 LMP Okay, and GET was 102:42:21.

04 06 03 40 CC Roger. GET of 102:42:21, and here's the AGS abort constants, Ed: 224, plus 60464; 225, plus 29400; 226, plus 60480; 305, minus 01760; 662, minus 54516; 673, minus 31704.

04 06 04 30 LMP Okay, Fredo. 224 is plus 60464; 225 is plus 29400; 226 is plus 60480; 305, minus 01760; 662, minus 54516; 673, minus 31704.

04 06 04 56 CC Okay, Antares. That was good readback.

04 06 05 03 LMP And Fredo, I'm coming on with ascent battery check, if you would like to watch that.

04 06 05 08 CC Stand by.

04 06 05 16 CC Antares, Houston. You have the GO for the ascent BAT check.

04 06 05 21 LMP Okay.

04 06 05 29 LMP BAT 5 NORMAL FEED coming on, now.

04 06 06 42 CMP Okay, I've got CMC time. You ready?

04 06 06 46 LMP Yes. You want me to set it up on 102:47?

04 06 06 49 CMP That'd be great.

04 06 06 57 CMP Three seconds.

04 06 06 59	CMP	Hack 102:47. Did you get that or would you like 102:47:30?
04 06 07 10	LMP	No. I have that. Stand by for a snapshot on NOUNs 65, please.
04 06 07 18	CMP	Okay. I'm standing by.
04 06 07 22	LMP	Okay. VERB 06 NOUN 65; 3, 2, 1 -
04 06 07 27	LMP	MARK.
04 06 07 29	CMP	Okay, on your mark, I read 102:47:28.35.
04 06 07 40	LMP	102:47:28.35. Thank you.
04 06 07 44	CMP	Roger.
04 06 08 42	CDR	Okay. You got a little old T_{ephem} over there somewhere I might be able to use? Either A or B, depending upon which one you like.
04 06 08 48	CMP	Okay. Stand by.
04 06 08 56	CMP	Okay, T_{ephem}. Are you ready to copy?
04 06 09 09	CDR	Go ahead, Stu.
04 06 09 11	CMP	Okay. Four ball 6; 3522.3, 1602.0.
04 06 09 23	CDR	You cut out there during the middle of it. Would you give it to me again, please?
04 06 09 26	CMP	Okay. Four ball 6; 3522.3, 1602.0.
04 06 09 39	CDR	Okay. I have four, zero, six; 3522.3, 1602.0.
04 06 09 46	CMP	Okay. Let's verify R_1. That's 00006.
04 06 09 50	LMP	That's verified. 00006.
04 06 09 52	CMP	Okay.
04 06 10 20	LMP	Houston, Antares.
04 06 10 22	CC	Go ahead, Antares.

04 06 10 28	LMP	My battery check is complete. The ED BAT voltage are 37.0, 37.0; and it appears that BATs 5 and 6 look exactly like they did last night.
04 06 10 41	CC	That looks great, Ed. Thirty-seven on each of the EDs, and we'll now get the work configured for - VERB 74.
04 06 10 54	LMP	Okay.
04 06 10 57	CDR	Okay, and we got the T_{ephem} squared here. And VERB 74 is coming down.
04 06 11 32	LMP	Houston, Antares.
04 06 11 34	CC	Go ahead, Antares.
04 06 11 38	LMP	Do you have any updates for DAP VERB 48 numbers?
04 06 11 44	CC	Stand by on that one, Ed. I do have some LM torquing - gyro torque angles for you.
04 06 11 52	LMP	Okay. Roger.
04 06 11 57	CMP	And Al, when you get a chance, I'd like to verify the capture latches.
04 06 12 04	CC	Okay, and Antares; Houston. I have the DAP data now, if you want to copy that.
04 06 12 14	LMP	Go ahead. Ready to copy.
04 06 12 16	CC	Okay. LM weight, plus 34039; CSM weight, plus 36116; and your gimbal angles, as loaded in the computer, are good.
04 06 12 37	LMP	Roger.
04 06 12 43	CC	And Antares, are you ready for the gyro torque angles, now?
04 06 12 52	LMP	Stand by.
04 06 12 55	CC	That's over on about page 2-26, Ed.
04 06 13 11	LMP	Okay. Ready to copy.

04 06 13 14	CC	A plus 00960, minus 00170, plus 00640.
04 06 13 32	LMP	I read back X, plus 00960; Y, minus 00170; Z, plus 00640.
04 06 13 45	CC	Okay. That's correct, and I need a readback on the weights. I didn't get that from you.
04 06 13 54	LMP	Roger. The weight - LM weight: 34039; command module weight: 36116.
04 06 14 03	CC	Okay. That's good, Antares.
04 06 14 12	LMP	And Houston, I'm in my S-band antenna stop. I'm going to have to go to OMNIs, I think.
04 06 14 19	CC	Roger, Ed.
04 06 15 02	LMP	Houston, Antares.
04 06 15 06	CC	Go ahead, Antares.
04 06 15 12	LMP	My S-band steerable pitch needle is sitting at 255 and will not move. The yaw seems to be working okay; however, I do not think that I'm in the stop.
04 06 15 33	CC	Okay. We copied, Antares. Your pitch reading is 255, and INCO concurs that it appears down here you're not in the stop.
04 06 15 50	LMP	Okay, if you like, I took it out for safety's sake; I'll put it back on AUTO TRACK if you'll give me the angles again.
04 06 15 58	CC	Okay. Stand by.
04 06 16 06	CC	Okay. Antares, the numbers are plus 121 and 40 - plus 40 on the yaw.
04 06 16 15	LMP	Good. Roger. 121 and 40.
04 06 16 28	LMP	Okay.
04 06 16 43	LMP	Houston. You're locked up on the steerable, and my pitch needle is still sitting at 255. I think we have a failure in it.

04 06 16 55	CC	Roger, Ed.
04 06 17 58	CDR	Okay, Houston. This is Kitty Hawk. We're getting ready to drop the landing gear.
04 06 18 04	CMP	Okay.
04 06 19 07	LMP	Houston, this is Antares - -
04 06 19 09	CMP	Okay, Houston. The gear deployed, and we've got a gray talkback.
04 06 19 15	CC	Roger, Antares.
04 06 19 18	CC	And Antares, Houston. Would you verify that the comm display breaker is closed on 16?
04 06 19 30	LMP	That's verified.
04 06 19 33	CC	Roger.
04 06 19 36	LMP	Remember, Fred, I've got one good needle and one bad needle.
04 06 19 39	CC	Okay, that wasn't - wasn't clear. We weren't sure if you just said one ... or not - Go ahead, Antares.
04 06 19 48	CDR	Okay, we're ready to press ahead with - -
04 06 19 52	LMP	Roger. Fredo.
04 06 19 56	CC	Okay, Antares.
04 06 19 57	LMP	Houston, we're ready to press ahead with RCS PRESSURIZATION.
04 06 20 00	CC	Go, Antares. You go.
04 06 20 01	LMP	Go ahead.
04 06 20 06	CDR	Okay, we're GO for RCS PRESS.
04 06 22 17	CMP	Hey, Al, when you get a chance, I need another verifier on the capture latches.
04 06 24 41	CDR	Okay, Houston. Pressurization looked good, and HELIUM PRESS, 2850.

04 06 24 54	CC	Roger, Antares.
04 06 25 29	LMP	And Houston. We're standing by for RCS checkout; and Stu, we need WIDE DEAD BAND, ATT hold.
04 06 25 43	CMP	...
04 06 25 44	CC	Hey, Antares, we're GO for the RCS checkout.
04 06 25 51	LMP	Roger.
04 06 25 54	CMP	Okay, I'm CMC FREE.
04 06 25 57	LMP	No, need ATT hold, Stu; WIDE DEAD BAND and ATT hold.
04 06 26 02	CMP	Okay. This your RCS checkout?
04 06 26 05	LMP	That's affirmative.
04 06 26 09	CMP	Okay. Mine says CMC FREE; I'll give you SCS WIDE DEAD BAND.
04 06 26 14	LMP	Great.
04 06 26 16	CC	It's the first part, Kitty Hawk. It's a cold fire.
04 06 28 39	LMP	Okay, Stu, you can go FREE now.
04 06 28 42	CMP	Okay.
04 06 29 24	LMP	Houston, here comes the hard part, the hot fire check.
04 06 29 28	CC	Okay, Antares. We're ready.
04 06 30 12	CC	Kitty Hawk, Houston. We'd like OMNI Alfa.
04 06 30 18	CMP	Okay. I - Is that for Kitty Hawk?
04 06 30 20	CC	That's affirmative. We'd like OMNI Alfa.
04 06 30 25	CMP	Okay.
04 06 31 51	LMP	Stu, hot fire checks are complete.

04 06 31 54	CMP	Okay.
04 06 31 56	CC	Roger, Antares. We're showing you a low yaw rate now.
04 06 32 00	LMP	Go ahead.
04 06 32 07	LMP	Say again, Houston.
04 06 32 10	CC	We're showing a little rates on there -
04 06 32 12	CMP	Why don't you bang the - take the -
04 06 32 21	CMP	Why don't you take the rate out before I go back to AUTO, Ed.
04 06 32 25	LMP	Okay. You'll have to tell us which way, Stu. We're not showing any rate.
04 06 32 33	CMP	Okay. Touch it a little right yaw.
04 06 32 48	CMP	Okay, hit it again. Again, you got 2/10ths a second to go. Again. Again. Again. Again. Two more times.
04 06 33 11	CMP	Okay, that's good.
04 06 33 14	LMP	Okay.
04 06 33 36	CC	Antares, Houston.
04 06 33 41	LMP	Go ahead, Houston.
04 06 33 43	CC	When you can work it in here, we'd like you to go back to page 2-12 and repeat step 7, which is terminate self test.
04 06 34 01	LMP	Wilco.
04 06 34 12	LMP	Okay. We'll go through it again, Houston.
04 06 34 17	CC	Okay, Antares. We don't need the whole self test again, just step 7. The termination step will do.
04 06 34 26	LMP	We understand.
04 06 34 27	CC	Roger.

04 06 35 09	CC	And Kitty Hawk, Houston. We're showing your cabin pressure up to about 57 now.
04 06 35 18	CMP	That's affirmative. I see it.
04 06 36 02	LMP	Houston, I'm ready for an uplink if you're ready to give it to me?
04 06 36 06	CC	Okay, give us POO and DATA, and we'll start her up.
04 06 36 17	LMP	You have it.
04 06 36 19	CC	Roger, Ed.
04 06 36 51	LMP	Stu, you look good from this side. You ready for hatch closure?
04 06 36 54	CMP	That's affirmative. I'll be ready in just a little bit.
04 06 37 00	LMP	Okay. You want us to stand by?
04 06 37 08	CMP	No, you can go ahead and close your hatch.
04 06 37 13	LMP	Okay, proceeding.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 06 42 06	CC	Antares, Houston. The computer is yours.
04 06 42 10	LMP	Okay, thank you.
04 06 42 21	CC	Antares, Houston.
04 06 42 26	LMP	Go ahead, Houston.
04 06 42 27	CC	Okay. With your meter problem there on the S-band, Ed, that you might change your LOS procedure to go on PITCH, 90; YAW, 0; and SLEW.
04 06 42 41	LMP	Okay. I'll do that Fredo. And I just now noticed the meter is back with me again, but I suspect it's not very reliable.
04 06 42 48	CC	Okay.
04 06 44 04	LMP	Houston. We had a PROGRAM alarm 1106 noted.
04 06 44 14	CC	Okay, Ed. We saw it here, and you can press on.
04 06 48 21	CMP	Okay, Al. Would you verify your hatch is closed and the DUMP VALVE, AUTO.
04 06 48 28	CDR	Verified.
04 06 48 34	CMP	Okay. I've got the - all 12 latches released and the hatch in. And I'm proceeding to vent down the tunnel.
04 06 48 44	CDR	Good show.
04 06 50 15	LMP	Houston, Antares.
04 06 50 16	CC	Antares, Houston. I've got an AGS K factor for you.
04 06 50 21	LMP	Go.
04 06 50 23	CC	Okay. It's plus 00100, plus all zips, plus 00072.
04 06 50 38	LMP	Understand. 100, all zeros, 00072.
04 06 50 43	CC	That's correct, Ed. Seven-tenths of a second.

04 06 50 49	LMP	Do you have a - an LOS pad for me, Fredo?
04 06 50 55	CC	Okay. I'm showing LOS in about 8 seconds.
04 06 51 03	LMP	Thank you.
04 07 17 --		BEGIN LUNAR REV 12
04 07 39 55	CMP	Hello, Houston. Do you read Kitty Hawk?
04 07 39 58	CC	Kitty Hawk. Read you loud and clear.
04 07 40 04	CMP	Okay. Like we're standing by for a GO for SEP.
04 07 40 12	CC	Roger, Kitty Hawk.
04 07 41 03	CC	Antares, Houston. Are you online?
04 07 41 12	CMP	Antares. Do you have lockup for Houston?
04 07 41 15	LMP	Roger; stand by. Okay, Houston. You're locked up.
04 07 41 26	CC	Roger, Antares. We would like HIGH BIT RATE.
04 07 41 33	LMP	And you have it.
04 07 43 15	CC	Antares, Houston. Could you try the SERVO again?
04 07 43 24	LMP	Houston. Let me put you on OMNI until we get undocked. I'm damn busy right now.
04 07 43 32	CC	Okay, Ed.
04 07 43 35	CDR	Okay, Houston. Do you want the - I got the gimbal angles ready for you, if you're ready to copy.
04 07 43 46	CC	Okay. Go ahead.
04 07 43 52	CDR	Okay. On that drift check, I got a GET of 103:58:25; command module as follows: 007.69, 113.04, 022.88. Are you with me?
04 07 44 10	CC	Roger, Al.
04 07 44 14	CDR	Okay. LM as follows 293.39, 293.05, 337.09.
04 07 44 25	CC	Okay. CSM, 007.69, 113.04, 022.88; LM, 293.39, 293.05, 337.09; and a GET of 103:58:25.

04 07 44 48	CDR	Okay.
04 07 44 59	CC	Kitty Hawk and Antares, you have a GO for undock.
04 07 45 06	LMP	Okay.
04 07 45 07	CMP	Kitty Hawk; Roger.
04 07 45 09	CC	Okay. And I'd just like to reiterate some words I think you got passed from Bruce earlier. If the nominal undock does not take place after you get things damped out again, we need 5 seconds of minus-X thrusted by both vehicles. And Kitty Hawk should call the thrusting on and off.
04 07 45 37	CMP	Okay. You want 5 seconds. We were told 3 before, but - Okay, we want each one a minus 5 seconds while I'm holding the switch.
04 07 45 48	CC	That's affirmative, Stu. And you should call the on and off command.
04 07 45 55	CMP	Okay. I'm going to try the nominal first.
04 07 45 58	CC	That's affirmative.
04 07 46 15	CMP	Okay. Antares, how do you read on VOX?
04 07 46 18	CC	Loud and clear.
04 07 46 20	LMP	Okay, loud and clear.
04 07 46 21	CDR	Loud and clear.
04 07 46 23	CMP	Okay.
04 07 46 25	LMP	Okay. TAPE RECORDER's, ON, S-BAND. What's that? Houston, I have you locked up on the steerable.
04 07 46 50	CC	Roger, Ed.
04 07 46 59	CDR	Okay, let me keep you on it now.
04 07 47 04	CMP	Okay.
04 07 47 12	CDR	Got to keep the - hold off on it until you do.
04 07 47 16	LMP	Give me about 5 seconds, Stu. Need another 5 seconds.

04 07 47 20	CMP	Okay. I'm showing 10. We'll make it 15.
04 07 47 24	LMP	Okay. Good.
04 07 47 27	CDR	Give me BIOMED, LEFT; PCM, HI.
04 07 47 31	CMP	Okay. They're zero. Will you be ready to go at 5? Are you ready, Al?
04 07 47 37	CDR	Okay. We're ready.
04 07 47 38	LMP	GO.
04 07 47 39	CDR	We're ready, go.
04 07 47 41	CMP	Okay. Okay, you're moving out - -
04 07 47 45	CDR-LM	We're clear - -
04 07 47 46	CMP	- - and you're hanging on the end of the probe. We'll wait until motions damp here. Okay, we seem real steady. I'm going to back off from you.
04 07 48 00	CDR-LM	Okay.
04 07 48 01	CMP	And we're free.
04 07 48 03	LMP-LM	Beautiful.
04 07 48 04	CDR-LM	Very good.
04 07 48 12	CMP	Okay, we had a normal undocking, Houston.
04 07 48 20	CDR-LM	Okay. DEAD BAND MIN; VERB 77; go to POO.
04 07 48 42	CDR-LM	Okay. Yaw left 60, pitch up 90.
04 07 48 46	LMP-LM	Okay, starting left yaw, Stu.
04 07 48 48	CMP	Okay. Boy, you look mighty pretty out there.
04 07 48 57	LMP-LM	And starting the pitchup.
04 07 49 06	CDR-LM	Yaw right 60, yaw left 60, pitch up 90.
04 07 49 11	CC	And, Antares; Houston. We've lost data on you now. We'd like your - what you ended up with in NOUN 83.

04 07 49 23	LMP-LM	Roger. We ended up with 1 - plus 0.1, minus point - minus 0.1, plus 0.1, and 0.
04 07 49 36	CC	Roger, Ed.
04 07 49 38	LMP-LM	Houston, you reading? Minus 0.1, minus 0.1, and 0.
04 07 49 43	CC	Okay. Minus 0.1, minus 0.1, and 0.
04 07 50 06	LMP-LM	Houston. I have you back on the OMNIs. It doesn't seem to be tracking.
04 07 50 11	CC	Roger, Antares.
04 07 50 20	LMP-LM	I'll give you LOW bit rate, if you want it.
04 07 50 31	CC	Okay, Antares. You can stay in HI.
04 07 50 36	LMP-LM	Roger.
04 07 51 02	CMP	Okay, Al. You're around - you want me to verify your tracker light? And it's loud and clear.
04 07 51 19	CDR-LM	Okay, Stu. We have you and have the camera on, and you look mighty pretty out there.
04 07 51 24	CMP	Yes. I've been taking a few shots of you there. Pretty impressive. Okay, DAC going OFF.
04 07 52 25	CC	And, Kitty Hawk; Houston. BMAG is rate 2.
04 07 52 32	CMP	Roger.
04 07 53 00	LMP-LM	Houston, Antares. You're back on the steerable.
04 07 53 03	CC	Roger, Antares. And I got a REV 12 TCA for you.
04 07 53 11	LMP-LM	Roger. Stand by 1.
04 07 54 22	LMP-LM	Houston, Antares. I'd like to recheck those gimbal angles with you again, please.
04 07 54 28	CC	Okay. Go ahead, Antares.
04 07 54 34	LMP-LM	I'm little bit rushed here. Let me just give you the command module and LM angles again. Command module, 007.69, 113.04, 022.88; and LM, I had 293.39, 293.05, 337.09.

04 07 55 01	CC	Okay, Antares. I copied command module: 007.69, 113.04, 022.88; LM: 293.39, 293.05, 337.09; and the GET was 103:58:25.
04 07 55 28	LMP-LM	That's correct, Fred. Thank you.
04 07 55 32	CDR-LM	Fred, I'm ready for the ... - REV 12 TCA.
04 07 55 51	CC	And, Antares; Houston. The TCA was 104:59:38. And we'd like to get the steerable again; PITCH, plus 66; YAW, minus 43.
04 07 56 23	LMP-LM	Okay, Fredo. You have the steerable again. Be advised, it seems to track for a few minutes, and then breaks lock, and then heads for the stop.
04 07 56 31	CC	Roger, Ed. The last loss there was due to a problem we had on the site on the ground here.
04 07 56 41	LMP-LM	Okay.
04 07 56 47	CC	And, Antares, did you copy the TCA time?
04 07 56 53	CDR-LM	Roger. 104:59:38.
04 07 56 56	CC	Very good.
04 07 57 35	CC	Kitty Hawk, Houston. OMNI Alfa.
04 07 57 46	CMP	Okay. You got OMNI Alfa, Houston.
04 07 57 50	CC	Roger, Stu.
04 08 00 01	LMP-LM	Houston, Antares. We'll proceed with the DPS throttle check, if you're ready.
04 08 00 14	CC	Roger, Antares. That'll be all right, and, if you give us POO and DATA, we'll pump you up a command module state vector.
04 08 00 25	LMP-LM	You have it, and we're proceeding with the throttle check.
04 08 00 29	CC	Roger.
04 08 00 53	LMP-LM	Okay. ENGINE STOP, push. We have a light.

04 08 01 11	LMP-LM	Okay, Houston. Engine is armed, and we go with the Commander's MIN, soft stop; MAX; back to MIN. Here we go with the LMP. It's in MIN, soft stop; and going to MAX.
04 08 02 11	CC	Antares, the throttle check looks good.
04 08 02 16	LMP-LM	Okay; ARM, OFF.
04 08 02 22	CC	Antares, Houston. The computer is yours.
04 08 02 28	LMP-LM	Okay. Thank you.
04 08 03 04	CC	And, Antares; Houston. You can proceed on by the program alarm.
04 08 03 11	LMP-LM	Okay, thank you.
04 08 11 54	LMP-LM	Houston, Antares.
04 08 11 58	CC	Go ahead, Antares.
04 08 12 03	LMP-LM	Roger. We're going over Hipparchus L and Hipparchus C at 8 minutes before the landing site. Looks just like the map.
04 08 12 13	CC	Roger, Ed.
04 08 12 56	CDR-LM	Okay. We got Albategnius on the left.
04 08 13 04	CC	Roger, Al.
04 08 13 13	LMP-LM	We have Hipparchus J on the right as we're going over it. It looks like it's right below us, about 1000 feet. Instead of 40. This is Muller ahead of us, Muller A on the left, Muller O first. Hipparchus K out to the right.
04 08 13 37	CC	Look's like you're right on the line.
04 08 13 42	LMP-LM	Yes; we sure are.
04 08 13 53	LMP-LM	Fred, I don't see how we could clear that ridge ahead of us; it sticks up so far.
04 08 14 12	CDR-LM	Okay, Ptolemaeus A on the left.

04 08 14 17	CC	Roger, Al.
04 08 14 31	LMP-LM	We look like we're at about - about a foot above it, and Stu's below us. Here's Herschel out - Herschel out to the right.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 08 15 54	LMP-LM	And the camera is started, Fredo, as we cross Lalande N and NA.
04 08 16 00	CC	Roger, Ed.
04 08 16 07	LMP-LM	Might even get a picture of Stu ahead of us; we're crossing Lalande C.
04 08 16 13	CC	Okay.
04 08 18 03	LMP-LM	Okay, Fredo. We're coming over Turner Crater. Looks just like on the map as we approach the site.
04 08 18 11	CC	Roger, Ed.
04 08 18 27	CC	Do you have about the same picture with respect to the shadows on those ridges up ahead, Ed, as the map?
04 08 18 36	LMP-LM	They don't seem quite as long as on the map, Fredo.
04 08 18 41	CC	Okay.
04 08 20 27	CDR-LM	Okay, Houston. We've spotted the general area of the landing site from in this area on in. We didn't spot Cone Crater on this pass, however.
04 08 20 38	CC	Okay, Al. We'll get a look at it a couple passes later.
04 08 20 52	CDR-LM	And, Fredo, as we come up on Lansberg here, it's - the terminator is running right across it. And it was a big one. It really has some - a steep rim - or rather a high rim, very noticeably high rim from here - from here. And it's right - the terminator goes right through it.
04 08 21 32	CC	And, Antares, Houston. You can use the same LOS procedures on the steerable.
04 08 21 41	CDR-LM	Okay.
04 08 22 02	CMP	Okay, Houston. How do you read Kitty Hawk?
04 08 22 05	CC	Loud and clear, Kitty Hawk.

04 08 22 11	CMP	Okay, that pass went just as advertised. I think we've got plenty of marks on it.
04 08 22 18	CC	Very good, Stu.
04 08 22 58	CMP	Antares, Kitty Hawk.
04 08 23 00	LMP-LM	Go ahead.
04 08 23 01	CMP	Okay. I'm going to be setting up for ranging SIMPLEX B.
04 08 23 05	LMP-LM	Okay, we're right on the time line.
04 08 23 09	CMP	Okay.
04 08 23 33	CC	Kitty Hawk, Houston.
04 08 23 34	CMP	Say again, Ed. Go ahead, Houston.
04 08 23 39	CC	Roger, Kitty Hawk. We'd like to crank up the HIGH GAIN. PITCH, minus 87; YAW, plus 281; MANUAL and WIDE so we can get a tape dump.
04 08 23 53	CMP	Okay, minus 87, and say again the YAW?
04 08 23 57	CC	YAW, plus 281.
04 08 24 02	CMP	281.
04 08 24 11	CMP	Okay. I read 0.53. No, make that 0.55; mine keeps varying a little bit.
04 08 25 34	LMP-LM	Okay, Stu. We'll take ...
04 08 25 44	CMP	Okay, I'm reading 0.57.
04 08 25 51	LMP-LM	0.57. Thank you.
04 08 26 47	CMP	Okay.
04 08 26 58	LMP-LM	Houston - Houston, Antares.
04 08 27 01	CC	Roger, Antares.
04 08 27 06	LMP-LM	My S-BAND ANTENNA circuit breaker has popped twice now. I think that may be the reason we're breaking lock occasionally. We got some problems in it.

04 08 27 15	CC	Okay, Ed. Is that the AC or, on your side, the DC one?
04 08 27 21	LMP-LM	No, that's the DC one on panel 16.
04 08 27 23	CC	Okay.
04 08 27 27	LMP-LM	Seems like it might be overheating on us, probably.
04 08 28 26	LMP-LM	Okay, Houston. I'm locked up again. The circuit breaker is holding for the moment.
04 08 28 30	CC	Roger, Ed.
04 08 29 16	CMP	Houston, Kitty Hawk. Did you get the torquing angles?
04 08 29 22	CC	And negative, Kitty Hawk.
04 08 29 27	CMP	Okay. Ready to copy?
04 08 29 29	CC	Go ahead, Stu.
04 08 29 37	CMP	Okay. 000.30, minus 000.38, plus 000.28; torque at 105:08:40.
04 08 29 57	CC	Okay, Antares; Houston. We'd like you to back out of that 52. We need to look at a bit here.
04 08 30 07	LMP-LM	Roger. Do you have some pads ready for me this pass, Fred?
04 08 30 15	CC	Okay. They're coming up in a minute, Ed. You ready to copy a couple of steps here?
04 08 30 25	LMP-LM	Yes. Go ahead.
04 08 30 26	CC	Okay. We'd like a VERB 11 NOUN 10 ENTER, 30 ENTER.
04 08 30 37	LMP-LM	You got it.
04 08 30 57	LMP-LM	You read the DSKY, Houston.
04 08 31 02	CC	Antares, Houston. What we're looking at there is the abort bit, and it looks set. And we'd like to proceed with the following to reset it.
04 08 31 13	LMP-LM	Okay. Give me the word.

04 08 31 15	CC	Okay. We need the STOP pushbutton, push. And the next thing is the ABORT pushbutton, depress. And wait on that one.
04 08 31 28	LMP-LM	Okay. Standing by on that one.
04 08 31 34	CC	Okay. I meant you can go ahead and press the ABORT button, Ed; but stand by for our word on the reset.
04 08 31 45	LMP-LM	Okay. It's set.
04 08 31 48	CC	Okay. Stand by.
04 08 32 08	CC	Antares, Houston. You can reset the ABORT push-button.
04 08 32 15	LMP-LM	Okay. It's reset.
04 08 32 25	CC	Okay. You can reset the STOP button - -
04 08 32 27	LMP-LM	..., Fredo?
04 08 32 29	CC	You can reset the STOP button now, Ed, and press on with the P52.
04 08 32 36	LMP-LM	Okay.
04 08 32 37	CDR-LM	Okay. STOP button is reset.
04 08 32 40	CC	Okay. And back to Kitty Hawk now. I missed the sign on your first torque angle there, Stu.
04 08 32 52	CMP	Okay. It was plus 000.30.
04 08 32 56	CC	Okay. I copy plus 00.30, minus 000.38, plus 000.28, at 105:08:40. And we need WIDE BEAM correction on that. We need MEDIUM, Stu. MEDIUM for the dump.
04 08 33 22	CMP	Okay. Read me your - the first torquing angle again, Fred.
04 08 33 27	CC	Okay. I copied plus 000.30.
04 08 33 32	CMP	Okay. That's correct. And I'm in MANUAL and MEDIUM.

04 08 33 37	CC	Very good.
04 08 34 08	CC	Kitty Hawk, Houston. We'd like POO and ACCEPT, and I got some pads ready for your CIRC.
04 08 34 18	CMP	Okay. Is that Kitty Hawk, Fred?
04 08 34 20	CC	That's affirm.
04 08 34 21	CMP	For the POO and ACCEPT.
04 08 34 23	CC	That's affirm. POO and ACCEPT, Kitty Hawk.
04 08 34 25	CMP	Okay. You have POO and - you have POO and ACCEPT, Houston. I'm ready to copy pads.
04 08 34 35	CC	Okay. CIRC pad, SPS/G&N; 36116; minus 0.81, plus 0.19; 105:51:48.11; plus 0070.2, plus all zips, minus 0029.6; 000, 130, 359; 0063.3, plus 0055.5; 0076.2, 0:04, 0062.9. The rest of the column N/A. Sirius and Rigel; 127, 148, 015; two jets, 16 seconds, quads B and D.
04 08 35 58	CMP	Okay, Fred. Copy CIRC, SPS/G&N; 36116; minus 0.81, plus 0.19; 105:51:48.11; plus 0070.2, all zips, minus 0029.6; 000, 130, 359; 0063.3, plus 0055.5; 0076.2, 0:04, 0062.9. Understand no sextant star; Sirius and Rigel; 127, 148, 015; two jets, 16 seconds, quads B and D.
04 08 36 51	CC	Okay. That was a good readback, Kitty Hawk. And Antares, did you copy the NOUN 33 and NOUN 81?
04 08 37 01	LMP-LM	That's affirmative, but confirm the time and DELTA-V_Z, plus or minus.
04 08 37 21	CC	Okay, Kitty Hawk. We'd like for you to get the steerable again. PITCH, minus 86; YAW, 251; and AFT OMNI for Antares.
04 08 37 39	LMP-LM	Okay, Fredo. Your AFT OMNI. And please confirm again the sign of DELTA-V_Z for NOUN 84.
04 08 37 49	CC	Okay. DELTA-V_Z is a minus 0029.6.
04 08 37 58	LMP-LM	Understand, minus 0029.6.

04 08 38 21	CC	Okay. And, Kitty Hawk - Kitty Hawk; Houston.
04 08 38 28	CMP	Go ahead, Houston.
04 08 38 29	CC	Okay. I got some more data here for you, map update, P24.
04 08 38 38	CMP	Okay, which one you want?
04 08 38 41	CC	Okay. Break. AFT OMNI for Antares; and I got a map - map update, REV 13.
04 08 38 52	CMP	Kitty Hawk's ready to copy map update.
04 08 38 54	CC	Okay, 180 crossing at 105:51:18.
04 08 39 05	CMP	105:51:18.
04 08 39 10	CC	Okay. Next, the P24 landmark track.
04 08 39 22	CMP	Okay. Go ahead.
04 08 39 26	CC	Okay, this is 14-1; 106:49:28, 106:54:18, 106:55:58, 106:56:46, south 2 miles.
04 08 39 55	CMP	Okay. 14-1; 106:49:28, 106:54:18, 106:55:58, 106:56:46, south 2.
04 08 40 11	CC	Good readback.
04 08 40 20	CC	Antares, Houston.
04 08 40 25	LMP-LM	Go ahead, Houston.
04 08 40 27	CC	Okay. I got a PDI_0 pad here for you, Ed. And would you verify your AFT OMNI?
04 08 40 36	LMP-LM	I'll verify AFT OMNI, but we're doing a P52 right now. Can you hold it?
04 08 40 41	CC	Okay, we only got about 4 minutes and 18 seconds to LOS, now.
04 08 41 13	LMP-LM	Okay, Fred. Ready to copy PDI_0.
04 08 41 17	CC	Okay, and some of this is for Kitty Hawk as well. Are you ready to copy. Stu?

04 08 41 26	CMP	I'm standing by, Fredo.
04 08 41 28	CC	Okay, PDI_0. ALFA: 106:47:24.57; Bravo: plus 0101.9, plus all zips, plus 0001.7, 0139.0, plus 0007.9, 0101.9, 036, 000, 288, plus 0101.8, plus all zips, plus 0002.9; Charlie: 107:48:30.00; Delta: 109:35, all zips. And the throttle profile is 10 percent for 15 seconds, 40 percent for the remainder of the burn.
04 08 42 43	LMP-LM	Okay, readback. 106:47:24.57; Bravo: plus 0101.9, plus all zeros, plus 0001.7, 0139.0, plus 0007.9, 0101.9, 036, 000, 288, plus 0101.8, plus all zeros, plus 0002.9; 107 - this is Charlie now, 107:48:30.00; Delta: 109:35, all zeros. Throttle profile, 10 percent, 15 seconds, the remainder at 40.
04 08 43 28	CC	Good readback, Ed.
04 08 43 34	CMP	And Kitty Hawk copies.
04 08 43 36	CC	Roger. And Kitty Hawk, you are go for CIRC.
04 08 43 41	CMP	Roger. Go for CIRC.
04 08 43 49	CMP	And, Fredo, I assume you're through with the computer.
04 08 43 52	CC	That's affirm; it's your computer, Kitty Hawk.
04 08 44 11	CC	Antares, Houston.
04 08 44 22	LMP-LM	Go ahead, Houston.
04 08 44 23	CC	Okay, before you go around the corner here, or after you go around the corner, would you select SECONDARY TRANSMITTER/RECEIVER on the S-BAND, and try us on that one when you come back around?
04 08 44 36	LMP-LM	Is that for Antares?
04 08 44 38	CC	That's for Antares.
04 08 44 42	LMP-LM	Okay, we'll get it going around the corner.
04 08 44 45	CC	Roger, Ed.

04 08 45 00	LMP-LM	Hey, Houston. Clarify SECONDARY TRANSPONDER ...
04 08 45 08	CC	And, Antares; Houston. That's SECONDARY TRANSMITTER/RECEIVER; stick on the PRIMARY POWER AMP.
04 09 11 --		BEGIN LUNAR REV 13
04 09 32 38	CC	Kitty Hawk, Houston.
04 09 32 43	CMP	Go ahead, Houston. ...
04 09 32 47	CC	Okay. You're way down in the mud, Stu. Can you get us a HIGH GAIN? PITCH, minus 71; YAW, plus 175; and use the normal acquisition routine.
04 09 33 10	CMP	Okay. How now, Fred?
04 09 33 13	CC	Loud and clear.
04 09 33 19	CMP	Okay. The burn was on time. It was a G&N shutdown with a 2-foot-per-second overburn. I backed that off 1 foot by residuals after trimming for a minus 1.0, minus 0, plus 0.5. The attitude in which I trimmed was 353, 127, 005. CMC shows the orbit 63.9, 56.0.
04 09 34 35	CC	Okay; Kitty Hawk. The HIGH GAIN YAW is 197 and copied burn on time, G&N shutdown; NOUN 85 after trim were minus 1.0, minus 0, plus 0.5. And, you trimmed at attitude 353, 127, 005; and you ended up with a 63.9 by 56.0. And did you give a DELTA-V_c?
04 09 35 06	CMP	Roger. The DELTA-V_c was a minus 14.7 after - prior to trim. And, as I was cleaning up the main bus ties, it jumped around a little bit. And, after trim, it's reading a minus 12.8. It's really - doesn't figure too closely; I backed off 1 foot.
04 09 35 27	CC	Roger.
04 09 35 57	CC	Antares, Houston.
04 09 35 59	LMP-LM	Houston, Antares. How do you read?
04 09 36 01	CC	Loud and clear. We'd like to get QUANTITY switch, OFF.

04 09 36 09	LMP-LM	Okay. Getting QUANTITY, OFF.
04 09 36 25	CC	Kitty Hawk, Houston.
04 09 36 50	CC	Kitty Hawk, Houston. Go OMNI Bravo. Would you relay, Antares?
04 09 36 59	CDR-LM	Roger, Ed.
04 09 37 01	LMP-LM	Kitty Hawk, go OMNI Bravo.
04 09 37 08	CDR-LM	Houston, Antares. Ready with NOUN 93.
04 09 37 12	CC	Okay. Go ahead, Al.
04 09 37 19	CDR-LM	Okay. NOUN 93: plus 097, plus 062, minus 013; GET, 105:26:40; LPD CAL azimuth 0; elevation, down 1 degree.
04 09 37 49	CC	Okay, Antares. Copy; NOUN 93: plus 097, plus 062, minus 013; and you torqued at 105:26:40; LPD CAL azimuth 0; elevation, down 1. And I'd like to get from Ed the AGS GYRO CAL numbers 544 through 546.
04 09 38 18	LMP-LM	Okay. You have your initial numbers don't you, Fredo?
04 09 38 24	CC	Stand by.
04 09 38 36	CMP	And, Houston; Kitty Hawk. I've started a CHARGE on BATTERY B.
04 09 38 42	CC	Roger, Stu. And, Ed, I guess we need both the initial and the final.
04 09 38 49	LMP-LM	Okay. I'll read the initial first: 540, minus 10; 41, plus 0; 542, plus 02; 544, minus 06; 545, minus 23; 546, minus 187. The CAL numbers: 540, minus 10; 541, minus 1; 542, plus 2; 544, minus 07; 545, plus 0; 546, minus 161.
04 09 39 36	CC	Okay. We copied, Antares.
04 09 39 42	LMP-LM	Okay.
04 09 40 11	CC	Kitty Hawk, Houston. We'd like POO and ACCEPT.

04 09 40 18	CMP	Okay. You have it.
04 09 41 01	CC	Okay. And, Antares; Houston.
04 09 41 03	LMP-LM	Antares. We're proceeding with a DPS pressurization checkout.
04 09 41 09		Okay. And, Antares, we're showing the abort bit set again, and we're working on a procedure to reset it. And, also, another procedure to lock it out after starting PDI.
04 09 41 29	LMP-LM	Okay. That'll be great, thank you. We're pressing on with the DPS pressurization.
04 09 41 52	CC	Okay. Antares, you can go ahead with the DPS pressurization.
04 09 41 59	LMP-LM	Okay.
04 09 45 38	CC	Antares, Houston.
04 09 45 46	LMP-LM	Go ahead.
04 09 45 49	CC	Okay. I see you're back to POO now. We'd like to do a VERB 11 NOUN 10 ENTER; 30 ENTER; and look at that bit again.
04 09 46 05	LMP-LM	Okay. VERB 11 NOUN 10.
04 09 46 21	CMP	Houston, Kitty Hawk. Are you through with the computer?
04 09 46 23	CC	Roger, Kitty Hawk. And, while we've got that display up, Ed, could you tap on the panel around the ABORT pushbutton and see if we can shake something loose?
04 09 46 51	LMP-LM	Yes, Houston, it just changed while I was tapping there.
04 09 46 54	CC	You sure tap nicely.
04 09 47 00	LMP-LM	I'm pretty good at that.

04 09 47 09	CC	Okay. Antares, we'd like to kind of sit here a minute and watch it.
04 09 47 18	LMP-LM	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 09 50 03	CC	Antares, Houston.
04 09 50 07	LMP-LM	Go ahead.
04 09 50 08	CC	Okay, why don't y'all proceed on, Ed, with the landing radar checkout?
04 09 50 15	LMP-LM	Okay.
04 09 51 23	CC	Kitty Hawk, Houst - Houston. OMNI Bravo.
04 09 52 05	LMP-LM	And, Fredo, standing by for my update and my pad.
04 09 52 12	CC	Okay, Ed, I got some stuff ready. Let me check. Kitty Hawk, how you read Houston?
04 09 52 25	CC	Okay, he's way down in the mud. Antares, would you relay OMNI Bravo?
04 09 52 32	LMP-LM	Roger. Kitty Hawk, Houston likes OMNI Bravo, please.
04 09 52 36	CMP	Roger. I have OMNI Bravo.
04 09 52 39	CC	Beautiful.
04 09 52 40	LMP-LM	Okay.
04 09 52 41	CC	Well, I guess you'll have to relay to - -
04 09 52 42	CMP	... loud and clear ...
04 09 52 43	CC	- - him, Ed, if I don't get through to him. You ready for PDI?
04 09 52 50	LMP-LM	Roger. Fred, he's reading you loud and clear, and he is on OMNI Bravo.
04 09 52 54	CC	Roger. Okay, here we go. India.
04 09 52 58	LMP-LM	I'm ready for the pad.
04 09 53 00	CC	Roger. India.
04 09 53 01	CMP	Houston, ...

04 09 53 09 CC And, Kitty Hawk; Houston. Try OMNI Alfa.

04 09 53 16 CMP Roger. I've just come up Alfa. How do you read me?

04 09 53 20 CC A little better, not much. Here we go with PDI pad. India: 108:42:27.51; 0923, plus 00004; 001, 113, 000; plus 56963. PDI early, Juliett: 113:32 all zips. PDI late; Kilo: 111:33 all zips. You ready for no PDI plus 12?

04 09 54 22 LMP-LM Okay, no PDI plus 12.

04 09 54 23 CC Okay, Echo: 108:55 all zips, - -

04 09 54 31 CMP ...

04 09 54 32 CC Foxtrot: plus 0111.4 - -

04 09 54 35 LMP-LM Okay there, Kitty Hawk.

04 09 54 36 CC - - plus all zips.

04 09 54 41 LMP-LM Fredo, let's start over again.

04 09 54 43 CC Okay. Over again on the no PDI - -

04 09 54 49 LMP-LM Kitty Hawk is not reading.

04 09 54 51 CC Okay, stand by 1, Ed.

04 09 54 52 LMP-LM Kitty Hawk is not reading you, and he'll have to pick them up later.

04 09 54 58 CC Okay, we'll press on then, Ed. You can relay to him. No PDI plus 12 - -

04 09 55 03 LMP-LM Okay.

04 09 55 05 CC - - Echo: 108:55 all zips. Foxtrot: plus 0111.4; plus all zips; minus 00750; 01468; plus 00072.

04 09 55 35 CC Stand by 1.

04 09 55 43 CC And DELTA-V_R - -

04 09 55 44 LMP-LM Kitty Hawk, I'll get the ... time on my readback.

04 09 55 48	CMP	Yes, I'm reading you now, Ed.
04 09 55 51	CC	Okay, Stu. DELTA-V_R, Ed: 01343, 044, 000, 278; plus 01124, plus 00001, minus 00734; Golf: 111:49 all zips. Hotel: 113:32 all zips. Throttle profile, 10 percent for 15 seconds, 40 percent for the remainder. Why don't we go ahead and get the readback on those first, and then I'll give you T_2 and T_3.
04 09 56 44	LMP-LM	Roger. I'll read back in the order you gave them. India: 108:42:27.51; 0923, plus 00004; 001, 113, 000; plus 56963. Juliett: 113:32 all zeros. Kilo: 111:33 all zeros. And now no PDI plus 12, Echo: 108:55 all zeros. Foxtrot: 0111.4; plus all zeros. And let's go back to Foxtrot again. That's a plus 0111.4, plus all zeros; minus 0075.0; 0146.8; plus 0007.2. 01343; 044, 000, 278; plus 01124, plus 00001, minus 00734, 11 - This is Golf: 111:49:00.00. Hotel: 113:32 all zeros. Throttle profile, 10 percent for 15 seconds; the remainder at 40.
04 09 58 35	CC	Okay, a good readback, Ed. You ready for T_2?
04 09 58 43	LMP-LM	Okay, T_2.
04 09 58 46	CC	Roger. T_2, Lima: 109:04:34.06. Metro: 113:32 all zips; and T_2 is at PDI plus 22 minutes and 7 seconds. T_3, Nectar: 110:54:25.87.
04 09 59 50	LMP-LM	Okay, Fredo. Lima: 109:04:34.06. Metro: 113:32 all zeros. T_2 dash 1 is at PDI plus 22:07. Nectar is 110:54:25.87.
04 10 00 18	CC	Okay. That was a good readback, Ed.
04 10 00 25	CMP	And, Houston; Kitty Hawk. Got all the pads.
04 10 00 29	CC	Roger, Kitty Hawk.
04 10 00 56	CC	Antares, Houston. Could you give us POO and DATA?
04 10 01 23	CC	Antares, Houston. How do you read?
04 10 01 37	LMP-LM	Go ahead, Houston.

04 10 01 38	CC	Okay, Ed. We'd like POO and DATA, so we can start uplinking you.
04 10 01 49	LMP-LM	Okay. Okay. You have it.
04 10 02 01	CC	Roger, Antares.
04 10 06 23	CC	Antares, Houston. The computer is yours.
04 10 06 28	LMP-LM	Okay.
04 10 06 50	CC	Antares, Houston. And don't uplink too fast; proceed on by the alarm.
04 10 06 57	LMP-LM	Okay.
04 10 08 13	LMP-LM	Houston, Antares. The LPD altitude shows 49,000.
04 10 08 21	CC	Roger, Antares. LPD altitude, 49,000.
04 10 08 30	LMP-LM	That's correct.
04 10 13 10	CDR-LM	Okay, I have Cone Crater, Triplet, and Doublet. They all look just like they're supposed to.
04 10 13 17	CC	Very good, Al.
04 10 13 23	CDR-LM	And Star - Look right down there - right straight down - -
04 10 13 26	LMP-LM	Got them, yes, sure do.
04 10 13 31	CDR-LM	Yoo-ha! I think we'll know it next time, Fredo.
04 10 13 33	CC	Very good.
04 10 13 38	LMP-LM	There they were right below us, big as life.
04 10 15 07	CDR-LM	Houston from Antares. The landing Sun angle looks very good for the next time around.
04 10 15 13	CC	Roger, Al.
04 10 16 59	LMP-LM	Yes, sir. Fredo, the LNA really looks clear today.
04 10 17 07	CC	Really does, huh?

04 10 17 27	LMP-LM	Fredo, I guess you'll advise us on that abort that - when we come round next time.
04 10 17 32	CC	Yes, I'm working up a little spiel right now, Al.
04 10 17 37	CDR-LM	Okay.
04 10 18 26	CMP	Okay, Fredo. Tracking on 14-1 went real well. I trust you got the data and ...
04 10 18 33	CC	Stand by 1.
04 10 19 52	CC	Antares, Houston. We'd like you to check the WATER SEP handle and make sure it's all the way in.
04 10 19 59	LMP-LM	Okay, Fred. I'll get to it in just a minute.
04 10 20 01	CC	Okay.
04 10 21 41	CC	Kitty Hawk, Houston. OMNI Alfa.
04 10 22 21	LMP-LM	Houston, Antares. I verified that the WATER SEP handle is all the way in.
04 10 22 25	CC	Roger, Ed.
04 10 23 40	CC	Okay. Antares, Houston.
04 10 23 47	LMP-LM	Go ahead.
04 10 23 48	CC	Okay, Ed. That bit just showed up again. Wonder if you could try tapping the panel there by the ABORT switch again.
04 10 23 59	LMP-LM	Okay.
04 10 24 20	LMP-LM	Anything yet, Fredo?
04 10 24 23	CC	Okay, Ed. You did good work again.
04 10 24 31	LMP-LM	Okay.
04 10 25 19	LMP-LM	Houston, Antares.
04 10 25 24	CC	Antares, Houston. Go ahead.
04 10 25 29	LMP-LM	Hello, Tom. Do you think we're going to come up with something on this problem with the ABORT button?

04 10 25 35	CC	Roger. We're working it right now and also MIT's working it. Needless to say, we're busy here, but we think we got a solution.
04 10 25 44	LMP-LM	Good enough. Something - is it something like a solder ball?
04 10 25 48	CC	Well, we don't know yet. We got about 19 minutes until loss of signal here, so we'll have something to you before then, and we'll have some time to pick it up on the other side.
04 10 25 58	LMP-LM	Thank you, Tom.
04 10 25 59	CC	Roger. Kitty Hawk, Houston.
04 10 26 08	CMP	Go ahead, Houston.
04 10 26 09	CC	Roger. Got a map update, REV 14.
04 10 26 19	CMP	Okay. Go ahead.
04 10 26 20	CC	Okay; 180 degrees, 107:49:38; LOS, 107:24:39.
04 10 26 38	CMP	Okay; 180, 107:49:38; LOS, 107:24:39.
04 10 26 44	CC	That's affirmative. And we have an LTC photo pad, 16. Roll, 000; pitch - -
04 10 26 52	CMP	Okay.
04 10 26 53	CC	- - 303; yaw, 000; T-start, 108:37:36; T-stop, 108:47:43; range 1, 91.4; range 2, 91.1. Over.
04 10 27 20	CMP	Okay. LTC pad 16; 000, 303, 000; 108:37:36; 108:47:43; 91.4; 91.1. Sounds like they got the first team in down there.
04 10 27 38	CC	Yes. We got the original CAP COMM down here today. Okay. Let me give you an LTC pad for target 12, also.
04 10 27 49	CMP	Okay.
04 10 27 50	CC	Okay.
04 10 27 51	CMP	Stand by just 1.

04 10 27 55	CC	Roll, 000 - -
04 10 27 56	CMP	Okay. Go ahead.
04 10 27 58	CC	Roger. Roll, 000; pitch, 162.4; yaw, 000; T-start, 108:53:29; T-stop, 108:54:29; range, 94.1. Over.
04 10 28 26	CMP	Roger. 000; 108:53:29; 108:54:29; 94.1. And I've got a question on the Hycon. This morning Bruce started to give me some procedures they wanted me to troubleshoot with. He never finished, and we never got a chance to get back together again; and I think we ought to pick out a convenient time here and run over those. I've got the camera out, and, as I get a chance, I'll try to run through the procedures.
04 10 29 02	CC	Okay. We've got that down here in a stack we've got by - back to you momentarily on it. One correction on the range; it was 94.4.
04 10 29 16	CMP	Okay. 94.4 - -
04 10 29 18	CC	Roger.
04 10 29 19	CMP	- - on LTC photo pad 12.
04 10 29 20	CC	Roger.
04 10 29 32	CC	Kitty Hawk, Houston. I tell you we're going to keep the air clear with you most of the time until LOS so we can be talking to Antares. Over.
04 10 29 43	CMP	Roger. I was thinking maybe if - can you bring up the other loop to talk to me on?
04 10 29 50	CC	Yes. Okay. We're kind of busy here. We'll see about it.
04 10 29 57	CMP	Okay. Whatever's customary.
04 10 30 07	CC	Antares, Houston.
04 10 30 13	LMP-LM	Go ahead.
04 10 30 14	CC	Okay, Ed, you and Al ready to listen to some words on the abort bit business?

04 10 30 24 LMP-LM Roger. We sure are. And did you get our torquing angles?

04 10 30 32 CC That's affirm, Ed. Okay, Ed. And before I start in here, would you try tapping the panel again? The abort bit came back.

04 10 30 55 CC Okay. You tapped it right again, Ed.

04 10 31 02 LMP-LM Okay.

04 10 31 03 CC Okay. I guess you've surmised already that we have some sort of a contamination in the ABORT switch. And the implications of that bit being set, I guess you also realize, means that in 63 we're going to find ourselves in P70.

04 10 31 27 CC Okay, so - -

04 10 31 28 CDR ..., Fred.

04 10 31 30 CC Say again, Ed. How do you read me now, Ed?

04 10 31 38 LMP-LM That's affirm. We read you. Go ahead.

04 10 31 40 CC Okay. Did you hear my last about the implications of that bit being set?

04 10 31 48 LMP-LM That's affirm. We understand.

04 10 31 49 CC Okay. So, directly, I'll be giving you some - -

04 10 31 52 CDR-LM Affirmative.

04 10 31 53 CC Roger, Al. I'll be giving you some changes to the time line here, whereby we'll be starting initiating PDI in PNGS, ATT HOLD, and MANUAL THROTTLE. The next consideration is if the bit sets during ullage, your procedure will be: STOP pushbutton to set and exit P63, or rather P70 in this case. And we'll have some further words on how you're to do that exit.

04 10 32 36 CDR-LM Okay. We understand the strategy, I believe.

04 10 32 38 CC Okay. Then we - we got some more. Assuming we - we get by ignition, like you to copy the following procedures.

04 10 32 54	CDR-LM	Stand by 1, Fred. And, while he's getting something to write on, I understand that you're going to be looking at the - you want us to be looking at the bit during the ullage cycle?
04 10 33 12	CC	Negative, Al. You'll get the program switched to P70, which is your cue. We'll be - we'll be looking at it down here, too, to pass the word up.
04 10 33 26	CDR-LM	Okay. I misunderstood you. I understand. We just go to a regular 63. Okay.
04 10 33 29	CC	Okay. I just got corrected, Al. The switch to P70 would occur at ignition, at ignition.
04 10 33 40	CDR-LM	Okay. I understand.
04 10 33 42	LMP-LM	Okay, Fred. Do I have enough room to write just in the space on my PDI chart?
04 10 33 47	CC	Stand by. Okay. You mean the time line, Ed, or your pad?
04 10 34 06	LMP-LM	The time line.
04 10 34 13	CC	All right, Ed - -
04 10 34 14	LMP-LM	... room on the DPS burn card, Fred. Go ahead with it.
04 10 34 17	CC	Okay. The procedure is VERB 25 NOUN 7 ENTER; 105 ENTER; 400 ENTER; 0 ENTER.
04 10 34 55	LMP-LM	Okay. I'll read back. VERB 25 NOUN 07 ENTER; 05 ENTER. Is it 4000 ENTER? 0 ENTER.
04 10 35 08	CC	Okay, Ed. It's - it's VERB 25 NOUN 7 ENTER. Then, 105 ENTER; 400, four zero zero, ENTER; 0 ENTER.
04 10 35 25	LMP-LM	Okay. VERB 25 NOUN 07 ENTER; 105 ENTER; 400 ENTER; 0 ENTER. And when do I do this?
04 10 35 34	CC	Okay. You can do this as soon as you can after ignition. We're trying to get this into - before there's any chance of the bit getting set in this interval.

04 10 35 49 LMP-LM Okay. We have to let P63 call up normally, get ignition in ATT HOLD, MANUAL THROTTLE, and then reset the bit, hopefully, before it gets - or rather, lock out the bit, hopefully, before it gets set. Is that right?

04 10 36 03 CC That's affirm, Ed. And, if somehow you get hung up a little further downstream, you can go ahead and throttle up manually at 26. I'd like to explain the implications of this. What we've done, then, is locked out P70 and P71, so any aborts have to be done on the AGS. And, while you got the card handle [sic] you can - I'll give you something that will reenable P70, P71.

04 10 36 36 LMP-LM Okay. We understand, and go ahead with your work.

04 10 36 41 CC Okay. It's VERB 25 NOUN 7 ENTER; 105 ENTER; 400 ENTER; 1 ENTER.

04 10 36 57 LMP-LM Okay. Readback: VERB 25 NOUN 07 ENTER; 105 ENTER; 400 ENTER; 1 ENTER. That's all straightforward enough.

04 10 37 06 CC Okay, Ed. Once we're by that initial disabling step, we got it made. We'll comment that if, in the process of your keying that in, the abort bit sets, we'll be in P70; and, if that happens, we need the same as before ignition; we'll need to stop button set and exit the program, and we'll try it on the second pass.

04 10 37 36 LMP-LM Okay. Are you going to give me the words on exiting now?

04 10 37 40 CC Okay. They're still - they're still working on that - Right. And, Antares; Houston.

04 10 37 58 LMP-LM Go ahead.

04 10 37 59 CC Okay. Assuming we get through the disabling procedure, after that time you can go back to AUTO on the THROTTLE and the MODE CONTROL switch.

04 10 38 15 LMP-LM Understand, Fredo. Thank you.

04 10 38 17	CC	Okay. One other word. The same holds for any surface NO STAY. The abort there would have to be on AGS.
04 10 38 30	LMP-LM	Understand, Fred.
04 10 38 31	CC	Okay.
04 10 38 33	CDR-LM	Roger. We understand. Sounds like you all have been busy down there.
04 10 39 45	CC	Kitty Hawk, Houston.
04 10 39 54	CMP	...
04 10 39 56	CC	Stu, I have some more words on the topo camera that may help a little. We've got about 5 minutes left to - to get the - these in if you're ready to discuss it.
04 10 40 21	CMP	Okay, Gordon. Stand by just 1. Let me copy down my COAS CAL here.
04 10 40 25	CC	Okay.
04 10 40 32	CMP	It'll keep. Go ahead. Tell me what I ought to do.
04 10 40 36	CC	Okay. By way of general discussion, evidently by recreating the noise here on the ground, the only way that we can recreate the noise is by causing a DC power current limit problem to the camera. An indication on board there that this is - that would really verify that it's a DC power problem would be a flickering power-on light while - while you're getting that clacking sound. But, any rate, the consensus here is that, when the camera is making the clacking sound, you're not getting good pictures. I believe you got the - about five steps about checking the panel 227 cable, and for pin damage, and reconnecting and switching the NONESSENTIAL BUS to MAIN A. Is that correct? Did you get those steps? Over.
04 10 41 50	CMP	Gordon, you dropped out. Are you with me?
04 10 41 53	CC	Roger, Stu. Where did I drop out?

04 10 41 59 CMP Okay. Both from you and Bruce, all I've got is to check the pins and the connections to see if things look all right and - and that's as far as I've gotten with either one - Oh, and to switch the NONESSENTIAL power to the other BUS.

04 10 42 16 CC Okay. That's all we can do to try to improve the DC power problem. However, if you have time to verify that it's not a camera shutter being out of sequence - out of synchronization, you could shut the shutter to 1/200th, and remove the magazine, and visually examine the shutter curtain inside to see that the slit in the shutter curtain is within 1 inch from one of the side rails, either side. And, at that time, examine the sprocket area from visible tears in the shutter curtain sprocket holes. After checking, if it is on one side, reinstall the magazine - and use magazine W for this - and actuate one single frame, and remove the magazine, and check that the slit is still positioned over to the side. If the slit is remaining in the center, then the camera shutter is completely out of SYNC and the camera is essentially unusable. Is that clear? Over.

04 10 43 42 CMP Yes, I believe I've got that, Gordon. I'll put in magazine W, 1/200th, and I guess fire a frame; remove the magazine, look at the slit, see if it's an inch from the side rail; then I guess I'll see some sprockets in there. And then if it is 1 inch, I'll put the magazine back in, fire another frame, check that the slit is still there. If it's out in the center somewhere, well then, we've got big problems.

04 10 44 10 CC Okay. We're just about to LOS. If this looks okay, then prepare the camera according to the normal procedures. Set the mode switch to AUTO, and do not use standby position. Just start the camera by turning the power on while the switch is in AUTO.

04 10 44 38 CC And, Stu, one last thing. If the clacking starts, turn the power switch off and then back on, and that may stop it.

04 11 08 -- BEGIN LUNAR REV 14

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 11 28 14	CC	Antares, Houston.
04 11 28 19	CDR-LM	Go ahead, Houston.
04 11 28 23	CC	Okay. Read you loud and clear. And we got some more procedures to pump up that are going to alter what you already copied, and Ed might ought to get something a little bigger than the DPS card to write this down.
04 11 28 45	CDR-LM	Okay, stand by. Let's get locked up on the main load first.
04 11 28 48	CC	Okay.
04 11 29 08	CDR-LM	Now, in the meantime, do you still read me?
04 11 29 11	CC	Roger, Al.
04 11 29 16	CDR-LM	Okay, ASCENT BATs went on at 108:01:45.
04 11 29 24	CC	Roger. 108:01:45.
04 11 29 35	CDR-LM	And NOUN 93's as follows: plus 40, minus 52, minus 16.
04 11 29 45	CC	Okay. Copied plus 40, minus 52, and minus 16.
04 11 29 53	CDR-LM	That's right. ..., 107:08:30.
04 11 30 00	CC	107:08:30.
04 11 30 12	CC	Okay, Antares; Houston. And, before we start here, the bit is set again; could you - You still there, Antares?
04 11 30 46	CDR-LM	Okay, I believe we're locked up now, Houston.
04 11 30 53	CC	Okay, Antares; Houston. If you get locked up there, you might just stay in SLEW.
04 11 31 04	CDR-LM	Okay, and we're locked up in AUTO TRACK, now.
04 11 31 08	CC	Okay. I don't know if you heard, the bit appeared to be set again, and we need you to rap on the panel again by the ABORT button.

04 11 31 40 CC Okay, Antares. The bit is reset. And, are you still reading now?

04 11 31 50 CDR-LM That's affirmative.

04 11 31 51 CC Okay, Al. The - the reason for the - some changes I'm ... to feed you up on the procedure is, we found, in the interim of time around the backside there, a little slicker way of doing this. And what it does is allows us to start PDI in the right configuration, switchwise. And, we can make an entry before we get to ullage or ignition that will get by that problem area.

04 11 32 26 CDR-LM Sounds very good. Go ahead; we're ready.

04 11 32 36 CC Okay. And in the interim here, Antares, could you give us POO and DATA, so we could start getting the uplinks - in?

04 11 32 44 CDR-LM Okay. You have POO and DATA.

04 11 32 49 LMP-LM And, Fred, I am having to stay on the OMNIs. I'm ... the S-BAND ANTENNA circuit breaker.

04 11 32 55 CC Okay, Ed. The first is after P63 selected and you're to NOUN 92, which, in the time line, is right up - correction NOUN 62 which is right after your ENTER at minus 4 minutes.

04 11 33 41 CC Okay, Antares. I've got a lot of static in the background here. How do you read?

04 11 33 47 LMP-LM Loud and clear. Keep going.

04 11 33 49 CC Okay. After the ENTER and check DET, Ed; we need a VERB 21 NOUN 01 ENTER; 10 10 ENTER; 107 ENTER.

04 11 34 22 LMP-LM Okay, Fred, I understand. After P63 is NOUN 9 - NOUN 62. At about 4 minutes, we want to ENTER VERB 21 NOUN 1; 101 ENTER; 107 ENTER.

04 11 34 38 CC Antares, Houston. Correction on your readback. It's VERB 21 NOUN 01 ENTER; 10 10 ENTER; 107 ENTER.

04 11 34 54 LMP-LM Roger; got you. 10 10 ENTER; 107 ENTER.

04 11 35 01	CC	Okay, that's correct. From there on, you can follow the nominal procedures through ignition. After ignition - -
04 11 35 13	LMP-LM	Okay.
04 11 35 16	CC	Okay. After ignition at plus 26 seconds on the - on page 6, we need MANUAL THROTTLE, up. And, so you don't misconstrue what I'm saying, we're - we had this AUTO switch in AUTO, but we're going to manually override it to FULL THROTTLE at 26 seconds.
04 11 35 39	LMP-LM	Okay. We understand that at ignition plus 26, we will MANUAL THROTTLE up, overriding the AUTO.
04 11 35 47	CC	That's correct. Okay. After we - after we get by THROTTLE UP, it's VERB 25 NOUN 07 ENTER; 101 ENTER; 200 ENTER; 01 ENTER. And this will enable guidance and give you steering at that time.
04 11 36 23	LMP-LM	Okay. Understand after THROTTLE up, we ENTER VERB 25 NOUN 7; 101 ENTER; 200 ENTER; 01 ENTER. And this enables guidance steering and - at that point.
04 11 36 40	CC	Roger. Okay the next entry. VERB 25 NOUN 07 ENTER; 105 ENTER; 400 ENTER; 0 ENTER.
04 11 37 07	LMP-LM	Okay. Understand VERB 25 NOUN 07 ENTER; 105 ENTER; 400 ENTER; 0 ENTER. And then it looks like our procedures you gave us earlier.
04 11 37 18	CC	That's right, Ed. This'll disable P70, P71. Okay, the next entry: VERB 21 NOUN 01 ENTER; 10 10 ENTER: 77 ENTER.
04 11 37 45	LMP-LM	Okay. VERB 21 NOUN 01 ENTER; 10 10 ENTER; 77 ENTER.
04 11 37 56	CC	Okay. This gets us in the P63 and the mode REG which is - gets us right for landing radar. Now, the same words apply if an abort requirement exists. We're going to be on the AGS. And one thing maybe I didn't make clear before, is the procedure for reenabling P70 - P71. You're not to perform, unless you do abort on AGS.

04 11 38 35 LMP-LM Roger. Roger. Understand that we will if - in the abort situation, we will abort on AGS and use the reenable procedure previously given up.

04 11 38 48 CC Okay. And the only other thing I can say is, as you already know, be sure and get MANUAL THROTTLE up at 26; and after the last entry, Ed, add one more thing; we need THROTTLE to MINIMUM setting.

04 11 39 10 LMP-LM Okay. Got that. The last entry we return to the COMMANDER's THROTTLE to MINIMUM setting.

04 11 39 16 CC That's affirm. Antares, Houston. We'd like FORWARD OMNI.

04 11 39 21 CDR-LM Hey, let me just recheck one -

04 11 39 27 CDR-LM Antares. You have FORWARD OMNI.

04 11 39 30 CC Okay. I'm sorry I cut you out. Say again, Al.

03 11 39 35 CDR-LM Let me just recheck one thing, now. With this new procedure; you want us to have the THROTTLE CONTROL in AUTO, MANUAL THROTTLE in COMMANDER's. Even though we're going to make the override to full throttle at 26 seconds.

04 11 39 50 CC That's affirm. And also the MODE CONTROL switch to PNGS in AUTO.

04 11 39 57 CDR-LM All right, sir. Fine.

04 11 40 01 LMP-LM Fredo, we need a few words on what you want to do with this S-band. I don't think you can fight it all the way down. Can we go with the OMNI?

04 11 40 10 CC Stand by, Ed.

04 11 40 24 LMP-LM And, Fredo, one more question. Does this procedure, now, stay ... until such time as we get the dip aids [sic] the abort disable to feed in, or do we still need to rush right along to get that in?

04 11 40 39	CC	Ed, this procedure is good as long as we can get by the first entry with the bit not set. That is, the entry at - right after you get NOUN 62. If you get that in with the bit not set, we're in good shape.
04 11 40 58	LMP-LM	Okay. Is the bit not set now?
04 11 41 05	CC	That's affirm. The bit is not set now.
04 11 41 11	LMP-LM	Okay. And I'm standing by to switch - OMNI antenna.
04 11 41 40	CDR-LM	Houston, are you through with the computer?
04 11 41 47	CC	Antares, Houston. The computer's yours.
04 11 41 52	CDR-LM	Okay.
04 11 42 13	LMP-LM	Houston, our VOICE BACKUP is giving us a hell of a squeal.
04 11 42 20	CC	Go ahead, Antares.
04 11 42 25	LMP-LM	I say our VOICE BACKUP position of the UPDATA LINK switch is giving us quite a squeal. You ready for us to go to UPVOICE and BACKUP now?
04 11 42 37	CC	Okay. Stand by 1, Ed.
04 11 42 55	CC	Okay, Antares. They're configured. Now, you can try it one more time, Ed.
04 11 43 02	LMP-LM	Okay. ...
04 11 43 04	CC	Roger.
04 11 43 07	CC	Kitty Hawk, Kitty Hawk, Houston. How do you read?
04 11 43 28	CC	Kitty Hawk, Houston. How do you read?
04 11 43 34	CMP	...
04 11 43 35	CC	Okay, you're way down in the mud, Stu. We're getting an awful lot of noise. We're going to drop the downlink - we're going to drop your downlink; and, if you call, call two times, so we can get it cranked back in here.

04 11 43 51	CMP	Okay.
04 11 44 00	CC	And - Antares; Houston.
04 11 44 06	LMP-LM	Go ahead.
04 11 44 07	CC	Okay. And, since we dropped Kitty Hawk here, we're not going to be in that relay mode for this period; so, you probably won't get an answer from him, if you call him at 2 minutes.
04 11 44 22	CDR-LM	Okay.
04 11 44 23	CC	Okay. I've got your downlink.
04 11 44 25	CDR-LM	Okay. ... How do you read in VOX, Houston?
04 11 44 34	CC	Okay, Al. You're about 2 by 2.
04 11 44 40	LMP-LM	Okay. How do you read, Ed?
04 11 44 42	CC	Okay, Ed. You're about 3 by 3 there. You're still getting a lot of background static in.
04 11 44 51	LMP-LM	Okay - -
04 11 44 52	CC	Okay. Now, you're loud and clear.
04 11 44 53	LMP-LM	- - Here's your VERB 83 coming up. Very good.
04 11 45 07	LMP-LM	Yes, that looks good. 317, looks good; 383, that looks good. Let's go to 277, that looks good. Great. All right, I can start loading the AGS pad, now. 231, plus 56963; 6963. 240 is the same, plus 56963.
04 11 45 42	CDR-LM	8254.
04 11 45 45	LMP-LM	8254 plus 05428.
04 11 45 49	CDR-LM	Right.
04 11 45 50	LMP-LM	05428.
04 11 45 53	CDR-LM	61, plus 00037.
04 11 45 57	LMP-LM	00037, 61, 00037 ENTER. - -

04 11 46 04 CDR-LM ***62 minus.

04 11 46 07 LMP-LM ***62 minus.

04 11 46 10 CDR-LM ***00147.

04 11 46 11 LMP-LM 000147 - 62, minus 00147.

04 11 46 16 CDR-LM Right. 404.

04 11 46 19 LMP-LM 04.

04 11 46 21 CDR-LM Minus 12345.

04 11 46 22 LMP-LM Minus 12345.

04 11 46 26 LMP-LM Okay. That's entered. Let me run back through them very quickly.

04 11 46 37 CDR-LM Okay.

04 11 46 38 LMP-LM VERB ***31 read-out 56963. That's good. 240 read-out, 56963. That's good. ***254 read-out - Check me on these - plus 5 - 05428.

04 11 46 46 CDR-LM GO.

04 11 46 47 LMP-LM 61 read-out, plus 00037.

04 11 46 52 CDR-LM That looks good.

04 11 46 53 LMP-LM 262 read-out, 900147.

04 11 46 58 CDR-LM Okay.

04 11 47 00 LMP-LM And 404 is a large negative number. It's 12345.

04 11 47 04 CDR-LM Okay.

04 11 47 06 LMP-LM That's good. Okay. Let's try it - -

04 11 47 08 CDR-LM Anything on minus 10.

04 11 47 11 LMP-LM Okay. We're a little ahead of time.

04 11 47 15 CDR-LM Okay. I think, Houston, what we'll do just before we enter on the final trim is to call you to see if the bit is set at that time. Do you concur?

04 11 47 30 CC Okay. It - it doesn't matter, Al. You can go ahead and make the enter and make the first entry at that time, after you get NOUN 62 up.

04 11 47 44 CDR-LM Okay. But we seem to be fairly successful at resetting by tapping; so, if it shows prior to that time, then let us know.

04 11 47 51 CC Okay.

04 11 48 02 LMP-LM Then, let me read this. At 4 minutes, that goes in, ignition plus 26 MANUAL THROTTLE.

04 11 48 07 CDR-LM All right.

04 11 48 08 LMP-LM I'll put these other calls in just as quick as I can get them in.

04 11 48 12 CDR-LM Yes. One right after the other. I'll tell you what's going on.

04 11 48 15 LMP-LM Okay.

04 11 48 16 CC Antares, Houston.

04 11 48 20 CDR-LM Go ahead.

04 11 48 21 LMP-LM Go ahead.

04 11 48 23 CC Okay. I see you're already past that point, and we need the throttle to - THROTTLE CONTROL to AUTO.

04 11 48 32 LMP-LM Okay. We're - we'll - we'll get it - when we've got it on our checklist, Fred. We're not quite there yet.

04 11 48 37 CC Okay, Ed. And one other thing - -

04 11 48 39 LMP-LM Go ahead and change our DPS burn?

04 11 48 41 CC - - the value of 231 has changed, Ed; so, we need you to reload 231 and 240 with the following number: plus 56978. That's an update to your ROS.

04 11 49 00 LMP-LM Roger. 56978, CLEAR 231; 56978, ENTER; ***40, plus 56978, ENTER. Okay, Fred. They are in.

04 11 49 22 CC Roger, Ed.

04 11 49 27	LMP-LM	In AUTO COMMANDER. AUTO again.
04 11 49 42	CDR-LM	It went through without ... down to the point where we check out ABORT and ABORT STAGE, RESET. DEAD BAND MIN, ROT CONTROL 3.
04 11 49 54	LMP-LM	Okay. Did you get your circuit breaker to gimbal ACT.
04 11 49 56	CDR-LM	Yes. They - they're all set.
04 11 49 58	LMP-LM	Okay. Let me check mine then. ...
04 11 50 01	CDR-LM	I already checked yours.
04 11 50 02	LMP-LM	Okay.
04 11 50 06	CDR-LM	Okay. PGNS and PGNS AUTO and AGS AUTO. Now, push button to RESET. ...
04 11 50 33	LMP-LM	Okay, how far down on the DPs configuration card now down to - -
04 11 50 37	CDR-LM	There.
04 11 50 38	LMP-LM	- - down to there. Okay.
04 11 50 41	CDR-LM	Through - we're through with that card.
04 11 50 44	LMP-LM	Okay.
04 11 50 46	CDR-LM	Back on this one?
04 11 50 47	LMP-LM	Roger. We have 10 minutes.
04 11 50 48	CC	Standing by for the landing radar.
04 11 51 17	CDR-LM	I'm a little early here.
04 11 51 21	LMP-LM	Fred, if you're going to give me any words on the antenna operation, I'd appreciate them very soon.
04 11 51 32	CC	Okay, Antares. The OMNI is GO.
04 11 51 38	LMP-LM	Okay. We're going on OMNI in 10 minutes; give me circuit breaker LANDING RADAR, closed. Check the ALTITUDE TRANSMITTER.

04 11 51 49 CDR-LM Okay. It's closed. And the VELOCITY TRANSMITTER is reading 4.0, and the ALTITUDE TRANSMITTER is reading 4.0.

04 11 51 55 LMP-LM Okay. Let's call P63.

04 11 51 58 CDR-LM Let's do.

04 11 52 10 CDR-LM (Humming)

04 11 52 24 LMP-LM It looks like it's about 1 second off. Right on. Okay, timer's set. It's right on.

04 11 52 34 CDR-LM Okay.

04 11 52 37 LMP-LM Okay. And we're looking for NOUN 63; go ahead.

04 11 52 41 CDR-LM Hold on.

04 11 52 50 CDR-LM Okay, your DPS burn card is all complete.

04 11 53 25 CC Antares, Houston.

04 11 53 30 LMP-LM Go ahead, Fredo.

04 11 53 31 CC Okay, somewhere down a little past 10 minutes, Ed, we're going to need to switch to AFT OMNI. We'll try to give you a call on it.

04 11 53 41 LMP-LM Okay, if I hear it, I'll switch - If I hear it start to break up, I'll switch it, unless you'd rather I wait for the call.

04 11 53 49 CC Okay, you can go ahead and initiate it on your own, Ed. I think that'll work out better.

04 11 53 56 LMP-LM Okay.

04 11 54 00 CDR-LM Okay, the FDAI, GO. lll and about -

04 11 54 18 LMP-LM Trim?

04 11 54 19 CDR-LM FDAI looks good. We'll zero the CDUs.

04 11 54 22 LMP-LM Okay.

04 11 54 27 CDR-LM Your zeroes in?

04 11 54 28 LMP-LM Roger. Standing by.

04 11 54 37 CDR-LM Your zeros complete.

04 11 54 39 LMP-LM Okay.

04 11 54 40 CDR-LM 400 to plus 30,000.

04 11 54 41 LMP-LM It's entered.

04 11 54 43 CDR-LM 410 to plus all zeros.

04 11 54 50 LMP-LM 410 to plus all zeros is entered.

04 11 54 52 CDR-LM 400 to plus 10,000.

04 11 54 54 LMP-LM Plus 10,000 is entered.

04 11 54 58 CDR-LM ...

04 11 54 59 LMP-LM It went in. We have needles.

04 11 55 00 CDR-LM Get a read-out at 433, at your pleasure.

04 11 55 05 LMP-LM Okay. 433 inertial velocity.

04 11 55 11 CDR-LM Okay, we're sitting on final trim, waiting 4 minutes.

04 11 55 21 CDR-LM Got a VERB 21 NOUN 01, 10 10 and a 107 is your first ball.

04 11 55 27 LMP-LM Okay. Have it there, and I've got it there. Good enough.

04 11 55 47 CDR-LM Okay, we're starting now with 96 upon A and *** on B. (Cough) Real good. ...

04 11 56 13 LMP-LM Hey, Al, your RCS system looks set.

04 11 56 16 CDR-LM Ascent helium 1 and 2 look good. B tanks still good. And the star track is good.

04 11 56 26 LMP-LM EPS system is good. ECS, all indications are normal.

04 11 56 31 CDR-LM Okay.

04 11 56 33 LMP-LM We're ready.

04 11 56 37 CDR-LM ... A minute and 50 seconds away from final trim.

04 11 56 43 LMP-LM Okay.

04 11 56 47 CDR-LM A minute there.

04 11 56 50 LMP-LM All right.

04 11 57 06 CDR-LM Okay. We'll go into final trim 30 seconds early. It'll allow you to get that -

04 11 57 11 LMP-LM Okay.

04 11 57 13 CDR-LM Then?

04 11 57 22 CDR-LM Let me do the final trim, and then you can take it over.

04 11 57 24 LMP-LM Okay. Good.

04 11 57 28 CDR-LM Rather have me put it in?

04 11 57 29 LMP-LM No, I've got it. I just wanted to adjust this lock - locking ... still reach.

04 11 57 37 CDR-LM Okay.

04 11 57 39 LMP-LM Oh?

04 11 57 42 CDR-LM ...

04 11 57 43 LMP-LM Hold onto there. Do it? Says we're there, and we are.

04 11 57 50 CDR-LM Hold it. Hey, are you ready?

04 11 57 52 LMP-LM I'm ready. ENTER.

04 11 57 55 CDR-LM A ENTER.

04 11 57 59 LMP-LM It'll look this ... comes up.

04 11 58 10 LMP-LM Okay, there it is.

04 11 58 11	CDR-LM	NOUN 62s VERB 21, NOUN 01 ENTER, 10 10, ENTER; 107, ENTER.
04 11 58 26	LMP-LM	Okay, Houston. It's in.
04 11 58 34	CC	Roger, Antares.
04 11 58 37	CDR-LM	And - Antares is standing by for a PDI GO.
04 11 58 51	CC	And, Antares; Houston. You're GO for Fra Mauro.
04 11 58 57	CDR-LM	Good show, Fredo. Thank you.
04 11 59 00	LMP-LM	Thank you. You troops do a nice job down there - -
04 11 59 02	CDR-LM	That was beautiful.
04 11 59 11	LMP-LM	Hey, if you watch us reset, we'll flip the page.
04 11 59 15	CDR-LM	Let's go.
04 11 59 16	LMP-LM	Okay.
04 11 59 25	CDR-LM	...
04 11 59 27	LMP-LM	Okay. All procedures are normal from here on in except the 26. I actuate the MANUAL THROTTLE to FULL on my side.
04 11 59 34	CDR-LM	That's correct. I'll start reentering the DPS after you have throttled up.
04 11 59 39	LMP-LM	Okay.
04 11 59 42	CDR-LM	Won't have guidance until after I give it to you, after ... Okay.
04 11 59 52	CDR-LM	We covered everything on that last one?
04 11 59 55	LMP-LM	Yes, sir.
04 12 00 00	LMP-LM	At 10 feet per second, we ...
04 12 00 08	CDR-LM	You're breaking up to me. Would you run your sensitivity up a little?

04 12 00 10	LMP-LM	Okay. ... sensitivity is full up.
04 12 00 13	CDR-LM	Okay.
04 12 00 25	CDR-LM	Hey, it's a beautiful day in the land of Fra Mauro.
04 12 00 44	LMP-LM	*** will bring MASTER ARM on 30 seconds*** hit us again.
04 12 00 50	CDR-LM	Okay. Houston, the MASTER ARM is ON, and the A and B LIGHTS are ON.
04 12 00 57	CC	Roger, Antares.
04 12 01 19	CDR-LM	Looks quiet; looks good.
04 12 01 28	LMP-LM	MARK; 1 minute.
04 12 01 31	CDR-LM	Okay. And the radar temperature's coming up. Okay.
04 12 01 45	LMP-LM	...
04 12 01 52	MS	...
04 12 01 54	CDR-LM	Okay. The DSKY's on time.
04 12 01 58	LMP-LM	ENGINE ARM to DESCENT.
04 12 02 00	CDR-LM	AVERAGE g is ON. The DESCENT ENGINE is ON.
04 12 02 04	CC	Roger, Antares.
04 12 02 05	CDR-LM	There's ALTITUDE AND VELOCITY light. R_3 looks quiet.
04 12 02 13	LMP-LM	Okay. We're waiting for ULLAGE AUTO light.
04 12 02 18	CDR-LM	R_3 looks good.
04 12 02 21	LMP-LM	ULLAGE.
04 12 02 22	CDR-LM	AUTO ULLAGE.
04 12 02 26	MS	PRO.
04 12 02 27	CDR-LM	3, 2, 1, 0 -

04 12 02 29 LMP-LM IGNITION.

04 12 02 30 CDR-LM And we have AUTO, IGNITION.

04 12 02 32 LMP-LM Ignition looks good.

04 12 02 33 CC Roger, Antares.

04 12 02 35 CDR-LM We have an AUTO IGNITION.

04 12 02 39 LMP-LM ENGINE ARM, OVERRIDE; ENGINE COMMAND, OVERRIDE.

04 12 02 41 CDR-LM Okay. And the MASTER ARM is OFF.

04 12 02 43 LMP-LM All right. Standing by for 26.

04 12 02 45 CDR-LM Okay. We'll take the THROTTLE up at 26.

04 12 02 54 LMP-LM THROTTLE up.

04 12 02 56 CDR-LM Okay. We're at full throttle.

04 12 02 58 LMP-LM The COMMAND is DOWN. VERB 5 - -

04 12 03 01 CC Roger, Antares.

04 12 03 03 LMP-LM NOUN 7 VERB 101.

04 12 03 09 CDR-LM 1.7.

04 12 03 12 LMP-LM ... have guidance. And you have COMMAND and THROTTLE.

04 12 03 19 CDR-LM Okay. We have guidance.

04 12 03 23 LMP-LM All right. I'm DISABLING. VERB 25 NOUN 7 ENTER, 105 ENTER - -

04 12 03 31 CC You're GO at 1 Antares.

04 12 03 32 LMP-LM 400, ENTER; 0 ENTER. Okay. And landing radar cable, VERB 21 NOUN 01 ENTER; 10 10, ENTER; 77, ENTER. The landing radar is there. Al, you can reduce your THROTTLE to MINIMUM.

04 12 03 56 CDR-LM Okay. It's coming down.

04 12 03 57 LMP-LM You have COMMAND and THRUST. Okay, Houston. The procedure is complete.

04 12 04 04 CC Roger, Ed.

04 12 04 06 CDR-LM And we're standing by for NOUN - and we're standing by for NOUN 69. As appropriate.

04 12 04 15 CC And, Antares, NOUN 69 is plus 02800.

04 12 04 31 LMP-LM 02 - no, 10 - plus 02800.

04 12 04 42 CDR-LM Okay, Houston, how does that look?

04 12 04 48 CC Okay; go ...

04 12 04 53 CDR-LM Okay, it's in.

04 12 04 55 LMP-LM Okay. Give me a 10-minute-30-second hack, Al.

04 12 04 58 CDR-LM ... my mark.

04 12 05 00 LMP-LM 230. Okay, we're a little fast. About 10 feet per second. Go a little slow on H-dot, a little low; PGNS and AGS that was in 2 foot per second; it looks good, it looks good.

04 12 05 19 CDR-LM Okay, it's almost back on the track.

04 12 05 20 LMP-LM Yes. I'll give it a 3-minute mark, again.

04 12 05 28 CDR-LM ...

04 12 05 29 CC And, Antares; you're GO at 3.

04 12 05 31 LMP-LM GO at 3. Okay, V_I - -

04 12 05 36 CDR-LM Okay; understand. GO at 3.

04 12 05 37 LMP-LM H-dot is low, H is a little low; PGNS and AGS a foot per second difference.

04 12 05 46 CDR-LM Okay. A little high ... at the moment. Okay, you want to get those ED BATs out of the way.

04 12 05 57 LMP-LM Yes. I was going to wait just another 10 seconds here. Look at - take a look at ED BATs.

04 12 06 11	CDR-LM	Okay, throttle converging; looks nice.
04 12 06 14	LMP-LM	Houston, my ED BATs are GO, all in the green.
04 12 06 17	CC	Roger, Ed.
04 12 06 24	LMP-LM	Isn't it a smooth ride?
04 12 06 25	CDR-LM	Yes, it's great.
04 12 06 26	CC	Antares, you're GO at 4.
04 12 06 28	CDR-LM	Guidance looks good. Roger.
04 12 06 33	LMP-LM	Four. V_I is good. H-dot still low. H is converging; PGNS and AGS are about 2 and a half foot apart. Good. Down to 32,000; we should be getting landing radar in very soon. They're good; they're GO.
04 12 07 11	CDR-LM	And we'll give an update at 12,000. There's a little difference in them.
04 12 07 15	LMP-LM	On radar, set the lock ON on radar. That's a thousand.
04 12 07 34	CC	Antares, Houston. You're GO at 5.
04 12 07 36	LMP-LM	... can't get the radar in.
04 12 07 39	CDR-LM	Roger.
04 12 08 02	LMP-LM	5:30. We're on profile.
04 12 08 08	CC	Okay, 6 plus 40 at throttle down, Antares.
04 12 08 15	CDR-LM	Roger.
04 12 08 16	LMP-LM	Roger, Houston; we still have ALTITUDE, VELOCITY lights.
04 12 08 19	CC	Roger.
04 12 08 24	CDR-LM	I'll bet they know that.
04 12 08 26	LMP-LM	What?
04 12 08 28	CDR-LM	I bet they know that. Stand by for six -

04 12 08 32	CDR	MARK, six.
04 12 08 33	LMP-LM	Six. V_I is good; H-dot is low; H is high, now. We're running high on H. PGNS and AGS are together.
04 12 08 42	CC	Antares, Houston. We'd like you to cycle the LANDING RADAR breaker.
04 12 08 49	LMP-LM	Cycle the RADAR LANDING breaker.
04 12 08 52	CDR-LM	Okay. It's cycled.
04 12 09 04	LMP-LM	Come on.
04 12 09 13	MS-LM	...
04 12 09 14	LMP-LM	... light. VERB 57 ENTER. How's it look, Houston?
04 12 09 27	LMP-LM	Could we ACCEPT?
04 12 09 29	CC	Okay. We'd like to ACCEPT the RADAR.
04 12 09 33	CDR-LM	Okay. Go, ... go great. Great. Oh, that was close.
04 12 09 40	CC	Okay, and monitor DESCENT FUEL 2.
04 12 09 45	CDR-LM	Okay, the throttledown was on time, essentially. And we're on DESCENT FUEL 2.
04 12 09 53	CC	Roger, Al.
04 12 10 04	CC	And, Antares; Houston. Your PGNS H-dot is a good one.
04 12 10 11	LMP-LM	Okay, thank you. Give me PGNS.
04 12 10 15	CDR-LM	You want me to leave that up?
04 12 10 23	LMP-LM	... 15,000.
04 12 10 26	CC	Antares, Houston. You're GO at 8.
04 12 10 30	LMP-LM	Roger. ... AGS ...
04 12 10 47	LMP-LM	... looks good, Al.

04 12 10 49	CDR-LM	I'm starting the camera.
04 12 11 00	CDR-LM	10 seconds to go.
04 12 11 03	LMP-LM	How much?
04 12 11 04	CDR-LM	10 seconds to go. 4 -
04 12 11 13	LMP-LM	Okay, there's pitchover.
04 12 11 14	CDR-LM	64 and we have pitchover, Houston.
04 12 11 15	LMP-LM	There's PRO - -
04 12 11 16	CC	Roger, Al.
04 12 11 17	CDR-LM	There's Cone Crater.
04 12 11 19	CDR-LM	And there it is.
04 12 11 20	CDR-LM	Right on the money.
04 12 11 21	LMP-LM	That's it. Right on the money.
04 12 11 22	CDR-LM	What's the LPD, babe?
04 12 11 23	LMP-LM	LPD, 41.
04 12 11 25	CDR-LM	Okay. BAT - BATTERY 2.
04 12 11 29	LMP-LM	4.
04 12 11 30	CDR-LM	Beautiful.
04 12 11 32	LMP-LM	Right out the window just like it ought to be.
04 12 11 34	CDR-LM	Outstanding.
04 12 11 35	LMP-LM	Great.
04 12 11 37	CC	Okay, Antares; Houston, here. GO for landing.
04 12 11 40	LMP-LM	Here we go.
04 12 11 42	CDR-LM	Thank you ...
04 12 11 44	MS-LM	...

04 12 11 46 LMP-LM Okay, you're out at 3000, Al; 75 feet a second.

04 12 11 50 CDR-LM Okay, the aerial TV is real good.

04 12 11 54 LMP-LM Houston, I'm on AFT.

04 12 11 56 CC Roger, Ed.

04 12 11 57 LMP-LM 2048 feet - -

04 12 11 59 CDR-LM One click left.

04 12 12 01 LMP-LM - - coming down a little fast.

04 12 12 02 CDR-LM One click left.

04 12 12 03 LMP-LM 2006 feet a second, a little bit fast, but not bad.

04 12 12 07 CDR-LM Okay. Outstanding.

04 12 12 11 LMP-LM Okay. 1500. A little fast; not bad. Holding in well. LPD's 40, Al.

04 12 12 21 CDR-LM Okay.

04 12 12 23 LMP-LM Coming through a 1000 feet - 27 feet, right on schedule. Right on schedule, now. Went by Cone Crater right outside to my right.

04 12 12 35 CDR-LM Okay, the best spot is a little south of track, about halfway between Triplet and Doublet. Little south of track.

04 12 12 43 LMP-LM Okay.

04 12 12 44 CDR-LM About 60 meters.

04 12 12 45 LMP-LM Looks good from here. Looks good from here. Okay, Al you're through 550 feet.

04 12 12 54 CDR-LM Okay.

04 12 12 56 LMP-LM 16 feet per second, 500 feet, 15 feet per second. Looks good. Your fuel is good at 10 percent.

04 12 13 05 CDR-LM Let's take it over and move up a little.

04 12 13 07 LMP-LM Okay. I think you're at 340 feet - -

04 12 13 10 CDR-LM ATT HOLD.

04 12 13 11 LMP-LM Okay. I'd give it a few clicks. You're through 200 feet, 5 feet per second. That looks good.

04 12 13 24 CDR-LM ... level here.

04 12 13 26 LMP-LM Nine percent fuel, looks great. Okay, you look like you're going right over the middle of Triplet. You're 170 feet, Al; 2 feet per second down; 8 percent fuel. You're looking good.

04 12 13 43 CDR-LM Okay, babe.

04 12 13 44 LMP-LM 170 feet and holding. About 1 foot per second down. You want to pick - speed it up a little bit.

04 12 13 50 CDR-LM Stand by to move forward.

04 12 13 52 LMP-LM Okay.

04 12 14 01 LMP-LM Seven percent fuel. Okay, you're still at 170 feet indicated.

04 12 14 06 CDR-LM Heading down.

04 12 14 08 LMP-LM Okay, you can move on forward. You're just barely crossing North Triplet. Barely crossing North Triplet. Six percent fuel; okay, 150 feet. DESCENT QUANTITY light.

04 12 14 12 CDR-LM Okay.

04 12 14 25 LMP-LM Low level.

04 12 14 27 CDR-LM All right.

04 12 14 28 LMP-LM If you could land over here; there's some dust, Al; 110 feet. Three feet per second down. You're looking great. Six percent; there's good dust. You're on your own.

04 12 14 41 CDR-LM Starting down, starting down.

04 12 14 43 LMP-LM Okay. It says 90 feet, 4 feet per second; 5 feet per second, down.

04 12 14 49 CDR-LM Okay.

04 12 14 50 LMP-LM Going down; looking great.

04 12 14 52 CC 60 seconds.

04 12 14 53 CDR-LM We're in good shape.

04 12 14 55 LMP-LM Okay. 50 feet down, 50 feet.

04 12 14 58 CDR-LM We're in good shape, too.

04 12 14 59 LMP-LM 3 feet per second, 40 feet; 3 feet per second, 30; 3 feet per second, looking great, 20 feet; 10, 3 feet per second.

04 12 15 11 LMP-LM CONTACT, Al.

04 12 15 12 CDR-LM ..., STOP. Great, PRO, AUTO, AUTO.

04 12 15 18 LMP-LM We're on the surface.

04 12 15 19 CDR-LM Okay, we made a good landing.

04 12 15 23 CC Roger, Antares.

04 12 15 24 LMP-LM 413, plus 10000. That was a beautiful one.

04 12 15 27 CDR-LM Okay, we're slightly off. We landed on a slope, but other than that, we're in great shape. Right on the landing site.

04 12 15 36 CDR-LM Okay. Recycling the Parker valve.

04 12 15 38 LMP-LM Okay, closed, open, closed, open, open, open, open, op - -

04 12 15 49 CDR-LM DESCENT HELIUM REG 1, CLOSED; talkback barber pole; and the OXIDIZER FUEL VENTS are gray; MASTER ARM is ON; DESCENT VENT, FIRE.

04 12 15 57 LMP-LM Okay. MASTER ARM.

04 12 16 01 CDR-LM ARM is OFF.

04 12 16 02 LMP-LM Okay. ... fuel.

04 12 16 05 CDR-LM And they're coming down.

04 12 16 06	LMP-LM	They're coming down. Okay.
04 12 16 07	CDR-LM	Okay.
04 12 16 08	LMP-LM	PROPELLANT TEMP PRESS/MONITOR is in ASCENT.
04 12 16 09	CDR-LM	...
04 12 16 10	LMP-LM	ASCENT, then DESCENT.
04 12 16 14	CDR-LM	Okay. ASCENT still good, DESCENT 1 - and 2. I'm coming down on both.
04 12 16 22	CDR-LM	Okay. ASCENT HELIUM MONITOR cycle. ...
04 12 16 27	CC	Antares, Houston. You're STAY for T_1.
04 12 16 31	CDR-LM	Okay. STAY for T_1. ASCENT HELIUM 2 looks good, ASCENT HELIUM 1 looks good.
04 12 16 36	LMP-LM	Okay. Okay, O_2 QUANTITY MONITOR; I'll take a look at those.
04 12 16 40	CDR-LM	Take a look at those babies.
04 12 16 43	LMP-LM	Okay. Just like we did in orbit. ASCENT 2 is full; back to DESCENT. All right. And the sequence camera is OFF.
04 12 17 07	LMP-LM	Okay. VHF A TRANSMITTER to VOICE. We're STAY for T_1, so I'll do a 414.
04 12 17 14	CDR-LM	Four, plus 20000?
04 12 17 15	LMP-LM	Plus 20000. And, four fourt - 400 plus 4.
04 12 17 24	CDR-LM	400, plus 40000.
04 12 17 27	LMP-LM	414. Did I get that right? Houston, did I get a 414, plus 20000, in?
04 12 17 35	CC	Stand by. That's affirm, Ed. You got it in.
04 12 17 44	CDR-LM	Okay, 0.01.
04 12 17 46	LMP-LM	Okay.

04 12 17 51 CDR-LM There are your NOUN 43s, Houston. Yes, we are on a little slope, aren't we?

04 12 18 00 LMP-LM Yes.

04 12 18 01 CDR-LM About the flattest place around here, though.

04 12 18 03 LMP-LM Yes. What's that, about 8 degrees of roll we're in? Eight degree slope.

04 12 18 07 CC Okay. We got the NOUN 43 on.

04 12 18 13 LMP-LM Okay. Let me copy those down. ... 2. Back on our book.

04 12 18 23 CDR-LM Stop and RESET.

04 12 18 26 LMP-LM NOUN 40 - hold it. I read it before I got it down.

04 12 18 29 CDR-LM Minus 367.

04 12 18 31 LMP-LM Pardon.

04 12 18 32 CDR-LM Minus 367, minus 1751.

04 12 18 37 LMP-LM Minus 367; 1 what?

04 12 18 43 CDR-LM 1751.

04 12 18 46 LMP-LM What was the altitude readout? Get that.

04 12 18 48 CDR-LM Want to give me the - everything from P12, please, ...

04 12 18 53 LMP-LM Okay. T_2, 109.

04 12 19 02 CDR-LM Plus 109.

04 12 19 05 LMP-LM 04.

04 12 19 06 CDR-LM Plus 04.

04 12 19 09 LMP-LM Plus 3406.

04 12 19 12 CDR-LM 406. I have 109:04:34.06.

04 12 19 17 LMP-LM Looks good.

04 12 19 19	CDR-LM	Okay. How about my NOUN 76?
04 12 19 27	LMP-LM	Okay, that's good. Go with the pad value, 55124.
04 12 19 32	CDR-LM	Okay, 25 ENTER; plus 5512 ENTER, plus 15 ENTER; 0 ENTER.
04 12 19 46	LMP-LM	Okay.
04 12 19 48	CDR-LM	Okay.
04 12 19 49	LMP-LM	Oh, wait a minute. (sigh) Houston, how do you like the AGS alinement? Should we go ahead and update the state vector, or stay with what we have?
04 12 19 57	CC	Stand by.
04 12 20 10	CC	Okay, Ed, the AGS is GO as is.
04 12 20 17	LMP-LM	Okay, GO as is. 411, plus 10000.
04 12 20 21	CDR-LM	...
04 12 20 25	LMP-LM	411, plus 10000.
04 12 20 26	CDR-LM	Right.
04 12 20 27	LMP-LM/ CDR-LM	410, plus 0.
04 12 20 31	CDR-LM	Okay, we're waiting on a stay.
04 12 21 05	LMP-LM	Okay, DESCENT HELIUM ... - -
04 12 21 08	CC	Antares, Houston. You are STAY for T_2.
04 12 21 13	LMP-LM	Roger, Roger. Roger.
04 12 21 15	CDR-LM	Okay, STAY for T_2. TAPE RECORDER, OFF; ICS/PTT.
04 12 21 21	LMP-LM	Okay. Say, Fred, that was really great work you did on that abort - problem.
04 12 21 35	CC	Yes. Those guys did a lot of scratching around there, Ed.
04 12 21 39	LMP-LM	Yes, sir. We sure appreciate that.

04 12 21 43	CDR-LM	You bet. It really saved our mission.
04 12 22 22	CC	Antares, Houston.
04 12 22 27	LMP-LM	Go ahead.
04 12 22 29	CC	Now that you're sitting still there, we'd like to try to get the steerable going. PITCH, plus 124; YAW, minus 42; and stay in SLEW.
04 12 22 47	LMP-LM	124, minus 42, and stay in SLEW.
04 12 23 16	LMP-LM	Okay, Fredo, you've got it. That picked up the signal strength a little bit.
04 12 23 24	CC	Antares, Houston; say again.
04 12 23 31	LMP-LM	You have the steerable, Fredo. Have locked up in SLEW.
04 12 23 36	CC	Okay, Antares, that looks good.
04 12 28 39	LMP-LM	Houston, my values were 047 and 053, 047, plus 37774; 053, plus 00541.
04 12 28 53	CC	Okay, we copy that.
04 12 32 49	CC	Antares, Houston.
04 12 32 54	CDR-LM	Go ahead, Fredo.
04 12 32 56	CC	Okay. Because of your attitude, sitting there, Al, the first star there, Arcturus, is going to come up in detent 2 rather than detent 3, so -
04 12 33 10	CDR-LM	Okay. Very good.
04 12 37 05	CDR-LM	Okay, Houston. You have the 93s?
04 12 37 08	CC	Go ahead, Antares.
04 12 37 14	CDR-LM	Do you have our NOUN 93s.
04 12 37 17	CC	Roger, Al. We got them.
04 12 41 02	CDR-LM	Okay, Houston. We're going to have to crank up the rendezvous radar and get it down out of the way. It apparently drifted up during the descent.

04 12 41 12 CC Roger, Antares.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK BETWEEN CC AND CM ACTIVATED

04 12 25 00 CC Kitty Hawk, Houston. Over.

04 12 25 05 CMP Go ahead, Houston.

04 12 25 07 CC Roger, Stu. We've got you on a different channel now than the LM. For some reason, we're getting a little bit of noise out of your downlink. But did you relay everything that was going on - or hear everything that was going on?

04 12 25 22 CMP Yes, man. I sure did.

04 12 25 24 CC Okay. Mighty fine.

04 12 25 25 CMP They really put her in there.

04 12 25 56 CMP Hey, Ron, let me know when I can talk without disrupting things. It quieted down, now?

04 12 26 00 CC Yes. It's all quieted down, and your downlink's on another channel; so, no problems. So, you're clear to talk.

04 12 26 08 CMP Okay. On this - Say again.

04 12 26 11 CC Roger. You're cleared to talk.

04 12 26 16 CMP Oh, okay. Hey, that LTC camera's still acting up the same way; I tried both nonessential BUS positions, and I cycled all the connectors - could see no visi - visible damage to the pins. I did look at that slit in the shutter, and the first two times I actuated it, it stayed pretty much over 1 inch from the edge. And then, the next couple of times, it stopped about 2 inches from the edge - one each time a different edge, but out about 2 inches, maybe just a little more. It still has the clacking sound; it still wants to - intermittently fire off a frame in standby, even with the frames per minute set on zero. And I did not take the LTC photo target 16; I figured that Gordon had implied that it might be a waste of film to shoot them this way; I thought maybe we

could get it fixed, we could save the film. I did shoot the landing because I figured, even if it is working - that one we wouldn't have another chance at. And I fired 39 frames off of magazine B on the landing per the pad. I don't know whether it will turn out or not, because it - it clanked and fluttered the whole time.

04 12 27 55 CC Okay. We copy that, Stu.

04 12 28 01 CMP Okay.

04 12 28 06 CC One thing I might ask you there. Did you try trying the power switch ON and OFF any time when it was clicking away there.

04 12 28 17 CMP Yes, I did. I cycled that. I cycled the nonessential BUS switch while it was running. Saw no change at all from MAIN A to MAIN B. And once you apply the power, it - it goes into its MAG and does its thing there, regardless of whether you have the MODE switch in AUTO, STANDBY, or SINGLE, and whether or not you turn the POWER ON and OFF again. Generally: now, when I came up to shoot the landing, when I turned the POWER switch ON a minute before the T start, it clanked all the time but didn't fire off any frames. And during the - minute plus a few seconds path there, it just kicked one, going off as it should every - one every 2 seconds. So the thing's kind of random; I can't seem to get a pattern on it.

04 12 29 21 CC Okay. We understand that, Stu. And it still acts like - we got the thing to foul up by a low dc voltage on the thing down here on the ground. And, like you say, if it's got the voltage up on the thing, it seems to work.

04 12 29 41 CMP Hey, along that line, Gordon implied that low dc voltage ought to have a flickering POWER ON light; and that's not true. Mine appears to be steady.

04 12 29 50 CC Okay. I copied. And, Stu, I've got a bunch of P24 pads here for you. Better start copying them, I guess. And also - -

04 12 29 59 CMP Okay. Hey, let me fire off this 52, and then I'll be right with you.

04 12 30 02	CC	Okay.
04 12 32 15	CMP	Okay. Ron, let's go to work on the pads.
04 12 32 18	CC	Okay. How about trying for the HIGH GAIN, MANUAL and MEDIUM, PITCH of minus of 73, YAW of 11.
04 12 32 51	CC	And Kitty Hawk; Houston. When you get it, start with RP-3 on page 13.
04 12 33 04	CMP	Okay. I've got you now. Can you read me, Ron; the signal strength doesn't look too good.
04 12 33 08	CC	Okay. The yaw - try a yaw of 25 degree.
04 12 33 21	CC	Okay. You still with me, Stu?
04 12 33 27	CMP	Yes, I've still got you here. Yaw 25's a little too much. Let me play with it just a second.
04 12 33 50	CMP	Okay, Ron. That looks like about the best I'm going to do. That good enough for you?
04 12 33 53	CC	Okay. I think it looks pretty good down here, now. And ready to start on RP-3. Still got about 9 minutes, yet. Okay, T_1, 109:57:54; T_2, 110:02:44; 110:04:24; 110:05:12; north 5 and - -
04 12 34 37	CMP	Okay. RP-3, 109:57:54. Go ahead, Ron. Let's run them all through, and then I'll read them back.
04 12 34 47	CC	Okay, good. RP-5: T_1, 110:08:45, 110:13:35; 110:15:15; 110:16:03. It's on track. Okay. The Daguerre 66. T_1, 110:30:11; 110 - -
04 12 35 37	CMP	Hold it. Start Daguerre over again. You broke up.
04 12 35 41	CC	Roger. Okay, the Daguerre 66 T_1 is 110:30:11; 110:35:01; 110:36:41; 110:37:29. It's north 22. Okay, ready for P20 - Landmark 14-1.
04 12 36 26	CMP	Okay.
04 12 36 27	CC	T_1 is 110:46:15; 110:51:05; 110:52:45; 110:53:33. It's north 6, and, of course, it'll be 14-1 for the NOUN 89.

04 12 37 02	CMP	Okay, Ron. You broke up on TCA and T_3.
04 12 37 08	CC	Okay. TCA on 14-1, 110:52:45; T_3, 110:53:33. North 6; NOUN 89 is 14-1.
04 12 37 33	CMP	Okay. 14-1, 110:46:15; 110:51:05; 110:52:45; 110:53:33; north 6, 14-1.
04 12 37 50	CC	Roger. Readback correct.
04 12 38 02	CC	Kitty Hawk, Houston. Request POO and ACCEPT there, and we'll give you a state vector.
04 12 38 12	CMP	Okay. You have it.
04 12 38 32	CC	And, Kitty Hawk; Houston. Got a map update for the REV 15 on page 13.
04 12 38 40	CMP	Go ahead.
04 12 38 41	CC	Roger. 180 degrees is 109:47:59.
04 12 38 50	CMP	109:47:59.
04 12 38 54	CC	Roger.
04 12 40 59	CC	Kitty Hawk, Houston. Computer's yours, now.
04 12 41 06	CMP	Okay. Thank you, Ron.
04 12 42 11	CC	Okay. Kitty Hawk, Houston. About 45 seconds to LOS; we'll see you on the other side.
04 12 42 19	CMP	Okay.
04 13 07 --		BEGIN LUNAR REV 15

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 12 45 56	CC	Antares, Houston.
04 12 46 01	LMP-LM	Go ahead.
04 12 46 03	CC	Okay. We need to change the second star in - your - your - second technique 257. That's on page 1-5.
04 12 46 20	LMP-LM	Okay.

04 12 46 21	CC	Okay. It should be star - rather than Gacrux. It should be star 56, which is Beta Centauri, and the new NOUN 88s are X, minus .21408; Y, minus .12572; Z, minus .3 - correction - minus .43401.
04 12 46 58	LMP-LM	Okay. I copy the second star, page 1-5, is Beta Centauri instead of Gacrux. It's number 56. And I presume it'll be in detent 1. And vectors, NOUN 88s, are minus .21408, minus .12572, and minus .43401.
04 12 47 28	CC	Okay. That's correct, Ed.
04 12 48 15	CC	Antares, Houston. We're going to have a site handover down here in a couple of minutes.
04 12 48 23	CDR-LM	Okay, Fredo. That was a real fine job. Thank you, Buddy.
04 12 48 27	CC	Thank you, Al.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 13 00 37	CC	Antares, Houston.
04 13 00 42	CDR-LM	Go ahead.
04 13 00 43	CC	Okay. You can go on by those alarms, Al. I think they're due to hit MARK REJECT before you've done VERB 32 ENTER. That isn't necessary; you can just reload that over them.
04 13 01 03	CDR-LM	Okay. We need to get rid of this mark, Fredo; we're going to reject it and start over.
04 13 01 11	CC	Okay.
04 13 06 21	LMP-LM	Okay, Houston. Shall we torque those?
04 13 06 24	CC	Stand by, Ed.
04 13 06 34	CC	Okay. They look good, Antares. You can torque them - -
04 13 06 36	LMP-LM	Al says he can't do any better.
04 13 06 39	CC	You're right.
04 13 07 06	LMP-LM	Okay, Houston. What would you like to do with those numbers?
04 13 07 10	CC	Stand by.
04 13 07 39	CC	Antares, Houston. Recommend ACCEPT.
04 13 07 48	LMP-LM	Okay. We're going to accept.
04 13 17 27	LMP-LM	Houston, Antares.
04 13 17 30	CC	Antares, this is Houston. Go ahead.
04 13 17 36	LMP-LM	Hello, Bruce. Al says that Beta Centauri, which you wanted for this second star, is just detent 6. Do you want it in 1 or 6, now that you've changed it?
04 13 17 58	CC	Scorpio [sic], Houston. Detent 6, please.

04 13 18 04	LMP-LM	Okay.
04 13 25 55	LMP-LM	Houston, your desire is on the NOUN 89.
04 13 26 01	CC	Stand by.
04 13 27 09	CC	Antares, this is Houston. We recommend that you do not accept this NOUN 89. The first set of marks was satisfactory. Over.
04 13 27 20	LMP-LM	Okay. Al says the star ball's alined a lot better today.
04 13 27 28	CC	All right, jolly good. Can you see at the center of the AOT in this case?
04 13 27 35	LMP-LM	Yes. As a matter of fact, no blind spots.
04 13 27 39	CC	Beautiful.
04 13 28 27	LMP-LM	Houston, Antares. We're standing by for a STAY.
04 13 28 32	CC	Antares, this is Houston. STAY. Over.
04 13 28 44	CC	Antares, this is Houston. STAY. Acknowledge. Over.
04 13 28 53	LMP-LM	Okay. We're having a little chuckle about that transmission but we acknowledge, very happily.
04 13 28 59	CDR-LM	And we will stay.
04 13 29 00	CC	Roger. Out.
04 13 29 43	LMP-LM	Houston, would you like my updated 047, 053 numbers?
04 13 29 48	CC	That's affirmative.
04 13 29 53	LMP-LM	Roger. 047, plus 37773; 053 is plus 00610, and we're standing by for a P22 hacktime.
04 13 30 06	CC	Okay. I copy ADDRESS 47, 37773; and 53 is 00610.
04 13 30 17	LMP-LM	Good readback.
04 13 30 40	LMP-LM	Houston, Antares. This is POO and DATA.
04 13 30 45	CC	Houston. Roger. Out.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 13 32 25	CC	Kitty Hawk, Houston. About time to start the camera on RP-5$_e$.
04 13 38 11	CMP	Houston, 14. How do you read?
04 13 38 15	CC	Roger. Loud and clear, Stu.
04 13 38 30	CMP	Well, how are the troops in Antares making out? Do we have an estimate on the landing spot yet, Don?
04 13 38 39	CC	Okay. They're pressing on with all their checks down there. And everything is still real good. They've got a STAY.
04 13 38 46	CMP	Real good.
04 13 38 53	CMP	How far from the spot? Did they come right in on the first pick?
04 13 38 59	CC	Say again, Kitty Hawk.
04 13 39 05	CMP	Roger. Are they right on the target?
04 13 39 09	CC	Yes, I think so. From what we can tell they just passed over the north crater of Triplet, and on down the stream just a little bit, but just a little bit short of the target, I think, initially. They haven't started the - their descriptions yet, though. I haven't gotten the word yet on exactly where they are.
04 13 43 41	CMP	Houston, 14 or Kitty Hawk.
04 13 43 45	CC	Roger. Go ahead, Kitty Hawk.
04 13 43 51	CMP	Hey, Ron, got any word on how the low altitude track on 14-1 and high altitude, compare?
04 13 44 05	CC	Let me see if I can get that, Stu.
04 13 44 11	CMP	Okay.
04 13 47 59	CC	Kitty Hawk, Houston.

04 13 48 04	CMP	Go ahead, big ...
04 13 48 06	CC	Roger. You're kind of down in the mud, Stu. But your high altitude tracking was excellent, and we've changed the landing site from a previous estimate there, 1400 feet in latitude, and zero in longitude. We've only got three real-time marks on the low altitude, but it compares real favorably with the high altitude stuff, so far.
04 13 48 37	CMP	Well, now the other marks, on the low altitude, Ron, on the - on the tape, that right?
04 13 48 42	CC	Yes. That affirm. They were on the tape, and it took us awhile to get that dumped on the tape, and then - so we're just now getting the tape data.
04 13 48 54	CMP	Okay.
04 13 49 39	CC	And, Kitty Hawk; Houston. You've got about 30 seconds to T_1 time for Daguerre 66.
04 13 49 48	CMP	Okay. Thank you.
04 13 54 01	CC	Kitty Hawk, Houston. You can start your camera.
04 13 54 07	CMP	Okay.
04 14 05 51	CC	Okay, Stu; Houston here. You're coming up on the T_1 time.
04 14 06 00	CMP	Okay.
04 14 10 04	CC	Okay. Time to start your camera there, Stu.
04 14 10 10	CMP	Ron, she's running; thank you.
04 14 10 14	CC	Okay. And when you finish up there as you're - whipping on across the landing site, those guys are so close to it, you probably can't tell the difference from up there.
04 14 14 06	CMP	Ron, I tried to change the camera and put the sextant on and take a look at - the site; Cone Crater went by just as I got the sextant up.

04 14 14 20	CC	Okay. Couldn't understand what you said that time, Stu. Just for your information though, Antares is locked onto you with her radar.
04 14 14 32	CMP	Okay. What I said was, that soon as I finished up on 14-1, I tried to get the sextant in, in time to look at the LM; but, by the time I got it in, Cone Crater was just passing out of the field of view.
04 14 14 47	CC	Roger. I understand. We'll catch them one of these other REVs.
04 14 14 55	CMP	Okay.
04 14 20 27	CC	Kitty Hawk, Houston.
04 14 20 33	CMP	Go ahead, Houston; Kitty Hawk.
04 14 20 35	CC	Roger. We'll stand by for the magazine percentage there after - on the landmark tracking magazine.
04 14 20 57	CMP	Okay. I saw it 62 percent.
04 14 21 03	CC	Roger. Sixty-two percent?
04 14 21 11	CMP	Yes. That's what it looks like.
04 14 21 13	CC	Okay. And once you get in attitude, we'll use this high gain procedures: MANUAL and MEDIUM BEAM width.
04 14 21 27	CMP	All right.
04 14 22 18	CC	Kitty Hawk, Houston. Request OMNI Alfa until we get into the attitude.
04 14 22 26	CMP	How do you read, Houston? Kitty Hawk.
04 14 22 30	CC	Roger, Kitty Hawk; loud and clear.
04 14 22 37	CMP	Okay.
04 14 28 47	CC	Kitty Hawk, Houston. I've got some map updates, and your zero phase pads for you.
04 14 28 57	CMP	Okay. Go ahead.

04 14 28 59	CC	Okay. On page 16, there. Map update, REV 16; 180 is 111:46:20.
04 14 29 15	CMP	Okay, 111:46:20.
04 14 29 19	CC	Okay, your zero phase pad to backward.
04 14 29 30	CMP	Go ahead.
04 14 29 31	CC	Roger. Roll, 197.4; pitch, 001.4; yaw, all zips; T-start, 111:59:43. And make a note there that your switch time will be 8:07. Over.
04 14 30 19	CMP	Okay, 0197.4, 001.4, 000; T-start, 111:59:43; switch time at 8:07.
04 14 30 33	CC	Roger. And on page 18 now, your zero phase pad forward.
04 14 30 43	CMP	Okay.
04 14 30 45	CC	Okay. Roll, 344.7; pitch, 240.1; yaw, all zips; T-start, 112:36:00. And make a note there that your new switch time is 9:58.
04 14 31 24	CMP	Okay. 344.7, 240.1, 000; 112:36:00; and switch time, 9:58.
04 14 31 36	CC	Roger. And just a reminder to be sure and get it on your tape up there. The verbal marks at your first and last intervalometer actuation.
04 14 31 52	CMP	Okay. Thank you.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 13 32 43	CC	Antares, this is Houston. It'll be a few minutes yet before we're ready to uplink the LOS and CSM state vectors to you. We'll let you know when we're ready to come up with it.
04 13 32 58	LMP-LM	Okeydoke. We're pressing on with our powerdown checklist.
04 13 38 03	CC	Antares, this is Houston. We're ready with the uplink on LOS and CSM state vectors. Are you still in POO and DATA?

04 13 38 13	LMP-LM	That's affirmative.
04 13 38 15	CC	Roger.
04 13 43 13	CC	Antares, this is Houston. Preliminary P22 acquisition time is for 110 plus 50 plus 00; we'll give you a more precise estimate as we approach it; over.
04 13 43 31	CDR-LM	Roger. Readback: 110 plus 50 plus 00 is the preliminary.
04 13 43 35	CC	Roger. Out.
04 13 43 59	CC	Antares, this is Houston. The uplink's complete. Computer's yours.
04 13 44 07	CDR-LM	Okay. Thank you.
04 13 45 24	CC	Antares, this is Houston. We're standing by for your description of the lunar surface as viewed from the windows of the LM, and we'd also be interested specifically in hearing whether you feel that the roll in the spacecraft is due primarily to terrain or whether you feel that there is some landing gear stroking, also. Over.
04 13 45 50	CDR-LM	Okay. We'll be right with you on the - the condition of the lunar surface here momentarily; we're configuring one of the cameras at the moment. With respect to the upward roll, it looks as though it's probably due mostly to the terrain. There's not really a good level spot to land on around here, unless we proceeded quite a bit closer to Doublet. So we'll keep you in - and we'll advise you further on that after we're had the EVA.
04 13 46 23	CC	Okay, very good. Sounds like you may have a nice level sight over near Doublet for the ALSEP though, doesn't it?
04 13 46 31	CDR-LM	Well, we'll find one.
04 13 50 03	CDR-LM	Okay, Houston, Antares here. You ready for some words on the surface?

04 13 50 08 CC That's affirmative, Antares. Go ahead with your description.

04 13 50 22 CDR-LM Okay. As you may have heard, after P64 at pitch-over, the Cone Crater and the landing site were immediately visible. The Sun-angle was good; the - We were able to recognize it rap - even easier than we were on the LNA display at the Cape. The LPD input are only one ..., and we took over short of a - of Triplet, and I thought at first I was going to land just south of the track, but it's rougher over there than the LNA shows. And so, we came back on track and landed - Since we held the track between Triplets and Doublet, and I estimate perhaps just 100 meters short of our target. Okay, with respect to the general terrain, we are in a depression here; we're looking, of course, directly toward Doublet Crater, which appears to be above us in elevation by approximately 25 to 30 feet. The terrain slopes gradually upward in that direction; there is - there are some modulations, but generally speaking it slopes gradually upward into the area of Doublet. The deactivated spacecraft is about 1 and a half degrees to the right of the landing plane, and of course that puts the shadow of the LM off to the left because of the current Sun location. Are you reading me, all right?

04 13 52 32 CC That's affirmative, Antares; we're copying you 4 0. Over.

04 13 52 40 CDR-LM Okay, while Ed is completing the pictures out of this window, I'll continue to say that generally speaking as I sweep from one horizon to the other, we find that the terrain is a little rougher than I suspected, and we are in a depression here in the landing site with respect to the south and to the north. The depression at the north appears to be very close to us, approximately 50 or 60 meters away; to the south, the land gradually slopes up to a ridge, which is perhaps half a mile away. The general area in the left-hand window of the LM is relatively free of large boulders; I see less than 10 within my field of view that are - over the size of perhaps 8 to 10 inches. And now, Ed's ready to take over, and I'll proceed to photograph out the left window and turn it over to him.

04 13 54 01 CC Roger, Ed; go ahead.

04 13 54 04 LMP-LM Okay, Houston. I'm just trying to get orientated [sic]; I think I can see quite a few of the craters that are out my window are here on the map. There are several large enough to be seen on the map, and in addition there's some reasonably large boulders. I will try to get us located first; then I'll describe what I see.

04 13 54 33 CC Okay.

04 13 54 48 CC Go ahead.

04 13 55 11 LMP-LM Well, it doesn't look like it's going to be quite easy - as easy as I thought, Houston, to pick out the craters that I see in front of me, and point, on the map until we get a little bit better - a clear view from the outside. Let me just pick it up with a description. First of all, as Al pointed out, we're very close to the landing site that was proposed - -

04 13 55 33 CC Antares, Houston - -

04 13 55 35 LMP-LM - - a bit more toward Triplet than that. Go ahead.

04 13 55 38 CC Roger. Updated P22 acquisition time, 110 plus 51 plus 00, and that will coincide with the angles that you got onboard. You should expect to see the CSM about 30 seconds later. Over.

04 13 56 00 LMP-LM Roger. 110:51:50.

04 13 56 03 CC 110:51:00.

04 13 56 09 LMP-LM Okay, 00. Thank you.

04 13 56 11 CC Roger; and continue.

04 13 56 35 LMP-LM Okay, Houston. As Al pointed out, toward Doublet is a rise, and then the ridge that we had talked about that is beyond Doublet - is very pronounced. It forms our skyline or my near horizon. And we seem to be sitting in a bowl. It slopes toward us from the west; it's rather choppy, I might admit, undulating, but the ridge beyond Doublet

is the highest thing I can see in front of me. Looking around to the right, the - skyline is quite undulating. There is a large, old depression to our right or that - that is to the north of us, which forms another bowl very similar to the one that we are - appear to be sitting in. And I can see several ridges and rolling hills of perhaps 35 to 40 feet in height. Obviously very, very old craters that are almost lost - almost indistinct now between myself and the skyline to the north - the horizon to the north. It just looks like a series of low hills from this vantage point.

04 13 58 16 CDR-LM Okay. And the window photography is completed. Magazine Kilo Kilo, exposure 20.

04 13 58 24 CC Houston, Roger. Out.

04 13 58 27 LMP-LM Okay, Houston. The - the undulations are far too complex for me to try to describe them right now, without getting in a better vantage point so I can point them out on your map. I'm sure I can do that as soon as I can get a better handle on our location. Let me suffice it to say that I think there is more terrain, more relief here, than we anticipated from looking at the maps.

04 13 58 56 CDR-LM There's a hell of a lot of relief inside the cabin, I'll tell you that.

04 13 59 05 LMP-LM Okay. And there's a few boulders out my window. They're scattered around falling between here and Doublet. I see at about my 230 position, probably 50 yards out, a large boulder that's probably 3 feet across. There - that's the largest one I have in my field of view, or at least, in my near field of view. And, there are two or three others perhaps half that size - or appear to be half that size in that same vicinity, just a little, little beyond, about - about 2:30 on the clock code and perhaps 50 meters to the largest one and then another 10 or 15 to the other - the other big - boulders. They don't seem to form a pattern that I can see. The color that we're looking at is a kind of a mouse-brown or mouse-gray. And, obviously, it changes with the Sun angle. The surface - Well, there are numerous

craters in my field of view. Some old, very subdued, some overlapped by newer craters. Some that seem to be relatively recent. Most of the surface, however, seems to be fine grain. Incidently, I do see some linear features on the surface. Very small, fine linear features. I do not think that they are erosion patterns; they may be. However, I can see a suggestion of them quite aways away from the LM, kind of running parallel to those that I can see, and we'll have to talk about later when we get out - -

04 14 00 56 CC Ed, Houston - -

04 14 00 57 LMP-LM I think we see lineations that are not - Go ahead.

04 14 01 01 CC Roger. Could you give us a little more description on the nearfield craters, that is the ones that are right in close to the LM?

04 14 01 10 LMP-LM Okay. We have a small pattern of craters at the 12 o'clock position or maybe about 12:30. I have an old subdued crater with a pressure crater in the middle of it, and two or three grouped around on the north edge of it. That crater is about 50 - 15 feet across. Immediately in front of us, maybe 15 feet, is about a - oh, about a 6- or 7-foot crater, that's pocked with a few pressure craters on it. At the 1:00 o'clock position, I have an old crater probably 12 feet in diameter, with a fairly small, relatively fresh crater on the southeast side of it that's maybe a foot in diameter. And as a matter of fact, the larger of those two I just described seemed to form the south pair, the south of a very small triplet. As a matter of fact, the one I described - the first one I described is in line with those three; as a matter of fact, they form a quadruplet, I guess. Now those are the largest craters in my near field, and they are the quadruplet I spoke of. The first one I described is in about the 12:30 position. It's probably 50 feet out. At the fourth one, which is the most northeasterly, it is about the 2:30 position and probably 40 feet out. Any questions?

04 14 02 58 CC All right. Sounds very good, Ed.

04 14 03 03 LMP-LM Okay. Beyond those in the 1 to 1:30 position, I see two craters that - that the surface is sloping up from me at that point. Two craters that are probably - The closest one is 25 feet across. It's about 60 to 80 feet from us, and that's at the 2:30 position. And about 25 feet beyond that one is a crater which is 15 to 20 feet across. These are both smooth-rimmed craters. They are rim craters, but they've been beaten down and have smaller craters on the sides. Those two that I just described are south of the large - the large block - rock block that I spoke of - They're south by about 30 to 40 feet. Let me describe two more craters and then you can have it. I'm getting dry. Almost due north, which would be my 3 o'clock position - Let's say the 2:45 position - I want to be discriminating here - 2:45 position at about 85 to 100 feet. Almost in line with the quadruplet is another crater 25 to 30 feet across with a smaller one on its southwest rim. Getting closer at the 3:00 o'clock position, just barely in my right-hand window field of view is about 35 to 40 feet out - yes, make it 40 feet out, is a crater about 12 feet across which seems relatively fresh. However, all of these craters have small, very small craters alining them. Okay, Al. Take over.

04 14 05 15 CDR-LM Okay, Houston. Referring to the surface map on the forward coordinates, Charlie Peter and 64.9 is a crater, a fairly new crater, which I'm looking at almost directly a beam of the LM. So I would say that our landing site is just about on track, and we're perhaps - perhaps 10 meters or 20 meters short of the landing site. The bright crater on the left wall of Doub - Doublet is also very visible to us from this point as it is in the landing surface photographs.

04 14 06 25 CC Antares, Houston. I understand you have this Charlie Peter 64.9 crater at your 9 o'clock position. Is that correct?

04 14 06 37 CDR-LM That's right.

04 14 06 39 LMP-LM Houston, we're going to have to get on with our P22 here very quickly.

04 14 07 02	CC	Roger. Go ahead.
04 14 07 49	CDR-LM	Yes, you could call it the 9:30 position, Houston.
04 14 07 53	CC	Roger. We got you.
04 14 10 36	CC	Antares, Houston. I have your consumables update when you're free.
04 14 10 42	LMP-LM	Roger. Stand by 1.
04 14 11 37	LMP-LM	Okay. Signal is building up; looks like we're going for a lockon.
04 14 11 44	CC	Roger, Ed.
04 14 11 46	LMP-LM	And the NO TRACK light is out.
04 14 11 49	LMP-LM	Okay, we're lock.
04 14 16 08	CC	Antares, this is Houston. I have the LM weight update for your DAP load for you, and we do want to do an E-memory dump prior to the gravity measurement test.
04 14 16 21	LMP-LM	Okay.
04 14 16 36	LMP-LM	Okay, I'm ready the up - for the updated weight.
04 14 16 40	CC	Antares, this is Houston. LM weight, 10869. Read back. Over.
04 14 16 52	LMP-LM	Roger. 10869.
04 14 16 55	CC	Roger, Ed.
04 14 17 22	CC	When you're ready to copy, Antares, I have your consumables update and also the updated lift-off times for REVs 16 through 19. Over.
04 14 17 49	LMP-LM	Okay, Houston. I'm ready to copy lift-off time.
04 14 17 53	CC	Roger, Ed. Updated lift-off times for REV 16, 112 plus 52 plus 47; REV 17, 114 plus 51 plus 07; REV 18, 116 plus 49 plus 28; 118 plus 47 plus 48. Read back. Over.

04 14 18 33	LMP-LM	Okay. REV 16, 112:52:47; REV 17, 114:51:07; one - REV 18, 116:49:28; 19, 118:47:48.
04 14 18 50	CC	Antares, Houston. Readback correct. I have your consumables update when you're ready. Over.
04 14 19 06	LMP-LM	Okay. Ready to copy.
04 14 19 09	CC	LM consumables update at a GET of 110 plus 30; RCS: Alfa, 80.0; Bravo, 77.0; descent oxygen, 81.6; ascent oxygen, N/A and 97; descent water, 75.1; ascent water, 98.4, 98.8; ampere hours descent, 1199; ascent, 572. Over.
04 14 20 00	LMP-LM	Roger. Give me the descent water again, please.
04 14 20 05	CC	Descent water, 75.1 percent. Over.
04 14 20 17	LMP-LM	Okay. GET of 110:30; RCS A is 80.0, B, 77.0; descent O_2, 81.6; ascent O_2, N/A and 97; descent water, 75.1; ascent water is 98.4, 98.8; ampere hours, 1199 and 572.
04 14 20 45	CC	Antares, this is Houston. Readback is correct. Out.
04 14 22 00	CDR-LM	Houston, do you have any questions about the surface comments that we've made so far?
04 14 22 06	CC	Stand by, please.
04 14 23 21	CC	Antares, Al, this is Houston. The only additional questions that we have generated from your description is a request for details on the lineaments. Specifically we're interested in knowing the direction that they trend, the abundance, and the size. Over.
04 14 23 44	CDR-LM	Okay. Stand by 1.
04 14 23 53	LMP-LM	Houston, I'll pick that up for a moment. I'm not going to describe the lineations near in because the one near in may very well be confused with a descent engine pattern, but I will say that further out to the north, I can see lineations that appear to run roughly east-west, but let's say a little bit north of west, south of east, along that line.

And it's very fine grain, almost imperceptible. Except it does have a little bit of shadow effect, almost - almost like sanduning but not quite. And I can't really say much more about it until we get out and look at it. They may disappear when we get out there, but they're certainly visible from this viewpoint.

04 14 25 01 CC Roger, Ed. And we're standing by for your E-memory dump.

04 14 25 08 CDR-LM Okay. VERB 74 coming now.

04 14 26 04 CC Antares, Houston.

04 14 26 09 LMP-LM Go ahead.

04 14 26 11 CC Antares, this is Houston. Based on your description, we estimate your location to be Charlie Papa 0.9 and 65.3. I say again, Charlie Papa 0.9, 65.3. Over.

04 14 26 31 LMP-LM Okay.

04 14 27 35 LMP-LM Houston, we are not making an issue of it at the moment. I think the crater at Charlie Romeo 0.2 and 64.5 is right out in front of me, about 150 feet. If that is so and I believe it is, it places our position just a little bit north of where you said we were.

04 14 28 12 CC Okay. We copy. Understand you would call that crater at your 12 o'clock position?

04 14 28 23 LMP-LM It's really about 12:30, and probably 130 to 150 feet out.

04 14 28 31 CC Roger. Out.

04 14 28 34 LMP-LM Maybe a bit more. Let's say over 150.

04 14 29 46 CC Antares, this is Houston. We're standing by to commence the gravity measurement on your GO.

04 14 29 56 LMP-LM Okay, Houston. The computer's yours.

04 14 29 59 CC Roger. Out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE COMMUNICATIONS

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 14 31 15	CC	... is 958.
04 14 31 26	CMP	Okay, 344.7, 240.1, 000, 112:36:00. And switch time 958.
04 14 31 37	CC	Roger. Just a reminder to be sure and get it on your tape up there - the verbal at your first and last intervalometer actuation.
04 14 31 52	CMP	Okay. Thank you.
04 14 39 10	CC	Kitty Hawk, Houston.
04 14 39 19	CMP	Go ahead, Houston; Kitty Hawk.
04 14 39 21	CC	Okay, we're about to LOS here, Stu. Get some good gegenschein photos when you go around the corner there. If you want to write these down and stick them on your site map there, it looks like they're located - located at Charlie Quebec, 0.5 and 65.4.
04 14 39 45	CMP	Okay, got Charlie Quebec 0.5 and 65.4. And we'll get the gegenschein. This new window shade sure looks great, Ron. And fits on - back on the camera real good. Just to be doubly safe, I just got through taping floodlight - right up by the window.
04 14 40 06	CC	Hey, beautiful.
04 14 40 47	CMP	And Houston, Kitty Hawk.
04 14 40 49	CC	Go.
04 14 40 52	CMP	Hey, Ron. Is somebody thinking up any words about our Descartes photography. Does it look like the Hycon's wiped out, or we going to do the COAS or - any decision on that?
04 14 41 08	CC	We're working on it right now, Stu.
04 15 06 --		BEGIN LUNAR REV 16

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 14 34 30	CDR-LM	Okay, Houston. Our crew status report. We've taken no medication. We're both in excellent shape. The PRD for the Commander is 16049; for the LMP is 07047.
04 14 34 46	CC	Roger; 16049, 07047, and are you all getting something to eat up there, now?
04 14 34 59	CDR-LM	As soon as we stop asking questions, we'll start eating.
04 14 35 03	CC	Okay. Munch away.
04 14 35 11	LMP-LM	Okay. We'll give you a little verbiage between bites here.
04 14 35 13	CC	No talking with your mouth full.
04 14 35 19	LMP-LM	Did you say talking or torquing?
04 14 37 45	CC	Antares, this is Houston. Based on Ed's report on the crater Charlie Romeo 2 and 645, our new estimate of your position is Charlie Quebec 0.5 - 65.4. Over.
04 14 38 06	CDR-LM	Okay. CQ 5, 65.4.
04 14 38 10	CC	Roger.
04 14 43 59	CDR-LM	Houston, Antares. Just an interesting comment while I think about it. We expect a zero phase. I was aware of it, but it really gave me no problem at all during the descent from high gate on down. Of course, we are out of plane here as far as the ... The Sun - it registers out of plane as far as we're concerned. But, nonetheless, I did notice zero phase, because I looked for it. But with respect to interfering with the landing, it was not a problem.
04 14 44 40	CC	Roger. We copy that. And we got a question for you. How soon did you recognize Triplet?'
04 14 44 52	LMP-LM	Almost as soon as I picked up Cone, almost immediately.
04 14 44 56	CC	Roger. Out.

04 14 45 02	CDR-LM	I probably looked down right after Al did and saw the whole pattern - the whole pattern was immediately recognizable to me.
04 14 45 09	CC	Roger. Out.
04 14 46 06	CDR-LM	Carrying on with an earlier comment that we've - as the left side is concerned, Houston. I was surprised by the lack of large rocks in the area in front of us. There - just don't appear to be more than half a dozen within the field of view in this southwest quadrant. On the crater which I mentioned in our 9:30 position earlier, it has no name; but the one which we coordinated for you - now there is a definite ray pattern visible coming from that crater - a ray pattern of smaller rocks with some that are perhaps 10 inches in size at the rim, varying on out to small hand-size pebbles at the edge of the rays. There appear to be rocks inside the rim of the crater, but they're all small rocks, 8 to 10 inches, and I wouldn't - it's not what I would classify as being a blocky crater.
04 14 47 31	CC	Roger, Al. Sounds like you should have no problem getting your football-sized rocks.
04 14 47 41	CDR-LM	No, they are not as plentiful as we might expect. We will be able to get at least one on each EVA.
04 14 47 47	CC	Roger.
04 14 53 53	CC	Antares, this is Houston. Could you give us some feel for your position relative to starting cabin PREP for EVA-1 on the time line. Over.
04 14 54 07	LMP-LM	Well, we're about eight bites away.
04 14 54 12	CC	Roger, munch away.
04 14 54 18	CDR-LM	We should be through with our lunch here, or whatever meal it is, in about 10 minutes and be pressing on with the EVA-1 PREP.
04 14 54 28	CC	This is Houston. Roger. Out.
04 14 57 41	CC	Antares, this is Houston. We've finished the gravity measurement test. Your computer.

04 14 57 52	CDR-LM	Okay; thank you.
04 14 57 55	CC	Roger. Out.
04 15 01 03	CC	Antares, this is Houston. At your convenience, we'd like you to go into program 06 - powering down - putting the computer in STANDBY and the IMU OPERATE circuit breaker to open. Over.
04 15 01 20	LMP-LM	Okay, Bruce, we'll be doing that momentarily.
04 15 01 22	CC	Roger. No rush.
04 15 08 36	CDR-LM	Houston, we're in Antares now, starting EVA-1 PREP.
04 15 08 43	CC	Roger. We're setting our timer to 15 minutes counting up, starting now.
04 15 08 53	LMP-LM	Okay, we're with you.
04 15 10 45	CC	Antares, this is Houston. If you feel like giving us a running commentary as you go through the equipment PREP for EVA-1, we'll be checking you off here.
04 15 10 57	CDR-LM	Okay; we'll try to do that.
04 15 11 28	CDR-LM	Houston, we've completed the first paragraph.
04 15 11 32	CC	Houston. Roger; out.
04 15 13 36	CDR-LM	Okay, one quick check. Oh, hell; the circuit breaker is probably up.
04 15 13 51	LMP-LM	Yes, it will be all right.
04 15 14 23	CDR-LM	Hey, we are doing the second paragraph, Houston. The LMP's PLSS is against the forward hatch.
04 15 14 29	CC	Houston. Roger; out.
04 15 15 27	CC	Antares, this is Houston. Would you describe your interior lighting configuration to us so that we may use it for power budgeting for later missions. Over.
04 15 16 10	CDR-LM	Okay, Houston. The only lights we have left on now are the annunciator/numerics. We have caution

and warning. But we have turned off the floodlights and there's adequate lighting.

04 15 16 28 CC Roger. Thank you, Antares.

04 15 18 41 CDR-LM Houston, this is Al. We have one problem here in paragraph 3. The first line - on my side, the UCTA has some fluid in it, and it just doesn't seem to work. Ed is able to depress the valve on the suit side and get some flow, but we've tried two different collection bags, and we are unable to get flow. We're going to press on in that configuration. You might think about that for a while.

04 15 19 12 CC Okay. Understand it's your UCTA that has the problem?

04 15 19 19 CDR-LM That's right.

04 15 19 20 CC Roger.

04 15 23 05 CC Antares - Al, this is Houston. Are you able to check the hose from the UCTA to the fitting in the suit to ensure that that hose is not kinked. We have had problems in this connection in the past. And do you feel that the reserve capacity in the UCTA would be sufficient for this EVA or not? Over.

04 15 23 31 CDR-LM We've just been discussing that. I think that the latter is probably the case. We'll make one quick check on that hose.

04 15 29 03 CC Antares, Houston. What was the resolution on the UCTA situation?

04 15 29 12 CDR-LM Roger, Houston. We got it fixed. We'll have it - be back on the time line here very shortly, I think.

04 15 29 18 CC Roger. Out.

04 15 29 20 CDR-LM We had a kink in the hose and we've got that straightened out and drained.

04 15 29 23 CC Beautiful.

04 15 33 16	CDR-LM	Okay, Houston. We're down to verifying watch on PGA. Proceeding on.
04 15 33 21	CC	Houston. Roger. Out.
04 15 36 10	LMP-LM	Okay. Magazine Charlie; Charlie is installed on the surface sequential camera.
04 15 36 14	CC	Roger. We copy Claremont, California, installed on the sequence camera.
04 15 36 24	CDR-LM	That's affirmed. Power cable connected, and it's verified operational.
04 15 36 29	CC	Roger; out.
04 15 38 32	CDR-LM	Okay. The CDR is going to deploy the EVA antenna.
04 15 38 38	CC	Roger. CDR.
04 15 40 01	CC	Antares - Al, Houston. You confirm the EVA antenna is deployed now?
04 15 40 10	CDR-LM	That's affirmative, and we're proceeding on.
04 15 40 13	CC	Roger; out.
04 15 43 04	LMP-LM	All right, Houston; we have the RCUs on the data file.
04 15 43 07	CC	Houston, Roger. Out.
04 15 45 41	LMP-LM	CDR's boots are on.
04 15 45 45	CC	Roger, Ed.
04 15 49 07	CDR-LM	Okay, the LMP OPS is on the floor.
04 15 49 13	CC	Say again. Say again, Al.
04 15 49 23	CDR-LM	The LMP OPS is on the - -
04 15 49 29	CC	Roger.
04 15 51 11	LMP-LM	Okay. We've had two satisfactory OPS checkouts. The CDR is reading 6000 torrs and the LMP is reading 5900 torrs.

04 15 51 24 CC Antares, Houston. Roger; out.

04 15 53 22 CDR-LM Antares is proceeding with the antifog on the inside of the helmet.

04 15 53 27 CC Roger, Antares.

04 16 01 58 CC Antares, Houston. How are you progressing?

04 16 02 05 LMP-LM Okay. We're down to the point where the armrest is coming off. We have one more to go.

04 16 02 11 CC Roger; out.

04 16 02 17 LMP-LM And we're in program 06, and the forward hatch handle is unlocked.

04 16 02 22 CC Roger; out.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 15 27 54 CC Kitty Hawk, Houston. You ought to be switching to your second target.

04 15 28 15 CC Kitty Hawk, Houston. You ought to be switching to your second target.

04 15 36 55 CC Kitty Hawk, Houston.

04 15 36 57 CMP Kitty Hawk. How do you read?

04 15 36 58 CC Okay, I got you now. How was good old target 2, there?

04 15 37 07 CMP Well, I'm afraid you're right, Ron. It was pretty tough, I never saw B at all and A - I think - is pretty far down. I was pretty surprised at target 1, generally, the targets, A, B, and C are very easy to pick up; but in zero phase, B was just completely wiped out. I think the clue is heading down the flat - if you have got some relief by you, even in zero phase, you know, you can sort of use that as - to help you on in. But in zero phase, B was pretty well bombed out. D was actually the best of the three and if you can pretty well hang on in, you can pick it up, if you use the other craters as a lead in and A was about - he was - ... and during zero phase that whole ... really washed out.

04 15 38 21	CC	Kitty Hawk, Houston. We are getting too much background noise here. I really couldn't understand anything you said there.
04 15 38 31	CMP	Well, why didn't you stop me? Okay ... get it all on the tape - I'll put this other ... on the tape, also then. Well, I guess it'll have to be running. Are you going to leave the tape running during this next ...?
04 15 39 04	CC	Kitty Hawk, Houston. Why don't you go ahead and leave the tape running here. We sure can't make out what you're saying down here.
04 15 40 39	CC	Okay, Kitty Hawk. Houston here. We took the ... out; maybe we ought to get rid of some of the banging. How do you hear me now?
04 15 40 50	CMP	Oh, you're loud and clear. What did you take out?
04 15 40 53	CC	Well, something that's supposed to cut out part of the static. It does cut down on the static, but everytime the signal strength gets a little bit low, it also bangs. So, I couldn't hear you. I took those out and now I can hear you loud and clear.
04 15 41 09	CMP	Okay, you've always been loud and clear here. No problem at all.
04 15 41 13	CC	Roger.
04 15 41 30	CMP	Okay, Ron; are you going to let the tape run for these - during this next sighting?
04 15 43 19	CC	Okay, Kitty Hawk. Houston.
04 15 43 25	CMP	Go ahead, Ron.
04 15 43 26	CC	Okay, Stu. The comm is a little bit marginal down here, but what we would like to do is leave the tape running until after this next zero phase, but also talk to the ground if you will and then maybe we will have some comments back for you. And then we should get it in one place or the other for sure.
04 15 43 47	CMP	Okay, very good.

04 15 46 56	CMP	And Houston, Kitty Hawk. You want me to terminate the charge on B and start one on Able?
04 15 47 05	CC	That's affirmative, Kitty Hawk.
04 15 47 11	CMP	Okay.
04 15 55 29	CC	Okay, Stu. You've got about 30 seconds to start time.
04 15 55 36	CMP	Okay, thank you.
04 16 00 25	CC	Okay, Stu. About 30 seconds to turn the camera on. Give me a hack when you turn it on.
04 16 00 36	CMP	Okay, I'll do that.
04 16 00 57	CMP	And stand by.
04 16 01 00	CMP	MARK. Camera's running ...

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 16 05 55	CC	Okay, Kitty Hawk; Houston. You can start on STOP on that one, and switch to target area 4. We can't hear a thing you're saying down here, but keep talking - We'll get it on the tape.
04 16 12 39	CC	Kitty Hawk, Houston. Will you try to pass down the frame number off of the zero phase stuff?
04 16 12 48	CMP	Okay. Frame number is 58.
04 16 12 52	CC	Say it again.
04 16 12 58	CMP	Frame number is 58.
04 16 13 02	CC	Roger. Understand 58.
04 16 15 43	CC	Kitty Hawk, Houston. I've got your map update for REV 17 and the zodiacal light photo pad.
04 16 15 48	CMP	Stand by just 1, Ron.
04 16 17 14	CMP	Okay, Ron; go ahead.
04 16 17 21	CC	Okay, Stu. Again, I could just barely read you; but your map update for REV 17: 180, 113:44:40.
04 16 17 32	CMP	Okay; 113:44:40.
04 16 17 35	CC	Roger, that's correct. Okay, zodiacal light photo pad T-start, 113:18:03.
04 16 17 51	CMP	Okay, 113:18:03, zodiacal light T-start.
04 16 17 57	CC	Roger; that's correct.
04 16 18 03	CMP	I guess our comm didn't hold out through that, did it, Ron? Seemed like I heard you - heard it drop out.
04 16 29 59	CC	Kitty Hawk, Houston.
04 16 30 05	CMP	Go ahead, Houston; Kitty Hawk.

04 16 30 07	CC	Okay, Stu. As you know, when you come around the other side here, we're going to want to dump the DSE to get your zero-phase stuff. So, if you'll come over the hill in these attitudes - You ready to copy?
04 16 30 26	CMP	Okay, stand by. Hey, I noticed the a - the tape was barber-poled. I don't know if it went during the second - or not - zero phase; did you stop the tape after the second zero-phase pass?
04 16 30 39	CC	That's affirm; we stopped it and rewound it.
04 16 30 46	CMP	Okay, that's what I was afraid of. I was afraid it might have run down - okay, thank you. Give me some attitudes.
04 16 30 51	CC	Okay. Roll, 060; pitch of 304, yaw of 0. Your HIGH GAIN angles will be PITCH, plus 33; YAW of 279. And you can start the maneuver to that attitude after you complete your zodiacal light stuff.
04 16 31 24	CMP	Okay, I'll start a maneuver after the zodiacal light of 060, 304, 000. Set up the HIGH GAIN on a PITCH of plus 33, YAW of 279.
04 16 31 37	CC	Roger; and, as you can know, that's just 60 degrees out and roll from the LM visual attitude.
04 16 31 48	CMP	Okay.
04 16 32 16	CC	Kitty Hawk, Houston.
04 16 32 17	CMP	Go ahead.
04 16 32 18	CC	Okay, Stu; I gave you some bum dope there. We just stopped the tape at the end of the zero-phase stuff; we did not rewind it, so you can go ahead and use it on the back side.
04 16 32 32	CMP	Okay.
04 16 32 45	CC	Your comm's good now; I don't know why it wasn't real good there during zero phase.
04 16 32 54	CMP	Yes; well, I got you on the HIGH GAIN now.
04 16 32 57	CC	Oh, okay; that's why (laughter).

04 16 33 04	CMP	Yes, it does help.
04 16 34 28	CC	Kitty Hawk, Houston. Just for your information, EVA preparation seems to be progressing normally down there at the Fra Mauro area. And they'll probably be out on the surface when you come around the other side.
04 16 34 45	CMP	Ah, very good. Did they say anything about the terrain, Ron? It seems like I heard them say they were - something like an 8-degree roll angle or something.
04 16 35 04	CC	Yes, that's right. And it's a little rougher than what they thought it was going to be down there. That was just a general comment on the terrain.
04 16 35 19	CMP	They comment on how steep it looked - to get up the Cone?
04 16 35 38	CC	Hey, Stu; Cone's about 5 o'clock, and they really weren't looking at the slope as they came down across there (laughter).
04 16 35 51	CMP	Oh, that's right. Yes, sorry about that.
04 16 35 55	CC	No sweat.
04 16 35 58	CMP	I already had them outside.
04 16 37 32	CC	Okay, Stu; you got about 30 seconds to T-start time.
04 16 37 40	CMP	Okay; thank you.
04 16 39 17	CC	Okay, Stu; we'll see you on the other side.
04 16 39 23	CMP	Okay, Ron.
04 17 04 --		BEGIN LUNAR REV 17

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 16 06 48	LMP-LM	Okay, Houston. We're at that point where we had the real PLSS out and get the lightweight one.
04 16 06 53	CC	(Laughter) Roger. I'll have Ron come on up the ladder.

04 16 07 01	LMP-LM	Great.
04 16 09 44	CDR-LM	Okay. The LMP PLSS is on, and we're proceeding with the CDR's PLSS.
04 16 09 49	CC	Roger, Al.
04 16 09 54	CDR-LM	Okay. The Commander's PLSS is on. We're going for the RCUs.
04 16 09 58	CC	Roger, Al.
04 16 24 41	CDR-LM	Okay, Houston. We've verified powerdown circuit breaker configuration, and we're proceeding with the comm check on the PLSSs.
04 16 24 48	CC	Roger, Al.
04 16 25 40	LMP-LM	Houston, Antares. How do you read?
04 16 25 43	CC	Ed, this is Houston. I read you loud and clear. Over.
04 16 25 50	LMP-LM	Okay, Bruce. Read you loud and clear.
04 16 25 52	CDR-LM	Okay, you all done down through there? Ed?
04 16 26 56	CDR-LM	Okay. And the comm panel S-BAND tran - ... VHF panel: VOICE, ON, OFF; ON, OFF, HI; VOICE, ON, OFF; ON, OFF, HI. Okay, RANGE, to RANGE. SQUELCH A and B noise threshold plus 1 and a half; RECORDER, ON.
04 16 27 12	LMP-LM	Okay.
04 16 27 14	CDR-LM	... antenna in EVA. UPLINK SQUELCH, ENABLE. SQUELCH, ENABLE. Okay, you collect to - connect to the PLSS comm, ... Okay. Connected to PLSS comm?
04 16 28 33	CDR-LM	Okay, here we - PLSS PTT. ... switch to A.
04 16 28 46	LMP-LM	A.
04 16 28 47	CDR-LM	Wheel, counterclockwise.
04 16 28 48	LMP-LM	Wheel, counterclockwise; there's a tone.
04 16 28 53	CDR-LM	Vent flag P, press flag O, O_2 momentary.

04 16 28 58 LMP-LM Okay. O_2's still on.

04 16 28 59 CDR-LM Read out the PLSS O_2 pressure gages.

04 16 29 02 LMP-LM Okay, it's greater than - looks like about 96 percent.

04 16 29 07 CDR-LM 96 percent. Okay ... - -

04 16 29 08 LMP-LM Let's see. Now, wait a minute. 75, 80, 85, 90 - about 92 percent. Okay?

04 16 29 15 CDR-LM 92 percent. And I'm reading you loud and clear.

04 16 29 17 LMP-LM Okay.

04 16 29 20 CDR-LM Okay. Commander's going to connect to the PLSS comm.

04 16 29 25 LMP-LM Okay.

04 16 38 12 LMP-LM Houston, this is Antares. Over.

04 16 38 16 CC Antares, this is Houston. Go ahead.

04 16 38 22 LMP-LM Okay, Bruce. I have your procedure of lost time on the PLSSs. Let's get coordinated and try it through it again. Over.

04 16 38 30 CC Roger.

04 16 38 33 LMP-LM What do you suggest? We went through the checklists; and when we gave you a call, no response. Were you reading us at all?

04 16 38 40 CC We were receiving data, but we did not read you on voice. What is your present configuration?

04 16 38 51 LMP-LM Well, I've come off of the PLSS comm and back onto the ship comm. Al is still set up with his PLSS operating, and - He's not reading at the moment, but he shouldn't be. And we can talk with each other in A, B, and AR.

04 16 39 14 CC Okay, I understand you talked to each other in A, B, and AR. The last word that I had from you was when you reported 92 percent oxygen; and, I believe, at that time, you were in mode A. Over.

04 16 39 32	CC	And Al was still on the ship's comm.
04 16 39 38	LMP-LM	Okay. Let's see if that's correct.
04 16 39 41	CC	Now, is Al in mode A at the present time?
04 16 39 47	LMP-LM	No, he's in AR at the present time, still. You're right, Bruce. That's the last time you should have heard me, I guess - is - that's the last time you heard me was at that point, and I was on A.
04 16 40 03	CC	Okay. We should have heard you subsequent to that, but that is the last time that we heard you. And, stand by. We'll have some procedures for you in a minute.
04 16 40 15	LMP-LM	Okay.
04 16 40 58	CC	Ed, this is Houston. We request that you return to the beginning of the PLSS comm check block, indicated at 18 minutes on the EVA-1 card; and verify all switches. If you'd like to read them out as you go through, why we'll check them off down here, too. Over.
04 16 41 20	LMP-LM	Okay, here we go.
04 16 41 21	CC	And, in the meantime, would you have Al unstow his PLSS antenna and see if that helps any?
04 16 41 30	LMP-LM	We've already done that.
04 16 41 31	CC	Roger. Out.
04 16 41 35	LMP-LM	Okay, you want us to go through - verify our powerdown circuit breaker configuration? Is that affirmative?
04 16 41 42	CC	Negative. You can start - we got COMM: MODULATE, FM confirmed down here, and we see TV sync pulses; so, that's good. Start out with our CDRs AUDIO panel.
04 16 41 56	LMP-LM	Okay, I am back - wait a minute - I am back in PM right now, Bruce. Let's go to FM and try.
04 16 42 04	CC	Roger. We'd - we had had FM in the past. We didn't catch you switching back.

04 16 42 15	LMP-LM	Okay, I'm going to FM, now.
04 16 42 17	CC	Roger.
04 16 42 33	CC	Ed, this is Houston. How do you read?
04 16 42 39	LMP-LM	Houston, this is Ed. Loud and clear.
04 16 42 41	CC	Okay. Got you in FM. We're presently receiving no data in FM. Let's press on to CDR's AUDIO panel.
04 16 42 52	LMP-LM	Okay, TV, CLOSED.
04 16 43 22	LMP-LM	Houston, will you verify the AUDIO - CDR's AUDIO panel.
04 16 43 26	CC	Okay. LMP's AUDIO panel.
04 16 44 15	CC	Ed, this is Houston. Over.
04 16 44 24	CC	Antares, Ed; this is Houston. Over.
04 16 44 38	CC	Antares, Antares. This is Houston. Over.
04 16 44 52	CC	An - -
04 16 44 53	LMP-LM	Houston, this is Ed. How do you read now?
04 16 44 55	CC	Ed, this is Houston. Loud and clear. How me?
04 16 45 01	LMP-LM	Okay. Bruce it seems like I lost you when I went to RELAY ON on my panel. I guess that's appropriate, since I'm still on Antares comm. Is it not?
04 16 45 17	CC	Roger. That's affirmative, Ed. And before you press on from here, we'd like you to take the MODULATE switch which is - stand by.
04 16 46 00	LMP-LM	Yes, but I don't know what he said. When he - when all the static came on the line. - Before I went to RELAY. No, with RELAY, ON, I was not reading him. I'm on ships comm, so I shouldn't.
04 16 46 22	LMP-LM	Okay, Houston. How do you read now?
04 16 46 24	CC	Stand by, please, Ed. Or go ahead, Ed.

04 16 46 29	LMP-LM	Okay. Okay, you wanted me to change the MODULATE switch to PM? Is that affirm?
04 16 46 34	CC	Negative. That problem is cleared up. We're now receiving FM data, so cancel that transmission.
04 16 46 43	LMP-LM	Okay. I'm at the point now of - of going back to the LMP's AUDIO panel. I will not transmit again until I get on the - -
04 16 46 52	CC	Stand by Ed. Hold at your present configuration. Over.
04 16 46 59	LMP-LM	Got you. I'm holding. And Houston. Al, can read you part of the time and not part of the time. I think it's because the RELAY's OFF over here, right now.
04 16 47 26	CC	Okay, Ed. Is that at the - is that a change from previous configuration? That is, was Al not receiving us at all before, and he's now receiving us intermittently?
04 16 47 41	LMP-LM	... Okay. Bruce, I think it had to do with the RELAY switch, as well. Let's ignore that and go on for the moment.
04 16 47 54	CC	Stand by, please.
04 16 48 14	LMP-LM	...
04 16 48 27	LMP-LM	Houston, Antares.
04 16 48 32	CC	Go ahead, Antares.
04 16 48 38	LMP-LM	I think a lot of this noise is coming when I hit my - it seems simultaneous with my keying my umbilical.
04 16 48 50	CC	Roger. I'm - I'm not copying the noise that you're referring to.
04 16 48 58	LMP-LM	Okay. Maybe its only ... to us.
04 16 49 31	LMP-LM	I don't know what it is. They're trying to figure out what's wrong with our comm. They won't let me go on until they - they fix it. (Cough)

04 16 49 50	CC	Ed, this is Houston. At the present time, we are verifying our site configuration. That's the reason for the hold at this point.
04 16 50 01	LMP-LM	Okay. You are verifying your - your own configurations? Is that affirmative?
04 16 50 04	CC	That's affirmative.
04 16 50 11	LMP-LM	Let's get your - get your antenna down before you break it off.
04 16 50 32	LMP-LM	... looks great. Put it any place.
04 16 51 35	LMP-LM	As of right now, we are only 20 minutes behind.
04 16 51 38	CC	Ed, this is Houston.
04 16 51 41	LMP-LM	Yes.
04 16 51 43	CC	Ed, we'd like you to put the RELAY switch on your panel to ON for about 20 or 30 seconds, during which time we will try to establish communication with Al who, I understand, is still in AR. And if that is unsuccessful, after about 20 or 30 seconds, go back to OFF. Over.
04 16 52 06	LMP-LM	Okay. Stand by. Let me verify his configuration. Okay. You should be in AR. Okay. You're in AR. They're going to call you. Okay, Bruce. On my mark, I will go to RELAY, ON and stand by for your call. In 20 or 30 seconds, I'll come back, if no comm.
04 16 52 30	CC	Roger, Ed.
04 16 52 33	LMP-LM	Okay. 3, 2, 1 -
04 16 52 36	LMP-LM	MARK. They're going to call you.
04 16 52 41	CC	Antares, Antares, this is Houston calling Al. Do you read? Over.
04 16 52 53	CC	Al, Al, this is Houston. Do you read? Over.
04 16 53 01	CC	Antares, this is Houston. Do you read? Over. Antares, this is Houston. Do you read? Over. Antares, this is Houston. Do you read? Over.

04 16 53 31	LMP-LM	Okay - Bruce. This is Ed. We both read you loud and clear. Al called back but you could apparently not read him.
04 16 53 41	CC	Roger. We understand you were both - you through the LM and Al through the PLSS - reading us loud and clear. We heard nothing from you.
04 16 53 52	LMP-LM	Okay. What? That's probably the next thing we'll try. However, the RELAY switch must be working, if - you were reading him. (Cough) Houston, one matter of suggestion: remember we have been in SECONDARY TRANSMITTER/RECEIVER since before PDI, and I don't know that we've ever established that our PRIMARY is good or not good.
04 16 54 32	CC	Roger. We copy. And would you verify that the Commander is either in VOX mode on the PLSS or he is pushing to talk?
04 16 54 47	LMP-LM	Al, were you in VOX mode, for sure? That's a verify. He was in VOX mode, and I was reading his comm.
04 16 54 58	CC	Roger. I understand you were reading him on board.
04 16 55 03	LMP-LM	That's affirm.
04 16 55 31	LMP-LM	Right. It didn't look that big when we came over it.
04 16 56 12	CC	Antares, Houston. Over.
04 16 56 18	LMP-LM	Go ahead, Bruce.
04 16 56 19	CC	Ed, we'd like to reverse the RELAY configuration on your comm panels. A summary of the changes are that on the Commander's panel, you will have the RELAY switch ON; you will be in VHF A T/R and B RECEIVE. On the LMP panel, RELAY switch will remain OFF, and you will go to VHF A OFF and VHF B OFF. Over.
04 16 56 52	LMP-LM	Okay, we've got it. We will reverse the LMP and the CDR's AUDIO panels.
04 16 56 58	CC	Roger. And are you up on LM comm now, or - are you back on the PLSS?

04 16 57 05	LMP-LM	No, I'm still on LM comm.
04 16 57 21	LMP-LM	Bruce, don't you want to try communicating with Al, just with his RELAY ON, before I can do anything else?
04 16 57 28	CC	Roger. If you can set us up in this LM configuration, we'll attempt to contact with Al through the RELAY mode.
04 16 57 38	LMP-LM	Okay.
04 16 57 40	CC	If - if no contact in about 1 minute, why, you better go back to the mode we've got now and contact us.
04 16 57 51	LMP-LM	Okay. Will do. Okay, Al. Put your PR T/R RELAY ON. Right, RELAY ON.
04 16 58 01	CDR-LM	ON.
04 16 58 03	LMP-LM	Mode VOX.
04 16 58 04	CDR-LM	Mode VOX.
04 16 58 05	LMP-LM	VHF A, T/R; B, RECEIVE.
04 16 58 07	CDR-LM	VHF A, T/R; B, RECEIVE.
04 16 58 11	LMP-LM	Okay, and mine's going T/R, T/R, RELAY OFF, VOX - VOX in; A, T/R; B, RECEIVE. Okay. Now give them a call.
04 16 58 29	CDR-LM	Houston, this is Al. How do you read?
04 16 58 33	CC	Al, this is Houston. Loud and clear. How us? Over.
04 16 58 41	CDR-LM	Houston, this is Al. How do you read?
04 16 58 42	LMP-LM	They're reading you.
04 16 58 43	CC	Al, this is Houston. We're reading you loud and clear. LMP's AUDIO panel -
04 16 58 49	CDR-LM	They're reading me but I'm not reading them.
04 16 58 50	CC	LMP's AUDIO panel should be VHF Alfa, and Bravo, OFF. Over.

04 16 58 59	LMP-LM	Houston, that's affirmative. Alfa and Bravo are OFF. I am reading you. Al does not seem to be. Give him another call.
04 16 59 08	CC	Al, Al, we - -
04 16 59 09	CDR-LM	Houston, this is Al. Testing 1, 2, 3, 4, 5, 4, 3, 2, 1.
04 16 59 16	CC	Al, Al, this is Houston. We are reading you loud and clear.
04 16 59 23	CC	Al, this is Houston. Reading you -
04 16 59 24	LMP-LM	Hey, Bruce, give him a long count and let him - give him a long count and let him try to adjust his volume and see if that's part of it.
04 16 59 33	CC	Al, this is Houston. Long count. 1, 2 - -
04 16 59 37	LMP-LM	You getting him now?
04 16 59 38	CC	- - 3, 4, 5, 6, 7, 8, 9, 10. Adjust the wheel for Houston. 9, 8, 7, 6, 5, 4, 3, 2, 1. Over.
04 16 59 53	LMP-LM	Both of them on ... maximum, and can't hear anything.
04 16 59 57	LMP-LM	Okay. Houston, he has full volume up and is not receiving you.
04 17 00 03	CC	Roger. How is he reading you?
04 17 00 10	LMP-LM	Do you read me, Al? Or do you hear me through here? Okay, he is not reading me. We're just talking in the cockpit.
04 17 00 26	CC	Ed, this is Houston - -
04 17 00 27	CDR-LM	... audio.
04 17 00 29	CC	Ed, this is Houston - -
04 17 00 30	CDR-LM	...
04 17 00 32	CC	- - Verify that Al is in the AR mode.
04 17 00 36	LMP-LM	Comm in AR.

04 17 00 39	CDR-LM	I'm in AR.
04 17 00 40	LMP-LM	You're verified.
04 17 00 42	CC	And - I understand you've gone to the extreme position on the volume control -
04 17 00 48	CDR-LM	Comm's back in AR.
04 17 00 51	CC	I understand Al's gone to the extreme position on the volume controls. I'll give you a long count here, and why don't you have him cycle or run the wheel from one end to the other, and see if at any point along the line he receives anything. Over.
04 17 01 07	LMP-LM	You've already cycled that wheel all the way, haven't you?
04 17 01 10	CDR-LM	Yes, I saw the way we - you cycled it.
04 17 01 14	LMP-LM	All one way to the other. Yes.
04 17 01 15	CC	Okay.
04 17 01 16	LMP-LM	We've already done that, and we still don't receive anything.
04 17 01 19	CC	Roger. Out.
04 17 01 42	CDR-LM	Counterclockwise is thataway.
04 17 01 48	LMP-LM	As you look at it, counterclockwise? Right? As you'd look down on it, counterclockwise?
04 17 01 55	CDR-LM	Yes.
04 17 02 00	CC	Ed. This is Houston.
04 17 02 04	LMP-LM	Go ahead.
04 17 02 05	CC	Ed, we'd like you to set up with yourself in mode Alfa, Al in mode Bravo, and attempt a comm check between the two of you and you with us. Over.
04 17 02 22	LMP-LM	Okay. Say again which one you want which.
04 17 02 27	CC	We want Al in mode Bravo and yourself in mode Alfa.

04 17 02 36	LMP-LM	Okay. Al in Bravo. Me in Alfa. And we will try our comm check again.
04 17 02 43	CC	Roger.
04 17 02 49	LMP-LM	... Houston, for that check. Observe - Do you still want VHF A, VHF B OFF on the LMP panel?
04 17 03 03	CC	That's affirmative. And on the Commander's panel - that's A, T/R and B, RECEIVE - we have reversed the relay routing through the CDR and LMP AUDIO panels.
04 17 03 14	LMP-LM	Understand that. Okay. You're in A, T/R and B RECEIVE, right?
04 17 03 20	CDR-LM	Right.
04 17 03 21	LMP-LM	Okay. Let's - you go Bravo. I go Alfa.
04 17 03 26	CDR-LM	Okay. But you're not even on the PLSS.
04 17 03 28	LMP-LM	Pardon?
04 17 03 30	CDR-LM	... not even ...
04 17 03 33	LMP-LM	I'm going to be in just a minute.
04 17 07 13	CC	Ed, this is Houston. How do you read on Alfa.
04 17 08 22	LMP-LM	... trouble. I think that circuit breaker was out.
04 17 08 31	CC	Ed, this is Houston. Now, do you read?
04 17 08 33	LMP-LM	Houston. This is Ed. How do you read?
04 17 08 37	CC	Loud and clear, Ed.
04 17 08 42	LMP-LM	Check to make sure your AUDIO circuit breaker is in.
04 17 08 44	CDR-LM	Okay. It's in.
04 17 08 47	CC	Ed, this is Houston. Loud and clear.
04 17 08 50	LMP-LM	That's good.
04 17 09 02	LMP-LM	... You go to B. I go to A.

04 17 09 05	CDR-LM	I'm B.
04 17 09 07	CC	Ed, this is Houston. Over.
04 17 09 09	LMP-LM	Houston, this is Ed. How do you read? Houston, this is Ed. How do you read?
04 17 09 14	CC	Ed, this is Houston. Loud and clear.
04 17 09 19	CDR-LM	This is Al. How do you read?
04 17 09 21	CC	Al, this is Houston - -
04 17 09 22	LMP-LM	Okay. Let's try once more.
04 17 09 23	CC	- - Al, this is Houston. If you're in mode B, I shouldn't - you shouldn't be able to read me, but I'm reading you loud and clear.
04 17 09 31	LMP-LM	Let's go to AR, now.
04 17 09 32	CDR-LM	Let's go to AR. Reconfigure the panel ... Okay? Let's put your RELAY ON. No, no leave it - leave it right where it is. We're fine. Don't touch a thing.
04 17 09 43	LMP-LM	Okay. Houston, this is Ed. How do you read?
04 17 09 47	CC	Ed, this is Houston. Loud and clear. How me? Over.
04 17 09 51	LMP-LM	Roger. Loud and clear. Try Al.
04 17 09 54	CDR-LM	This is Al. How do you read, Houston?
04 17 09 56	CC	Al, this is Houston. Loud and clear. How me? Over.
04 17 10 02	CDR-LM	Loud and clear.
04 17 10 03	CC	Hey, beautiful.
04 17 10 05	CDR-LM	Okay. I think we got our - I think we got our problem solved.
04 17 10 12	CC	Okay. The word from down here is don't touch a thing.

04 17 10 17	CDR-LM	Yes, we're in good shape. We're just going to leave it right where it is.
04 17 10 21	CC	Okay.
04 17 10 27	CDR-LM	Okay. Where are we in the great scheme of things?
04 17 10 35	LMP-LM	Okay. ... right in through here. We've done all our comm checks.
04 17 10 43	CDR-LM	All right. Okay. We're - we're still in FM, are we not?
04 17 10 47	LMP-LM	Yes. We want to stay in FM.
04 17 10 49	CDR-LM	Okay.
04 17 10 51	LMP-LM	Circuit breakers in.
04 17 10 53	CDR-LM	Okay.
04 17 10 54	LMP-LM	Final systems prep.
04 17 10 56	CDR-LM	Okay. I'll read out for you. Panel 16, CABIN REPRESS verified closed, circuit breakers.
04 17 11 03	LMP-LM	Okay. Go again.
04 17 11 05	CDR-LM	Verify CABIN REPRESS breaker, closed, circuit breakers.
04 17 11 07	LMP-LM	Okay.
04 17 11 08	CDR-LM	SUIT FAN, DELTA-P, open.
04 17 11 11	LMP-LM	SUIT FAN, DELTA-P, open.
04 17 11 12	CDR-LM	SUIT FAN 2, open.
04 17 11 14	LMP-LM	SUIT FAN 2, open.
04 17 11 15	CDR-LM	Okay, let's SELECT SUIT FAN 2.
04 17 11 18	LMP-LM	Okay.
04 17 11 19	CDR-LM	And we got a MASTER ALARM. Suit fan.
04 17 11 24	LMP-LM	Okay.

04 17 11 25 CDR-LM Is the WATER SEP COMP light on?

04 17 11 27 LMP-LM It'll take a few minutes.

04 17 11 28 CDR-LM Why don't you check and see if it's on.

04 17 11 35 LMP-LM No, it's not on yet.

04 17 11 36 CDR-LM Okay it must be -

04 17 11 40 LMP-LM Just take a little while for it to run down. ... minutes.

04 17 11 43 CDR-LM Okay - Okay. SUIT GAS DIVERTER, PULL, EGRESS.

04 17 11 49 LMP-LM Okay. PULL, EGRESS.

04 17 11 53 CDR-LM CABIN GAS RETURN, EGRESS. CIRCUIT RELIEF, AUTO. Verify. I'll get them.

04 17 11 57 LMP-LM Okay.

04 17 11 59 CDR-LM Put the RELIEF AUTO.

04 17 12 02 LMP-LM Stand by ... .

04 17 12 06 CDR-LM CABIN GAS RETURN is EGRESS. Okay. Ready for the OPS hookup.

04 17 12 14 LMP-LM Okay. OPS hookup.

04 17 12 18 CDR-LM Go on, you first.

04 17 12 19 LMP-LM Okay.

04 17 12 22 CDR-LM Unstow the O_2 actuator, if you will bend over a little bit. ...?

04 17 12 30 LMP-LM No - Yes it's on backup again. I'll put it down for you. Okay. Can you get it to me?

04 17 12 36 CDR-LM ... here we go. All snapped up nice and clean on top.

04 17 12 49 CDR-LM Okay, O_2 actuators unstowed and - Actuator to RCU.

04 17 13 18 CDR-LM Okay. It is.

04 17 13 24 LMP-LM Okay.

04 17 13 29 CDR-LM Okay. SUIT ISOLATION, disconnected. Disconnect the LM hoses.

04 17 13 35 LMP-LM Okay, I'm hung up here on something.

04 17 13 41 CDR-LM Okay.

04 17 13 42 LMP-LM Let me get your antenna down before you break it. ...

04 17 13 57 CDR-LM Okay, your LM hoses are off. And we'll let them hang down there.

04 17 14 04 LMP-LM Okay.

04 17 14 05 CDR-LM Okay. OPS O_2 hose to PGA.

04 17 14 14 LMP-LM Okay.

04 17 14 25 LMP-LM ... Master alarm ... the ECS system.

04 17 14 27 CDR-LM Right.

04 17 14 29 LMP-LM Okay. That CO_2 ... H_2O COMP light.

04 17 14 46 LMP-LM Try it again. That bulky one.

04 17 14 52 CDR-LM Okay, there it is. And you need a purge valve.

04 17 14 58 LMP-LM Okay, a purge valve.

04 17 15 00 CDR-LM Okay, we've got a purge valve; it's closed, locked, and trimmed; and we're on low flow. Okay.

04 17 15 39 CDR-LM Do you know where this thing ends up?

04 17 15 41 LMP-LM Yes. ...

04 17 15 53 CDR-LM Okay. ...

04 17 16 03 CDR-LM PGA diverter valves to verter - valves to vertical. And repeat with thee.

04 17 16 10 LMP-LM Okay.

04 17 16 11 CC Ed, this is Houston - -

04 17 16 12	LMP-LM	- - ... right there.
04 17 16 14	CDR-LM	- - ... Okay.
04 17 16 16	CDR-LM	Go ahead, Houston.
04 17 16 17	CC	We'd like to ensure that you reset the MASTER ALARM from the WATER SEP, and we'd like you to verify which panel is in RELAY MODE, ON. Over.
04 17 16 28	LMP-LM	Your valve was loose. It came up - Stand by, Houston.
04 17 16 33	CDR-LM	Turn it on.
04 17 16 34	LMP-LM	Yes, but it - it hung up on the cover when it came up. It's still loose. Okay, that's - -
04 17 16 40	CDR-LM	Okay, the MASTER ALARM has been reset, Houston.
04 17 16 43	CC	Okay, Al. Which AUDIO panel has the RELAY switch ON? Over.
04 17 16 51	CDR-LM	CDR's.
04 17 16 52	CC	Roger. Out.
04 17 16 53	LMP-LM	... stay that way because we've got a problem over on that one. Oh, we do have two problems. The first one was right there. With that one, the second one was the other one with the computer.
04 17 17 06	CDR-LM	Okay.
04 17 17 16	LMP-LM	Okay.
04 17 17 17	CDR-LM	Ready, ... to connect these babies.
04 17 17 22	LMP-LM	Okay.
04 17 17 27	CDR-LM	... . (Yawn) Okay. Connect the OPS O_2 hose.
04 17 17 37	LMP-LM	Okay. OPS O_2.
04 17 17 39	CDR-LM	PGA, blue to blue.
04 17 17 48	CDR-LM	And, we have a purge valve. ..., locked and verify LO. LO? Okay.

04 17 17 58	LMP-LM	Got LO. Okay. See where ...?
04 17 18 13	CDR-LM	Okay?
04 17 18 14	LMP-LM	Okay.
04 17 18 16	LMP-LM	Okay, get your diverter VALVES vertical.
04 17 18 19	CDR-LM	There you are.
04 17 18 20	LMP-LM	Okay. Great.
04 17 18 23	CDR-LM	Push champagne!
04 17 18 33	CDR-LM	(Laughs) Yes. All right.
04 17 18 37	LMP-LM	I think they put champagne instead of iodine in the LM water this time. Okay. ...
04 17 18 50	CDR-LM	Okay. You can close the DESCENT WATER valve.
04 17 18 52	LMP-LM	Okay. DESCENT WATER valve, CLOSED.
04 17 19 04	CDR-LM	Okay. Right down here. Mikes are repositioned.
04 17 19 06	LMP-LM	Okay. PLSS -
04 17 19 08	CDR-LM	Fan, on.
04 17 19 10	LMP-LM	... get my helmet ... strap down. Tighter. That's it.
04 17 19 26	CDR-LM	Okay?
04 17 19 28	LMP-LM	Okay. PLSS fan, ON. Right vent flag - right vent flag, cleared.
04 17 19 39	CDR-LM	Right vent flag is cleared. Tone is stopped.
04 17 19 41	LMP-LM	Okay, my tone is stopped. Okay. Don helmets.
04 17 19 46	CDR-LM	Okay.
04 17 20 23	CDR-LM	Okay. You're locked. And the LEVAs. Is your drink bag positioned okay?
04 17 20 31	LMP-LM	... I get a mouth full of microphone, and I can't get a drink.

04 17 20 37 CDR-LM Hey, you'll just have to put up with it. ... Ah, you've got to put up with a few hardships.

04 17 20 41 LMP-LM Right, I don't mind at all.

04 17 20 48 CDR-LM Okay. I think that baby is about ready.

04 17 20 54 LMP-LM Okay, let's snap it on.

04 17 21 01 CDR-LM ... the drink port.

04 17 21 08 LMP-LM Okay. I'll let you check my back.

04 17 21 22 CDR-LM Houston, this is Al. Are you following us on the checklist, now?

04 17 21 26 CC That's affirmative, Al.

04 17 21 29 CDR-LM Okay.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 17 27 00 CMP Houston, how do you read Kitty Hawk?

04 17 27 03 CC Okay, Kitty Hawk; Houston. We got you loud and clear.

04 17 27 09 CMP Okay.

04 17 27 15 CC And, Stu, I guess we may as well start off with the P24 landmark tracking pad, there, on page 21. And, let me ask you a question here. If the - the hours are the same in all these T_1, T_2, TCAs, and T_3, how about just reading the hour on the T_1 and read minutes and seconds on the rest of them. Is that okay?

04 17 27 40 CMP That sounds like a great idea.

04 17 27 42 CC Okay. Good.

04 17 29 34 CC Kitty Hawk, Houston.

04 17 29 35 CMP Houston, how do you read Kitty Hawk?

04 17 29 37 CC Okay. Loud and clear there. Now, Stu, how about that POO and ACCEPT here, and we'll ship you a

state vector. And whenever you're ready to copy on the LM visual pad.

04 17 29 52 CMP — Okay. You have POO and ACCEPT, and I'm ready to copy.

04 17 29 54 CC — Okay. T_1, 114:43:27; 48:27, 49:57, 50:11; north 12 miles. Okay for your latitude - it'll be a minus 03.651; longitude over 2, minus 08.734. And you can make a little note down there for the site map. The coordinates - latest ones, are CQ 0.1 and 65.4, that's Charlie Quebec 0.1.

04 17 31 07 CMP — Okay. Copy 114:43:27, 48:27, 49:57, 50:11; north 12; latitude, minus 03.651; longitude over 2, minus 08.734, and, I guess, we'll call the altitude 000.76.

04 17 31 34 CC — That's affirm. And, Kitty Hawk; Houston, the computer is yours. And, Stu, I'm going to - -

04 17 31 48 CMP — Okay. The computer's mine and - Go ahead, Ron.

04 17 31 55 CC — Okay. If you want to take these down here, I'm going to give you some magazine - numbers here that I want to make sure we save. Since we're having a couple of problems here with our Hycon, we would like to save magazine Tango. That's the MBW film as a backup to magazine Papa. And the magazine Papa is the prime 500-millimeter magazine. And now, if you've already used something out of magazine Tango, we'd just like to know what percentages are still on the magazine, or what the frame numbers are?

04 17 32 49 CMP — That doesn't sound familiar. I'll have to go back through here and check it. The only ones I've used are those that we've listed here. So far, I've been following them right down the line.

04 17 33 01 CC — Okay. Sounds like we're in pretty good shape. I think magazine Tango is the one that - was - you know, opportunity-type photos.

04 17 33 13 CMP — Yes. I haven't taken any of those.

04 17 33 16 CC Okay. Real good. And just as a - a note, we're not sure - for sure yet, but we'll probably do a COAS pass on Descartes on REV 25. And then, when they get on around to the Hycon passes, we'll probably try to - to get that thing to work as we're going for REV 27 and whenever the other one is.

04 17 33 41 CC And, Stu, to keep you up to date on what's happening down there on the surface, they had a little bit of comm problems with the PLSSs and the relays and all those good-deal things like that. And they're running a little bit behind, but it looks like they'll make it out, probably in about 20 or 30 minutes.

04 17 36 12 CC And, Kitty Hawk; Houston. Do you remember - remember what the percentage of magazine left for the zodiacal light?

04 17 36 29 CMP Roger, Houston. I call that 72 percent.

04 17 36 35 CC Mighty fine, Stu. 72 percent.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 17 21 39 CDR-LM Okay, you're ready to go out and play in the snow.

04 17 21 44 LMP-LM Yes, it looks like my snow suit's ready.

04 17 21 48 CDR-LM Okay.

04 17 21 51 LMP-LM ... would do the same for you.

04 17 21 53 CDR-LM Okay.

04 17 21 58 LMP-LM You got your comm ... cable like you want it?

04 17 22 02 CDR-LM Yes.

04 17 22 26 CDR-LM Okay, helmets on.

04 17 22 28 LMP-LM Okay.

04 17 22 31 CDR-LM Bag's okay. Install the LEVA. (Singing)

04 17 23 07 LMP-LM Okay. Your LEVAs on?

04 17 23 08 CDR-LM Get the back.

04 17 23 09 LMP-LM I'll get the back in just a second.

04 17 23 13 CDR-LM I'll get this tucked down right there.

04 17 23 32 LMP-LM Okay. Let me look back there, Al. I'm afraid to trust it without looking. Okay.

04 17 23 41 CDR-LM Okay. The LEVAs are both on.

04 17 23 44 LMP-LM Okay.

04 17 23 45 CDR-LM The LCG is as required.

04 17 23 48 LMP-LM There's somewhere we missed something. You didn't go back and do that twice.

04 17 23 56 CDR-LM What? The OPS CONNECT?

04 17 24 01 LMP-LM Yes. We connected one, but we didn't recycle. Did we?

04 17 24 07 CDR-LM Yes, yes we did.

04 17 24 08 LMP-LM Then, you've still got some Irish pennants floating loose here.

04 17 24 12 CDR-LM This isn't installed yet.

04 17 24 14 LMP-LM It was installed a minute ago. Put it back on you.

04 17 24 31 LMP-LM Okay it's locked now. Must not have had it locked before. Oh - No, we triggered it when we were getting your ... on.

04 17 24 44 CDR-LM Okay. Yes, that's good. Okay.

04 17 24 53 LMP-LM Okay, we're ready to go LCG, cold to ...

04 17 24 57 CDR-LM No, leave the LCG.

04 17 25 00 LMP-LM Huh?

04 17 25 01 CDR-LM I disconnected, so let's leave that LCG control as it is.

04 17 25 05 LMP-LM Okay.

04 17 25 06 CDR-LM And we can open up the LCG PUMP circuit breaker on your circuit breaker panel. And - -

04 17 25 14 LMP-LM Okay, the CG PUMP is open.

04 17 25 16 CDR-LM Okay. You can take off your LM water hose.

04 17 25 23 LMP-LM And connect the PLSS water hose.

04 17 25 26 CDR-LM And get the umbilical out the way, also.

04 17 25 44 CDR-LM ... here to get this - Get this. ...

04 17 26 04 CDR-LM Okay, now, lean it forward a little bit, Ed. Okay. Hold it.

04 17 26 13 LMP-LM Okay.

04 17 26 14 CDR-LM Got it.

04 17 26 38 LMP-LM Okay.

04 17 26 40 CDR-LM Okay. ... water hose on?

04 17 26 44 LMP-LM Yes, they're all connected.

04 17 26 45 CDR-LM Okay. Let me read while you verify. Helmet and visor alined and adjusted.

04 17 26 51 LMP-LM Okay.

04 17 26 52 CDR-LM Torso tiedown.

04 17 26 57 LMP-LM Adjusted.

04 17 26 58 CDR-LM Three oxygen connectors locked.

04 17 27 01 LMP-LM Okay.

04 17 27 03 CDR-LM Three oxygen connectors locked.

04 17 27 06 LMP-LM Okay, two, three ... locked.

04 17 27 10 CDR-LM Okay. One purge valve locked.

04 17 27 12 LMP-LM Purge valve locked.

04 17 27 13 CDR-LM Check the water connector.

04 17 27 17 LMP-LM Locked.

04 17 27 18 CDR-LM Okay, and the comm connector.

04 17 27 22 LMP-LM It's locked.

04 17 27 23 CDR-LM Okay. Read for me.

04 17 27 24 LMP-LM Okay. Helmet and visor.

04 17 27 28 CDR-LM Okay, and the LEVA.

04 17 27 30 LMP-LM And, torso tiedown.

04 17 27 35 CDR-LM See all your flags?

04 17 27 37 LMP-LM Yes.

04 17 27 40 CDR-LM Okay, that's locked. Okay.

04 17 27 43 LMP-LM Okay, O_2 connectors.

04 17 27 44 CDR-LM One there, red; one there, blue; locked. One there, blue, locked. Okay.

04 17 27 49 LMP-LM Purge valve 1.

04 17 27 51 CDR-LM Purge valve on and locked.

04 17 27 52 LMP-LM Water connector.

04 17 27 54 CDR-LM Water connector is on and locked.

04 17 27 56 LMP-LM Comm connector.

04 17 27 58 CDR-LM Comm connector is on and locked.

04 17 28 04 LMP-LM Okay.

04 17 28 06 CDR-LM Okay, verify EVA circuit breaker configuration.

04 17 28 11 LMP-LM Okay, let's go circuit breakers.

04 17 28 28 CDR-LM In ...

04 17 29 18	LMP-LM	Okay, its - Breakers are configured here.
04 17 29 21	LMP-LM	Okay, I verify no fog on the right-hand window. You can tie the jettison bag.
04 17 30 10	LMP-LM	Yes. It's getting a little rough to move around.
04 17 30 14	CDR-LM	Okay.
04 17 30 15	LMP-LM	Okay, we can don the EV gloves.
04 17 32 55	LMP-LM	Okay. Verify your wrist locks and your glove straps. Oops, you're not on yet.
04 17 33 06	CDR-LM	Not quite.
04 17 33 12	LMP-LM	The strap.
04 17 33 14	CDR-LM	No, that's the arm rest.
04 17 33 21	LMP-LM	Okay, we'll get it in a minute.
04 17 33 34	CDR-LM	Okay. My gloves are on and straps are adjusted.
04 17 33 40	LMP-LM	Okay.
04 17 33 49	CDR-LM	Okay.
04 17 33 50	LMP-LM	Okay. Now, let's go; PLSS DIVERTER to MINIMUM.
04 17 34 00	CDR-LM	Okay. PLSS DIVERTER.
04 17 34 02	LMP-LM	Verify it's MINIMUM.
04 17 34 03	CDR-LM	MINIMUM.
04 17 34 04	LMP-LM	Turn your pump on - that's to the right.
04 17 34 07	CDR-LM	I'm coming on now. Okay, I can hear it running. Feel it getting cool. Press REGs A and B to EGRESS. Okay, ready for PLSS, mode 2, ON. PLSS, mode 2, ON. Okay, O_2 flag. And it's 0.
04 17 34 16	CDR-LM	Your pressure gage is coming up.
04 17 34 32	CDR-LM	Press flag clear, 3.2.

04 17 34 45	CDR-LM	O_2 flag clear, 3.7. Okay, are you ready for the 1-minute check?
04 17 34 56	CDR-LM	Am I reading you? Okay, try.
04 17 35 01	LMP-LM	Okay, do you read me, now?
04 17 35 02	CDR-LM	Yes.
04 17 35 03	LMP-LM	Okay. (Laughter) I was reading you.
04 17 35 07	CDR-LM	Yes. Okay. Okay, you ready to bring PLSS O_2 OFF?
04 17 35 14	LMP-LM	Okay, where are we?
04 17 35 16	CDR-LM	We'll do it at 20. Coming off. Watch it - gage decay.
04 17 35 24	LMP-LM	Okay. My O_2 is off.
04 17 36 20	CDR-LM	Okay, Houston, we're 1 minute. Both suits are tight. PLSS O_2 is going back on, and we're standing by for CABIN DEPRESS.
04 17 36 32	CC	Roger. Stand by, Antares.
04 17 36 39	CC	Antares, this is Houston. You are GO for CABIN DEPRESS. Be sure and give us a mark when you start your watch, at the second DEPRESS.
04 17 36 49	CDR-LM	Okay. Okay. Circuit breaker CABIN REPRESS, open.
04 17 36 56	LMP-LM	It's - open now.
04 17 37 01	CDR-LM	CABIN REPRESS valve, closed.
04 17 37 10	LMP-LM	Closed now.
04 17 37 11	CDR-LM	Okay. And let's check the -
04 17 37 22	LMP-LM	No, let's get the overhead. I think it would be easier, don't you?
04 17 37 25	CDR-LM	I can get the forward one.
04 17 37 28	LMP-LM	Okay.

04 17 37 29	CDR-LM	I'll go down and get that. Let me know when it's 3.5.
04 17 37 39	LMP-LM	Okay. I think I'm going to be in your way.
04 17 37 46	CDR-LM	No, I'm all right.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 17 37 45	LMP-LM	Okay. Drop her on down.
04 17 37 47	CDR-LM	Good. Good.
04 17 37 52	LMP-LM	... get the latch out of the way?
04 17 37 55	CDR-LM	I - There we go. Here we come.
04 17 38 05	LMP-LM	Okay. Down through 4.5. Through 4.
04 17 38 12	CDR-LM	Okay, 3.5.
04 17 38 13	LMP-LM	Not quite, bring her on down. There's 3.5 and holding.
04 17 38 23	LMP-LM	Okay.
04 17 38 26	CDR-LM	I've got 4.9.
04 17 38 29	LMP-LM	4.85 and holding.
04 17 38 31	CDR-LM	Okay.
04 17 38 32	LMP-LM	Okay. Cabin's at 3.5.
04 17 38 35	CDR-LM	CABIN SUIT CIRCUIT.
04 17 38 36	LMP-LM	Is at 4.5.
04 17 38 39	CDR-LM	Okay.
04 17 38 40	LMP-LM	PGA is 4.8 and coming on down. Houston, we are ready to start our watches.
04 17 38 55	CC	Roger. Give us a mark.
04 17 38 53	LMP-LM	Okay; 3, 2, 1 -
04 17 38 56	LMP-LM	MARK it. We're off and running. Time zero.
04 17 39 00	CDR-LM	Okay. Over here - let's see, FORWARD DUMP VALVE, OPEN, now.
04 17 39 05	LMP-LM	Okay. ...
04 17 39 33	CDR-LM	Turn on water flag A.

04 17 39 35	LMP-LM	Water flag A.
04 17 39 41	CDR-LM	Nine pounds pressure. ... cabin; 0.65 on the cabin. ... half a pound in the cabin. You might be able to get the door open partly.
04 17 40 06	LMP-LM	Yes. Better let her drop a little more. It's a pretty heavy pull there.
04 17 40 17	CDR-LM	You got a lot of surface area on that hatch.
04 17 40 22	LMP-LM	Yes. Okay, there's a quarter of a pound.
04 17 40 27	CDR-LM	Still tight, huh? Let her drop - Let her drop.
04 17 40 38	CDR-LM	Okay. It should be almost zero now.
04 17 40 44	CC	Okay, we're showing 1/10th of a pound right now.
04 17 40 51	LMP-LM	There it comes. Okay. Final PREP. PLSS feed - PLSS feedwater.
04 17 41 05	CDR-LM	Would you hold it for me, please?
04 17 41 06	LMP-LM	Yes, I got it.
04 17 41 08	CDR-LM	Thank you.
04 17 41 09	LMP-LM	Okay, - -
04 17 41 10	CDR-LM	I can get it now.
04 17 41 12	LMP-LM	Straighten up.
04 17 41 13	CDR-LM	That's silly. If I'm - There we go.
04 17 41 15	LMP-LM	Okay. PLSS feedwater, open.
04 17 41 29	LMP-LM	Okay. We're waiting for the water flag.
04 17 43 39	CDR-LM	... Don't have the PREAMP and ECS caution lights.
04 17 43 44	LMP-LM	No, they're on.
04 17 43 46	CDR-LM	Are they?
04 17 43 47	LMP-LM	Yes.

04 17 43 48	CDR-LM	Oh, I see. You've got them on dim. Okay. Just barely see them over there.
04 17 43 54	LMP-LM	Okay. Getting a water flag clear here in a minute.
04 17 44 05	LMP-LM	Okay my PGA is getting down to about usable pressure of 4.3 now. What's your now?
04 17 44 13	CDR-LM	Okay. Reading 4.2.
04 17 44 15	LMP-LM	We will be able to work in a minute. Okay. The present warning status is good. We have a WATER SEP light, PREAMPS, ECS.
04 17 44 50	CC	Ed, this is Houston. We're showing your feedwater pressure going up. You ought to be in business shortly.
04 17 44 57	LMP-LM	Roger. Water pressure - water flag just cleared. That's great.
04 17 45 08	CDR-LM	How's your reading?
04 17 45 11	LMP-LM	Pressure is up. Your water flag about clear?
04 17 45 13	CDR-LM	Don't know -
04 17 45 14	CC	Al's pressure is rising now; it ought to clear momentarily.
04 17 45 20	LMP-LM	Okay, Al's water flag is clear.
04 17 45 21	CDR-LM	Okay.
04 17 45 22	CC	Beautiful.
04 17 45 33	CDR-LM	Okay.
04 17 45 35	LMP-LM	Okay. LIGHTING ANNUNCIATOR to DIM.
04 17 45 39	CDR-LM	Okay. DIM. Stop the DET.
04 17 45 42	LMP-LM	All right, DET is stopped.
04 17 45 45	CDR-LM	Okay.
04 17 45 46	LMP-LM	Forward hatch the rest of the way open.

04 17 45 49	CDR-LM	All righty.
04 17 45 52	LMP-LM	Two REG monitor. Okay. Forward hatch is OPEN. Lower your visor.
04 17 46 03	LMP-LM	Let me get a ...
04 17 46 05	CDR-LM	Yes. Let me - -
04 17 46 09	LMP-LM	That's fine. Can you reach everything now?
04 17 46 15	CDR-LM	Okay.
04 17 46 17	LMP-LM	Stay right there. I'm going to help you.
04 17 46 28	CDR-LM	We're all the way now. ... Okay, very good.
04 17 46 32	LMP-LM	I'll get your antenna as you go out.
04 17 46 35	CDR-LM	All righty. Starting out the door.
04 17 46 52	LMP-LM	Get your PLSS down a little; roll toward me.
04 17 46 57	CDR-LM	Okay, coming on over.
04 17 46 58	LMP-LM	Okay, there you go. Now you're clear. Your head down as soon as you can. Back right on out. That's great. Wait a minute, let me get your antenna; hold it.
04 17 47 09	CDR-LM	Okay.
04 17 47 10	LMP-LM	You'll have to get mine when I come out.
04 17 47 13	CDR-LM	Okay.
04 17 47 15	LMP-LM	You're clear. Go on out.
04 17 47 25	CDR-EVA	Okay, clear of the hatch. Give me the jettison bag.
04 17 47 34	LMP-LM	Roger. Let me get over here on the other side so I can get to it.
04 17 47 48	LMP-LM	Oops.
04 17 48 07	LMP-LM	I'm hung up on something, Al.

04 17 48 19 CDR-EVA Probably that - -

04 17 48 21 LMP-LM It's the door handle. I got it loose now.

04 17 48 23 CDR-EVA Okay, very good.

04 17 48 35 LMP-LM Okay, jettison bag coming at you.

04 17 48 38 CDR-EVA Okay. Okay, I've got it now. Standing by for the LEC.

04 17 48 50 LMP-LM Okay.

04 17 49 43 CDR-EVA Okay, Houston. While he's working on the LEC, let me comment that it certainly is a stark place here at Fra Mauro. I think it's made all the more stark by the fact that the sky is completely black.

04 17 50 01 CC Roger.

04 17 50 11 CDR-EVA Okay, I have the conveyor now. Have the bag. And it's deployed. And standing by to deploy the MESA. And the MESA has released - MESA has released properly, Houston.

04 17 50 50 CC Roger, Al.

04 17 50 51 CDR-EVA Starting down the ladder.

04 17 50 52 CC Roger.

04 17 51 10 CC Okay, Al; beautiful. We can see you coming down the ladder right now. It looks like you're about on the bottom step. And on the surface. Not bad for an old man.

04 17 51 26 CDR-EVA Okay, you're right. Al is on the surface. And it's been a long way, but we're here. And I can see the reason we have a tilt is because we landed on the slope. The landing gear struts appear to be about evenly depressed.

04 17 51 51 CC Roger; out.

04 17 51 52 CDR-EVA I'm moving around, getting familiar - getting familiar with the surface. The surface on which the forward footpad landed is extremely soft. As a matter of fact, it's in a small depression.

The - the soil is so soft that it comes all the way to the top of the footpad; it even folded over the sides to some degree. The same is true of the plus-Y strut.

04 17 52 26 CC Roger.

04 17 52 32 CDR-EVA Okay, we'll move on over. Take a look at Fra Mauro. I - take a look at Cone Crater, I should say, which is right where it should be, and is a very impressive sight. You can see - -

04 17 52 53 CC Antares, this is Houston. You are GO for two-man EVA. Over.

04 17 53 01 LMP-LM Roger, Houston. Thank you.

04 17 53 06 CDR-EVA And, continuing, we can see the boulders on the rim. It looks as though we have a good traverse route up to the top of Cone. I can see Cone Ridge going on to the north. That's very apparent.

04 17 53 36 CDR-EVA I'm moving over to adjust the MESA.

04 17 53 40 CC Roger, Al.

04 17 54 04 LMP-LM And, Houston. I'm finishing up my circuit breaker check. Will be ready to go out shortly.

04 17 54 08 CC Roger, Ed.

04 17 54 14 CDR-EVA Okay, the MESA is adjusted. Going over to remove the MET blanket.

04 17 54 37 LMP-LM Okay, Al. I'm starting out.

04 17 54 40 CDR-EVA Okay.

04 17 55 44 CC Okay, Ed. We can see you coming down the ladder, now.

04 17 55 54 LMP-EVA And it's very great to be coming down.

04 17 55 56 CC Roger. Bottom step.

04 17 56 08 LMP-EVA That last one is a long one.

04 17 56 19 LMP-EVA Ascent check. Very easy to do. A little push and just spring right up.

04 17 56 26	CC	I guess we got there with those lightweight units.
04 17 56 31	LMP-EVA	Yes. Sure glad they did, too. That's great.
04 17 56 45	CC	Al, this is Houston. Have you released the MET, yet? Over.
04 17 56 53	LMP-EVA	He's releasing it now.
04 17 57 02	CDR-EVA	Okay, Houston. The MET is finally clear of the MESA.
04 17 57 06	LMP-EVA	Al, I'm going to come over. How about getting my antenna out before I lose comm here in 2 minute - -
04 17 57 11	CDR-EVA	Okay.
04 17 57 12	LMP-EVA	- - if I go around the corner or something.
04 17 57 14	CDR-EVA	Okay. If we just drop this baby over here.
04 17 57 16	LMP-EVA	Okay.
04 17 57 35	LMP-EVA	It is bright up-Sun, isn't it?
04 17 57 37	CDR-EVA	Okay. If you'll stop here a minute, I'll get your antenna out. Stand by 1. Okay, you're now deployed. Okay.
04 17 57 59	LMP-EVA	Thank you.
04 17 58 01	CDR-EVA	Okay, Houston, the MESA has been stowed on the plus-Y footpad.
04 17 58 06	CC	Roger. Out.
04 17 58 13	CDR-EVA	And going back to adjust the MESA.
04 17 58 25	LMP-EVA	Mobility is - very great under this crushing one-sixth-g load, Houston.
04 17 58 36	CC	Roger.
04 17 58 46	LMP-EVA	And looking at Cone Crater, where Al was looking a short time ago, it doesn't appear there is going to be any trouble getting the MET up Cone Crater.

04 17 59 00	CC	The backup crew copies.
04 17 59 02	CDR-EVA	We knew the troops would - -
04 17 59 06	LMP-EVA	I knew they would.
04 17 59 08	CDR-EVA	We knew the troops on the ground would be glad to hear that.
04 17 59 19	CC	Okay. And here comes the LM's ...
04 17 59 20	CDR-EVA	The MESA blanket is coming off here. You'll lose - -
04 17 59 23	CC	Roger. MESA blanket.
04 17 59 24	CDR-EVA	- - You'll lose television for a moment.
04 17 59 31	LMP-EVA	Okay. That's beautiful.
04 17 59 48	LMP-EVA	Okay, señor.
04 18 00 01	LMP-EVA	Let me give you a hand, and we'll get it done.
04 18 00 10	LMP-EVA	Okay.
04 18 00 26	LMP-EVA	Put this back on?
04 18 00 29	CDR-EVA	Ed, ...
04 18 00 33	LMP-EVA	Great.
04 18 00 38	CDR-EVA	Okay, the lens cap is going on now, Houston. We set up the tripod - -
04 18 00 44	CC	Antares, this is Houston. Request EMU status check here.
04 18 00 54	LMP-EVA	Okay, Houston. LMP is 3.75 psi; reading 85 percent; all flags GO.
04 18 01 09	CC	Roger. MIN cooling.
04 18 01 12	LMP-EVA	MIN cooling.
04 18 01 13	CDR-EVA	MIN cooling.
04 18 01 16	CC	Go ahead, Al.

04 18 01 17 CDR-EVA Okay, CDR here is 81 percent. CDR is 81 percent, 3.75, no flags, MIN cooling.

04 18 01 28 CC Roger. Out. You're looking good down here.

04 18 01 39 LMP-EVA Houston. While Al's getting that television, I'll go ahead and get my contingency sample; get it out of the way.

04 18 01 52 CC Roger, Ed.

04 18 02 46 LMP-EVA Houston. The contingency sample is being taken about 25 feet to the - in the 0100 position of the LM, adjacent to a - about a 5-foot crater. I'll identify it for you later.

04 18 03 08 CC Roger, out.

04 18 03 59 CDR-EVA Do you want to watch the cable as I go out, Ed? Carry it?

04 18 04 09 CC Al, this is Houston. Would you verify the lens is still capped. Over.

04 18 04 20 CDR-EVA That's affirmative.

04 18 04 21 CC Roger.

04 18 04 40 LMP-EVA Keep going.

04 18 04 42 CDR-EVA Okay. It's about 50 feet, I'd say.

04 18 04 46 LMP-EVA Why don't we get all the cable out while we're at it?

04 18 04 49 CDR-EVA Okay. Go ahead and pull it in. I'll - -

04 18 04 51 LMP-EVA Okay. Let me get this contingency sample folded up.

04 18 05 25 CDR-EVA Okay, Houston, the lens cap is off. We're aiming for the general area of MESA.

04 18 05 42 LMP-EVA Al, could you pull the rest of this cable out away from the MESA here. We get - -

04 18 05 46 CDR-EVA Yes. You've got about 30-foot zoom. How does that look?

04 18 05 50	CC	Okay. I think you can zoom in a little more. Let's try 40 here.
04 18 06 02	CC	Okay. And on the f-stop, Al, we'd like to stop it down one additional stop. That's toward the higher numbers.
04 18 06 12	CDR-EVA	Okay. It's going from 22 to 44, and I'll zoom it to 40. Stand by.
04 18 06 23	CC	Okay. Hold the zoom there, and the position looks good, also.
04 18 06 31	CDR-EVA	Okay, how about the f-stop?
04 18 06 48	CDR-EVA	Is the f-stop satisfactory, Houston?
04 18 06 50	CC	Al, this is Houston. See if you can stop it down a little more. Run it up - run the diaphragm ring up against the stop, there. It's still a little bright.
04 18 07 07	CDR-EVA	Okay. It's right up against the stop.
04 18 07 17	CDR-EVA	It's against the stop, Houston.
04 18 07 18	CC	Roger. Stand by. Al, this is Houston. Request you go to peak control.
04 18 07 39	CDR-EVA	Okay. Going to peak. Satisfactory?
04 18 07 57	CC	Okay, Al. Now, we'd like to open it up to f/22.
04 18 08 06	CDR-EVA	Okay, this is the next adjustment to f/22. There you go.
04 18 08 14	CC	Roger.
04 18 08 47	CC	Al, this is Houston. Would you confirm that you're at f/22 now?
04 18 08 54	CDR-EVA	Okay, I'm confirming that I'm in peak and I'm at f/22.
04 18 09 26	CDR-EVA	And while we're waiting for the television adjustment, the 2:30 position approximately 50 feet where the camera is, is slightly uphill. We see that the LM did, in fact, land - sort of a - on the downslope - -

04 18 09 43	CC	Al, this is Houston - -
04 18 09 44	CDR-EVA	- - It seems to be - almost a basin. Go ahead.
04 18 09 48	CC	Roger, Al; this is Houston. We'd like to go back to average and f/44; stop it down all the way, and then leave it there.
04 18 09 57	CDR-EVA	Okay, this is the last adjustment, f/44.
04 18 10 04	CC	Roger, and back to zoom, out to about 35.
04 18 10 07	CDR-EVA	And going - and going to average. And back to zoom, out to 35. And how does that look?
04 18 10 19	CC	Beautiful.
04 18 10 24	CDR-EVA	Okay, pressing on the S-band antenna.
04 18 10 29	CC	Roger; press.
04 18 10 31	CDR-EVA	Again continuing - continuing; the soil is very fine here. Very fine grain, and as we mentioned before there is - there are very few samples that - of any size at all. Mostly hand-sample size and a box of generally under 2 inches or less.
04 18 11 05	LMP-EVA	Roger. Houston, as you can see, the SRC table is deployed. BB is emptied and I'm putting LiOH canisters in it now.
04 18 11 20	CC	Roger, Ed. And you did leave the contingency sample on the ladder?
04 18 11 26	LMP-EVA	That's affirmative. That's where it is.
04 18 11 32	CDR-EVA	Houston, it looks as though we've landed in a fairly rough place.
04 18 11 36	LMP-EVA	Yes; indeed it does. Evidenced by the fact that you put your front landing gear in a hole.
04 18 12 07	LMP-EVA	Okay, Houston. I have the SWC out and setting up to deploy it.
04 18 12 13	CC	Roger, Ed.
04 18 12 22	LMP-EVA	Am I still in your field of view, Houston?

04 18 12 24 CC That's affirmative.

04 18 12 28 LMP-EVA Okay.

04 18 12 42 CDR-EVA Okay, Al's bringing the S-band antenna around.

04 18 12 46 CC Roger, Al; we're watching you.

04 18 12 47 CDR-EVA Positioning.

04 18 13 41 LMP-EVA And, Houston. The SWC's in place.

04 18 13 44 CC Roger, Ed. That's 114 plus 53 plus 48 GET. SWC.

04 18 13 54 LMP-EVA Okay.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 17 40 08 CC Kitty Hawk, Houston.

04 17 40 13 CMP Go, Houston.

04 17 40 15 CC Okay, we've got a good tape dump, and you can proceed to the LM visual attitude at your convenience.

04 17 40 26 CMP Okay. Thank you.

04 17 51 39 CC Kitty Hawk, Houston. Big Al's on the surface.

04 17 54 32 CC Kitty Hawk, Houston.

04 17 54 40 CC And Kitty Hawk, Houston. Kind of translating in the blind. Ed's out on the surface now with Al. And I think we got a good uplink, but downlink is pretty weak. So, don't answer if you can't read anything.

04 18 00 58 CMP Houston, Kitty Hawk.

04 18 01 24 CC Kitty Hawk, Houston. You're very weak. Say again.

04 18 01 52 CC Kitty Hawk, Houston. In the blind, about 30 seconds from T_1 time.

04 18 02 03 CMP Houston, are you calling Kitty Hawk?

04 18 02 06	CC	Hey, by golly; I read you, Stu. Yes, you are coming up T_1 time.
04 18 03 45	CMP	You are unreadable. Pick another comm track ...
04 18 19 38	CC	Kitty Hawk, Houston.
04 18 19 43	CMP	Go ahead, Houston; Kitty Hawk.
04 18 19 45	CC	Okay, Stu. I've got a bunch of P24 pads here, if you're ready to start copying. Starting on page 22 with RP-2.
04 18 19 54	CMP	Okay, just a word about the - Okay, before you start those, I got a track on the - on the LM. I noticed as I came back up, the - the tape motion had gone barber pole, though; I hope it was running. I checked it just before I started marking. Or maybe you stopped it. I don't know. But I would put the LM on those coordinates at Charlie Quebec 0.0 and 65.1.
04 18 20 31	CC	And you saw the LM at Charlie Quebec 0.0 and 65.1. Is that correct?
04 18 20 38	CMP	Yes, that's where I - I would put it on the map. It looks like that's where I was tracking it. It looked like it was just a little - you know, you'd - you'd plotted it down just off the edge of that old crater in Triplet, and I've got it over on the other side of it.
04 18 20 59	CC	Okay.
04 18 21 13	CC	I guess you got the word - they're out on the surface now - don't you?
04 18 21 19	CMP	I heard Bruce talk something about the contingency sample, so I figured they made it.
04 18 21 29	CC	Okay. And, if you are ready to copy here, we'll press on with some of these P24 pads.
04 18 21 37	CMP	Okay, I'm ready to go.
04 18 21 39	CC	Okay, in RP-2: T_1, 115:49:34; 54:24, 56:04, 56:52; north 08.

04 18 22 16	CMP	Okay, I got that.
04 18 22 18	CC	Okay; and the 12-1: T_1, 115:59:16; T_2 is 116:04:06, 05:46, 06:34; north 32. And let's go on over to the map update next.
04 18 22 58	CMP	Okay.
04 18 23 00	CC	Okay. LOS and AOS are changes. I'll read them all. LOS, 115:18:05; 115:43:01; 116:04:23. Okay, let's switch to page 23 and Dollond - -
04 18 23 28	CMP	... 115 - Okay. I'm ready for Dollond.
04 18 23 34	CC	Okay. T_1: 116:30:45; 35:35, 37:15, 38:03; north 15. And push to the next page for FM-1.
04 18 24 12	CMP	Go ahead.
04 18 24 14	CC	T_1, 116:41:46; 46:36, 48:16, 49:04; north 23. Over.
04 18 24 42	CMP	Okay. I'll go back to RP-2.
04 18 24 47	CC	Okay. Go.
04 18 24 55	CMP	Okay. 115:49:34; 54:24, 56:04, 56:52; north 08. 12-1: 115:59:16; 116:04:06, 05:46, 06:34; north 32. Map update REV 18: 115:18:05; 115:43:01; 116:04:23. Dollond E: 116:30:45, 35:35, 37:15, 38:03; north 15. Are you still with me?
04 18 24 58	CC	Okay. Your readback is correct, so far.
04 18 25 17	CMP	Okay. Are you with me, Ron?
04 18 25 20	CC	I missed your readback on FM-1, Stu.
04 18 25 27	CMP	Okay. FM-1: 116:41:46, 46:36, 48:16, 49:04; north 23.
04 18 25 40	CC	Okay. Your readback is correct. And I've got a preliminary TEI 34 pad for your update book.
04 18 27 04	CMP	Okay. I'm ready to copy.

04 18 27 06	CC	Okay. This is preliminary. TEI-34, SPS/G&N; 34930; minus 0.71, minus 0.02; 149:15:34.58; plus 3018.2, plus 1649.1, minus 0283.4; 181, 108, 029; NA; plus 0019.0. Okay. Your DELTA-V total, 3451.0, 2:25, 3426.9. Sextant star 11, 125.3, 22.7; NA on the bore site. Skip down to NOUN 61, minus 27.03, minus 171.50; 1160.8, 36251; 216:23:32. Okay. Your GDC aline, Sirius and Rigel, 130, 129, 018. Ullage, four jets, 12 seconds. Okay. Your notes, number 1, the longitude at T_{ig} equals plus 178.69. Note 2, assumed plane change and lift-off REFSMMAT. Note 3, with TEI REFSMMAT, roll, 180; pitch, 0; yaw, 0. And ready for readback.
04 18 30 48	CMP	Okay. Before I start, give me DELTA-V total again, please ...
04 18 30 55	CC	Kitty Hawk, Houston. I can't read you now. Maybe it'll get better here in the next 7 minutes before all of that. But too much background noise.
04 18 31 10	CMP	Okay. Could you read me DELTA-V total, please?
04 18 31 15	CC	Okay. Stu, your DELTA-V total was 3451.0.
04 18 31 38	CMP	Okay. ...
04 18 31 48	CC	Kitty Hawk, Houston. Skip the readback now. I can't read you.
04 18 36 08	CC	Kitty Hawk, Houston. In the blind here. You want to try OMNI Charlie? We've got about a minute and a half to LOS now.
04 18 37 34	CC	Stu, Houston. In the blind. About 30 seconds to LOS here. We'll pick you up on the other side.
04 18 37 43	CMP	Okay.
04 18 37 45	CC	Beautiful answer that time, anyhow. I heard that.
04 18 37 52	CMP	I guess when I don't have much to say, I'm coming in loud and clear, huh?
04 18 37 56	CC	Yes. That's right.
04 19 02 --		BEGIN LUNAR REV 18

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 18 14 47 LMP-EVA And, Houston, the LR cubed is coming off.

04 18 14 50 CC Roger, Ed.

04 18 15 58 CC Al, this is Houston. If you would, give us the commentary on how the legs go into the surface.

04 18 16 10 CDR-EVA Okay, the legs are in the surface approximately 1 inch, I would say. Due to the - fairly equal all the way around - perhaps the legs of the last is in an inch and a half.

04 18 16 41 CC Roger. We were driving more at force penetration. And did you meet any rocks or anything like that?

04 18 16 51 CDR-EVA I didn't attempt to run any kind of an experiment - -

04 18 16 54 CC Roger, I copy.

04 18 16 55 CDR-EVA - - forcing the legs down. I just - just -

04 18 17 19 LMP-EVA Here comes the S-band antenna cable.

04 18 17 25 CC Looks more like a kangaroo.

04 18 17 27 LMP-EVA Al, you're too far away. It should have more cable than that. It's hung up.

04 18 17 43 CDR-EVA Okay. How are we in respect to the cable.

04 18 17 47 LMP-EVA I'm afraid you're too far away.

04 18 17 51 CDR-EVA Well, go on to get maximum length for moving on in.

04 18 17 55 LMP-EVA That's better. Let's see. Yes, I want to do that, too.

04 18 18 03 LMP-EVA This is all I've got, Al.

04 18 18 04 CDR-EVA Okay, we'll bring it in.

04 18 18 17 LMP-EVA Right over here. Right about in here anywhere will probably do it.

04 18 18 22 CDR-EVA We ought to put it right here to get it level.

04 18 18 24 LMP-EVA Okay.

04 18 18 30 CDR-EVA Okay. Can you reach that?

04 18 18 31 LMP-EVA Oh, yes.

04 18 18 33 CDR-EVA Okay. If you want to stand clear, we'll deploy the antenna.

04 18 18 38 LMP-EVA Let her rip.

04 18 18 45 CDR-EVA Okay, here we go.

04 18 18 53 LMP-EVA It's hung up at the top.

04 18 18 54 CDR-EVA Base?

04 18 18 55 LMP-EVA Yes. If you'll tilt it over toward me without dropping it, I'll get it unhung for you.

04 18 19 01 CDR-EVA All righty. Ready for it?

04 18 19 09 LMP-EVA Get it lower on down.

04 18 19 10 CDR-EVA Okay.

04 18 19 13 LMP-EVA Keep coming. Okay, set her up.

04 18 19 17 CDR-EVA Okay. All kinds of freebies in today's simulations.

04 18 19 27 CC Roger. We got the boys in the backroom working overtime.

04 18 19 31 CDR-EVA Sure have.

04 18 19 45 LMP-EVA Okay.

04 18 19 59 LMP-EVA Sure you got it?

04 18 20 04 CDR-EVA Appears to be.

04 18 20 06 LMP-EVA Okay.

04 18 20 34 LMP-EVA There is Earth way up there.

04 18 20 40 CDR-EVA Hey. How does that look ... - -

04 18 20 42 LMP-EVA Looks like it's getting close. Let me get on the glass.

04 18 20 45 CDR-EVA Very good. Turn it to the left a little more.

04 18 20 54 LMP-EVA Have to wait on it because that changes the whole deal.

04 18 21 04 CDR-EVA That's about it. ...

04 18 21 07 LMP-EVA Okay. I don't see it, Al.

04 18 21 08 CDR-EVA I'll just put it back down again.

04 18 21 14 CDR-EVA Okay.

04 18 21 16 LMP-EVA Okay. I think my PLSS - my OPS is hitting it.

04 18 21 19 CDR-EVA All right, just a second. Let me back it off a minute. And move this a little bit.

04 18 21 31 CDR-EVA Okay, that's about it for azimuth. I'll come down a little bit.

04 18 21 34 LMP-EVA Okay.

04 18 21 36 CDR-EVA Let me just check through and see if that's the way we want to go.

04 18 21 46 CDR-EVA ...

04 18 21 47 LMP-EVA Okay.

04 18 21 49 CDR-EVA Okay, coming down a little bit.

04 18 21 50 LMP-EVA Coming down.

04 18 21 56 CDR-EVA Hold it.

04 18 21 57 LMP-EVA Back up just a bit. Right there. Okay, I have the Earth centered.

04 18 22 05 CDR-EVA Okay.

04 18 22 08 LMP-EVA Okay, Houston. Boresighted the - the Earth, dark side and all.

04 18 22 14	CC	This is Houston. Roger.
04 18 22 16	LMP-EVA	Okay. The S-band antenna has been erected and alined and the cable has been attached and I'll go back into the switch.
04 18 22 28	CC	Roger, Ed.
04 18 22 30	LMP-EVA	Okay.
04 18 22 34	CC	And we'd like to get an EMU status report as you go by.
04 18 22 41	CDR-EVA	Okay. The CDR's reading 3.75. Reading 76 on the O_2. I have no flags; I'm still in minimum flow; and I'm comfortable.
04 18 22 56	LMP-EVA	Okay, and this is Ed. I'm reading 3.75, about 75 percent in the O_2, no flag, minimum cooling, and I'm very comfortable, too.
04 18 23 09	CC	Roger. Out.
04 18 23 27	CC	And, I guess - contingency sample into the ETB.
04 18 23 34	LMP-EVA	Okay.
04 18 24 03	LMP-EVA	Hey, Bruce. Is any appreciable dust flying off these boots? I'd like not to take all that dirt in there.
04 18 24 10	CC	I didn't notice any on the TV.
04 18 24 15	LMP-EVA	Good.
04 18 24 47	LMP-EVA	And, Houston, I'm back in the LM.
04 18 24 50	CC	Roger, Ed.
04 18 24 51	LMP-EVA	Without a great deal of problem. I'm getting ready to switch to LUNAR STAY. Give me a call, and, if I don't hear you in about 30 seconds, we will go back.
04 18 25 04	CC	Ed, this is Houston. You're GO to switch to LUNAR STAY. Go ahead.

04 18 25 19 LMP-EVA And, Houston; this is Ed. How do you read?

04 18 25 22 CC Loud and clear, Ed.

04 18 25 26 LMP-EVA Okay, you're on the erectable antenna.

04 18 25 28 CC Roger. And how are you reading us?

04 18 25 33 LMP-EVA Loud and clear.

04 18 25 35 CC Beautiful.

04 18 25 41 LMP-EVA Okay, Alan. I'm ready for the ETB most anytime.

04 18 25 45 CDR-EVA Okay. Take it on up. It's ready for you.

04 18 25 59 CC And did the contingency sample get in there?

04 18 26 04 CDR-EVA That's affirmative.

04 18 26 09 LMP-EVA Wouldn't never do for us to leave that one behind, Bruce.

04 18 26 27 CDR-EVA Okay. Well, Bruce is loading up the ETB.

04 18 26 34 LMP-EVA Who?

04 18 26 35 CC Don't I wish it - -

04 18 26 36 CDR-EVA Ed is loading up the ETB. While Ed is loading up the ETB, I'll sort of describe the general landing site. We are, in fact, in a - in a low area. There seems to be a general swale or a wide valley between the Triplet Craters and the Doublet Craters. And we are on the downhill side at this particular point. It levels off at a lower elevation to the left of the LM, approximately 15 feet lower there, and then it starts back up to the rim of Doublet. It's a very uneven landing area here. And, of course, like all of the sections of the Moon, it's pockmarked by a - enormous amount of craters. The surface here, as we pointed out, is mostly fines and I hate to discuss any kind of lineations here in the immediate vicinity of the LM, because I can see very definite indications of the radial dust pattern caused by the descent engine. And *** any other lineal pattern, as such, right here in the area.

04 18 28 11 CDR-EVA There are perhaps half a dozen very large rocks at the 1 o'clock position from the LM. But perhaps they're ejected from Cone, although they don't seem to have any particular ray pattern. They probably are ejected from Doublet, because they appear to be closer to Doublet than they do Triplet. They are a lighter gray in material - excuse me - the material is lighter gray in color and I'm certain that we'll get some of those samples on the way back from our ALSEP deployment. It's very difficult to assess any kind of stratigraphy in Cone right now, looking back at it, because we're looking into the Sun at a low Sun angle, and it's just not the right direction to view that crater when looking for stratigraphy. But there certainly are boulders on it. From here, it looks as though they are at least 20 feet in diameter perhaps, at least the ones we can see here in the western slope. They appear to be grouped fairly close to the rim of the crater and not too many large boulders on down the sides of the slopes, the outside rim. Then again, it looks as though the band was traveling slowly forward and slowly to the right. As you'll see from the photographs, that's the direction of the landing gear probes, as they are bent. The footpad plus-Y, for example, has a drag pattern of approximately 1 foot in the dust.

04 18 30 46 CDR-EVA Okay, Ed, how're you up there?

04 18 30 48 LMP-EVA Okay, Al. I've got it loaded. I'm about ready to start down with it now.

04 18 30 52 CDR-EVA Okay.

04 18 30 53 LMP-EVA Just another minute. I have - the IFA came loose from its straps and is being a great major headache.

04 18 31 10 CC Okay, Ed. Before you start transferring, you want to verify contents in the ETB.

04 18 31 17 LMP-EVA Okay, let me give you a call on them, Bruce. I put in one black-and-white camera, a television camera, two Hasselblads, one TDS, two 16-millimeter - millimeter MAGs, and two maps.

04 18 31 36 CC Roger. Did you get the 16-millimeter camera with MAG attached?

04 18 31 47 LMP-EVA No. Thank you. Guess we kind of need that one.

04 18 31 56 CDR-EVA Yes, that's the one that's supposed to photograph you coming down the ladder.

04 18 32 01 LMP-EVA Oh, oh; all of the contingency - the disposal containers just fell out on the floor. Just a minute. Get the camera.

04 18 32 34 CDR-EVA Okay, Houston. With respect to the erosion pattern, directly into the engine valve, there is very little erosion. Most of the erosion occurs about 3 feet to the southeast of the location of the valve. That's probably where the thrust was when the engine was cut off. And the LM slowly drifted to the northwest from there.

04 18 33 30 CDR-EVA As perhaps you can see from your camera Houston, the view off to the south is an undulating hill. And I would estimate that hill back there to the south is, oh, perhaps 100 feet higher than we are.

04 18 33 54 CC Roger.

04 18 33 55 LMP-EVA Okay, Al. I am ready to bring this down.

04 18 33 56 CDR-EVA Okay.

04 18 34 03 LMP-EVA Wait a minute. Got it.

04 18 34 09 CDR-EVA Okay.

04 18 34 10 LMP-EVA Okay. Let her come gently.

04 18 34 13 CDR-EVA All righty.

04 18 34 28 LMP-EVA Okay.

04 18 34 31 CDR-EVA Okay, just a second here, we'll get a little more tension. Coming over the sill, put a little more tension, please. There you are. Okay, coming over the steps now. Okay. Prepare to step and I'll take it down slowly.

04 18 34 58 LMP-EVA Do you have it in hand?

04 18 35 00 CDR-EVA Negative. Just hold it right there for a minute. Okay, ease it down a couple of feet. Okay, I have it now. Thank you.

04 18 35 13 LMP-EVA And it is all yours.

04 18 35 14 CDR-EVA Very good. I've got it.

04 18 35 18 LMP-EVA All right. Coming out again.

04 18 35 22 CC Okay. We'll give Al a few seconds to get the camera - -

04 18 36 35 CDR-EVA Okay. Are you about ready?

04 18 36 36 LMP-EVA No. Stand by 1.

04 18 37 02 LMP-EVA Okay, one screw is coming off.

04 18 37 38 CDR-EVA Okay, come on down.

04 18 37 40 LMP-EVA Okay.

04 18 37 52 CC Okay. Give me a mark, Al, when you start using film.

04 18 37 58 CDR-EVA I just started using film now.

04 18 38 01 CC Roger. You on 24?

04 18 38 05 CDR-EVA 12.

04 18 38 07 CC Roger, 12.

04 18 38 12 LMP-EVA Okay. Let me close the hatch.

04 18 38 23 LMP-EVA But not too far.

04 18 38 42 LMP-EVA Tell me when I hit the bottom step.

04 18 38 44 CDR-EVA You're at the bottom step.

04 18 38 46 LMP-EVA I'm on it?

04 18 38 47 CDR-EVA Yes.

04 18 38 48 LMP-EVA Okay.

04 18 38 52 LMP-EVA I want to miss the LR cubed. Okay? And I'm down.

04 18 38 59 CDR-EVA Okay. Camera stopped, Houston.

04 18 39 00 CC Roger.

04 18 39 06 LMP-EVA Okay, up one flag.

04 18 39 10 CDR-EVA Okay, we're right on the time liner. Right to the minute.

04 18 39 27 LMP-EVA Okay, I'll take the camera while you get the flag set up. Okay. I'll go off to the left over there by the SWC. It will be on television.

04 18 39 41 CDR-EVA It will be the best place, I guess.

04 18 39 43 LMP-EVA Okay, f/8.

04 18 40 16 LMP-EVA The camera was on 1/60 and I hope it got bumped there.

04 18 40 20 CDR-EVA No, that's where it's supposed to be for you; 2.8, 1/60.

04 18 40 26 LMP-EVA Okay.

04 18 40 31 CDR-EVA Okay. You got it?

04 18 40 34 LMP-EVA Aim my camera out there at about the right spot.

04 18 40 37 CDR-EVA Okay. Let's see. Up there on the rise? Be okay?

04 18 40 54 LMP-EVA Let's see where you're pointed.

04 18 40 56 CDR-EVA Over here on the rise?

04 18 40 57 LMP-EVA Okay. Let me point a little bit further around that way. Get out there in the sunlight after this; okay.

04 18 41 18 CC Antares, Houston. The flag is going off the camera to the right.

04 18 41 34 CDR-EVA How about that?

04 18 41 39	CC	Al, this is Houston. We still show you're off - -
04 18 41 41	CDR-EVA	Okay, Houston.
04 18 41 43	CC	- - Okay. You're coming back in now.
04 18 41 48	CDR-EVA	Okay.
04 18 41 53	LMP-EVA	Al, we're not going too far around. We're not going to be able to get it with 16, now.
04 18 42 02	CDR-EVA	... can put it down here close by, if he wants.
04 18 42 09	CC	Al, this is Houston. I think it would look a lot better if you could bring it over closer towards the TV.
04 18 42 16	CDR-EVA	Okay.
04 18 42 17	LMP-EVA	Put it right here in front of us, Al.
04 18 42 19	CC	Yes, maybe on this - on the TV camera side of the LM shadow. At 1:30, 20 feet.
04 18 42 35	CC	There you go. Beautiful, baby.
04 18 42 39	CDR-EVA	Okay.
04 18 42 44	LMP-EVA	Okay. Camera going here.
04 18 42 48	CC	Give me a mark.
04 18 42 53	LMP-EVA	MARK. It's running.
04 18 42 57	CC	Roger. Out.
04 18 43 08	LMP-EVA	How's this, Bruce? Look okay?
04 18 43 10	CC	Roger. That's a good site.
04 18 43 28	LMP-EVA	Okay. Going in very easily, but not as deep.
04 18 43 33	CC	Ed, now you're going off camera to the right.
04 18 43 45	CC	Okay. That's good.
04 18 43 55	CDR-EVA	Okay. Take a picture this way and then we'll sling it around so they can see it in television.

04 18 44 01 LMP-EVA All right.

04 18 44 02 CC Okay we can see it - -

04 18 44 03 LMP-EVA Okay, let me turn it around a little to the ... here.

04 18 44 20 CDR-EVA Okay. There we go.

04 18 44 39 LMP-EVA I think I'm still too close to you, Al.

04 18 44 42 CDR-EVA Except for the LM leg.

04 18 44 45 LMP-EVA Yes.

04 18 44 50 CDR-EVA Okay. And when you're finished, you can flop it around so they can see it a little better on the TV.

04 18 44 59 CC Okay, and which magazine are you using? On the Hasselblad?

04 18 45 01 CDR-EVA Indianapolis, Indiana.

04 18 45 03 CC Roger. Indianapolis, Indiana; but that was my line.

04 18 45 04 LMP-EVA Got your feet in the TV cable, Al. Al, watch your TV cable.

04 18 45 17 CDR-EVA Thank you.

04 18 45 18 LMP-EVA The S-band cable both - Got them both. Back up. Try it again.

04 18 45 34 LMP-EVA Okay, you're clear.

04 18 45 35 CDR-EVA Okay.

04 18 45 44 CDR-EVA Okay. Ready?

04 18 45 46 LMP-EVA Ready.

04 18 45 50 CDR-EVA Okay. Got it.

04 18 45 54 CC What's the final exposure number?

04 18 45 56	LMP-EVA	Houston. Give me a good orientation for the flag.
04 18 46 00	CC	Okay, Ed. If you just turn it broadside - -
04 18 46 03	CDR-EVA	Give me 25, 25.
04 18 46 04	CC	Just turn it broadside to the TV camera with the field to the TV camera right; that is, 180 out from that would be better.
04 18 46 15	LMP-EVA	Okay.
04 18 46 16	CDR-EVA	There you go. You got 25 on the MAG.
04 18 46 22	CC	Copy, Al.
04 18 46 25	CC	Okay, that's good on the flag.
04 18 46 28	CDR-EVA	Okay, Houston.
04 18 46 35	LMP-EVA	Did you say 16?
04 18 46 37	CDR-EVA	No.
04 18 46 38	LMP-EVA	Okay. 16 is off, Bruce.
04 18 46 43	CC	Roger. Stop.
04 18 46 49	CC	You have about 3 minutes remaining on that magazine, Claremont, California.
04 18 46 56	LMP-EVA	Roger. We won't change it. Okay, I'm going to press on out for the TV pan, Houston.
04 18 47 03	CC	Roger.
04 18 47 08	CDR-EVA	And, Ed - while Ed is doing that, Al is going to proceed with photographing the landing gear - -
04 18 47 15	CC	Roger.
04 18 47 17	CDR-EVA	- - and all features about the LM.
04 18 47 18	CC	Roger. Using Indianapolis, Indiana.
04 18 47 28	LMP-EVA	Okay, Houston. I will on - for my first sector per pan, I'll point a little bit more to the south.

04 18 47 38 CC Okay. We want to go to a zoom of 25 on this.

04 18 47 45 CDR-EVA Roger.

04 18 47 59 CDR-EVA Okay. You're zoom of 25; focus pointing out toward infinity. And how's your picture, Houston?

04 18 48 17 LMP-EVA Houston, this is Ed. Al?

04 18 48 25 CDR-EVA Yes - -

04 18 48 26 CC Go ahead, Ed.

04 18 48 31 LMP-EVA Okay, how's your picture now?

04 18 48 34 CC Roger. It looks good. We can now pick up - -

04 18 48 37 LMP-EVA Okay. Can you see the horizon?

04 18 48 39 CC - - That's affirmative. The horizon is about two-thirds of the way up from the bottom of the tube. The flag is over near the left-hand corner of the field of view. And that little rise is sort of centered, with the small crater off to the left.

04 18 48 55 LMP-EVA Okay, that's just about where I wanted it. Roger. The horizon that you - the far horizon - Now, this is a ridge that seems to run around this bowl that we're sitting in - there appears to be a ridge. It runs down from what we called "Old Nameless" to the south, and it runs to the west. It seems to be roughly circular but, of course, we could be a little bit deceived, at this point, on that score. The little rise you see in front of us is - -

04 18 49 31 CC Say, Ed.

04 18 49 33 LMP-EVA - - a rise that showed on the map with - the craters are on the map. Since I don't have it handy, it - I'll have to give you the coordinates later, but I think you already know them. They are about 150 feet south - -

04 18 49 47 CC Ed, this is Houston.

04 18 49 48 LMP-EVA - - southwest of the LM. Go ahead.

04 18 49 52	CC	Roger. If you're going to spend several seconds describing each of these locations here after the camera studies out, you might just as well zoom out a ways, and we'll pick up some features at random on higher magnification, and zoom back in when you go onto the next 45-degree sector.
04 18 50 11	CMP-EVA	Okay. All right, I've moved around to the next sector now. And it's looking down over what we used to call Clover Leaf - although it's not obvious from here what the clover leaf was. There is a fairly significant crater about 250 to 300 yards out. I'll try to come - bring it in for you.
04 18 50 43	LMP-EVA	Can you see it out there, Houston?
04 18 50 45	CC	Yes, you're doing fine. Keep zooming, if you've got any left. It's well centered.
04 18 50 52	LMP-EVA	Okay. Let's zoom all the way.
04 18 50 54	CC	Okay. Beautiful.
04 18 50 56	LMP-EVA	Okay. That crater is - it's kind of in a low spot, but it's not the lowest spot in this dip that we're in. The lowest spot we will pick up in out next sector.
04 18 51 10	CC	Okay, bring it back down.
04 18 51 11	LMP-EVA	However, I will shoot across it because you won't be able to see it. Okay. Now, another sector to the right.
04 18 51 20	CC	Roger.
04 18 51 21	LMP-EVA	Facing almost down-Sun.
04 18 51 24	CC	Roger. We got your shadow.
04 18 51 25	LMP-EVA	And - Okay. It's a very low spot. The deepest part, I guess, of what we were calling Clover Leaf before, although I did not realize how deep that depression was and I still don't quite - -
04 18 51 47	CC	Okay, zoom out while you're talking.

04 18 51 52 LMP-EVA - - Okay. Can't quite get the relief in my mind, because, it is so different than what I expected. Where you're looking at now, this deep part is to the south of Doublet, and it's probably 75 to 100 feet below where we are - -

04 18 52 12 CC Okay, you're aimed up a little high.

04 18 52 14 LMP-EVA - - coming up on the far side to above it. Okay. How's that now?

04 18 52 19 CC A lot better. Say, Ed, you don't need to stop talking when I talk if you can do both at once.

04 18 52 26 LMP-EVA Okay. I have a little trouble listening to you and talking at you, too. Not polite (Laughter). Okay. I'm bringing it back in and coming around through the west-northwest, and you should be able to see in the distance Doublet Crater. And I've lost it now because of the Sun angle, but it's just about on the - on the near horizon. I'm sorry, there are three mounds, three ridges. The nearside - the nearest one - the ridge that Doublet is on and then the far horizon. And I'll bringing them - bringing it on out for you. Doublet is on the second - second hill that you see.

04 18 53 21 CC Roger, we can see the ridges, and I - and I can see a crater that probably is Doublet.

04 18 53 26 LMP-EVA Okay. We'll zoom back in and move on around, and I think Al's about to finish up his task over there.

04 18 53 34 CDR-EVA Negative. I'm still working at 8 o'clock.

04 18 53 38 LMP-EVA Oh.

04 18 53 39 CDR-EVA Ed, I just wonder how come McCandless has the audacity to presume that we're wrong about Doublet crater (laughter).

04 18 53 48 LMP-EVA Very presumptuous. Okay, Bruce, I'm coming around one more sector. And you should be able to - I'm going to move it just a little bit more and you should be able to see the large rock, the four or five rocks I was talking about in my discussion before we got out of the LM. Now, I'll zoom in on those if I may.

04 18 54 13	CC	Yes, please.
04 18 54 15	LMP-EVA	Here we come.
04 18 54 18	CC	Okay, now point the camera down a degree or 2.
04 18 54 26	LMP-EVA	Okay. How's that?
04 18 54 29	CC	Beautiful. You might come right a degree or so. I see the small rocks off to the right. Okay. What's that object in profile on the horizon?
04 18 54 43	LMP-EVA	I mentioned a quadruplet chain of craters - -
04 18 54 51	CC	Point it down a little.
04 18 54 53	LMP-EVA	- - They're right here in front of me - Okay. The quadruplet chain of craters starts right here in front of me; well, it's halfway between the rock and myself - -
04 18 55 06	CC	You're getting all sky.
04 18 55 07	LMP-EVA	Across here, now, there's quite a few - Let me zoom back in again.
04 18 55 15	CC	Roger. Okay, hold it.
04 18 55 25	LMP-EVA	Okay. How's that now?
04 18 55 27	CC	Good.
04 18 55 31	LMP-EVA	Okay. There's the south quadruplet crater, and then there's the next one and the next one and the largest one. You didn't see - -
04 18 55 43	CC	Roger. Okay, we probably better go back to zoom 25 and press on with the panorama.
04 18 55 52	LMP-EVA	- - Okay, I'm at zoom 25. And I'm looking almost due north now. I'll swing back around and pan for my rocks. There's the rocks we were looking at. Panning slowly to the north, you can now see the undulation, the ridges that I was talking about - -
04 18 56 14	CC	Roger.

04 18 56 15	LMP-EVA	There's not a level portion out here that's more than a few square meters. And you can see at least three ridges between us and the horizon. Now, I'll zoom in out here once more. Let you see it close - closer-hand what's out there. Another pile of rocks, or ridges.
04 18 56 44	CC	You're pointing at the sky.
04 18 56 51	LMP-EVA	Okay.
04 18 56 52	CC	That's better.
04 18 56 53	LMP-EVA	You need a gunsight on this thing.
04 18 56 54	CC	You sure do.
04 18 56 55	LMP-EVA	That better?
04 18 56 56	CC	Yes. The horizon is about one quarter of the way up.
04 18 56 58	LMP-EVA	Okay.
04 18 57 04	CC	Beautiful.
04 18 57 05	CDR-EVA	Okay, Houston. Al is finished with the documentation counter at 1:10.
04 18 57 28	CC	Roger, Al. 1:10, Indianapolis, Indiana. And, Ed, a frame or two ago it looked like one of those rocks was split right down the middle; did you notice that, too?
04 18 57 47	LMP-EVA	I don't think it is I - it may be - it may look like it from there - we'll go by there later on.
04 18 57 57	CC	Roger. Let's press on with the TV panorama.
04 18 58 08	CC	We're about 2 minutes behind time line at this point, Ed. And you're looking at sky again. Bring her down. Okay. Okay, Ed, we're recording all this on video tape so that it only takes a relatively brief period of time looking at the scene that we can play it back, frame at a time, later on. Back at 25?

04 18 58 56	CC	Ed. Are you reading me?
04 18 59 01	CDR-EVA	Ed. Are you reading Houston?
04 18 59 07	CC	Ed - -
04 18 59 08	CDR-EVA	Don't look like Ed's reading anybody.
04 18 59 10	CC	Oh, God. Ed, this is Houston; we're not reading you.
04 18 59 16	LMP-EVA	Okay, Bruce, now you are; I hit the transmit switch to off.
04 18 59 21	CC	Roger, loud and clear.
04 18 59 25	LMP-EVA	The horizon that you see in this view is the north flank leading up to Cone Crater. It's probably - it's over a mile away - a mile and a half away. I'll give a quick zoom in on it. And then I can't go any closer to the Sun right now.
04 18 59 40	CC	Okay, you're looking at sky again.
04 18 59 43	LMP-EVA	Okay, we're - Okay. There you go.
04 18 59 47	CC	Beautiful.
04 18 59 49	CDR-EVA	Okay, we're at the time to deploy the MET, Ed, if you want to swing it on back around.
04 18 59 55	LMP-EVA	Okay. Bruce, what was the zoom setting you wanted?
04 19 00 02	CC	Okay, let's try it at about 45 there; we'd like to get the flag in at the right extremity and the plus-Y, if we can, at the left extremity. Hold that. Pan left about 2 degrees. Left 2 degrees. Okay, Ed. Okay.
04 19 00 28	LMP-EVA	Is that okay?
04 19 00 29	CC	Yes. Back it out about to 40 on the zoom. Okay, that's good.
04 19 00 39	LMP-EVA	Okay.
04 19 00 43	CDR-EVA	Okay.

04 19 00 44 CC Okay. Al and Ed, if we could get you both in the field of view there for a minute, we've got a message for you.

04 19 00 54 CDR-EVA Okay.

04 19 01 00 CC Okay. You're looking lovely troops. Why don't you take a pair and let me pass a message to you.

04 19 01 07 LMP-EVA Okay.

04 19 01 08 CDR-EVA Okay.

04 19 01 09 CC Okay. We were very pleased a few minutes ago to receive a phone call here in Mission Control from President Nixon. He asked me to extend to you and Stu his best congratulations. He said that, like millions of people all over the world, he is an astronaut watcher at this time. The picture is coming in very well at the White House, he said. The President said he knew how many thousands of people had worked on this mission without whom men would not be walking safely on the moon. He asked that I wish the Apollo entire team well. The President said he was proud of you and proud of them. He sent you a wire just before the flight wishing you Godspeed, and he wishes you well on your return flight. The President also asked me to invite you to the White House for dinner and to spend the weekend at Camp David with your families after the mission is completed. Over.

04 19 02 04 CDR-EVA That's fine, Deke. Thanks very much. And we appreciate those kind words.

04 19 02 10 LMP-EVA Thank you, Deke. And convey our thanks to the President, please.

04 19 02 13 CC Roger. Will do. I don't think Stu got this, but we'll see he gets it later.

04 19 02 18 CDR-EVA Okay. You ready? Get the wheels first.

04 19 02 27 LMP-EVA Hey. Okay.

04 19 02 34 LMP-EVA Wheels out, 180, gear down and locked.

04 19 02 46 CC Roger. Out.

04 19 02 48	LMP-EVA	Wait a minute.
04 19 03 05	LMP-EVA	Okay.
04 19 03 07	CDR-EVA	Okay. Put it there.
04 19 03 11	LMP-EVA	Let's get that. ... still up there - there we go.
04 19 03 24	CDR-EVA	Well, I see we've had visitors again.
04 19 03 28	LMP-EVA	Yes.
04 19 03 31	CDR-EVA	Hardly worth mentioning.
04 19 03 33	LMP-EVA	Agree.
04 19 03 39	CDR-EVA	Okay. Houston as you can see the MET is deployed properly.
04 19 03 45	CC	Roger.
04 19 03 49	CDR-EVA	Looks like it - looks like it's in good shape.
04 19 03 53	LMP-EVA	Okay. I'll get a camera.
04 19 04 01	CDR-EVA	Okay, if you want to -
04 19 04 05	LMP-EVA	If you prefer here -
04 19 04 07	CDR-EVA	I'll move around to put the TV camera on the scientific equipment area.
04 19 04 11	CC	Antares, Houston. We'd like to get an EMU status report at this point.
04 19 04 18	CDR-EVA	Okay. CDR is 3.7 and reading 72; no flags. I'm on low flow, and I'm in good shape.
04 19 04 29	CC	Roger.
04 19 04 33	LMP-EVA	And the LMP is 3.7 and reading 67 percent; low flow, low cooling, and feeling great.
04 19 04 49	CC	Roger.
04 19 04 51	CDR-EVA	TV camera - TV camera is covered, and proceeding to the rear of the LM to observe the deployment of the ALSEP.

04 19 05 02	CC	Roger.
04 19 06 03	CDR-EVA	Okay, Houston. The cover is coming off the lens now.
04 19 06 11	CC	Roger, Al. Are - -
04 19 06 13	CDR-EVA	How does that look to you?
04 19 06 15	CC	- - are you all the way back at the 30-foot position there? 6 o'clock, 30.
04 19 06 22	CDR-EVA	Well, it's about - it's about 30 right there, I'd say.
04 19 06 32	CC	Okay. Our picture is moving around a lot; you're going to have - -
04 19 06 34	CDR-EVA	It's a little hilly here - -
04 19 06 35	CC	- - to set it down and let it stabilize before we can tell you anything about it. Okay, what zoom are you on?
04 19 06 43	CDR-EVA	We have been trying to find a level spot, Bruce. We're in - -
04 19 06 45	CC	Roger.
04 19 06 46	CDR-EVA	We're on the side of the hill, as you probably have heard. And it may not stay; it may tip over.
04 19 07 01	CC	Can you poke one of the legs into the surface there? That's a pretty clumsy tripod, I realize.
04 19 07 06	CDR-EVA	I'll tell you in just a moment.
04 19 07 17	CDR-EVA	Okay. Do you know, I think it will stay now?
04 19 07 25	CC	Okay. What zoom are you on?
04 19 07 27	CDR-EVA	Okay. How's that?
04 19 07 28	CC	We need to back off the zoom some.
04 19 07 33	CDR-EVA	Yes. I think we'll have to.
04 19 07 41	CC	Okay. Wrong way.

04 19 07 44	LMP-EVA	Okay, Bruce, can you see the bay?
04 19 07 46	CC	I can see your hands very clearly. We seem to be close ... Okay, hold that zoom, Al.
04 19 07 56	CC	Roger. Looks good.
04 19 08 00	LMP-EVA	Okay.
04 19 08 01	CC	Beautiful.
04 19 08 07	LMP-EVA	Okay, the door is - quad door is open. Let's see, cube A door is open. Pulled a little stiffer than I expected in one-sixth g.
04 19 08 23	CC	Looking good though, Ed. And you all are within 9 minutes of the time line.
04 19 08 30	LMP-EVA	Okay. We'll pick it up here in a little while. Okay. Ready with number 1.
04 19 08 36	CDR-EVA	Hey. Number 1, coming out.
04 19 09 08	LMP-EVA	Okay. Got it down.
04 19 09 12	CDR-EVA	Okay. I'm going to move it over a little bit here.
04 19 09 16	LMP-EVA	Okay. It's almost as heavy as you are.
04 19 09 30	CC	Look who's talking.
04 19 09 34	LMP-EVA	Let's move over. Man, it's rough to find a level spot to put anything. Okay. Number 2 is coming out. Okay, can you get that by yourself?
04 19 09 47	CDR-EVA	Yes, I think so.
04 19 09 52	LMP-EVA	I'm sure. It's not going to vibrate too much? Okay, and it's on the surface. Oh, all this beautiful white paint is sure going to get filthy up here.
04 19 11 06	LMP-EVA	I'm going to have to bend a little bit. I just can't bend down for that.
04 19 11 10	CDR-EVA	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 19 12 11	LMP-EVA	Handtool carrier's clear.
04 19 12 14	CC	Roger.
04 19 12 33	CC	You never object - -
04 19 12 40	LMP-EVA	Say again, Houston.
04 19 12 43	CC	Nothing, Ed.
04 19 14 12	LMP-EVA	I fully expect to see Earl and Ron come running around to pick up the pit pins from thrown-away parts.
04 19 14 22	CDR-EVA	See this - -
04 19 14 23	LMP-EVA	Okay. I think there's a pretty level place right there.
04 19 14 39	LMP-EVA	Oops. Excuse me.
04 19 15 07	LMP-EVA	Okay, I'm ready for the fuel cask.
04 19 15 10	CC	Roger, Ed.
04 19 15 19	CDR-EVA	The handtool carrier, as you can undoubtedly see, is on the MET. No problem.
04 19 15 30	CC	Roger.
04 19 16 04	CDR-EVA	Okay. Temperature indicators on the mast show that there's been no heat.
04 19 16 12	CC	Roger.
04 19 16 22	LMP-EVA	And the cask is coming down.
04 19 16 25	CC	Roger, Ed.
04 19 16 29	LMP-EVA	And it's down far enough, I believe.
04 19 16 52	LMP-EVA	Okay, stand by 1. Not the best place in the world to work. There we are. Okay, if we can get the lid off of it.

04 19 17 55 LMP-EVA ... drove it pretty hard. Okay, it's locked.

04 19 18 05 CDR-EVA ...

04 19 18 06 LMP-EVA Think so.

04 19 18 17 CDR-EVA Okay, down a little bit. Go a little more in right there. There you go.

04 19 18 27 LMP-EVA Okay, good. Houston, the lid is off the nuclear fuel cask.

04 19 18 35 CC Roger. Report TEMP levels.

04 19 18 37 LMP-EVA And I have none of them - no - no TEMP indicators that are black. You want to take that? Got me in mid-throw there. Okay, it's open.

04 19 19 16 CDR-EVA Okay, The cask ready? Okay.

04 19 19 31 LMP-EVA All set.

04 19 19 33 CDR-EVA Okay.

04 19 19 51 CDR-EVA This slight slope is about as little as we can get from here.

04 19 19 54 LMP-EVA Okay.

04 19 19 59 CDR-EVA Okay, looks good. All right, a little more this way. There you go. Very good.

04 19 20 23 CDR-EVA They reading on that tube?

04 19 20 26 LMP-EVA Yes, just a minute.

04 19 20 27 CDR-EVA Okay.

04 19 20 34 LMP-EVA And, Houston; all the temperature indicators are still white.

04 19 20 39 CC Roger, Ed.

04 19 20 42 LMP-EVA ... doors

04 19 20 47 CDR-EVA Okay, the doors have closed.

04 19 21 36 CDR-EVA Okay, Houston. We're going to cover the television - -

04 19 21 39 CC Roger, Al.

04 19 21 40 CDR-EVA - - ...

04 19 21 45 CC And for your information, you're approximately 7 minutes behind the time line at this point.

04 19 21 50 CDR-EVA Okay.

04 19 21 55 CDR-EVA Okay. Where do you think is a good spot for the ALSEP?

04 19 21 59 LMP-EVA Oh, boy. That's going to be tough, Al. I'd just head out toward Doublet out there and let's look. I - great toward Doublet.

04 19 22 12 CDR-EVA I think that's the best way. Aim for the center of Doublet. Aim for the - Yes, aim for the center of Doublet, and let's go from there. However, I think maybe we better go a little further south, or we're going to violate that CCIG constraint if we go too far north. How about toward the south edge of Doublet?

04 19 23 04 LMP-EVA Hey, why don't you point it - point it at us, and we'll just pick it up on the way out?

04 19 23 08 CDR-EVA What's that?

04 19 23 10 LMP-EVA You ought to point it at us, and we'll pick it up on the way out.

04 19 23 13 CDR-EVA Well, we're supposed to - Okay, right now - you can put it here and watch the MET deployment, if you like.

04 19 23 31 LMP-EVA Okay.

04 19 23 34 CDR-EVA Okay, Houston. We're about - a 40-foot zoom now, on the area of the MESA and the MET. How does that look?

04 19 23 56 CDR-EVA Houston, are you with us?

04 19 23 58	CC	Roger. Let's go to 50.
04 19 24 05	CDR-EVA	Okay. 50.
04 19 24 11	CC	And come right about 3 degrees. Okay, good.
04 19 24 23	CDR-EVA	Okay.
04 19 24 48	CDR-EVA	Okay. Got the television camera there?
04 19 24 51	LMP-EVA	Yes, it's down at the bottom.
04 19 24 53	CDR-EVA	Okay.
04 19 25 18	LMP-EVA	Hey, Bruce. As I mount these 70 millimeter cameras on the MET, I just flip the little spring clip; I just pick up the whole MET and drag it along.
04 19 25 30	CC	Okay. We got that, Ed.
04 19 25 31	LMP-EVA	I can't do that when they get - get a little more weight on there.
04 19 25 39	CC	Be sure you get the large scoop on there replaced.
04 19 25 45	LMP-EVA	Yes. Okay. Bruce, I've put on two Hasselblads, and I'm going ahead and getting the 16-millimeter on and getting it out of my way right now.
04 19 26 04	CC	Okay, Ed. Two Hasselblads plus the 16-millimeter.
04 19 26 10	CDR-EVA	Right. Well, I've just started the TV bracket in, and I'm open - getting ready to open SRC number 1.
04 19 26 22	CC	Roger.
04 19 26 28	CC	And, Al, have you gotten - -
04 19 26 31	CDR-EVA	... my television camera.
04 19 26 33	CC	Roger.
04 19 26 37	CDR-EVA	Black-and-white TV cameras in the plus-Y strut.
04 19 26 41	CC	Roger. With the white surface normal to the line of the Sun.
04 19 26 44	LMP-EVA	...

04 19 26 47 CDR-EVA That's correct.

04 19 26 50 CC Roger.

04 19 26 51 CDR-EVA ... dimension horizontal.

04 19 26 53 CC Roger. And on magazine Charlie - Charlie, I show you still have 3 minutes remaining.

04 19 27 06 LMP-EVA Okay. We'll leave it on there, then.

04 19 27 08 CC Roger.

04 19 27 25 CDR-EVA Okay, SRC-1 is open. Okay.

04 19 27 43 LMP-EVA Oh, damn, dropped the weigh bag.

04 19 27 55 CDR-EVA Wait a minute.

04 19 27 58 LMP-EVA Okay.

04 19 27 59 CDR-EVA I can give you some tongs, if you want them.

04 19 28 00 LMP-EVA Okay. I probably shouldn't ... any dirtier than necessary. Hell, I dropped both of them. The MET ...

04 19 28 23 CDR-EVA Okay. May as well put them in the pocket when you're through.

04 19 28 27 LMP-EVA Okay.

04 19 29 30 CDR-EVA Okay, Houston. Magazine double Dog and double Easy going on the MET.

04 19 29 37 CC Roger. Delta-Delta and Echo-Echo.

04 19 29 54 CDR-EVA Take that baby up a little.

04 19 29 58 LMP-EVA Yes. ... and while you're getting that ready, let me slip these babies in there.

04 19 30 09 CDR-EVA Okay.

04 19 30 15 LMP-EVA That's what I'm sweating.

04 19 30 16 CDR-EVA Okay, good.

04 19 30 19 LMP-EVA Damn, these suits are hot. These boots are sure a lot stiffer than the training suits.

04 19 30 30 CDR-EVA And the sand's a little different too.

04 19 30 32 LMP-EVA Yes.

04 19 30 51 CDR-EVA Well, now.

04 19 31 10 CDR-EVA Damn it!

04 19 31 12 LMP-EVA There it goes again.

04 19 31 15 CDR-EVA I should have lifted it up with one hand and then put it down.

04 19 31 22 LMP-EVA Lift it up and do what?

04 19 31 24 CDR-EVA Lift it up with one hand and put it over the other.

04 19 31 27 LMP-EVA That's what I was going to do - this time.

04 19 31 46 LMP-EVA Okay. It's a bit longer than expected.

04 19 32 33 CDR-EVA Okay, Houston. I've got three core tubes, no cams.

04 19 32 41 CC Roger.

04 19 32 46 CDR-EVA And, Houston, I finally succeeded in getting two weigh bags. And one SESC in so far. In addition to the other things, plus the core tube cap assembly.

04 19 32 58 CC Roger.

04 19 33 12 LMP-EVA Okay, you putting on the other SESC?

04 19 33 14 CDR-EVA I've got the other SESC now.

04 19 33 18 LMP-EVA Okay, very good.

04 19 34 06 LMP-EVA The problem here is the clips are so tight that takes a monumental amount of force to get them in there. Course, that's the way we asked for them; can't complain. And, Houston, I'm sealing the organic sample at this point.

04 19 34 28 CC Roger.

04 19 34 33 CDR-EVA Okay, and we'll put this one in the pocket. ...

04 19 35 23 LMP-EVA Okay, Houston. I have the closeup camera.

04 19 35 26 CC Roger. Still reading on even hundreds?

04 19 35 31 LMP-EVA I'm not there yet.

04 19 35 33 CC Okay.

04 19 35 46 LMP-EVA Didn't want that to get away from me, but it did. Got it. Okay. Houston, it's turned on and; it's reading 300.

04 19 35 58 CC Roger.

04 19 36 06 CDR-EVA Okay, can you see that little flag, Ed?

04 19 36 11 LMP-EVA Huh?

04 19 36 12 CDR-EVA Ed, can you see that little flag all right?

04 19 36 14 LMP-EVA Yes, I think I can see that. Good show.

04 19 36 38 LMP-EVA Okay, and here's one hammer for you.

04 19 36 41 CDR-EVA Okay. Thank you.

04 19 36 50 LMP-EVA Okay. We finally got to set the flight gnomon.

04 19 37 04 CC 21 Nancy.

04 19 37 08 CDR-EVA (Laughter) Glad your still with us, Bruce. Okay. Break there.

04 19 38 30 CDR-EVA Okay, let's put that baby over here. That your last item?

04 19 38 37 LMP-EVA Let me double check. Let's see, 1, 2, 3, -

04 19 38 42 CDR-EVA Okay, Houston. We'll start a rundown here; I think we are about ready.

04 19 38 44 LMP-EVA Yes.

04 19 38 45	CDR-EVA	Got the core tube cap assembly, extension handle, two sets of - two sets of tongs. We have a numbered geophone anchor on the front. We have the tether, the gnomon, the hammer, the scoop. Three core tubes, 35 bag dispensers, closeup camera, dual SESCs, two 70-millimeter cameras with solar exterior, one 16-millimeter camera and one MAG, four weigh bags, two maps, extra number geophone flag, large scoop is on, right. Large scoop is on, and we're taking the trenching tool with us.
04 19 39 24	CC	Okay, and you should have 16-millimeter and two MAGs.
04 19 39 30	CDR-EVA	That correct; we have a total of, I was just going to say, a total of three MAGs; one is almost used and the other two are clean.
04 19 39 39	CC	Roger. Looks good.
04 19 39 42	LMP-EVA	...
04 19 39 44	CC	And why don't you give us EMU status check before you set out?
04 19 39 50	LMP-EVA	Okay, the LMP is reading 3.75, and about 55 percent, medium to low - low cooling. Doing great.
04 19 40 10	CC	Okay. Say again the percentage, Ed.
04 19 40 16	LMP-EVA	It looks like I'm reading 50 - No, sorry about that.
04 19 40 25	CDR-EVA	Man, it's hard to see.
04 19 40 26	LMP-EVA	Yes. I'm reading 55 percent, Bruce.
04 19 40 29	CC	Roger.
04 19 40 30	CDR-EVA	You're reading lower than that. It must be -
04 19 40 34	LMP-EVA	No, I'm not reading more than that.
04 19 40 37	CC	Go ahead, Al.
04 19 40 40	CDR-EVA	Okay. Okay, Al. There's a 3.75, reading 62 percent, and I have no flags; I'm on vent cooling, and I'm very comfortable.

04 19 40 51 CC Roger. Out. And we need to point the TV camera out to the ALSEP side.

04 19 40 58 LMP-EVA Al, I'll go get it.

04 19 41 00 CDR-EVA Let me zoom on out and get that. I think I'll aim it a little bit to the left of - that bright crater on the side of the west wall of - of Doublet.

04 19 41 10 LMP-EVA Hey, that's a good place, Al.

04 19 41 12 CC Say, Al, if there's any uncertainty as to the deployment area, we'd rather go to a zoom of 100 instead of a zoom of 150; but if you think you've got a good site picked out, now, why, we can go to 150.

04 19 41 27 CDR-EVA I think we can find a good site. We may be a little closer to Doublet than the - than the map shows, because of the grade going up there; but I think there's a level site fairly close to the south rim of Doublet, and we'll aim the camera in that general direction and give you 150 zoom.

04 19 41 45 CC Roger. Out.

04 19 41 46 CDR-EVA Focus at infinity. Okay. You should be able to see on the right side of your picture when I settle down here. You should be able to - Hold on.

04 19 42 11 LMP-EVA Al, you can get quite a ways further out if you want to; you've got a little cable left.

04 19 42 14 CDR-EVA You should be - we're aiming right for the south rim of Doublet now, Doublet or south Doublet; but you'll probably be able to see that bright star crater right in the very edge of your field of view. The f-stop okay?

04 19 42 29 CC Yes, f-stop's fine. I've got what looks line one - two ridges and then the horizon in the picture, and I see a - just past the second ridge, I see - look like two craters in line. Over.

04 19 42 51 CDR-EVA It may be two small boulders.

04 19 42 54 CC Okay, may be.

04 19 42 59 LMP-EVA Okay. I think we can find something out there that fits the bill.

04 19 43 06 CDR-EVA Okay. I'll go pick up the barbell.

04 19 43 09 LMP-EVA All right. The LR cube is there on the front step.

04 19 43 17 CC Al, this is Houston. We'd like to try f/22 and peak.

04 19 43 25 CDR-EVA Okay; you caught me just in time.

04 19 44 04 CDR-EVA Okay; f/22 and peak. How does that look to you?

04 19 44 23 CC Roger, Al. And we'd like to elevate a little bit so that we get the horizon in.

04 19 44 33 CDR-EVA Okay, we'll try. How's that?

04 19 44 41 CC See if you can depress a little now. It's real touchy at this long focal length.

04 19 44 52 CDR-EVA Okay. We'll try to depress a little bit.

04 19 45 17 CDR-EVA Okay, you still have the horizon?

04 19 45 20 CC Okay, that looks good for elevation; and if you've got us aimed at your proposed deployment site, we're GO.

04 19 45 29 CDR-EVA Well, it looks like that's the way we're going.

04 19 45 32 CC Okay. Very good.

04 19 45 34 CDR-EVA You'll just have to stay in that line of sight, Bruce.

04 19 45 44 CC Roger. You want a GCA?

04 19 45 49 CDR-EVA Yes. I think ...

04 19 45 53 CC Well, our ASR isn't working very well; but we can once get you in the field of view, we'll acquire you.

04 19 46 01 LMP-EVA Roger. I'm headed over that way.

04 19 47 00 LMP-EVA Can you see - field of view - yet, Bruce?

04 19 47 04	CC	Negative, Ed. I believe you're off to our left. Okay, you're coming in, now.
04 19 47 10	LMP-EVA	... field of view until we get up pretty close to the site.
04 19 47 12	CC	Okay. You're coming in now.
04 19 47 14	LMP-EVA	Okay. Okay. I'm going to stop here and rest for a minute, Al. This darn thing is heavier than I expected.
04 19 47 23	CC	Okay, Ed. We've got you in the field of view over to the left, now.
04 19 47 29	LMP-EVA	Okay. Al should be coming in right now, too.
04 19 47 51	CDR-EVA	Looks as if it might be a little secondary impact crater here by me.
04 19 47 54	LMP-EVA	Man, there's so many different types of craters around here, you could - we could spend the whole EVA within a hundred yards of the LM. Okay, lead on and I'll follow and watch the MET for you.
04 19 48 06	CDR-EVA	Okay. Going to your right.
04 19 48 24	CDR-EVA	Okay, Houston. We're proceeding over a very fine-grade regolith. We described before. Undulating surface - -
04 19 48 36	CC	Okay. You need to angle left just a little bit.
04 19 48 39	CDR-EVA	- - getting more sloped.
04 19 48 42	CDR-EVA	Left?
04 19 48 43	CC	Yes, you're doing fine, now.
04 19 48 45	CDR-EVA	Okay.
04 19 48 51	LMP-EVA	Say, Houston. This looks like brown talcum powder; it's so fine in most places.
04 19 49 01	CC	Roger. The METs going off to the right.
04 19 49 03	CDR-EVA	... angle is increasing, now. The METs trying to find a smooth place to go.

04 19 49 11 LMP-EVA Al, I think you'll have to go around this crater, here, to the left. I think we can find our way down. Good heavens, that's a deep hole. But I guess we can get it - make it either way.

04 19 49 34 CDR-EVA Say again.

04 19 49 35 LMP-EVA I said we could make it either way.

04 19 49 37 CDR-EVA Okay.

04 19 49 45 LMP-EVA See those two over there at 10 o'clock? Al, we can see those are on the map.

04 19 49 49 CDR-EVA The two at 10 o'clock?

04 19 49 50 LMP-EVA Yes.

04 19 49 53 CDR-EVA Yes. Okay, Houston. We'll be dropping down out of sight for a while, probably.

04 19 50 02 CC Roger.

04 19 50 04 CDR-EVA Going down in - in a depression.

04 19 50 09 LMP-EVA A deep - a very deep depression, compared to what they looked like.

04 19 50 29 CDR-EVA Well, I don't know.

04 19 50 32 LMP-EVA I don't know either. Let's stop a minute, Al.

04 19 50 37 CDR-EVA I'm not sure but what we've picked just about as good a spot as anywhere.

04 19 50 40 LMP-EVA I think so.

04 19 50 44 CDR-EVA It looked a little further out here because of being closer to zero phase, perhaps.

04 19 50 51 LMP-EVA I think that's it, but it's not a bit smoother than the other. I'll be darned if I know what to do.

04 19 51 04 CDR-EVA Well, we'll move on a little closer to Doublet.

04 19 51 09 LMP-EVA Okay.

04 19 51 15 LMP-EVA Okay.

SEPARATE SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 19 31 06	CC	Kitty Hawk, Houston.
04 19 32 29	CC	Kitty Hawk, Houston.
04 19 33 19	CC	Kitty Hawk, Houston. Got a report. Your downlink is very weak, but it's not important now. I'll catch you once you get into high gain for your P52 attitude.
04 19 50 19	CC	Kitty Hawk, Houston. In the blind here. Looks like about - coming upon T_1 time for Dollond E.
04 19 54 33	CC	Kitty Hawk, Houston. In the blind, again. Time to start the camera.
04 19 54 42	CMP	Okay. Can you read, Ron?
04 19 54 48	CC	We just barely got you that time, Stu.
04 19 57 46	CC	Kitty Hawk, Houston. I guess remote site said that you were asking if we're picking you up, and - Negative, we're not picking you up here.
04 20 01 15	CC	Kitty Hawk, Houston in the blind. Coming up on T_1 time.
04 20 05 33	CC	Kitty Hawk, Houston in the blind. You can start the camera.
04 20 10 47	CC	Okay, Kitty Hawk; Houston in the blind here still. Looks like you're on your way to the attitude. You might figure out your - switch over to page 26 for P30 maneuver there in the flight changes.
04 20 13 04	CC	Kitty Hawk, Houston; you're in the blind, again. You might try OMNI Charlie.
04 20 16 39	CC	Kitty Hawk, Houston; how you read?
04 20 16 44	CMP	Well, great. Looks like we made it.
04 20 16 48	CC	Hey, mighty fine. How about whipping into P00 and ACCEPT, there; and we'll ship you up a state vectors and the target load. And if you're ready to copy, there on - We got your plane change maneuver from page 26.

04 20 17 09	CMP	All right, I'll be right with you.
04 20 17 11	CC	Okay.
04 20 17 45	CMP	Okay, Ron, I'm ready to copy.
04 20 17 48	CC	Okay, mighty fine. Your weight, 35752; minus 0.95, plus 0.17; 118:09:35.17; NOUN 81, minus 0012.9, plus 0370.7, minus 0005.5; 180, 354, 002; NOUN 44, 0062.1, plus 0057.2; 0371.0, 0:18, 0356.6; sextant Star, 27, 030.5, 07.6; boresight star, 043, up 13.2, left 27; GDC aline, Sirius and Rigel, 049, 287, 331; your ullage, four jet, 11 seconds. Read back.
04 20 20 05	CMP	Okay, Ron. Plane change, 35752; minus 0.95, plus 0.17; 118:09:35.17; minus 0012.9, plus 0370.7, minus 0005.5; 180, 354, 002; 0062.1, plus 0057.2; 0371.0, 0:18, 0356.6; 27, 030.5, 07.6; 043, up 132, left 27; Sirius and Rigel, 049, 287, 331; four jet 11 seconds.
04 20 21 12	CC	Okay, read back your DELTA-V_Y again.
04 20 21 20	CMP	DELTA-V_Y, plus 0370.7.
04 20 21 25	CC	Okay, that was correct. Okay, whip back to page 25, on your north ecliptic pole attitudes.
04 20 21 44	CMP	Okay, I got it.
04 20 21 45	CC	Okay, it'll be at roll 270, 009, and 355. And your 180 position for your map update 117:41:22.
04 20 22 09	CMP	Okay, that's the north ecliptic pole attitudes at 117:11; 270, 009, 355; 180, 117:41:22.
04 20 22 24	CC	Roger. Okay, Stu, it's your computer; and, now, you can whip in to P52.
04 20 22 42	CMP	Okay.
04 20 26 11	CC	We saw that.
04 20 26 17	CMP	Sorry about that.
04 20 26 18	CC	(Laughter) Okay.

04 20 27 41	CMP	Well, there's just no justice tonight.
04 20 27 47	CC	(Laughter) Okay.
04 20 28 12	CC	Okay. We got you NOUN 93 here, Stu.
04 20 28 19	CMP	Okay.
04 20 33 07	CC	Kitty Hawk, Houston.
04 20 33 29	CC	Kitty Hawk, Houston.
04 20 34 03	CC	Kitty Hawk, Houston. Kind of in the blind here. Just a reminder to terminate your battery charge prior to the plane change burn.
04 20 35 01	CC	Kitty Hawk, Houston. About 1 minute until LOS. We'll see you coming around the other side, and Al and Ed are about 3 hours into their EVA, whipping away on their ALSEP deployment.
04 20 35 18	CMP	I didn't get all of that, Ron. But I did get they're in the ALSEP deployment. Is that affirm?
04 20 35 24	CC	That's affirm, about 30 seconds. And did you get: terminate your battery charge prior to burn?
04 20 35 34	CMP	No, I didn't get that yet. Do you want to let it run on through until I come out AOS, or do you want that terminated?
04 20 35 44	CC	No, do it sometime prior to the burn.
04 20 35 50	CMP	Okay.
04 21 01 --		BEGIN LUNAR REV 19

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 19 51 36	LMP-EVA	Well, I think the first ridge over there about another 75 yards might be our answer. Right beyond this next - these next two craters.
04 19 51 49	CDR-EVA	Yes, I think so. It's probably a pretty good spot. About right up there.
04 19 51 54	LMP-EVA	Yes.

04 19 52 05	CDR-EVA	Okay, Houston. We're in the general area of the planned ALSEP deployment now - on the check. It's in a depression, and I think we'll move on a little closer to Doublet to give it a higher elevation.
04 19 52 18	CC	Roger. You're visible from - about the armpits up, right now.
04 19 52 27	CDR-EVA	Okay.
04 19 52 31	LMP-EVA	Think you ought to press a little - bear a little to the left, Al.
04 19 52 33	CDR-EVA	Yes. I guess we'll have to. Nothing like being up to your armpits in lunar dust.
04 19 52 48	LMP-EVA	I think just to the left of that rock that's ahead of us, it provides a path through here.
04 19 53 00	CDR-EVA	The MET seems to be riding very well, Houston. It's bouncing a little bit, making nice tire tracks, but not about to turn over. It jumps about a foot every time it hits a small rise, but very stable.
04 19 53 20	CC	Are you getting any dust thrown up by the tires?
04 19 53 25	LMP-EVA	No. There is a little bit, Bruce, but it's not - the dirt feels to be kind of clumpy.
04 19 53 53	CDR-EVA	Okay, I guess that ridge is the best place.
04 19 53 56	LMP-EVA	I think so.
04 19 53 57	CDR-EVA	How are you doing?
04 19 53 58	LMP-EVA	Fine.
04 19 54 00	CDR-EVA	You still on your television, Bruce?
04 19 54 02	CC	Yes, indeed. You're very well centered. And I can see your -
04 19 54 09	CDR-EVA	He's coming back in now; we're coming up to - the grade here.
04 19 54 14	CC	Roger. I can see your shadows now, so - I guess - in fact, I can see your feet; so, you're well in view.

04 19 54 23 LMP-EVA Okay, about another 30, 40 feet now and I think we're as good as we're going to get.

04 19 54 29 CDR-EVA Yes.

04 19 54 35 CDR-EVA What we're discussing here, Houston, is - grade going up to south Doublet. It is very consistent, and it's difficult to find a level place.

04 19 54 52 LMP-EVA Okay. Let's set down and look for a minute, Al.

04 19 54 58 CDR-EVA All righty.

04 19 55 01 LMP-EVA Then, we can figure where we are.

04 19 55 09 LMP-EVA I don't know but what this - this rise we're standing on right here - it's about as good as any. Okay, now, there's a 20-meter crater there.

04 19 55 37 CDR-EVA Okay. You got that other map on there, too?

04 19 55 40 LMP-EVA Yes, it's in the pocket. Now, let's see. Okay, the one - that one right - right there. Let's see if we can find those. The big one. May I see it a minute? Can we spot that one and those two?

04 19 56 05 CDR-EVA That one's right over there, I believe. Isn't it? That's an old rounder one right there. See what I mean?

04 19 56 13 LMP-EVA Yes, that may be. What's this one right here? That one right beside it. Oh, I don't know whether we're that far out or not, Al.

04 19 56 45 LMP-EVA ... that little, looking for that little distance thing. Here we go.

04 19 57 25 LMP-EVA Okay, I'd say we're probably about 400 feet out, almost directly out in front. Plus-X.

04 19 57 34 CDR-EVA Okay.

04 19 57 35 MS-EVA ...

04 19 57 36 CDR-EVA I think ... 80 meters along the track.

04 19 57 39 LMP-EVA Look here. See that crater right in between those two traverse tracks?

04 19 57 43 CDR-EVA Yes.

04 19 57 45 LMP-EVA Okay, those two craters and that crater that you pointed out.

04 19 57 47 CDR-EVA Right.

04 19 57 48 LMP-EVA Okay, I think that one between the traverse tracks is that one right there.

04 19 57 53 CDR-EVA Okay.

04 19 57 54 LMP-EVA On the hill, the two - those right over there and the one you pointed out, this one; is that one over there, the big one behind it. Now, I think it's out of sight, unless it's that one over there.

04 19 58 10 CDR-EVA Well, where do you think we are?

04 19 58 12 LMP-EVA I think that we are to the north - I think we're about BR, and let's see we thought that - We're about CQ 0.8 and 62.5 - 61.5.

04 19 58 37 CDR-EVA Did you read that, Houston?

04 19 58 38 CC Roger. Charlie came back 8 at 61.5.

04 19 58 45 CDR-EVA Okay. Let's move directly toward that big rock up there, about halfway between here and there. It's about right up in there.

04 19 58 56 LMP-EVA Yes. I need this clear area down here for that thumper.

04 19 58 59 CDR-EVA Okay, let's put it right up in there.

04 19 59 01 LMP-EVA Right up there, on that spot?

04 19 59 03 CDR-EVA Yes, you got it. Okay, Houston. We're going to move about 10 meters to the west-northwest from those coordinates that Ed gave you. That will be where - -

04 19 59 16 CC Roger.

04 19 59 17 CDR-EVA - - ALSEP central station will go. We reserve the right to change our mind as to where we are when we get up on the hilltop.

04 19 59 26 CC Okay.

04 19 59 31 CDR-EVA Okay.

04 19 59 47 CDR-EVA Pull it over here a little, Ed; there's a crater there.

04 19 59 52 LMP-EVA Al, that's - that's right about where we are.

04 19 59 55 CC Okay, we've lost the MET off to the right of our picture.

04 20 00 05 LMP-EVA What's wrong with right about here? It would just be a nice clear shot down there with the thumper.

04 20 00 11 CDR-EVA Can you still see Ed, Houston?

04 20 00 12 CC Yes, he's at the extreme right-hand edge of our picture, Al; and you're off.

04 20 00 19 CDR-EVA Okay. We'll turn them back on. This is really not deployed.

04 20 00 22 CC Well, I guess the primary consideration, of course, is to find a good site; and our being able to watch you is secondary.

04 20 00 31 CDR-EVA Yes. We understand, but it's all pretty much the same; the upslope is about - 4 or 5 degrees, pock-marked by all types of craters. They're all old craters; but nonetheless, they produce a very uneven surface. And I think we've found a spot here as reasonable as we'll find anywhere.

04 20 00 51 CC Roger. Out.

04 20 00 53 LMP-EVA Let's see, Al. But those two craters right there are going to be in the way. I think I'd like to move back here about 5 feet. Better than having to run through those going south. Or, I can leave a central station about where I've got it, I mean, the power generator. Think that'll be all right?

04 20 01 22	CDR-EVA	Are you done with your thumper geophone line?
04 20 01 24	LMP-EVA	Yes, I'm through.
04 20 01 25	CDR-EVA	Your line will put you right through those two craters. That'll give you a good reference.
04 20 01 28	LMP-EVA	Well, I'm going to have to go this way, so - because I can't fire into that ridge. I've got to put it more north, right up that way. Then, I'm going to go right down across through there. Okay, this looks good to me if you're happy with it.
04 20 01 45	CDR-EVA	Let's see. Southwest is right - The best spot is right through those two craters.
04 20 01 49	LMP-EVA	I'm going to have to go almost due south of the -
04 20 01 52	CDR-EVA	I mean, southeast of these.
04 20 01 53	LMP-EVA	I'm going to have to go due south.
04 20 01 57	CDR-EVA	Okay, you can go by the right edge of that baby.
04 20 01 59	LMP-EVA	Yes.
04 20 02 00	CDR-EVA	Okay, very good. Okay, we've got a spot, Houston. We will proceed with the deployment.
04 20 02 06	LMP-EVA	We're not quite as far from those coordinates as we thought we were.
04 20 02 09	CC	Roger, Antares.
04 20 02 19	CDR-EVA	Okay, Houston. We will start the 16-millimeter going here and -
04 20 02 26	CC	Okay, give me a hack.
04 20 02 28	CDR-EVA	We may have to change magazines.
04 20 02 30	CC	Roger. I'll keep track.
04 20 02 32	CDR-EVA	I'll give you the hack.
04 20 02 44	CC	And if you have a free minute, we would like some commentary on the depth of the MET tracks.

04 20 02 54	LMP-EVA	Well, it's - Bruce, let us take a picture for it after a while. We can see the MET track clear back to the LM. They're about three-quarters of an inch deep.
04 20 03 02	CC	Roger.
04 20 03 48	CDR-EVA	Can't get any closer without falling in that crater, Ed.
04 20 03 52	LMP-EVA	It's fine right there, Al.
04 20 03 54	CDR-EVA	Okay.
04 20 04 17	LMP-EVA	Okay. 50th, six frames per second.
04 20 04 38	LMP-EVA	I can see that this is going to be a considerably slower process than I expected.
04 20 04 45	CC	Has he started it yet, Al?
04 20 04 50	CDR-EVA	Stand by.
04 20 05 03	CDR-EVA	Mark. It was running six frames per second.
04 20 05 07	CC	Roger.
04 20 05 22	CC	And, for reference, Al and Ed, you're about 2 9 minutes behind the time line at this point. Over.
04 20 05 32	LMP-EVA	Okay.
04 20 05 40	CDR-EVA	Okay; Ed is working on the central station, and I'm going over the subpallet.
04 20 05 48	LMP-EVA	Houston, the RTG cable temperature is 175 degrees.
04 20 05 53	CC	Roger. Out.
04 20 07 31	CDR-EVA	Okay. Subpallet is deployed northeast of the central station.
04 20 07 36	CC	Roger. Out.
04 20 07 37	LMP-EVA	Houston, the current - current reading is 8.
04 20 07 42	CC	Understand 8 amperes before pressing the switch.

04 20 07 49 LMP-EVA That's affirmative.

04 20 07 50 CC Roger.

04 20 09 00 CDR-EVA Ed, that looks beautiful. Beautiful, but it's all full of dust.

04 20 09 10 LMP-EVA Yes. That's nothing. Everything else is going to be full of dust before long. Be filthy as pigs.

04 20 09 17 CDR-EVA Okay. I'm going to have to lift this up. You want to help me?

04 20 09 20 LMP-EVA Okay. What you want to do?

04 20 09 22 CDR-EVA I'm going to have to lift it up and shake the dust out of it that ... I can't get it otherwise.

04 20 09 26 LMP-EVA Okay.

04 20 09 37 LMP-EVA Okay. Watch it.

04 20 09 42 CDR-EVA There we go. Okay, watch that -

04 20 09 48 LMP-EVA Is there anything that's not tied on?

04 20 09 49 CDR-EVA That's loose, yes. I've already taken those out.

04 20 09 51 LMP-EVA Okay, I'll hold it.

04 20 09 57 CDR-EVA Okay. Let's turn it upside down and shake it.

04 20 10 05 LMP-EVA Every little Boyd bolt is falling off.

04 20 10 08 CDR-EVA Yes, but that's not the ones we've got the problems with. Okay, plop it over a minute.

04 20 10 18 LMP-EVA That'll do it?

04 20 10 20 CDR-EVA No, it's still not clear.

04 20 10 34 LMP-EVA Okay, I believe that will get it.

04 20 10 36 CDR-EVA Let me just try it while it's right here.

04 20 10 37 LMP-EVA Okay, I'll hold it. Go ahead.

04 20 10 48 CDR-EVA Okay.

04 20 10 49 LMP-EVA Got it?

04 20 10 50 CDR-EVA Yes. Let's get the other one.

04 20 11 17 CDR-EVA I know it's down in here somewhere.

04 20 11 20 LMP-EVA Say again.

04 20 11 21 CDR-EVA I know it's down in here somewhere.

04 20 11 26 CC Al, this is Houston. For your information, the 16-millimeter camera is out of film at this time.

04 20 11 36 MS-EVA ...

04 20 11 40 LMP-EVA Let me tilt it down a little more; let me hold it, and you go ahead.

04 20 11 41 CDR-EVA I can do it. Turn it around and get the front of it. Can you hold it up a little?

04 20 11 47 LMP-EVA Yes; I got it.

04 20 11 56 LMP-EVA You better hold - -

04 20 12 00 CDR-EVA There you are - Oops.

04 20 12 03 LMP-EVA Don't step on that.

04 20 12 06 CDR-EVA Just put it down there on the end, I guess, is the best way. Let me fuss with it.

04 20 12 11 LMP-EVA Don't step on the PSE cable there.

04 20 12 17 CDR-EVA Let it go.

04 20 12 51 LMP-EVA About 3 minutes.

04 20 12 53 CDR-EVA No, it's not going to do it, apparently.

04 20 13 39 LMP-EVA Maybe your tool is screwed up - let's see about - see if mine's any better. Full of dirt.

04 20 13 48 CDR-EVA Ain't no better ... one.

04 20 13 55 CDR-EVA Let's step on it, babe.

04 20 14 22 LMP-EVA Why, I'm not even sure there's one down there.

04 20 14 26 CDR-EVA Well, there should be.

04 20 14 37 LMP-EVA Okay. The only thing I can figure out to do at this point is to lift it up. I'll get it.

04 20 14 44 CDR-EVA Okay. Let's ...

04 20 14 55 CDR-EVA And, the cover off.

04 20 15 07 CDR-EVA Yes.

04 20 15 10 LMP-EVA There?

04 20 15 17 CDR-EVA Yes, it's there. See it?

04 20 15 19 LMP-EVA I can't see it; but if you think it's there, go get it.

04 20 15 24 CDR-EVA It's there.

04 20 15 26 CC Al, this is Houston. Could you give us some more details of your problems at the side from the sub-pallet you're working on?

04 20 15 35 LMP-EVA It's the side Boyd bolt that's hidden back in the corner. It apparently got full of dirt, Bruce; and we're having a devil of a time getting it off.

04 20 15 42 CC Roger.

04 20 15 44 LMP-EVA The one that's deep in the back. Just can't feel it any longer.

04 20 15 49 CC Roger.

04 20 15 52 CDR-EVA Let's do that. Hold that circular level - oh, good. Thank you. What I want to do is get the Sun shadow in there. And you had it for a minute. No.

04 20 16 12 LMP-EVA Tilt it a little more this way.

04 20 16 22 LMP-EVA Okay. Just hold it right there.

04 20 16 24 CDR-EVA Okay. I'll try.

04 20 16 25 LMP-EVA See where it's not.

04 20 16 50 LMP-EVA Okay. What do you want?

04 20 16 54 CDR-EVA Well, I'm having just no luck at all that way. Yes, there it is.

04 20 17 28 LMP-EVA I got it.

04 20 17 29 CDR-EVA Got it? Great. Okay.

04 20 17 35 LMP-EVA It takes two of us to do what half of us can do.

04 20 17 38 CDR-EVA Here we go. Okay.

04 20 17 41 CC Did you get it loose, Ed?

04 20 17 44 CDR-EVA Yes, it's loose.

04 20 17 47 LMP-EVA Yes, we got it.

04 20 17 53 CDR-EVA Okay, let me move it up. Are you ready to go?

04 20 17 58 LMP-EVA Yes. I'm ready to get the connector.

04 20 18 09 LMP-EVA Go on. We've got it.

04 20 18 13 CDR-EVA Okay. And here comes the side out the subpallet.

04 20 18 21 LMP-EVA Okay, let me get the connector and -

04 20 18 38 LMP-EVA Wait a minute. Don't drag the connector through the dirt.

04 20 18 42 CDR-EVA Why don't you move this thing; then, I need the tape to pull it up.

04 20 18 53 LMP-EVA There you go.

04 20 18 59 LMP-EVA Okay.

04 20 19 21 CC Ed, this is Houston.

04 20 19 26 LMP-EVA Go ahead.

04 20 19 27	CC	Roger. Sixteen-millimeter's been running about 9 minutes, now, since it ran out of film. We're using juice from the battery; and, also, we'd like to get the MET turned a few degrees. You've got a specular reflection coming right back to the TV camera. Over.
04 20 19 42	LMP-EVA	Okay. I'll do that right now, Bruce.
04 20 19 45	CDR-EVA	I'll get it.
04 20 20 02	LMP-EVA	(Humming) Okay. The side connector is connected. Am I clear to press the shorting switch, Bruce?
04 20 20 19	LMP-EVA	Houston?
04 20 20 20	CC	Roger. Go, Ed.
04 20 20 27	LMP-EVA	Turning switch is depressed. You'll be able to read it in a minute, I think.
04 20 20 33	CDR-EVA	Is that - better on the reflection, Houston?
04 20 20 37	CC	Yes, indeed. That's much better.
04 20 20 44	CDR-EVA	Okay. Camera is off.
04 20 20 47	CC	Roger.
04 20 21 06	CDR-EVA	Are you reading Charlie-Charlie is off?
04 20 21 33	CDR-EVA	Magazine Echo-Echo will be going on.
04 20 21 36	CC	Roger. Esmerelda, Equador.
04 20 21 46	LMP-EVA	He's got a checklist beside him that's got those, Al. There's no way you can beat him at that game.
04 20 21 53	CC	(Laughter) You'd better believe it.
04 20 21 55	CDR-EVA	What have we done to deserve this?
04 20 22 06	CDR-EVA	What have we done to deserve this?
04 20 22 15	CC	Just wait until you get to J-J.

04 20 22 21 LMP-EVA (Laughter) I'm nervous - I'm nervous already.

04 20 22 33 CDR-EVA Okay; f/8, six frames per second, 250th.

04 20 22 43 CC Roger. Give me a hack when you're started.

04 20 22 49 CDR-EVA Okay, Bruce. Stand by.

04 20 22 59 CDR-EVA Hack, hack.

04 20 23 01 CC Roger.

04 20 23 16 LMP-EVA And Houston, I verify that the switch number 5 is clockwise.

04 20 23 21 CC Roger, Ed.

04 20 23 42 LMP-EVA And the thumper geophone's coming off, now.

04 20 23 45 CC Roger.

04 20 24 10 CDR-EVA Hey, got pretty good range out of that baby.

04 20 24 13 LMP-EVA Man, that thing really went, didn't it?

04 20 24 21 CDR-EVA Pretty good range out of that baby.

04 20 25 07 CC Al, this is Houston. Could you tell us where you are in the SIDE or PSE sequence?

04 20 25 18 CDR-EVA Yes, sir. The legs of the SIDE have been deployed; PSE stool is being placed 10 feet north from the central station.

04 20 25 28 CC Roger.

04 20 26 32 LMP-EVA Okay, Houston. The thumper is stowed on the MET. I had to get the first geophone out in order to get it there, but we'll take care of that in a few minutes.

04 20 26 41 CC Roger, Ed.

04 20 26 47 LMP-EVA Now comes the task that tries men's patience; getting the mortar pack off. And it's coming off, now. Incidentally, how much are you able to see, Bruce?

04 20 27 06	CC	Okay, Ed. You're about one-seventh the height of our picture.
04 20 27 41	LMP-EVA	Yes. Okay. ...
04 20 28 07	CDR-EVA	Hey, that's going to be -
04 20 29 07	LMP-EVA	Okay, Bruce. The mortar pack is in place.
04 20 29 11	CC	Roger.
04 20 29 26	CDR-EVA	And we've had interim deployment of the PSE.
04 20 29 31	CC	Roger, Al.
04 20 29 52	LMP-EVA	You know, I don't think the solar wind is going to blow our antenna over like it generally does.
04 20 29 58	CDR-EVA	How about that. Okay, the CPLEEs starting to come off, now.
04 20 30 05	LMP-EVA	Watch it, watch it, watch it, watch it, watch it.
04 20 30 07	CDR-EVA	Yes, thank you, thank you, thank you, thank you, thank you. And let's try to get it back in line. Can you tap it for me a little? We're a little too close, if we can get this whole thing a little further away. Kind of push it with your foot.
04 20 30 22	LMP-EVA	I don't want to get too much dust on it; bad enough as it is.
04 20 30 35	LMP-EVA	About another 8 inches or so. That looks pretty good.
04 20 30 40	CDR-EVA	Is that level?
04 20 30 42	LMP-EVA	Yes. It looks pretty level to me, Al. Okay. CPLEEs coming off.
04 20 30 49	CDR-EVA	No, it's not.
04 20 30 53	LMP-EVA	Well, okay. We'll fix it up. When you get that baby off there.
04 20 31 04	CDR-EVA	Okay, Houston. Al is reading 3.75, reading 55 on the O_2. I have no flags on my minimum cooling and very comfortable.

04 20 31 17 CC Roger, Al. Go ahead, Ed.

04 20 31 23 LMP-EVA Okay, hold on here. Okay. Ed is reading 3.75, is reading 43 percent, and is reading - has no flags, is on minimum cooling, and feeling very comfortable.

04 20 31 45 CC Roger, Ed. And for your information, Antares, those numbers compare very well with our predictions; and it looks like you're going right down the old line.

04 20 32 03 LMP-EVA Very good.

04 20 32 06 CC And just by way of reference, I show you about 38 minutes behind the nominal time line at this point.

04 20 32 16 LMP-EVA Okay.

04 20 32 18 CDR-EVA Okay. We'll give you a little credit for that, Bruce. Better make up your mind as a television technician.

04 20 32 29 CC Roger. And, we're looking right now at about a 30-minute extension. I'll have more word for you on that later.

04 20 32 40 LMP-EVA Okay. We'll keep looking ahead, here.

04 20 32 48 LMP-EVA Okay. Have a good ... right amount of dirt. Metro station is level.

04 20 33 33 LMP-EVA Okay, Houston. The CPLEE is deployed. It is - the ball is in the inner ring. And it is lined up due east.

04 20 33 44 CC Roger, Ed.

04 20 33 49 LMP-EVA And we're going for the SIDE now.

04 20 33 54 CDR-EVA And it looks clean and pretty, doesn't it? That little CPLEE all sitting there.

04 20 34 00 LMP-EVA It won't long.

04 20 34 02 CDR-EVA All trim and proper.

04 20 34 04	LMP-EVA	You look very white, trim, and proper yourself. Little tarnished, now, but - -
04 20 34 10	CDR-EVA	... lower extremities, huh?
04 20 34 19	CC	Ed, Houston. You confirm interim or initial mortar pack deployment.
04 20 34 27	LMP-EVA	That's affirmative. I confirm it.
04 20 34 30	CC	Roger.
04 20 34 33	LMP-EVA	It's lined up almost due north, Bruce, in order to have a free flight away from all the craters, I can see and still miss the ridge that we're worried about.
04 20 34 44	CC	Roger. We copy.
04 20 34 56	LMP-EVA	And I'm heading out with the SIDE and the CCIG at this point.
04 20 35 02	CC	Roger.
04 20 35 04	LMP-EVA	Say, Houston, relative to the CCIG, since we have these ridges to the south of us and this thing is being deployed somewhat in a hollow, is this going to upset the investigators?
04 20 35 21	CC	Stand by. We'll get you an answer on that.
04 20 35 34	LMP-EVA	I don't really know what else we can do, since this whole area is a bowl.
04 20 35 39	CC	Ed, you can go ahead and deploy in accordance with the nominal plans that we understand and that will not impact the experiment.
04 20 35 52	CC	Ed, Houston. Do you copy deploy in accordance with the nominal plans?
04 20 35 59	LMP-EVA	Okay. Got you, Bruce. Thank you.
04 20 36 01	CC	Roger.
04 20 36 02	LMP-EVA	Sorry I was busy - at that moment.

04 20 36 47	CDR-EVA	Okay, Houston. To keep you honest, Al is operating in the central station at the moment.
04 20 36 53	CC	Roger, honest Al.
04 20 36 58	CDR-EVA	(Laughter)
04 20 39 21	CDR-EVA	Okay, up comes the central station. And that's one for the troops on the ground.
04 20 39 27	CC	Okay. We're watching.
04 20 39 32	CDR-EVA	Can you actually see it from there?
04 20 39 35	CC	I couldn't see it move up. I can see something, so to speak, flopping in the breeze. I guess that's the foil.
04 20 39 45	CDR-EVA	Flapping in the what?
04 20 39 59	LMP-EVA	Houston, I've - I'm here having a wrestling match with the SIDE and the CCIG. The SIDE is so light; the cable is sufficiently stiff that every time I touch the CCIG, it almost turns the SIDE over. It's turned it over twice on me, now.
04 20 40 22	CDR-EVA	Want some help up there, Ed?
04 20 40 24	CC	...
04 20 40 25	LMP-EVA	... I think.
04 20 40 27	CDR-EVA	Okay.
04 20 40 30	CC	Say again on that, Ed.
04 20 40 35	LMP-EVA	Say again?
04 20 40 36	CC	Yes, I missed your last.
04 20 40 41	LMP-EVA	I said I've been wrestling with the SIDE and CCIG out here. And - the cable is still sufficiently stiff, and the SIDE is sufficiently light and then - that's sufficiently a little bad; but it keeps getting tipped over.

04 20 41 08	CC	Can you do anything by moving it back a little bit toward the central station to slack off the cable?
04 20 41 15	LMP-EVA	No, no, no, no. It's the cable from the CCIG to the SIDE.
04 20 41 19	CC	Oh, okay.
04 20 41 24	CDR-EVA	A little hysteresis problem, huh?
04 20 41 28	LMP-EVA	There it goes again. Okay, Houston. I think I have it leveled. Besides that, it's poorly balanced, it turns out. It wants to tip over very easily to the rear. The CCIG is alined and leveled. I mean the SIDE is alined and leveled; and the corners, I guess I better check those.
04 20 41 59	CC	Okay, Ed. If you have a problem, SIDE is first priority; CCIG comes second.
04 20 42 08	LMP-EVA	Roger.
04 20 42 24	LMP-EVA	It's interesting, Bruce that the dynamics of the SIDE are such that - just pulling this pin on it almost tipped it over again. I had to use a lever technique to get it off.
04 20 42 44	CC	Roger.
04 20 42 45	LMP-EVA	Okay. The SIDE is - the SIDE is deployed.
04 20 42 49	CC	Roger. And copy, the dust cover is off.
04 20 42 56	LMP-EVA	Okay. We'll head back and get on to the thumper geophone.
04 20 43 01	CC	Okay. What's the status of the CCIG, Ed?
04 20 43 06	LMP-EVA	It's in good shape. It's deployed about 4 feet to the southeast, and pointing almost due south with a little bit to the west.
04 20 43 18	CC	Beautiful.
04 20 43 33	CC	Al, this is Houston. I show about 3 to 4 minutes overdue on the magazine on the 16-millimeter camera.

04 20 43 47 LMP-EVA I was heading for it over there, now, Al. I'll turn it off.

04 20 43 49 CDR-EVA Okay. You shut it off, and we'll change the MAG later.

04 20 44 06 LMP-EVA Okay. And Bruce, I'm going to go to INTERMEDIATE COOLING just for a few minutes - for a couple of minutes.

04 20 44 20 CC Roger, Ed.

04 20 44 36 LMP-EVA I've got it in between LOW and INTERMEDIATE, now.

04 20 44 46 CC Roger, Ed.

04 20 44 53 LMP-EVA And I'm going to take penetrometer measurement, now, Houston.

04 20 44 55 CC Roger.

04 20 44 56 LMP-EVA As I get ready for the thumper.

04 20 45 13 LMP-EVA That new extension handle works well. Hey, Houston, I'm taking these measurements now at a site about 15 - about 25 feet south of the central - not of the central station but of the RTG and here goes my first one. One hand. And Houston, I can push it in - Well, let's see - it's gone all - nearly all the way in.

04 20 45 53 CDR-EVA Six marks. Six blacks showing.

04 20 45 55 LMP-EVA ... 1, 2, 3, - 1, 2, 3, a double one and a black and white. A white, a black, and white below the upper double one. Do you understand?

04 20 46 07 CC Roger. We do.

04 20 46 11 LMP-EVA That's with one - with one hand.

04 20 46 14 CC But by - -

04 20 46 17 LMP-EVA - - hand. Let's push it all the way in.

04 20 46 19 CC Roger.

04 20 46 22 LMP-EVA I'll try it one more - -

04 20 46 24 CDR-EVA - - You have about 3 inches left, there.

04 20 46 26 LMP-EVA Well, it - it was no problem getting it in there, Al. It's my fingers won't reach any further.

04 20 46 29 CDR-EVA Okay.

04 20 46 34 LMP-EVA Okay. Here we go. One - one hand. And I have two white and two black rings going below the upper double ring. Understand?

04 20 46 51 CC Roger. Understand.

04 20 46 52 LMP-EVA With one hand. And two hands all the way again.

04 20 46 57 CC Roger, Ed.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 20 47 04 LMP-EVA And one more.

04 20 47 11 LMP-EVA At this side, Houston, I got it all the way to the upper double ring, one hand.

04 20 47 17 CC Roger, Ed. And get all - -

04 20 47 21 LMP-EVA And again all the way in, two hands.

04 20 47 24 CC Okay, the geophone deployment.

04 20 47 29 LMP-EVA Roger.

04 20 47 37 LMP-EVA And, Houston, I'm back in minimum cooling.

04 20 47 40 CC Roger, Ed.

04 20 48 25 LMP-EVA That looks like a pretty good - line right out there.

04 20 49 04 CC Honest Al, this is Houston. How are you doing?

04 20 49 10 CDR-EVA Fine, thank you, Honest Abe. I'm in the process of leveling and alining the antenna.

04 20 49 17 CC Roger.

04 20 50 09 LMP-EVA Now, let's see what that site looks like.

04 20 50 16 CDR-EVA Okay, the antenna is leveled. ***

04 20 50 34 LMP-EVA Al, you do take a picture down along this line, do you not?

04 20 50 37 CDR-EVA Yes.

04 20 50 38 LMP-EVA Okay. I've got me a site.

04 20 51 37 LMP-EVA And, Houston, I have my first geophone in the ground. And in this soft ground they go in vertically without any problem, and they push right on in.

04 20 51 48 CC Okay, that's the 10-foot one.

04 20 51 53 LMP-EVA That's affirm.

04 20 51 55	CC	Roger.
04 20 51 57	CDR-EVA	Okay, Houston. The central station antenna is along - is alined. I'm going to turn switch number 1 clockwise and switch number 5 counterclockwise. Are you with me?
04 20 52 12	CC	I'm with you; go.
04 20 52 21	LMP-EVA	Okay Al, will you watch me; keep me honest here.
04 20 52 28	CDR-EVA	Just a second, Ed. Number 1, clockwise. Number 5, counterclockwise. Okay. That's where they are, Bruce.
04 20 52 41	CC	Roger. Out.
04 20 52 57	LMP-EVA	I'm going to start moving out, Al.
04 20 52 58	CDR-EVA	Okay.
04 20 52 59	CC	And, Al, for your information, they're receiving a good signal back from ALSEP.
04 20 53 01	CDR-EVA	... Okay.
04 20 53 09	LMP-EVA	See where my first geophone is, Al? Is it okay?
04 20 53 11	CDR-EVA	Yes, I'll just - line you up there, just a second.
04 20 53 15	LMP-EVA	Okay.
04 20 53 17	CDR-EVA	Okay, a good line for you is the horizon intersection of that crater rim which is out of your sight; do you see it?
04 20 53 28	LMP-EVA	Yes.
04 20 53 31	CDR-EVA	That big intersection there.
04 20 53 32	LMP-EVA	Okay.
04 20 53 33	CDR-EVA	That's a perfect line for you.
04 20 53 34	LMP-EVA	That's where I'm headed.
04 20 53 36	CDR-EVA	Yes, beautiful. Okay, Houston, the ALSEP interior alinement looks good.

04 20 53 45	CC	Roger; out.
04 02 53 51	CDR-EVA	Okay, let's press on with the LR cubed.
04 20 53 57	CC	Okay, we've also got the PSE final deployment.
04 20 54 09	CDR-EVA	Okay, and we'll do that now.
04 20 54 15	LMP-EVA	Do da da do da doo, taah. Okay. Pull it - feet out this way. And ... to straight; plane ...
04 20 57 19	LMP-EVA	Okay, Houston. The second geophone is in. And I was a little bit overly optimistic about the ease of which they could be put in. The tension of the cable is such that it didn't want to allow the geophone to hang straight. Rather the - set in the cable.
04 20 57 40	CC	Roger, Ed.
04 20 57 41	LMP-EVA	The geophone isn't heavy enough to straighten it out. But we got it in.
04 20 57 48	CC	This we stuff?
04 20 57 53	LMP-EVA	That's an editorial we.
04 20 57 54	CC	Roger.
04 20 58 00	CC	And are you getting the - -
04 20 58 01	LMP-EVA	I was really referring to the end of the - -
04 20 58 05	CC	Are you getting the second flag in there?
04 20 58 06	LMP-EVA	I was really referring to the end of the thumper and me. Yes, it's in.
04 20 58 14	CDR-EVA	Okay, the final deployment of the PSE gives us a shadow reading of - 093.
04 20 58 29	CC	Roger. 093 degrees and level. Over.
04 20 58 35	CDR-EVA	093 degrees and level.
04 20 58 40	CC	Beautiful.

04 20 58 41	CDR-EVA	Make that -
04 20 58 56	CDR-EVA	You can call it 093.5 if you want, Houston.
04 20 59 00	CC	Roger; out.
04 20 59 04	LMP-EVA	And the skirt is all deployed very nicely and level; it's flat all the way around.
04 21 02 22	LMP-EVA	Okay, Houston, this is Ed. I'm at the end of my geophone line. Looking back over it, I see the cable has knocked down the second flag. Do you want me to go back and look at it or shall we try one shot and see if everything is working?
04 21 02 40	CC	We'd just as soon go ahead and try a shot and see how it works, Ed. Have you got the third one in the ground, yet?
04 21 02 49	LMP-EVA	Yes, the third one is in the ground. Somehow or another I'm tangled up on this cable. Just a minute.
04 21 02 59	CC	Roger.
04 21 03 05	LMP-EVA	There we go.
04 21 03 14	CDR-EVA	Okay. The LR cubed is deployed 100 feet, west of the central station. It is level, bed index is zero. The cover is coming off, now.
04 21 03 30	CC	Roger, Al.
04 21 03 31	CDR-EVA	The cover - The cover is off.
04 21 03 32	CC	And, Ed, this is Houston. Whenever you're ready, we need to get a calibration on the geophone, so if you and Al will just stand still for a moment, then we can give you a GO to commence thumping.
04 21 03 47	LMP-EVA	Okay. I'm standing still, now.
04 21 03 52	CDR-EVA	Okay. So is Al. The cover is off of the laser, and it's completely clean.
04 21 03 59	CC	Roger.

04 21 04 08	CDR-EVA	And it did not move during the cover removal.
04 21 04 12	CC	Roger, Al. And if you can do without moving around, we'd like to get an EMU status report.
04 21 04 25	CDR-EVA	Okay. This is Al. 3.75; volume, 0 percent; I have no flags; MIN cooling and I'm comfortable. Everything is beautiful.
04 21 04 35	CC	Roger.
04 21 04 36	LMP-EVA	Okay. This is Ed. I'm 3.75; 34 percent. I'm MID cooling, no flags. Feel great.
04 21 04 50	CC	Roger. Got it.
04 21 05 05	CC	Ed, this is Houston. You're GO for thumper activity. We will require that you and Al stop 20 seconds beforehand and let it quiet down. They're very sensitive.
04 21 05 18	LMP-EVA	Okay. You're giving them from all three geophones, Houston?
04 21 05 23	CC	That's affirmative.
04 21 05 27	LMP-EVA	Okay. Here goes the first one.
04 21 05 31	CDR-EVA	Okay.
04 21 05 32	LMP-EVA	Do I need 20 seconds now, Houston?
04 21 05 33	CC	That's affirmative.
04 21 05 38	LMP-EVA	Okay. Started counting.
04 21 05 52	LMP-EVA	5, 4, 3, 2 - Start over. 5, 4, 3, 2, 1 -
04 21 06 07	LMP-EVA	FIRE. I didn't feel anything, Houston.
04 21 06 16	CC	Roger; we copy. Stand by.
04 21 06 27	CDR-EVA	Ed, I'm going to mosey on back and start taking pictures in the meantime.
04 21 06 30	LMP-EVA	Okay.

04 21 06 56	CC	Ed, this is Houston. We saw an ARM and a DISARM signal on that. We would like for you to attempt to fire squib number 1 again at the same location. Over.
04 21 07 08	LMP-EVA	Okay. I haven't moved. Al, if you'll hold your position, we'll give them another go at it.
04 21 07 14	CDR-EVA	Okay, I'm steady.
04 21 07 30	LMP-EVA	5, 4, 3, 2, 1 -
04 21 07 36	LMP-EVA	FIRE.
04 21 07 38	LMP-EVA	Okay, we got it that time, Houston.
04 21 07 40	CC	Roger; very good.
04 21 07 43	LMP-EVA	Okay, it's a hard trigger, that's all. That was the problem.
04 21 07 48	CC	We copy.
04 21 07 52	LMP-EVA	Say again. Okay.
04 21 08 00	CDR-EVA	Houston, did you know that - we were filming that last magazine at six frames per seconds? Did you take that into account?
04 21 08 09	CC	That's affirmative. Six frames per second was nominal 15 minutes, and we ran for almost 20.
04 21 08 23	CDR-EVA	Okay, the little ball indicator was not indicating empty. Okay.
04 21 08 26	LMP-EVA	Hey, Al, I'm ready for another one.
04 21 08 28	CDR-EVA	GO.
04 21 08 47	LMP-EVA	5, 4, 3, 2, 1. Here, to try it again.
04 21 09 04	LMP-EVA	5, 4, 3, 2, 1 -
04 21 09 12	LMP-EVA	FIRE.
04 21 09 16	LMP-EVA	A hair trigger, this isn't.

04 21 09 20	CC	Okay, Ed. We copy it fired on that one, and we see it -
04 21 09 28	LMP-EVA	Okay.
04 21 09 30	CDR-EVA	Okay, Echo-Echo is coming off and Delta-Delta going on.
04 21 09 36	CC	Roger; understand Dover, Delaware, is going on the 16-millimeter camera.
04 21 09 44	CDR-EVA	Oh, dear (sigh).
04 21 09 48	LMP-EVA	Okay, Al, I'm ready for another one. And, Houston, this is the - number 2.
04 21 09 55	CC	Should be number 3, Ed.
04 21 10 00	LMP-EVA	Okay, counting from - counting from zero, zero it's number 2.
04 21 10 07	CC	Roger; counting from zero, it is number 2.
04 21 10 11	LMP-EVA	...
04 21 10 12	CDR-EVA	Okay.
04 21 10 27	LMP-EVA	5, 4, 3, 2, 1 -
04 21 10 32	LMP-EVA	FIRE.
04 21 10 42	CC	Beautiful, Ed.
04 21 10 46	LMP-EVA	Okay.
04 21 10 49	CDR-EVA	All set for those Juliett-Juliett. Starting frame is 6.
04 21 10 57	CC	Roger; frame 6, Jogjakarta, Java.
04 21 11 05	CDR-EVA	Do you have to be so prosaic?
04 21 11 12	LMP-EVA	Okay, Al, I'm ready when you are.
04 21 11 14	CDR-EVA	Go ahead.
04 21 11 32	LMP-EVA	5, 4, 3, 2, 1 -

04 21 11 37	LMP-EVA	FIRE. 1, 2, 3, 4, 5 ...
04 21 11 45	CC	Okay.
04 21 11 46	LMP-EVA	Okay, because this thing has a pretty good kick to it.
04 21 11 48	CC	Okay, good shot, Ed.
04 21 11 55	LMP-EVA	... like firing both barrels of a 12-gage shotgun at once.
04 21 12 00	CC	Roger.
04 21 12 26	LMP-EVA	Houston, am I on number 5 now?
04 21 12 30	CC	That's affirmative. Counting from 1, you're on number 5. Counting from zero, you'd be on number 4. Over.
04 21 12 38	LMP-EVA	Okay, give me the count from zero. That's what I'm marking on.
04 21 12 42	CC	Okay, from zero, you're on number 4.
04 21 12 45	LMP-EVA	Okay, Al, I'm ready.
04 21 12 49	CDR-EVA	Okay, I'm ready, Ed. Go ahead.
04 21 13 00	LMP-EVA	I'm not being facetious, Bruce. That's the way it's marked.
04 21 13 03	CC	Okay, I'm not fighting you.
04 21 13 12	LMP-EVA	5, 4, 3, 2 - Let's try that one over, it moved. 5, 4, 3, 2, 1. Okay, let's try it again, 5, 4, 3, 2, 1 - Damn, I didn't get a fire out of number 4, Bruce.
04 21 13 44	CC	Roger, Ed. Let's go to the next position, next initiator.
04 21 13 55	LMP-EVA	Okay. 1, 3, 4, 5. I can't get that one to fire either ...
04 21 14 06	CC	Okay, Ed. What I meant was the next geophone line station with the next initiator.

04 21 14 16	LMP-EVA	Okay.
04 21 14 18	CC	So using initiator number 5 - -
04 21 14 20	LMP-EVA	Yes. Let me try this one, again ...
04 21 14 26	LMP-EVA	Say again what you want me to do, Bruce - -
04 21 14 27	CC	Okay, using -
04 21 14 28	LMP-EVA	On both number 4 and number 5 - -
04 21 14 34	CC	Using your initiator number 5, you are to move on to the next station, which will be the sixth position. 1, 2, 3, 4, 5, 6, and try it again, there.
04 21 14 45	LMP-EVA	Okay. Okay.
04 21 14 54	CC	And, Ed and Al, for your information, you've been out 3 hours and 35 minutes, and you're about 35 minutes behind the nominal time line with a half-hour extension expected.
04 21 15 10	CDR-EVA	Roger.
04 21 15 12	LMP-EVA	Okay, Al, I'm ready to try again.
04 21 15 16	CDR-EVA	Okay. Go ahead, Ed.
04 21 15 38	LMP-EVA	5, 4, 3, 2, 1 - It just won't fire. I'll try that charge initiator once more.
04 21 15 55	CC	Roger; repeat that one, at the same location.
04 21 16 00	LMP-EVA	Roger. 1, 3, 4 - -
04 21 16 04	CC	Okay, and hold an ARM for 10 seconds.
04 21 16 10	LMP-EVA	Okay, let me reinitiate the ARM.
04 21 16 15	CC	Roger.
04 21 16 20	LMP-EVA	1, 2, 3, 5, 6, 7, 8, 9, 10,
04 21 16 26	LMP-EVA	FIRE. It won't go, Bruce.
04 21 16 36	CC	Okay, next ignitor, next geophone station.

04 21 16 43	LMP-EVA	Roger.
04 21 17 02	LMP-EVA	Okay, Al, I'm ready.
04 21 17 05	CDR-EVA	Okay, go ahead.
04 21 17 11	LMP-EVA	Bruce, do you want a 10-second ARM on this one, or 5?
04 21 17 13	CC	10 seconds, please.
04 21 17 26	LMP-EVA	5, 4, 3, 2, 1 -
04 21 17 31	LMP-EVA	FIRE. Got a good one. 3, 4, 5.
04 21 17 36	CC	Roger, Ed.
04 21 17 38	LMP-EVA	Hurrah, we got one.
04 21 17 41	CDR-EVA	Hurrah, we got one.
04 21 17 55	LMP-EVA	It was afraid not to. I told it I was going to break it in half if it didn't fire on that one. Okay, I'm ready for the next one.
04 21 18 03	CDR-EVA	Okay, go ahead.
04 21 18 06	LMP-EVA	Okay, here we go.
04 21 18 19	CC	Ed, this is Houston. We'd like you to proceed to the central geophone, that is geophone number 2, ... ignitor number 11, or make that ignitor number 10, by your count, and fire that one off. Over.
04 21 18 37	LMP-EVA	Instead of the one I'm firing right now?
04 21 18 40	CC	That's affirmative.
04 21 18 44	LMP-EVA	All right, just about to push the trigger. Oh, oh, that's what I was afraid of, Bruce. This one is pulled out.
04 21 18 55	CC	Which one pulled out?
04 21 19 00	LMP-EVA	The middle geophone is not in the ground.
04 21 19 04	CC	Okay, if you can reemplace it, do so.

04 21 19 08	LMP-EVA	I shall. This ground is so soft that apparently, the - just a tug on the cable lifted it right out.
04 21 19 27	CC	Al, this is Houston. What are you photograph - photographing now? Over.
04 21 19 37	CDR-EVA	Right now, I'm taking the distance shots back to the LM from the RTG.
04 21 19 44	CC	Roger. Out.
04 21 19 45	CDR-EVA	Getting down to photograph the SIDE.
04 21 19 49	CC	Roger.
04 21 20 27	LMP-EVA	(Whistle) Okay, Houston. Number 11, it is.
04 21 20 33	CC	Roger. Be your ignitor number 10, and you're at the second geophone.
04 21 20 42	LMP-EVA	Okay, that's affirm. Al, I'm ready when you are.
04 21 20 47	CDR-EVA	Go ahead.
04 21 21 06	LMP-EVA	5, 4, 3, 2, 1 -
04 21 21 10	LMP-EVA	MARK. Good shot.
04 21 21 13	CC	Roger. Al, you're released from the constraint for - of holding still for a period of time prior to and after the geophone thumps. Ed must still abide by the 20-second-before-and-5-second-after rule. Over.
04 21 21 31	CDR-EVA	This is Al. I understand.
04 21 21 37	LMP-EVA	Okay, Bruce.
04 21 22 10	CC	Ed, this is Houston. We're expecting you to thump at each station from there on in.
04 21 22 21	LMP-EVA	Okay.
04 21 22 56	LMP-EVA	Okay. Houston, here is number 11 coming up.
04 21 23 07	CC	Roger.

04 21 23 24	LMP-EVA	5, 4, 3, 2, 1 -
04 21 23 28	LMP-EVA	FIRE. Good shot.
04 21 23 30	CC	Roger.
04 21 23 35	CDR-EVA	You should have threatened it earlier in the game.
04 21 23 39	LMP-EVA	You're right.
04 21 23 53	LMP-EVA	Okay. Number 12.
04 21 24 12	LMP-EVA	5, 4, 3, 2, 1 -
04 21 24 16	LMP-EVA	FIRE. GO shot.
04 21 24 19	CC	Roger, Ed.
04 21 24 33	LMP-EVA	...
04 21 24 53	LMP-EVA	Okay, number 13, Houston.
04 21 24 55	CC	Roger.
04 21 25 03	LMP-EVA	5, 4, 3, 2, 1 -
04 21 25 08	LMP-EVA	FIRE. No fire.
04 21 25 10	CC	Okay, Ed. Press on to the next station; the next ignitor.
04 21 25 17	LMP-EVA	Okay.
04 21 25 29	LMP-EVA	Are we getting any decent signals back, Bruce?
04 21 25 32	CC	That's affirmative, Ed.
04 21 25 37	LMP-EVA	Okay. I'm on ignitor 15.
04 21 25 40	CC	Al, this is Houston. We need to have you stand still again.
04 21 25 47	CDR-EVA	Okay.
04 21 25 51	CC	And I - I show that you ought to be on your ignitor number 14, Ed. Unless that was the one you last used.
04 21 26 01	LMP-EVA	Okay.

04 21 26 08 LMP-EVA 5, 4, 2, 1 -

04 21 26 13 LMP-EVA FIRE. No fire. Let me try it once more, Bruce.

04 21 26 21 LMP-EVA ARM 1,

04 21 26 32 LMP-EVA FIRE. No fire. Okay, I'm moving on.

04 21 26 36 CC Roger; move on.

04 21 26 49 LMP-EVA Number 15. Okay.

04 21 27 12 LMP-EVA 5, 4, 3, 2, 1 -

04 21 27 16 LMP-EVA FIRE. No fire.

04 21 27 22 CC Roger; next geophone, next position; or not next geophone, next station, next - next squib.

04 21 27 34 LMP-EVA Roger.

04 21 27 50 LMP-EVA Okay, Al.

04 21 27 51 CDR-EVA *** Ed.

04 21 28 10 LMP-EVA 5, 4, 3, 2, 1 -

04 21 28 15 LMP-EVA FIRE. Good shot.

04 21 28 18 CC Roger.

04 21 28 19 LMP-EVA 2, 3, 4, 5.

04 21 28 22 CC Roger; understand good shot on your ignitor 17 - 16.

04 21 28 28 LMP-EVA That's affirm.

04 21 28 39 LMP-EVA Okay, number 17.

04 21 28 47 CDR-EVA Okay.

04 21 29 22 LMP-EVA 5, 4, 3, 2, 1 -

04 21 29 27 LMP-EVA FIRE. Good shot. 2, 3, 4, 5.

04 21 29 35 CC Roger, Ed.

04 21 30 08 LMP-EVA Okay, number 18.

04 21 30 15	CDR-EVA	Okay, go ahead.
04 21 30 41	LMP-EVA	5, 4, 3, 2, 1 -
04 21 30 46	LMP-EVA	FIRE. Good shot.
04 21 30 48	CC	Roger.
04 21 30 50	LMP-EVA	*** 4, 5.
04 21 31 00	LMP-EVA	These latter shots are firing like its supposed to, Bruce?
04 21 31 03	CC	Roger, Ed.
04 21 31 05	LMP-EVA	Good easy pull and it's not kicking - didn't seem to be kicking quite so hard. Maybe I'm just pushing on it harder.
04 21 31 17	LMP-EVA	Okay, Al.
04 21 31 19	CDR-EVA	Okay, go ahead.
04 21 31 35	LMP-EVA	5, 4, 3, 2, 1 -
04 21 31 40	LMP-EVA	FIRE. Good shot. 2, 3, 4, 5.
04 21 31 47	CC	Roger, Ed.
04 21 31 52	LMP-EVA	And we only have one left, Bruce.
04 21 31 56	CC	Okay, how many positions do you have to go?
04 21 32 02	LMP-EVA	Well, I'm on 20, and I'm on my last position.
04 21 32 10	CC	Beautiful.
04 21 32 11	LMP-EVA	I'm at the last geophone.
04 21 32 12	CC	Beautiful.
04 21 32 15	LMP-EVA	And I'm - okay. What I'm saying is we got a shot to spare, but we must have had 22 charges.
04 21 32 24	CC	Ed, this is Houston. We'd like both of you to stand still for a minute here until we get a calibration curve.

04 21 32 32 LMP-EVA Okay.

04 21 32 33 CC And bear in mind that you told me that you started with charge number zero. So zero to 20 is 21 charges, and we come out even.

04 21 32 43 LMP-EVA Yes, I understand that. I've never seen one fire on zero before. Of course, I've never fired flight hardware before.

04 21 33 09 CC Ed, now are you both holding still for the calibration here?

04 21 33 15 CDR-EVA Affirmative.

04 21 33 29 LMP-EVA Fans and the pumps are running on our PLSS.

04 21 33 32 CC Well, we wouldn't want you to shut those off.

04 21 33 38 LMP-EVA Thank you.

04 21 33 40 CC Okay, go ahead with the last shot, Ed.

04 21 33 46 LMP-EVA Okay, here we go.

04 21 33 47 CDR-EVA I'm ready.

04 21 34 01 LMP-EVA 5, 4, 3, 2, 1 -

04 21 34 05 LMP-EVA FIRE. Good shot.

04 21 34 08 CC Good show.

04 21 34 09 LMP-EVA 3, 4, 5.

04 21 34 12 CDR-EVA Okay.

04 21 34 17 CDR-EVA Okay, Al has completed the photographic coverage of the ALSEP and - Juliett-Juliett, counter number 34. And would you tell us now how much - Counter number 34, Ed - Would you tell us now, how much longer we have before we have to be back at the MESA for closeout?

04 21 34 47 CC Roger. Counter 34, and stand by.

04 21 34 55 CDR-EVA ... not a bad batting average. Big-league stuff.

04 21 35 06 LMP-EVA I was hoping to get a few more shots off than that.

04 21 35 08 CDR-EVA Okay, we ought to look around the spot for the - ... I think we'd better have a little change in strategy here.

04 21 35 27 CDR-EVA Okay, Houston, the - -

04 21 35 29 CC Al and Ed, this is Houston with a half-hour extension. You have 18 minutes until you have to be back at the MESA.

04 21 35 43 LMP-EVA Eighteen minutes and 30 extension is what we have, is that correct?

04 21 35 47 CC That's Roger. You are 3 hours and 56 minutes into the EVA at this time.

04 21 35 54 LMP-EVA Okay, in that case then, we will arm the mortar package at this time before we leave. We'll proceed back along our track getting geology along the way.

04 21 36 07 CC Roger. We concur.

04 21 36 13 CDR-EVA Hey. If you wait a minute, I'll come over and help you with that thing, Ed.

04 21 36 16 LMP-EVA Okay, Houston. Did you copy that switch number 5 is clockwise and safe?

04 21 36 20 CC Roger. I now copy that switch number 5, clockwise and safe.

04 21 36 32 LMP-EVA Okay, we're going to arm the mortar pack, and unlock and pull the safety latch. Hold her down.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 21 23 07 CMP Houston, you read 4 - Kitty Hawk?

04 21 23 10 CC Okay, Kitty Hawk; Houston. We're reading you loud and clear.

04 21 23 17 CMP Okay, I'm coming up on my pitch 4-minute mark. Everything's completed on the checklist up to that.

04 21 23 26	CC	Okay, mighty fine, Stu. As soon as we get a little HIGH BIT RATE here, we'll take a good look at your data.
04 21 23 53	CMP	And, Ron, do you want me to do anything with the tape recorder; you going to handle that?
04 21 24 04	CC	Kitty Hawk, Houston. We'll handle the tape recorder.
04 21 24 11	CMP	Okay.
04 21 25 32	CC	Okay, Kitty Hawk; Houston. You're looking mighty fine down here. You have a GO for plane change.
04 21 26 20	CC	Kitty Hawk, Houston. You have a GO for the burn.
04 21 29 07	CMP	Okay, 30 seconds. Everything looks good, Ron.
04 21 29 11	CC	Okay. Looking good down here.
04 21 29 24	CMP	Okay. Ullage is on.
04 21 29 36	CMP	And we've got -
04 21 29 37	CMP	IGNITION. And she's steady as a rock.
04 21 29 46	CC	Beautiful.
04 21 29 54	CMP	And SHUTDOWN.
04 21 30 52	CC	Okay, Kitty Hawk; Houston. No trim on this burn. And you can whip into POO, and we'll start sending some uplink to you.
04 21 31 03	CMP	Okay. Just a second ... Do you need anything else? The Delta V_T is minus 12.3, and I guess your monitors are wrong. I hate to break up the discussion here, but I want to be right with you.
04 21 31 21	CC	Roger. Delta-V_T was minus 12.3.
04 21 31 57	CMP	Okay. You wanted POO and ACCEPT. Is that right, Ron?
04 21 32 09	CC	Okay, Kitty Hawk; Houston. Do you have POO and ACCEPT?

04 21 32 18	CMP	You've got POO and ACCEPT now.
04 21 32 21	CC	Roger.
04 21 32 28	CC	And, when you get things pretty well squared away there, I've got some 00 time and a photo pad and then a map update for you.
04 21 32 46	CMP	Okay. I'm ready to copy.
04 21 32 48	CC	Okay. Your REFSMMAT 00 time, 142:25:30.00. Okay, your earthshine photo pad is on page 28; T-start is 118:45:37.
04 21 33 37	CMP	Okay, Ron. I copy REFSMMAT 00 time, 142:25:30.00; earthshine photo pad T-start, 118:45:37.
04 21 33 50	CC	Okay. And then the next page - on page 29, your map update. For 180 - for 180, it's 119:39:59. And while we've got a little time here, do you happen to have the percent magazine for the P24 pass and also from the galactic survey?
04 21 34 29	CMP	Okay. ... right after ...
04 21 34 41	CC	Stu, wait a minute. I can't read you there. You might check - try tweaking on the OMNI - or tweaking up the HIGH GAIN, please.
04 21 34 58	CMP	How do you read, now?
04 21 35 01	CC	Still got a lot of - Hey, there it's quieted down. It should be good now.
04 21 35 10	CMP	Okay. Let's start with map update.
04 21 35 14	CC	Okay, go ahead.
04 21 35 19	CMP	I didn't get it.
04 21 35 21	CC	Oh, okay. Map update, REV 20 - -
04 21 35 22	CMP	Went out on me.
04 21 35 25	CC	- - is 18 - for the 180, 119:39:59.
04 21 35 37	CMP	Okay; 119:39:59.

04 21 35 40	CC	And the computer's yours.
04 21 35 53	CC	And, Stu, if you got it there, we need the percent of the magazine remaining from your P24 passes and also from the galactic survey.
04 21 36 38	CMP	Okay, Ron. I think I've got you again.
04 21 36 40	CC	Okay, good. Go. Okay. Did you hear the request for the - -
04 21 36 47	CMP	I got the map update.
04 21 36 51	CC	Okay. And we need the percent remaining on your magazine from P24 and your galactic survey. Over.
04 21 37 04	CMP	Okay.
04 21 37 11	CMP	Okay; on the galactic survey is 73 percent.
04 21 37 18	CC	Copy; 73 percent.
04 21 37 22	CMP	And on the landmark tracking, that's magazine B, it's 50 percent.
04 21 37 29	CC	MAG Bravo, 50 percent.
04 21 37 44	CC	Okay, Stu. You can go ahead and press on, and whip into your P52 attitude there.
04 21 37 49	CMP	Okay.
04 21 37 55	CC	And, whenever you get some time there, maybe while you're torquing P52 or something, you can read back your TEI-34 preliminary pad.
04 21 38 11	CMP	Okay.
04 22 00 40	CC	Okay, Kitty Hawk; Houston. We're back with you again.
04 22 00 49	CMP	Roger.
04 22 05 01	CC	Okay, Kitty Hawk; Houston. You got about 30 seconds here before T-start time on the earthshine.
04 22 05 09	CMP	Okay.

04 22 06 02	CC	Okay, Stu; Houston here. Looks like this might be a good time to read back your TEI-34 pad to us.
04 22 06 13	CMP	Just a minute, Ron. I got to configure one more camera, here.
04 22 06 18	CC	Oh, okay, I -
04 22 07 10	CC	And, Stu, just as a matter of interest, Ed now has been out 4 hours and 28 minutes. They're back at the LM now cleaning up the stuff, and they're about ready to crawl back in.
04 22 11 47	CC	And, Kitty Hawk; Houston. Comm down here is getting lousy again.
04 22 13 03	CC	Kitty Hawk, Houston in the blind. It's time to change your shutter speed. Your data camera to 1/15th; your DAC, 1/50th.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 21 36 52	CC	Al -
04 21 36 53	LMP-EVA	... and place to hold it.
04 21 36 56	CC	Al and Ed, this is Houston, after arming the mortar pack, we'd like you to proceed back in the general direction of the LM, and selecting a suitable area in route, collect the comprehensive sample and try to pick up a football-size rock on the way. Over.
04 21 37 14	LMP-EVA	Okay, that's our intent, Houston.
04 21 37 17	CC	Okay, and I'll give you periodic reports on how much time you've got left until you have to be back at the MESA.
04 21 37 26	LMP-EVA	Okay.
04 21 37 45	LMP-EVA	***
04 21 38 03	CDR-EVA	Okay, it's a little off level, now.
04 21 38 05	LMP-EVA	Yes. I'll relevel it some more.
04 21 38 06	CDR-EVA	Okay.

04 21 38 07	LMP-EVA	Okay. I'm fixing to relevel it right now.
04 21 38 11	CDR-EVA	I'll press on, and back and look for a good spot for this - -
04 21 38 14	LMP-EVA	Okay. Houston, the safety rods are out of the mortar pack.
04 21 38 18	CC	Roger.
04 21 38 59	CC	Al and Ed.
04 21 39 00	CC	MARK, four hours into the EVA.
04 21 39 07	LMP-EVA	Okay.
04 21 39 08	CDR-EVA	Okay.
04 21 39 10	CC	With the half-hour extension, we're working into a 4-hour-and-45-minute EVA duration.
04 21 39 19	LMP-EVA	Roger.
04 21 39 24	CC	And, Al and Ed, would you confirm that you have the extension handle off of the thumper geophone anchor.
04 21 39 34	LMP-EVA	I will have it when we leave here, but we don't have it yet.
04 21 39 39	CC	Roger. Out.
04 21 39 52	LMP-EVA	Okay, Houston, the mortar pack is alined, with the bubble tangent to the inner ring; and I'm going to arm it now; and it's - point it almost - yes, almost due north, a little bit to the west of north. I guess Al's photographs will allow you to get that exactly.
04 21 40 15	CC	Roger; bubble tangent to inner ring and almost due north.
04 21 40 22	LMP-EVA	Well it's tangent to the inner ring on the northwest side.
04 21 40 32	CC	Okay.

04 21 40 34	LMP-EVA	Both arming switches are on, on the mortar pack. Switch number 5 is going back counterclockwise.
04 21 40 41	CC	Okay, stand clear.
04 21 40 56	LMP-EVA	Okay. Switch 5 is armed.
04 21 41 00	CC	Okay. You got the safety - -
04 21 41 01	LMP-EVA	You've got to stay 15 feet back when it's - -
04 21 41 05	LMP-EVA	Fifteen feet away when that cable's only 10 feet long.
04 21 41 10	CC	Roger; we copy. And you got the safety rods, the two switches on the pack, and switch 5. Beautiful.
04 21 41 18	LMP-EVA	That's affirm.
04 21 41 28	LMP-EVA	And I have the extension handle, and I'm starting out after Alan, now.
04 21 41 44	LMP-EVA	Whee. Hey, this is sure a different mode of traveling than carrying that barbell.
04 21 41 52	CDR-EVA	Okay, Houston, on this - Houston, on this comprehensive sample we're, about a third of the way back to the LM, I've not found an area exactly what I want, so I have drawn a circle which is approximately 2 meters in radius, and I'm going to pick the surface rocks from that, and a sampling of the surface fines from that area.
04 21 42 24	CC	Roger, Al.
04 21 42 26	CDR-EVA	And I've photographically doc - I've documented this location with a locator shot back to the LM and to the ALSEP.
04 21 42 37	CC	Roger, Al.
04 21 42 51	LMP-EVA	Okay, Al. Need some help there?
04 21 42 53	CDR-EVA	Yes, I wanted to pick up all the walnut-size rocks in your tongs. And we'll get the surface fines, here.

04 21 43 10 CDR-EVA Why don't you work that - that side of it, and I'll work this side.

04 21 43 14 LMP-EVA Okay.

04 21 43 31 CDR-EVA You have to be careful you don't put them in the ground. If you make consecutive passes up the whole circle, we can tell.

04 21 43 53 LMP-EVA Oh, damn.

04 21 43 58 CDR-EVA Maybe we can - -

04 21 44 00 LMP-EVA Pardon?

04 21 44 01 CDR-EVA For this amount of time, we can really only get the - the ones that are essentially there.

04 21 44 07 LMP-EVA Yes, let me grab another weigh bag, because you're too far away for me to - -

04 21 44 10 CDR-EVA An inch in diameter.

04 21 44 17 LMP-EVA - - Can't help you very well this way.

04 21 44 18 LMP-EVA Put something together in a minute.

04 21 44 47 CDR-EVA I think I've got them, Ed.

04 21 44 49 LMP-EVA Okay. I'll get one for the fines.

04 21 44 51 CDR-EVA Get one for the fines and we'll start - I'd just say, just grab an undisturbed site out of each quadrant, we didn't hit with our feet. Cut it down to about a centimeter level - and fill the bag that way.

04 21 45 15 LMP-EVA Okay. You want the medium-size scoop or the big scoop for this?

04 21 45 21 CDR-EVA No, actually - the trenching tool, medium - Now the medium size scoop is the best. All you've got to do is cut the surface to the depth of about a centimeter in an undisturbed area here - where we haven't picked up the rocks. Okay?

04 21 45 37 LMP-EVA Okay. ***bringing the stuff over right now.

04 21 45 43 CC Al and Ed this is Houston. We show about 8 minutes remaining until you should be at the MESA to start closeout.

04 21 45 53 CDR-EVA Okay, we will be able to bring the comprehensive sample at that time.

04 21 45 59 CC Beautiful.

04 21 46 02 LMP-EVA Hey, here - don't close it, here's one in here for that.

04 21 46 06 CDR-EVA What?

04 21 46 07 LMP-EVA Here's one in here I picked up.

04 21 46 08 CDR-EVA Oh, okay. Dump it in here, then.

04 21 46 23 CDR-EVA Okay. Good.

04 21 46 37 LMP-EVA Okay, I'll start over here in this undisturbed area.

04 21 46 47 CDR-EVA Yes, just get that area and then right here in this area. And fill up the bag to the line. Now I'll head on back a little farther, get a football-size rock.

04 21 46 59 LMP-EVA Okay.

04 21 47 46 CDR-EVA Okay. There's some pretty good-sized ones back over in here.

04 21 48 58 CDR-EVA Okay, that's too big.

04 21 49 04 CDR-EVA I'll get one that's a little smaller.

04 21 49 10 CC Al and Ed, 5 minutes.

04 21 49 14 CDR-EVA Okay. You want to start back now, Ed?

04 21 49 21 LMP-EVA All right, let me get about three more scoops, Al. I can get there before long.

04 21 49 25 CDR-EVA Good.

04 21 50 12 CDR-EVA Okay, Houston, you can see where the - the area where the football-sized rock is coming from. It's

essentially two-thirds of the way back toward the LM, from the ALSEP site. The rock appears to have been ejected from the crater which Ed was describing earlier, in his 12:30 position. As a matter of fact, it's going to be the small foot size - football-sized rock - No it turned out to be two of them.

04 21 50 58 CC Roger.

04 21 51 16 CDR-EVA The second small football appearing on the same crater - from near the same crater.

04 21 51 45 CDR-EVA And, at first glance, appears to be fairly similar color. It's a large hand sample. It's essentially nonvesicular. Just some very small vesicles. The -

04 21 52 01 CC Roger. We've got 2 minutes, we'd like to get you on back to the vicinity of the MESA.

04 21 52 08 CDR-EVA ***looks to be a fairly large crystal in that second small football rock and now, starting back toward the MESA, now.

04 21 52 17 LMP-EVA And I'm on my way, too.

04 21 52 19 CC Roger.

04 21 52 31 CDR-EVA Okay. Away we go.

04 21 52 33 LMP-EVA The number of surface rocks, or rocks compared with the number of surface fines is very, very small, Houston. It is - there's a few boulders lying around and there's a few blocks around some of the craters, but by and large, it's a powdery surface. Don't run into that crater, Al.

04 21 52 56 CDR-EVA Don't - don't worry, Babe. A little sidewinder action, here.

04 21 53 12 CDR-EVA The old man's traveling pretty well.

04 21 53 14 CDR-EVA Hey, how about keeping your eye on it because - -

04 21 53 16 LMP-EVA I am.

04 21 53 21 LMP-EVA Boy, my sample's packing down. It was more than that when I left the site.

04 21 53 38 CDR-EVA Okay, we're coming back down the hill, Houston.

04 21 53 42 CC Roger, Al. We're seeing you going across the TV camera and it looks like you've gotten back to the MESA here with about 10 or 15 seconds to spare on our mark. We do have plenty of time for the nominal closeout, so we don't want you to rush that. Just go through the procedures, and we'll take the timing as it comes. And, when you have a moment, we'd like to get an EMU status report.

04 21 54 08 CDR-EVA Okay.

04 21 54 15 LMP-EVA And since I'm coming by the camera, Houston, I'll turn you around.

04 21 54 19 CC Roger. And we'll put the zoom on - zoom on about 44.

04 21 54 22 CDR-LM Okay. ***have a view - -

04 21 54 31 CC And we go back to average, and f/44.

04 21 54 40 LMP-EVA How's the field of view right now?

04 21 54 43 CC It's pretty poor right now.

04 21 54 48 LMP-EVA Okay. Just a minute. Okay.

04 21 55 02 LMP-EVA Switch it to 40.

04 21 55 03 CC Okay, can you elevate the camera a little?

04 21 55 08 LMP-EVA Yes, I have to dig in her - bag. How is that?

04 21 55 13 CC Okay. Good. Very good.

04 21 55 17 LMP-EVA Okay.

04 21 55 22 LMP-EVA Oh, damn it. There went my sample bags.

04 21 55 28 CDR-EVA Put your UHT handles for it.

04 21 55 32 LMP-EVA I'll use the - this handle. Fortunately, I don't think more than a little bit fell out.

04 21 56 36 CDR-EVA Okay, we've got it packed down to only half full.

04 21 56 58 CDR-EVA Okay, Houston, for your information, those location - documentary location shots of the comprehensive sample taken on JJ and - I'm now showing 40.

04 21 57 12 CC Roger; JJ, 40, for the comprehensive sample area.

04 21 57 38 LMP-EVA Take that - take that, can you? That's - that's all right I wanted you to stow that, but your hands are full, too. I'll get it.

04 21 57 49 CDR-EVA And on the comprehensive sample, Houston, I feel we have about 15 rocks, and some fines. One weigh bag is going in the SRC.

04 21 58 01 CC Roger. If you take an additional weigh bag, and put material from the immediate vicinity of the LM into it to fill up the SRC, we request that you drop a documented sample bag in it as a tag. Over.

04 21 58 16 CDR-EVA Okay.

04 21 58 24 CDR-EVA Okay, I guess we've got a little room to do that. I put the football-sized rocks in the ETB.

04 21 58 29 LMP-EVA Okay. Let's see, you put a 70-millimeter camera in the ETB?

04 21 58 35 CDR-EVA You want a bag? Yes, it's in there.

04 21 58 37 LMP-EVA Did you take out the TDS?

04 21 58 41 CDR-EVA No, not yet.

04 21 58 43 LMP-EVA Okay, it's probably in the bottom.

04 21 58 45 CC And, Al, I show that you have a magazine on the 16-millimeter that's totally unused, Dover Delaware.

04 21 58 54 CDR-EVA It's on the MET, Bruce. It never made it on the camera.

04 21 58 59 CC I think Ed put it on. But didn't start it.

04 21 59 04 LMP-EVA Negative.

04 21 59 07 CDR-EVA Oh, I'm sorry. I take it back, we did put it on.

04 21 59 16 CDR-EVA Okay, where's that tin scoop?

04 21 59 21 LMP-EVA Which one, the big one? Why don't you let me help you with the - let's take the shovel, Al; it'll be faster.

04 21 59 28 CDR-EVA All right.

04 21 59 30 LMP-EVA Trenching tool.

04 21 59 31 CDR-EVA Want to hold the bag?

04 21 59 32 LMP-EVA Yes.

04 21 59 33 CDR-EVA Let's hit that little crater out there. It looks like a secondary -

04 21 59 36 LMP-EVA Okay, let's go get it.

04 21 59 37 CDR-EVA Right out here.

04 21 59 40 LMP-EVA I saw a - saw a little crater about this size out here that I'd swear had glass in the bottom of it, but I was too busy thumping to stop and make any comment on it.

04 21 59 54 CDR-EVA Okay. ...

04 22 00 26 LMP-EVA There's a little different colored layer at the bottom of it there.

04 22 00 28 CDR-EVA Yes. Scoop it out. ...

04 22 00 37 LMP-EVA See, there's a different color there, maybe.

04 22 00 45 CDR-EVA Okay, how does that look to you?

04 22 00 47 LMP-EVA I can take another shovelful.

04 22 00 48 CDR-EVA Okay.

04 22 01 03 LMP-EVA That's good.

04 22 01 04 CDR-EVA Okay. Houston, that's in a small crater; looks like it might be a secondary impact, just hazarding a guess; it's about 2 feet in diameter, and it's - it's between 130, 50 feet, 130, 40 feet from the LM.

04 22 01 25 CC Roger. That's the initial - -

04 22 01 26 CDR-EVA And we'll put a documented sample bag in there with it.

04 22 01 31 CC Right. That's the - -

04 22 01 32 CDR-EVA We'll put a documented sample bag in there with, and that will be bag number 1. Here you go, Ed.

04 22 01 53 LMP-EVA Okay, put it in.

04 22 01 56 CDR-EVA One November, 1 November.

04 22 01 59 CC Roger. Out.

04 22 02 05 LMP-EVA Okay. ***and that'll fill up this one - this SRC, and that will do it very nicely.

04 22 02 09 LMP-EVA Okay. There you go.

04 22 02 14 CDR-EVA Hey, you got her.

04 22 02 18 LMP-EVA Okay. All right, Houston. I'm getting the two used MAGs off the MET. They're going in the ETB.

04 22 02 46 CC Al, this is Houston.

04 22 02 49 CDR-EVA Okay, that's too big, stick that in the ETB, also. Go ahead, Houston.

04 22 02 54 CC Roger; prior to terminating the EVA, on the TV camera; we'll need it set to f/44, peak and aline, so that the long axis of the camera is perpendicular to the Sun. We'd also like to move the camera so that in this orientation we're still viewing the LM. Over.

04 22 03 15 CDR-EVA Okay. Okay. At f/44, peak, and long direction, normal to the sunline.

04 22 03 22 CC Roger.

04 22 03 26 LMP-EVA Al, did you get the - did you get to put the maps in - no, the maps are right here.

04 22 03 32 CDR-EVA No, I haven't done anything yet. I'm just loading the SRC.

04 22 03 35 LMP-EVA Okay.

04 22 03 36 CDR-EVA The 70-millimeter camera in the ETB, and I'm storing - packing the SRC.

04 22 03 42 LMP-EVA Okay.

04 22 03 43 CDR-EVA And, Houston, we were unable to get all of the weigh bags in the SRC. It's full. We're putting the small samples of small rocks from the comprehensive sample in the weigh bag along with the two small football rocks.

04 22 04 11 CC Roger. All righty. Understand the football rocks are in one weigh bag, and you're adding another weigh bag containing the small rocks.

04 22 04 23 CDR-EVA Right, two weigh bags and they're both in the ETB.

04 22 04 27 CC Roger.

04 22 04 29 CDR-EVA Get in there, baby.

04 22 04 31 LMP-EVA We're going to have to make another ETB load, Al. I've got another 70-millimeter camera to go.

04 22 04 38 CDR-EVA It's not very heavy.

04 22 04 40 LMP-EVA But I'm thinking about volume.

04 22 04 46 CDR-EVA Okay, SRC is closed now.

04 22 04 52 CDR-EVA Okay, so SRC, serial 07, Houston, contains, then, the organic control sample, the fines from the comprehensive sample, and the extra fines from that small crater we collected near the LM.

04 22 05 18 LMP-EVA Okay.

04 22 05 19 CC Roger; we copy those in the SRC.

04 22 05 20 CDR-EVA *** 70-millimeter cameras, and three 16-millimeters. Get the good one off there, okay.

04 22 05 22 LMP-EVA Yes, I got it, Al.

04 22 05 24 CDR-EVA Okay, and the map should be in there - -

04 22 05 26	LMP-EVA	I've got the map, already.
04 22 05 27	CDR-EVA	- - and the lens/scribe/brush assembly.
04 22 05 30	LMP-EVA	I'll grab it.
04 22 05 31	CDR-EVA	Okay, I'll boot on out here, take care of - -
04 22 05 33	LMP-EVA	Watch - You're tangled up in the cable?
04 22 05 39	CDR-EVA	Okay, 44, peak, normal.
04 22 05 42	LMP-EVA	Roger.
04 22 05 47	CC	Roger; and we might as well go to 25 on the zoom, Al.
04 22 05 55	CDR-EVA	I just zoomed by you.
04 22 05 59	CC	We saw you zoom by us.
04 22 06 00	CDR-EVA	Verify 44, 44 on the zoom; I mean 44 on the f-stop; 25 on the zoom - Want - want infinity on the - -
04 22 06 13	CC	Just a minute, Al, I've got to configure one more camera here.
04 22 06 17	CDR-EVA	- - Very good on the focus. We're transmitting and we're in peak and we're long axis normal to the Sun. How is that?
04 22 06 30	CC	Roger, Al.
04 22 06 39	CDR-EVA	You want the lens cap on or off?
04 22 06 41	CC	Lens cap off, o-f-f.
04 22 06 47	CDR-EVA	Off. Okay, ETB contains two medium football rocks and the small rocks from the comprehensive sample, contains two 70-millimeter CAMs, three 16-millimeter MAGs, map, lens/scribe/brush assembly.
04 22 07 09	LMP-EVA	Yes, they're all in there; I just checked them.
04 22 07 11	CDR-EVA	Good show.

04 22 07 12 LMP-EVA And the SRC number 2 is on the mat.

04 22 07 17 CDR-EVA Okay, let's see if we can get you clean.

04 22 07 20 LMP-EVA Okay, I think that completes my checklist.

04 22 07 23 CC Did I copy SRC number 1, sealed?

04 22 07 26 LMP-EVA You're tangled up in the cable again, the cable, the cable.

04 22 07 31 CDR-EVA Say again.

04 22 07 32 CC SRC number 1, sealed and closeup camera off.

04 22 07 37 CDR-EVA SRC number 1 is sealed.

04 22 07 40 LMP-EVA And verify that closeup camera is off.

04 22 07 47 CDR-EVA Okay, its going to be a -***-

04 22 07 57 LMP-EVA Brush?

04 22 07 59 CDR-EVA Yes.

04 22 08 00 LMP-EVA Okay.

04 22 08 03 LMP-EVA Coming off.

04 22 08 10 CDR-EVA Okay?

04 22 08 22 CDR-EVA Okay, next. Okay, let's get out in the Sun and see what we can see.

04 22 08 29 LMP-EVA Yes. Looks good here. Go at it. No, no, no, no, not your mess.

04 22 08 41 CDR-EVA Oh, it helps.

04 22 08 43 LMP-EVA Yes, it helps quite a bit ... It'll take awhile, but we'll get it there.

04 22 08 59 CDR-EVA On these gloves, here.

04 22 09 01 LMP-EVA Pardon?

04 22 09 06 CDR-EVA Okay, press on.

04 22 09 14 CDR-EVA ***

04 22 09 22 LMP-EVA Get into you connectors, there.

04 22 09 35 CDR-EVA Hey, Houston. How much time do we have to REPRESS, now?

04 22 09 39 CC All right, we're looking at 14 minutes and 20 seconds to scheduled end of EVA; about 12 minutes and 20 seconds to REPRESS. You've got a - a half-hour margin in there. A half an hour margin in addition.

04 22 09 59 CDR-EVA Okay.

04 22 10 01 LMP-EVA We're going to use it getting clean, I think.

04 22 10 06 CC Roger. Just do the best you can, and we'll keep you posted.

04 22 10 12 CDR-EVA All righty.

04 22 10 17 CDR-EVA Do you ever use soap on your clothes? Bet you been wallering in them.

04 22 10 35 LMP-EVA Okay, come on around and let me get this other leg. Okay. That's good. Get them off good because you're going to sleep in that hammock over me.

04 22 10 49 CDR-EVA (Laughter) Oh, ho, ho -

04 22 10 55 LMP-EVA Okay. That's it. Turn it around toward me a little bit more. Those overshoes are impossible.

04 22 11 09 CDR-EVA They came off pretty well.

04 22 11 11 LMP-EVA Yes. I think we can do best by kicking them off of those, Al.

04 22 11 14 CDR-EVA Okay.

04 22 11 15 LMP-EVA Because you're just going to get back on as fast as - -

04 22 11 16 CDR-EVA All righty. Turn around and let me get the Sun on you, probably better. Okay. Okay, inside. Okay. Okay on the inside. Okay, you're pretty clean on the torso. Few on the hoses. Not too bad. Most of this stuff seems to be coming off fairly well - -

04 22 11 57 LMP-EVA Yes. It comes off if it's not too - much rubbed in; if it's just laying there, it brushes off well.

04 22 12 05 CDR-EVA Okay. You have a UHT still on.

04 22 12 09 LMP-EVA Okay. I'll take it.

04 22 12 15 CDR-EVA Okay. Now I'll add a little. Not much we can do with that. Okay. Yes. It comes - quite a bit of that stuff comes off, especially off the back. That's lot better.

04 22 12 50 CDR-EVA Okay.

04 22 12 51 LMP-EVA Okay, ready?

04 22 12 52 CDR-EVA Wait a minute, I've got a - -

04 22 12 53 LMP-EVA Hey, you're in the S-band cable.

04 22 12 54 CDR-EVA - - S-band cable. Let's - get the inside of you, there. And the other side. Oops. That's the end of that.

04 22 13 06 LMP-EVA Okay.

04 22 13 09 CDR-EVA ... put a pair of tongs in that. Did you get it?

04 22 13 19 LMP-EVA No. These tongs will never pick it up. You can help me with it, though.

04 22 13 36 LMP-EVA Okay. Got it.

04 22 13 38 CDR-EVA Okay. All righty, let's press on here. Okay. I want to get this baby out in the Sun.

04 22 13 53 LMP-EVA Lay that right there until tomorrow.

04 22 14 04 LMP-EVA Okay. Caught your cable again. Hold it. Al, hold it.

04 22 14 10 CDR-EVA Holding it.

04 22 14 33 LMP-EVA Go up to -

04 22 14 39 CDR-EVA That it.

04 22 14 40 LMP-EVA I'll go - I'll go ahead and start up the ladder and you can pass me the ET - pass me the - -

04 22 14 44 CDR-EVA Yes. Go ahead.

04 22 14 45 CC Ed and Al, Houston. We'd like to get a final EMU status report.

04 22 14 53 CDR-EVA Okay.

04 22 14 54 LMP-EVA This EMU is about 4 feet in the air, right now.

04 22 14 57 CDR-EVA This is Al, 3.75; and I'm reading, 40, 40 percent; no flags on LOW FLOW; and I feel fine.

04 22 15 09 LMP-EVA Okay. I'm 3.75; reading 20 percent; and no flags; MINIMUM cooling, and I feel great.

04 22 15 23 CC Roger. Thank you, Ed.

04 22 15 31 LMP-EVA Got it?

04 22 15 32 CDR-EVA Got it.

04 22 15 33 LMP-EVA Piece of cake.

04 22 15 36 CDR-EVA *** falls flat on his back.

04 22 15 38 LMP-EVA *** up the MESA with you.

04 22 15 56 CDR-EVA How's our buddy the redhead doing, Houston?

04 22 16 08 LMP-EVA I don't think they heard you.

04 22 16 09 CC Oh, yes. We did too, Al. He's doing fine up there taking photographs, and he just passed by you about 10 minutes ago. Over.

04 22 16 21 CDR-EVA Did he ever get his big - Hycon camera fixed?

04 22 16 28 CC Okay. Negative on the Hycon, and he was able to spot the LM last pass. Over.

04 22 16 37 CDR-EVA Ah, beautiful. Beautiful.

04 22 16 40 LMP-EVA Okay, Houston. I'm at the door, ready for ingress.

04 22 16 44 LMP-EVA Getting ready to open the hatch, now.

04 22 16 46	CC	Roger, Ed.
04 22 16 52	LMP-EVA	Hatch is open, and I'm ingressing.
04 22 16 57	CC	Roger.
04 22 16 58	CDR-EVA	Okay, the -
04 22 17 02	CC	Where's the SRC?
04 22 17 07	CDR-EVA	Say again.
04 22 17 08	CC	Did the SRC get up to the platform?
04 22 17 14	LMP-EVA	Yes.
04 22 17 24	CDR-EVA	The MET is parked in the Sun, 45-degree angle; S-band cover is on it. It looks like it's going to spend the night very comfortably.
04 22 17 38	CC	Roger.
04 22 17 51	CDR-EVA	Okay. The TV's ready to go.
04 22 17 56	LMP-EVA	Okay. Get mine turned on the lanyard and away we go.
04 22 18 25	LMP-EVA	Hum, bum, bum, ba ba bum ba bum.
04 22 18 30	CDR-EVA	Okay. He coming up on the porch now.
04 22 18 43	LMP-EVA	Okay. Right - right up side of the hatch, now. Coming in the hatch. It's all yours. Okay. Do you have it?
04 22 18 52	CDR-EVA	I've got it.
04 22 18 53	LMP-EVA	Okay.
04 22 19 06	LMP-EVA	Houston, Al's starting up the ladder.
04 22 19 10	CC	Roger. Did you get everything in the one ETB?
04 22 19 16	CDR-EVA	Yes.
04 22 19 18	CC	Roger. Very good.

04 22 19 44 LMP-EVA Okay. Al's up at the top of the ladder waiting for the LEC to come up.

04 22 19 59 CDR-EVA Now it's up here.

04 22 20 01 LMP-EVA Okay.

04 22 20 14 LMP-EVA Okay. Here's the LEC.

04 22 20 20 CDR-EVA Okay. Thank you.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

04 22 20 54	CDR-EVA	Okay, are you ready for the sample box?
04 22 20 56	LMP-LM	Yes. Pass it in.
04 22 20 57	CDR-EVA	Wait a minute; I'll give it up to you a little higher.
04 22 21 00	LMP-LM	Just push it right on in. I've got it.
04 22 21 04	CDR-EVA	Okay, the SRC is in the cabin, Houston.
04 22 21 06	CC	Roger, Al.
04 22 21 09	LMP-LM	And Al will be starting in any moment.
04 22 21 15	LMP-LM	Okay, Al; let me get over behind the door.
04 22 21 18	CDR-EVA	All righty.
04 22 21 36	CDR-EVA	Okay, are you behind the door?
04 22 21 39	LMP-LM	No, your hoses are in my way. I'm coming around the other way.
04 22 21 43	CDR-EVA	I had those babies pulled pretty far back. I guess they came out again.
04 22 21 47	LMP-LM	Between your hoses and the ISA, which keeps falling off the hook, it gets pretty messy. Okay, come on in.
04 22 21 55	CDR-LM	Okay, I'm going through the hatch.
04 22 22 05	LMP-LM	Okay. If you'll hold there just a second, I'll clear your antenna.
04 22 22 18	LMP-LM	Okay. Come on through.
04 22 22 21	CDR-LM	All clear?
04 22 22 23	LMP-LM	Yes. Roll toward me, roll toward me. Okay. Come on up. There - Turn to your -
04 22 22 43	CDR-LM	Coming around. Okay. Okay. Stand by 1 minute. (Grunting) Get this -

04 22 22 59	LMP-LM	Think about it first.
04 22 23 02	CDR-LM	Okay?
04 22 23 03	LMP-LM	Okay, Houston. Al is in the cabin, and PLSS feedwater coming off.
04 22 23 06	CC	Okay, Al in the cabin, and PLSS feedwater off.
04 22 23 15	LMP-LM	And - and Ed's feedwater is off.
04 22 23 18	CC	Roger, Ed.
04 22 23 20	CDR-LM	Oh, man, I can't get it off.
04 22 23 21	LMP-LM	You want me to get it?
04 22 23 22	CDR-LM	...
04 22 23 31	LMP-LM	Stand up again. There you go, it's ...
04 22 23 40	CDR-LM	Okay.
04 22 23 46	LMP-LM	I'm ready to close the hatch. ... all the way ...
04 22 23 53	CDR-LM	...
04 22 24 00	LMP-LM	...
04 22 24 02	CDR-LM	...
04 22 24 04	LMP-LM	Lean forward and then back in. Harder.
04 22 24 14	CDR-LM	There. Just a -
04 22 24 34	CDR-LM	Okay. The hatch is closed and locked.
04 22 24 37	LMP-LM	In AUTO? I'll get it.
04 22 24 39	CC	Roger the hatch.
04 22 24 44	CDR-LM	Hatch is closed.
04 22 25 00	LMP-LM	Right. Your hoses were holding me off. I was still -
04 22 25 06	CDR-LM	...

04 22 25 14	CDR-LM	Okay. Dump valves in AUTO. ...
04 22 25 22	LMP-LM	AUTO.
04 22 25 25	LMP-LM	I will verify as soon as I can turn. I can't -
04 22 25 33	LMP-LM	...
04 22 25 39	LMP-LM	Okay. OVERHEAD DUMP VALVE in AUTO.
04 22 25 44	CDR-LM	... Let me ...
04 22 26 01	LMP-LM	It's just a bang we're going to hear. Lighting: ANNUNCIATOR/NUMERICS, BRIGHT. CABIN REPRESS, AUTO. Circuit breaker ... bus, closed. ...
04 22 26 35	CDR-LM	Circuit breaker in.
04 22 26 37	LMP-LM	Say again.
04 22 26 50	CDR-LM	PRESS REGs A and B to CABIN.
04 22 26 56	LMP-LM	Now I read you. ... Ready to go on? ... Put PLSS O_2 off.
04 22 27 26	CDR-LM	Okay. You got your procedure ... on.
04 22 27 42	LMP-LM	Make it a blank.
04 22 27 45	CC	Al and Ed; this is Houston. Over.
04 22 27 49	LMP-LM	Go ahead, Houston.
04 22 27 50	CC	Roger. We request that you do not break your suit PLSS integrity until we call you again. Over.
04 22 28 01	LMP-LM	Okay.

SEPARATE SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 22 27 52	CC	Okay. I'll see if they're in the blind, losing their comm, or data from the - pick an antenna there or try the HIGH GAIN.
04 22 28 09	CC	Kitty Hawk, Houston; in the blind.

04 22 28 21	CC	Kitty Hawk, Houston; transmitting in the blind. For your VERB 79 attitude there in - about 119:28; make it a 5-degree dead band instead of 10 degrees.
04 22 28 41	CC	Kitty Hawk, Houston; transmitting in the blind. At 119:28, for the VERB 79 maneuver there, change your dead band from 10 degrees to 5 degrees.
04 22 32 04	CC	Hey, Kitty Hawk; Houston. We've started picking up some data, now. You got about 2 minutes and 30 seconds to LOS.
04 22 32 49	CC	Kitty Hawk, Houston; transmitting in the blind. For the VERB 79 dead band there, it's 119:28; and change the dead band to 5 degrees.
04 22 33 47	CC	Kitty Hawk, Houston. About 30 seconds to LOS here. Change your dead band for the arrest attitude to 5 degrees instead of 10 degrees.
04 22 59 --		BEGIN LUNAR REV 20

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

04 22 28 02	CDR-LM	... reading you.
04 22 28 04	LMP-LM	... ...
04 22 28 26	LMP-LM	Yes. I read you. I read you. Hear me?
04 22 28 30	CDR-LM	Yes.
04 22 28 31	LMP-LM	Okay.
04 22 28 36	CDR-LM	We're in CABIN, yes.
04 22 29 01	CC	Ed, Ed, this is Houston.
04 22 29 05	LMP-LM	Go ahead.
04 22 29 08	CC	Okay, Ed. As you may have noticed during the EVA and, in fact, during the predepressurization checklist, your suit leak rate seems to be somewhat higher than Al's, although within spec. At this time, we'd like you to run through the normal pressure integrity check on your suit/PLSS combination as called out at the 52-minute mark prior

to DEPRESS on the EVA-1 card. Al can proceed to reconfigure himself onto the LM ECS. Over.

04 22 29 53 LMP-LM Why don't you go ahead, Al? Then I'll just turn - -

04 22 29 57 CDR-LM Yes. I'll go here.

04 22 30 00 LMP-LM Okay, CABIN's at 4.6.

04 22 30 06 CDR-LM Okay.

04 22 30 45 CDR-LM You can't do this.

04 22 30 46 LMP-LM Why?

04 22 30 59 LMP-LM ... I'm just going to blow mine up here in a minute. What? Go ahead. Do it.

04 22 31 07 CDR-LM ... turn AUTO.

04 22 31 09 LMP-LM CABIN GAS RETURN is AUTO.

04 22 31 12 CDR-LM SUIT CIRCUIT RELIEF, AUTO.

04 22 31 19 LMP-LM Shit. Can you move over a little bit? I'll get it; there we go. SUIT GAS DIVERTER, PUSH-CABIN.

04 22 31 37 CDR-LM Okay.

04 22 31 47 LMP-LM Okay.

04 22 31 49 CDR-LM Okay. CABIN GAS RETURN's in AUTO; SUIT CIRCU - AUTO and SUIT GAS DIVERTER, PUSH-CABIN.

04 22 31 54 LMP-LM Okay. Let's get the EVA circuit breakers.

04 22 32 09 CDR-LM Okay, circuit breakers. And they're all good.

04 22 33 01 LMP-LM Circuit breaker okay, Al?

04 22 33 24 CDR-LM Okay, circuit breakers are verified - -

04 22 33 25 LMP-LM Okay, Al. I'll finish the rest of it. You can doff your helmet and - Go ahead and doff. Houston, I'm going back to 57.

04 22 33 40 CC Say again, Ed.

04 22 33 45 LMP-LM I'm going back for this check.

04 22 33 46	CC	Roger.
04 22 33 49	LMP-LM	Let's see, that's on the same page, isn't it?
04 22 33 52	CC	That's correct. It's over in the left-hand column.
04 22 34 04	CDR-LM	It's at 52.
04 22 34 08	LMP-LM	Okay, PLSS O_2 coming along. PLSS O_2 is OFF.
04 22 34 29	CDR-LM	O_2 and PRESS flags.
04 22 35 20	LMP-LM	Okay.
04 22 35 44	LMP-LM	Houston, I'm down to 70 percent, and my pressure will not - doesn't seem to want to come up.
04 22 35 50	CC	Okay. Stay in that configuration and stand by a second.
04 22 37 54	LMP-LM	Houston, the air is starting to get a little stale in this suit.
04 22 37 59	CC	Roger, Ed. Discontinue the check and go ahead with your post-EVA systems configuration.
04 22 38 08	LMP-LM	Okay.
04 22 38 23	CDR-LM	Wait a minute. Let me get your antenna.
04 22 39 04	LMP-LM	Where is my purge valve?
04 22 39 25	LMP-LM	Al, where's my purge valve?
04 22 41 00	CDR-LM	Okay. On top of the ETB. Okay, you got your purge valve.
04 22 41 37	CDR-LM	Okay, your purge valves in ...
04 22 41 39	LMP-LM	Okay.
04 22 41 46	CDR-LM	Connect ECS O_2 hose.
04 22 41 50	LMP-LM	Okay. Why don't you turn the fan off here? Okay, very good.
04 22 41 57	CC	Ed, this is Houston. We'd like to confirm that you have closed the O_2 valve on your PLSS. Over.

04 22 42 07	LMP-LM	That's firm.
04 22 42 09	CC	Roger. Out.
04 22 42 21	LMP-LM	I'll doublecheck it, Bruce, but -
04 22 42 35	LMP-LM	I verify it's closed.
04 22 42 37	CC	Roger, Ed.
04 22 42 39	CDR-LM	Okay. Connect the LM O_2 hoses.
04 22 42 40	LMP-LM	Okay.
04 22 43 29	CDR-LM	Okay, go to SUIT FLOW on the ISOL valve.
04 22 43 36	CDR-LM	Is your PLSS pump off? Is your PLSS fan off?
04 22 43 43	LMP-LM	Off and off.
04 22 43 46	CDR-LM	Connect your PLSS water. Connect the LM water.
04 22 44 11	LMP-LM	Let's help me with the water.
04 22 44 12	CDR-LM	Huh?
04 22 44 14	LMP-LM	You've got to help me with the water connection. I can't close it.
04 22 44 15	CDR-LM	*** it is.
04 22 44 17	LMP-LM	I said, I can't close that one.
04 22 45 06	CDR-LM	Okay.
04 22 45 39	LMP-LM	How about popping this one in for me too, will you?
04 22 46 00	CDR-LM	Okay.
04 22 46 05	LMP-LM	Put that one in.
04 22 46 27	CDR-LM	...
04 22 46 30	CDR-LM	What kind of fitting was in there?
04 22 46 32	LMP-LM	What?

04 22 46 34	CDR-LM	You'd stuck this one in that one. I didn't do it very well.
04 22 46 40	LMP-LM	Okay. - -
04 22 46 41	CDR-LM	Okay.
04 22 46 42	LMP-LM	PLSS mode, both off. Off.
04 22 46 46	CDR-LM	Connect LM water.
04 22 46 48	LMP-LM	Yes.
04 22 46 49	CDR-LM	ECS: LCG PUMP breaker, closed.
04 22 46 51	LMP-LM	CLOSED.
04 22 46 52	CDR-LM	Okay. Adjust the cooling gradually. PLSS mode, both 0.
04 22 46 55	LMP-LM	Okay. AUDIO, BIOMED, and A, RECEIVE B, OFF.
04 22 47 00	CC	Antares, this is Houston. Over.
04 22 47 06	CDR-LM	Go ahead, Houston.
04 22 47 08	CC	Antares, this is Houston. Been going through the comm checklist. We'd like to leave the S-band TRANSMITTER and RECEIVER in SECONDARY. Over.
04 22 47 20	LMP-LM	Okay, will do.
04 22 48 20	CC	Antares, this is Houston.
04 22 48 26	LMP-LM	Go ahead.
04 22 48 27	CC	Roger. We'd like you to pull the circuit breaker on the TV camera at this time. Over.
04 22 48 39	LMP-LM	No sooner said than done.
04 22 48 41	CC	Roger.
04 23 35 36	LMP-LM	Houston, Antares.
04 23 35 40	CC	Antares, Houston. Go ahead, Ed.

04 23 35 45	LMP-LM	Hello, Gordon. We're about ready to give you some weights on return equipment.
04 23 35 51	CC	Okay, Ed. Ready to copy.
04 23 36 09	LMP-LM	Okay - we're ready to come up with the first - first bags - Stand by 1.
04 23 36 49	LMP-LM	Houston, let me tell you what we've done. Remember, Al said that we brought in the - the small rocks from the comprehensive sample area in one weigh bag.
04 23 37 02	CC	Okay.
04 23 37 08	LMP-LM	We couldn't get them all in - we couldn't get them in the SRC. We got in - we got the contingency sample here. And it so happens that the material cracked on the contingency sample bag, and it's leaking. So we're putting it in the weigh bag with these - these other rocks. And the weight of that total combination is 5 pounds.
04 23 37 29	CC	Okay Ed, got you. The contingency sample's in that weigh bag - with a total weight of 5 pounds.
04 23 37 38	LMP-LM	Roger.
04 23 38 43	LMP-LM	And, Houston, the next bag has two toy-sized football rocks in it. And they weigh 15 pounds total.
04 23 38 54	CC	Okay, Ed. Stand by 1, Ed.
04 23 39 07	LMP-LM	And that's going into the left-hand storage compartment.
04 23 39 11	CC	Okay. Left-hand storage compartment with two little-league footballs, 15 pounds.
04 23 39 21	LMP-LM	Roger.
04 23 39 40	LMP-LM	Okay, Houston. Both of those rock bags are going to left-hand storage compartment.
04 23 39 45	CC	Okay, Ed. That's the one with the contingency sample and the comprehensive and the football ones, right?

04 23 39 55	LMP-LM	That's affirmative.
04 23 40 07	CC	Ed, if you'll stand by just 1 minute, I need to copy these - -
04 23 40 09	LMP-LM	Let me - -
04 23 40 10	CC	- - down from Stu, and I'll be right back to you.
04 23 40 14	LMP-LM	Okay.
04 23 41 25	CC	Antares, Houston. Okay. I'm ready to listen to you for a while. Anything else you might have.
04 23 41 34	LMP-LM	Okay. We want you to be discriminating about our samples now. We have the comprehensive rocks in the left-hand storage compartment. The comprehensive fines, however, are in the SRC.
04 23 41 51	CC	Okay, got that. The rocks - the comprehensive rocks in the storage compartment and the fines in the SRC.
04 23 42 01	LMP-LM	That's affirmative.
04 23 43 42	LMP-LM	And MAG MM is replacing II.
04 23 43 50	CC	Antares, Houston. Say again.
04 23 43 58	LMP-LM	Okay. We replaced magazine JJ on the Commander's camera with LL and II on the LMP's camera with MM.
04 23 44 10	CC	Okay. We've got LL and MM on there now.
04 23 44 17	LMP-LM	That's affirm.
04 23 44 36	LMP-LM	Houston, Antares. Verify which are the two 16-millimeter MAGs that have been used?
04 23 44 44	CC	Roger.
04 23 45 37	LMP-LM	Houston, Antares.
04 23 45 39	CC	Go ahead, Ed.
04 23 45 42	LMP-LM	Did you understand my question, Gordon?

04 23 45 46	CC	I guess I didn't. I didn't realize it was a question. Go ahead. Say it again, please?
04 23 45 52	LMP-LM	Okay. We have three 16-millimeter MAGs, of which we only used two. Can you tell me which two we used?
04 23 46 00	CC	I'll have to check back. I'll give you an answer in a minute here?
04 23 46 06	LMP-LM	Okay.
04 23 46 36	CC	Antares, Houston.
04 23 46 42	LMP-LM	Go ahead.
04 23 46 44	CC	Our records show that the used magazines are Charlie-Charlie and Echo-Echo. And the Delta-Delta should be the unused one. Over.
04 23 46 55	LMP-LM	Okay. Thank you. That's what we thought.
04 23 50 37	LMP-LM	Okay, Houston. We're making a slight deviation to our storage plan in the ETB.
04 23 50 45	CC	Okay, Ed. Go ahead with it.
04 23 50 50	LMP-LM	In addition to the three 16-millimeter MAGs called for, we're also taking back out the one we didn't get used today.
04 23 50 58	CC	Okay, Ed. Sounds like a good idea.
04 23 51 08	LMP-LM	And in addition to the black and white MAG KK, we're taking back out Juliett-Juliett. We've only used 40 frames off of that, and we've got very few pictures of the LM and other appropriate-type shots.
04 23 51 25	CC	Roger. Juliett-Juliett, you're also going to take out on the second EVA.
04 23 51 34	LMP-LM	That's affirm.
04 23 53 55	CC	Antares, Houston.
04 23 54 00	LMP-LM	Go ahead.

04 23 54 01	CC	Just following you in the checklist here and looking ahead, it looks to us like you'll probably get to the EVA debriefing at about - in an hour and a half - about 1:22. Does this agree with your estimate? We just wanted to know to be sure to have the right people standing by.
04 23 54 24	LMP-LM	Well, it's not on this card. How - how far is it on the Lunar Surface Checklist? Right now, we're weighing SRC.
04 23 54 42	LMP-LM	And we find that it weighs 43 pounds.
04 23 54 44	CC	Okay, 43 pounds on the SRC. And if - if you're just proceeding down the card with no changes to it, well, then we'll figure it out when you get to the debriefing.
04 23 54 56	LMP-LM	Okay. That's what we're doing.
04 23 54 59	CC	Okay.
04 23 55 08	CDR-LM	Listen, we've had enough thrills today without changing our checklist.
04 23 55 12	CC	We didn't really mean to suggest that, Al, we just - disregard.
04 23 55 21	CDR-LM	(Laughter) I was just kidding.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

04 23 23 33	CC	Kitty Hawk, Houston. Over.
04 23 23 39	CMP	Oh, howdy, Houston; Kitty Hawk.
04 23 23 42	CC	Howdy, Stu. You're loud and clear. Sounds better than it has in a while. Maroon Team's now on duty, and I got a number of words for you when you get a chance to listen to me.
04 23 25 40	CMP	How do you read, Gordon?
04 23 25 41	CC	Stu, I'm reading you about 3 by 3, now. How do read me?
04 23 25 49	CMP	Okay. You're 5 square. Looks like the comm keeps coming and going.

04 23 25 56	CC	Roger. You're loud and clear, now. And starting through my list of things to tell you here, we've a - first of all, the LM guys are back in the LM. They got about a 4-hour 48-minute EVA and completed all the ALSEP deploy. And - pretty good shape and got quite a batch of rocks back in with them.
04 23 26 26	CMP	Hey, that sounds great. How was the TV from the surface?
04 23 26 30	CC	It was beautiful. We had live TV through just about everything they did, including all the ALSEP deploy, and - and it couldn't have been much better.
04 23 26 47	CMP	Hey, that sounds real good.
04 23 26 50	CC	Okay. Stuff for you. We're going to ask you to use 5-degree dead band during the sleep period to help us stay on the HIGH GAIN better, and hope we can get it a little higher percentage of HIGH BIT RATE while you're sleeping. If this results in too much RCS activity and keeps you awake, then we'll consider - well, we'll most likely then go back to the 10 degree if that's considerably quieter. Over.
04 23 27 26	CMP	Okay.
04 23 27 29	CC	Okay. Still hanging our - your readback of the TEI-34 preliminary pad. Also, would like the magazine percentage and frame numbers at the end of earthside. That should be listed under Solo Book at 119:09. And the P52 data, and I'll take any of that in any order that you come to it. Over.
04 23 27 58	CMP	Okay. Let's start with the TEI-34 - -
04 23 28 04	CC	Okay - -
04 23 28 05	CMP	334930; minus 0.71, minus 0.02; 149:15:34.58; plus 3018.2, plus 1649.1, minus 0283.4; 181, 108, 029; and NA; DELTA-V total, 3451.0; 2:25; 3426.9; 11, 125.3, 22.7; boresight star NA; NOUN 61, minus 27.03, minus 171.50; 1160.8, 36251; 216:23:32; Sirius and Rigel, 130, 129, 018;

four jet, 12 seconds; longitude and T_{ig}, plus 178:69 assumes plane change burn and lift-off REFSMMAT; with TEI REFSMMAT attitude 180:00.

04 23 29 32 CC Okay, Stu. Readback's good, except for one omission on NOUN 44. Your height to perigee is a plus 0019.0. Over.

04 23 29 48 CMP Oh, very good. H_p, plus 0019.0.

04 23 29 52 CC Okay. Readback's good.

04 23 29 53 CMP And on the magazines - the mag - okay, magazine S ended up with frame number 57; magazine K, 55 percent; the P52: NOUN 93, 00.027, 00.065, that's a minus and a minus; plus 00.018. They were torqued at 119:27:15.

04 23 30 34 CC Okay, Stu. Copy 55 percent on Kilo; and frame 57 on Foxtrot; and a minus 00.027, a minus 00.065, a plus 00.018, at 119:27:15.

04 23 30 59 CMP Okay. That Hasselblad magazine is Sierra, S. Frame number 57.

04 23 31 06 CC Okay, Sierra.

04 23 31 12 CMP Okay.

04 23 31 55 CMP Okay, Gordon. I just set you up a 5-degree dead band in this attitude; looks like it's a pretty good one for the HIGH GAIN.

04 23 33 08 CC Roger, Stu.

04 23 37 55 CMP And, Houston; Kitty Hawk.

04 23 37 58 CC Go ahead, Kitty Hawk.

04 23 38 03 CMP Okay. Have you got good enough lockup for an E-memory dump?

04 23 38 09 CC Stand by to check.

04 23 38 18 CMP Say again, Gordon.

04 23 38 24 CC Stu, you are GO for the E-MOD dump. Let us have it.

04 23 38 31	CMP	Okay, coming at you.
04 23 38 54	CMP	And, Gordon. And as far as crew status, I'm in good health, no medication; and I have some onboard read-outs.
04 23 39 01	CC	Roger, Stu. Stand by on the read-out; I'm working with the LM here on the other channel.
04 23 39 11	CMP	Okay.
04 23 39 22	CC	Okay, Stu; ready to copy the onboard read-outs. I was tied up with Ed, there.
04 23 39 32	CMP	Okay. BATTERY C is 37.0; PYRO BATTERY A, 37.2; PYRO BATTERY B, 37.2; RCS: A, 80; B, 71; C, 74; D, 73.
04 23 39 53	CC	Okay, Stu. Copied all that.
04 23 44 06	CC	Kitty Hawk, Houston.
04 23 44 11	CMP	Go ahead, Houston.
04 23 44 13	CC	Okay, Kitty Hawk. Got some S-band things for you. Got a - I'd like to have you put the S-BAND NORMAL VOICE switch to OFF, set the HIGH GAIN ANTENNA to WIDE and MANUAL, and use your present angles.
04 23 44 37	CC	And Kitty Hawk - -
04 23 44 40	CMP	Okay. You want WIDE - Go ahead.
04 23 44 44	CC	Okay. On the S-BAND NORMAL VOICE to OFF, that's when you're getting ready to go to sleep. But they do want the HIGH GAIN to WIDE and MANUAL, and you already have the good angles.
04 23 45 00	CMP	Okay. Going WIDE.
04 23 48 58	CC	Kitty Hawk, Houston.
04 23 49 03	CMP	Go ahead, Houston.
04 23 49 06	CC	Okay. Got a couple of short messages for you before we close up shop. The - in a position to stop and talk a minute?

04 23 49 19	CMP	Roger.
04 23 49 21	CC	Okay. First of all, let's say that REVs 25 and 26 are going to be nominal, no matter - as far as you're concerned - no matter what other activities people decide to juggle around. And, in case you didn't get the word, the President called Control Center, here awhile back, and offered us his congratulations to all of you, and the team down here for doing a good job; and as soon as we get a transcript of that, why, we'll read it up to you. The third thing is that Hycon camera. We've been talking to the Hycon people; and they're of the opinion that many of the things we've been chasing, some of the shutter oscillations and so forth, would not occur if the - or could not occur - if the counter is, in fact, counting off with each film advance; and it's our impression that, normally, you've been seeing the film counter advance. So, we've got a couple of steps we'd like to have you try in order to verify camera operation. The betting is that we have a good chance that the camera is functioning normally as far as taking pictures, and the noise may or may not be extraneous. The first question is status of MAG W. And if it still has some film on it, we'd like you to use it as the one to perform the check I'm going to describe to you.
04 23 51 05	CMP	Yes, it's still got film. I don't know how much, but we haven't hit the end of it yet.
04 23 51 12	CC	Okay. It won't take much. Briefly, what we're going to do is to check visually and have you look to see if the shutter's operating. And we'll do this by looking down the lens barrel, looking from the - the operating end back towards the shutter. And what you're going to be seeing is - you won't see the shutter slit go across, but you will see the motion; and you should be able to detect the direction of motion, and the time of it. And you may want to use your flashlight to look down into the lens barrel and see what a - what you're doing. I'll read you some details - a detailed procedure; I just want to give you an outline first of what we're doing.

04 23 52 00	CMP	Okay. What did they have to say about that check that we made where you look inside to make sure that the slit is an inch from the side.
04 23 52 12	CC	Okay -
04 23 52 14	CMP	You know ... and -
04 23 52 15	CC	I'll - I'll check on that one; I'm not sure.
04 23 52 34	CC	Okay, Stu. I understand that they're satisfied with what you saw, and they think that - that looks normal, which is one of the things that makes us think that the camera is probably operating normally. And if it turns out that the shutter is oscillating, what you're going to see is just a blur; but, again, you'll see a - the - the blur will appear to oscillate; and I think you'll be able to detect that the shutter is going from side to side; and it just looks like a big flash. And I - if you'll put the - put a flashlight in the lens with you as you look in there, I think you'll be able to see it; and you may even see one of the seams on the Mylar, when it comes to a stop. So, with that description of what it is you're going to be looking at, I'll read you the detailed procedures, if you're ready.
04 23 53 34	CMP	Okay. Go ahead.
04 23 53 38	CC	Okay. We'll use the magazine W, because we're not going to use much film. We'd like to finish that one off. Go ahead and put the camera on the couch, or wherever it's convenient for you, with the lens opening visible to you. And you might want to tie the camera down, because we're going to operate it. Go ahead and hook up the camera according to the instruction decal; do everything in the normal orders. Like to have you make the following settings: for the MODE, we'd like to use AUTO; the shutter should be on 1/50th of a second; the RANGE, 99.9; and the FRAME RATE at 60. Once you have the control box set up, turn the power to ON; and we'd like to have you observe the shutter operation by looking through the lens and use the penlight. And go ahead and run this thing, say 10 cycles. Like to have you also verify

that the magazine spools are rotating and that the counter is counting for each actuation that you observe.

04 23 54 50 CMP — Yes, I can already verify that. The counter counts, and the spools rotate.

04 23 54 55 CC — Okay. Has there been any instance when the counter didn't count when it was making its funny noises and so forth?

04 23 55 08 CMP — No. Not - I don't - don't believe so at all.

04 23 55 12 CC — Okay, that's encouraging. I think the voting down here is that you probably have a functioning camera. What we'd like for you to do is - do this little test at your convenience, and let us know what you see. If it works out that this is one of these times where the test is performed, and the camera sounds like it's operating okay, go ahead and run the test; but don't sit there and run the camera trying to make it duplicate the sounds you've heard before. And what we're going to do is assume that if you see a shutter move, and it sounds right - we're going to assume that it's okay. Now - then, later in the flight, if this thing starts to act up again, we'd like to have you go ahead and finish that pass using the film; assume again that it's working properly; but, at the first convenient time afterwards, perform this test again. And the time, of course, that we're most interested in is performing this test when the noises and so forth are coming out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

SEPARATE, SIMULTANEOUS COMMUNICATIONS
LINK IN USE BETWEEN CC AND CM

04 23 56 23	CMP	Okay. I don't think we'll have to sweat finding that. Seem like it's all the time. Now, I still don't see what I'm looking for when I look down the - the lens. I know the shutter moves because I can actuate it and go in and look at the slit, and it's moved.
04 23 56 47	CC	Okay. What we're trying to see, Stu, is that the slit is not oscillating. We've been able to duplicate your noises down here by setting up an oscillation in the slit, whereas the shutter just sits there and runs back and forth. And it's cycling. Just completely out of control. So, we want to verify that that's not our problem. In that case, if you look at the slit before and after an actuation, you would find that the slit had moved, but it wouldn't tell you that it was moving properly. And I think that's the big thing you're looking for.
04 23 57 28	CMP	Okay. I'll do that sometime, first chance I get tomorrow.
04 23 58 14	CMP	And, Ken, another question.
04 23 58 18	CC	Yes, sir.
04 23 58 22	CMP	Okay. What do they say about the - the shutter moving, FMC operating, and all that good-deal stuff with the switch in STANDBY?
04 23 58 35	CC	Okay. We've run several tests where we've been able to duplicate that, but it's - it's not easy to correlate the way we've duplicated that with what you've been saying. We've been able to lower the power into the camera and make it do that. And it'll sit there; and, when the timing logic gets out of sequence, then there's - there's a little - all the timing internal to the camera is run from a commutator. And this little commutator can get hung up on one sequence like the shutter operation, and it'll sit there and do that. The reason the

FMC seems to operate normally is that that's all an AC operation, and the problems that we have been able to duplicate have all been associated with DC.

04 23 59 31 CMP — Okay. I tried that - you know, I had it in STANDBY, and I put the frame rate on zero - now I don't know whether there's a minimum, whether zero really means zero or not - but that didn't seem to phase it. It went ahead and did its thing anyway.

04 23 59 47 CC — That's - that's been our experience too, Stu. Whenever we set this condition up due to a low-power input on the DC, why, once it gets into this uncontrolled shutter oscillation, why, all other controls are - seem to be ineffective.

05 00 00 10 CMP — Okay. And the noise is - is not synonymous with sporadic firings of the camera. You know, you can set sometimes in STANDBY POWER, ON, and all you have is the noise and no operation of the camera. Then, other times, you have the operation of the camera along with the noise.

05 00 00 34 CC — Okay. I'm afraid we don't have a real good handle on that. And - we've been able to duplicate many of your symptoms, but we haven't been able to duplicate them all simultaneously. So, we're going to hang our hats on this check that you're making just to - to verify that - our assumption that the camera's probably taking photographs and operated normally. If it turns out that the shutter speeds have been off or something of that nature, once we know that - and we can determine that on the ground - we can process the film accordingly and - and recover all of the data. And just as a back-up procedure, we've had a lot of people working around the theory here that - to see what we can do - how we'd use our film if we finally have a limited amount or how we want to apportion our other film resources to take the place in case this camera check doesn't pass.

05 00 01 40 CMP — Okay. So, if the shutter's not oscillating, we can press ahead. That's the plan, huh?

05 00 01 46 CC — Yes, sir. And just in case it doesn't act up the one time you look at it, which seems to be one of

		nature's rules, why go ahead and assume it's working fine; and, next time it does act up, why, we'll run the test whenever it's convenient.
05 00 02 07	CMP	All right.
05 00 02 09	CC	You having a good time up there?
05 00 02 14	CMP	Yes, man.
05 00 02 19	CC	Sure sounds like it. You guys have really done a good job.
05 00 02 22	CMP	Okay. We'll, I think I'm going to see - Yes, I think I'm going to see if I can have a little chow and sack out here. It's been a long day. Hey, would it help anybody if I'd run that check now, or should I - Is it all right if I wait until in the morning?
05 00 02 49	CC	Well, I think - just run it the next time it's convenient for you.
05 00 03 00	CMP	Okay. Unless - unless you think it would be a breakthrough somebody could work on tonight, I'd just as soon wait until tomorrow.
05 00 03 06	CC	That sounds good. Just give us a call whenever you get it done.
05 00 03 13	CMP	Okay. And I think, as I told Gordon there, you know, I did take the pictures of the - of the landing, just assuming that maybe the thing was working right. I did - I did not take that target 16, however, because I thought maybe we could get it again if the thing gets to working right.
05 00 03 32	CC	Okay. Sounds good.
05 00 04 42	CMP	Hey, Ken? One other question.
05 00 04 48	CC	Okay. Go ahead.
05 00 04 52	CMP	Okay. Originally, criteria been that that shutter slit would stop an inch from the side. That - that's not really an iron-clad operating mode, then. Is that correct?

05 00 05 14	CC	Well, I'm not - real sure what you mean by an iron-clad operating mode, Stu. It - it indicates that the - the shutter is, in fact, still being properly sync'ed. Tells you that the timing sync hasn't been lost, but it doesn't tell you that the shutter is firing at the proper time. It just means that it's - the shutter curtain itself is still hooked up.
05 00 05 43	CMP	Okay. But I'm sure you got the word that it - you know, you can trip this beauty and sometimes it stops an inch from the side like it should; and then, the four or five times that I looked at that little operation, twice it stopped down maybe twice that far, maybe 2 inches or a little more out. It didn't - it didn't always stop the same distance out.
05 00 06 12	CC	Okay, Stu. Gordy says that's enough. That's an indication that we do have a sync problem.
05 00 06 30	CC	I guess one thing I'd like some verification on, Stu, is the randomness of this oscillation that you're getting. Does it happen the same in STANDBY and AUTO?
05 00 06 47	CMP	You mean the noise?
05 00 06 49	CC	Yes, sir.
05 00 06 54	CMP	Yes. It's - it doesn't change when you go from STANDBY to AUTO. It doesn't change when you move the NONESSENTIAL BUS switch from MAIN A to MAIN B. It doesn't change when you poke around on the connector on 227. It just seems like it's there, and - in all the modes. It - it - like it [sic] say, it started intermittently on that low pass. Came on, then went back off again. But now, every time that I've turned the power on, I've gotten the noise. I don't always get the shutter operation - I meant the - well, the shutter operation as far as the counter moving and the FMC operating. But the noise is always there.
05 00 07 58	CC	Okay. And can you associate that more with AUTO than STANDBY? Anything like that?
05 00 08 11	CMP	That's a negative.

05 00 08 13	CC	Okay.
05 00 08 14	CMP	You turn the power on in STANDBY, and it's there.
05 00 08 16	CC	All right.
05 00 08 17	CMP	And you go to AUTO - You go to AUTO and you start taking the pictures, but the noise is still there.
05 00 08 28	CC	Okay. Understand. Thank you.
05 00 10 03	CMP	Okay, Ken. I'm going to turn off my handy-dandy switch here, and we'll see you all in the morning.
05 00 10 09	CC	All right, sir. All your systems look GO.
05 00 10 15	CMP	Jolly good.
05 00 11 30	CC	Kitty Hawk, Houston. This is in the blind. No need to answer. Should you remember it, I want - being sure that your biomed's plugged in.
05 00 57 --		BEGIN LUNAR REV 21

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 00 00 09	LMP-LM	Houston. I'm standing by for my T_3s.
05 00 00 24	CC	Antares, this is Houston. Say again, please?
05 00 00 30	LMP-LM	I'm standing by for a lift-off table.
05 00 00 32	CC	Oh, okay - -
05 00 00 33	LMP-LM	And whatever else you have.
05 00 00 36	CC	Roger, Ed. I've got them for 20 through 25, if you're ready.
05 00 00 44	LMP-LM	Okay. It's a little late for 20. But go ahead.
05 00 00 53	CC	Okay. I'll give it to you anyway. To fill in all the blanks. 20 is 120:46:22; 21, 122:44:45; 23 is - or did I miss 22 - I think I missed - 22 is 124:43:06; T at 23 is 126:41:29; T-24, 128:39:51; T-25 is 130:38:11.

05 00 01 58	LMP-LM	Okay. Read REV 20 is 120:46:22; 21 is 122:44:45; 22 is 124:43:06; 23 is 126:41:29; 24 is 128:39:51; 25, 130:38:11.
05 00 02 22	CC	Roger. Your readback is correct. Short status on the CSM up there: He's in good shape. Done everything on the time line right on the money. The only problem on board seems to be the TOPO camera. The plane change went well with a DELTA-V of 671 feet per second, about 8 or 9 feet per second more than preflight, which was just to circularize the orbit slightly. Over.
05 00 02 57	LMP-LM	Okay. Good for him. Is he using the 500 - Let's see, what is it - 700 - the 500 millimeter in place of the Hycon?
05 00 03 06	CC	We're mulling that over. Actually the substitution won't occur until tomorrow, and that's most likely what we'll do. We're running one more test on the Hycon to verify that it is indeed hopeless, and then we'll back it up with the 500.
05 00 34 32	CDR-LM	Houston, Antares.
05 00 34 34	CC	Antares, Houston. Go ahead.
05 00 34 40	CDR-LM	We've finished our meal, whatever meal it was, and we're off and running on the PLSS feedwater collection.
05 00 34 48	CC	Roger, Al.
05 00 37 31	LMP-LM	Houston, Antares.
05 00 37 34	CC	Go ahead.
05 00 37 38	LMP-LM	Roger. Please be advised that one RCU weighs 0.38 kilograms.
05 00 37 45	CC	Roger, Ed.
05 00 41 58	LMP-LM	Houston, the commander's feedwater is 0.2 - 0.25 kilograms.
05 00 42 10	CC	Roger, Ed. The commander's feedwater is 0.25 kilograms.

05 00 46 23 LMP-LM Houston, the LMP's feedwater, point - no, wait a minute - 0.19 kilograms.

05 00 46 31 CC Roger, Ed; 0.19 on your feedwater.

05 00 46 38 LMP-LM Okay.

05 01 12 49 LMP-LM Houston, Apollo 14. Rather, Houston; Antares.

05 01 12 53 CC Antares, go ahead.

05 01 12 58 LMP-LM Okay, we've arrived at the EVA debriefing block. But, in the meantime, let us say to the medics that we haven't had any medication; that the Commander's PRD is 16051, and the LMP is 07049.

05 01 13 18 CC Roger, Ed. We copy that. I have 10 questions having to do with the EVA. We don't want elaborate answers, because they, of course, cut into your sleep period. A couple general comments first, though. The CDR's EKG electrode is erratic, and the data from it is erratic. We were going to ask you to do what you can by way of applying external pressure or any other good ideas you might have there to maybe get it working again; but do not unzip your suit to get to it. Over.

05 01 14 04 CDR-LM Okay, will do. We'll - we'll try a little pressure in the right places. In the meantime, we also would like to report that we have completed both the O_2 top-off and the water recharge from both PLSSs. And the condition of the crew is excellent.

05 01 14 24 CC Roger, Al. Glad to hear it. About the start of the next EVA: we plan not to wake you up any earlier then scheduled, but if you are awake and ready to go, we'll be ready to support for an early egress on the next one. Over.

05 01 14 47 CDR-LM Okay, that sounds good. We'd like to plan on an early egress anyway, I think, so that we'll be in a position to get the full EVA-2 and still get back in at the regularly scheduled time line.

05 01 15 04 CC Roger. The LM status is completely OPS normal. The consumables are in good shape. We believe that the steerable antenna problem you had during descent

was probably due to a multipath reception at AOS, and we're predicting, now, that it will probably work okay for ascent. Over.

05 01 15 30 CDR-LM Okay.

05 01 15 31 LMP-LM Glad to hear that one.

05 01 15 34 CC Okay. Question number 1 about EVA-1: How do you feel about your planned second EVA, now that you've done the first, especially in terms of time and terrain. Over.

05 01 15 51 CDR-LM Well, I think that the second EVA will go a little more smoothly with respect to the time line. It's not as complicated as far as the equipment is concerned. We don't spend as much time moving around with the PLSS - scientific equipment. It's primarily a geological traverse once the thing has gotten by the first few minutes. And we should be able to be on the time line and hang onto that real well. And we, of course, are again counting on a - at least a 30-minute extension to the nominal time, so that's the reason we'd like to start early.

05 01 16 29 CC Roger. Do you feel the terrain will be any problem?

05 01 16 35 CDR-LM No, we don't. We had no difficulty at all in traversing the terrain. As a matter of fact, we were bounding along, even with the barbells and the MET. The traversing is extremely easy, although we have a rolling landscape and lots of craters to circumnavigate. I believe from looking at the Cone, we'll be able to get up there with no trouble at all.

05 01 16 59 CC Okay - -

05 01 17 00 LMP-LM I completely concur in that the undulating terrain is just a surprise. It's not that much more difficult.

05 01 17 09 CC Roger, Ed. Second question is, would you please describe the rim of Doublet, especially the blockiness? Over.

05 01 17 27 CDR-LM Well, I don't think you'd call Doublet a blocky rim. The craters north and south of Doublet, of

course, are both older craters and had subdued rims. There are some blocks of ejecta at and near the vicinity of the rims, but - and there are a few blocks down inside. For example, we can look at the west wall of south Doublet from here and see a few fairly good sized rocks, perhaps 3 or 4 feet at the largest. But I really wouldn't call it a blocky rim. It's a fairly well subdued rim.

05 01 18 05 LMP-LM I concur. The biggest blocks we could see on the - on the rim of Doublet correspond to these large ones I pointed out in my pan - TV pan. There are some of that size or maybe a little larger, but the population is miniscule compared with the total rim area of Doublet.

05 01 18 28 CC Roger. Third question: how deep is the DPS erosion crater?

05 01 18 40 CDR-LM It's not very deep at all. The photographs will show that it - perhaps it's only 4 inches in maximum depth.

05 01 18 51 CC Okay, and can you describe the lineations and how far out they went, their orientation, and direction.

05 01 19 04 LMP-LM Are these the lineations that I referred to earlier, or are you talking about lineations from the DPS engines?

05 01 19 13 CC The ones that you referred to earlier, Ed.

05 01 19 19 LMP-LM Okay, they're there; and I saw evidences of them in directions different than the exhaust would cause, but there just simply was not time to look at them. We'll have to look at them tomorrow.

05 01 19 35 CC Okay. Next question: on the football samples, were they documented?

05 01 19 47 CDR-LM That's affirmative. They were documented with a stereopair before, in the case of both samples. And they were taken from the crater which is located at - let's see - that'd be QR-CR - CR1 and 646. They came from the southwest - in the southwest rim of that crater.

05 01 20 21 CC — Roger, Al. Next question: did you notice any variations in soil mechanics characteristics at various locations where legs or poles were pushed in, such as the solar-wind staff, the flagstaff, geophone, penetrometer, and so forth?

05 01 20 45 LMP-LM — Yes, there are a few places around, primarily fill - or rather the throwouts from craters, or what are obviously near the rims of craters, have a softer - a softer material around them than there is just in general. However, that - There are so many craters that you find the soft material quite often, but generally on the fresher ones. Along my traverse - rather along the upper geophone line, there are two or three fairly fresh craters along that line that has some quite soft material around them. And it was a matter of sinking in 2 - 3 or 4 inches instead of a normal one-half to three-fourths that we're sinking in out here.

05 01 21 36 CC — Roger, Ed. On the surface features of rock marks, well, we'd like a description of the surface features of the rocks. If they are marked, variations in rounding, angularity, grain size, size distribution, shape, texture, and color. Over.

05 01 22 01 LMP-LM — You're getting into stuff that we're going to have to look at tomorrow. We just barely had time to finish the ALSEP and get back. The rocks I see from the cockpit, there are some rounded rocks; I see two or three that are varied, that are - that have some rounding on top. I see some angular rocks. As far as granularity, crystal size, et cetera, et cetera, we didn't have time to look at any of that. We'll have to wait until tomorrow.

05 01 22 28 CC — Okay, Ed, this next question probably falls in the same category. I'll read it in case you have anything to say about it, and that is to describe the regolith, the general nature, fragment distribution, fragment shapes, variations in texture, color, surface patterns, and firmness.

05 01 22 46 LMP-LM — Okay, we can give a quick one on that. I think we've we've already done most of it. The regolith is - is mostly a mouse brown or sometimes looking gray, a powdery material. Almost like a - chalk, ground

up; it's that thin and that fine-grained. There are a few rocks scattered around; the population - less than a percent - ranging in size from 5 to 6 - well, I guess, 2 or 3 centimeters, but the ones that are obvious, that aren't buried, are 5 or 6 centimeters; up to the largest ones that I've seen, are the ones I showed you in the pan, which are 4 - 3, or 4 or 5 feet across. The distribution is less than 1 percent, but you see a few of these blocks sitting all around the landscape as far as you can see, and I guess they're even out over toward Doublet, which we didn't say was blocky, but these smaller ones might not be visible at that distance. And I can look to the north, and I don't see too many on the far edge of the crater over there either; but it could be that that's too far away to be able to see them well.

05 01 24 16 CC — Okay, did you notice any variations in color or surface patterns or texture?

05 01 24 28 LMP-LM — To me, it looked all about the same, as far as the general regolith here is concerned; but, again, we haven't looked at it that carefully, or I didn't look at it that carefully, just because of the press of time. By and large it is all - all this very fine-grain material with a few scattered rocks on top of it. Let's see if we can do a better job of describing it tomorrow for you.

05 01 24 53 CC — Okay.

05 01 24 54 CDR-LM — Yes, I think that's generally true. I - we can see areas, for example, looking normally out the window, that is in the cross-Sun direction - in my case to the south - where the rocks - in one ejecta pattern of fairly large rocks of 3 or 4 feet - appeared to have a very lighter gray texture to them in comparison to the gray-brown which Ed just described, which would be the regolith. And I notice that this crater that sits out here to the 9:30 position of the LM is also a brighter crater. It's a newer crater; it has a raised rim. And it has a different color than, for example, than does the crater directly behind it - about the same distance - which is much older and a darker gray.

05 01 25 48 CC — Roger, Al. Next question - -

05 01 25 53 CDR-LM — I think, generally, we'll find some variations. I think, generally, we'll find some variations in texture throughout tomorrow's traverse.

05 01 26 00 CC — Roger; how abundant was glass?

05 01 26 09 LMP-LM — The only place I thought I saw glass - and I didn't have time to confirm it - was in a very small crater along the thumper line. It looked like there was pools - a little pool of glass at the bottom; and this crater was only about 2 foot across and maybe 8 inches deep. It was - had quite a bit of small chunky material in it, but it had a different color and looked very glassy at the bottom; and I didn't have time to go back and look at it, but I'm sure there's some more of that around.

05 01 26 45 CC — Roger. Last question is, how abundant were fillets? Do those by the LM appear to be disturbed by the DPS? Over.

05 01 26 58 CDR-LM — I think we find some fillets. I don't know whether the percentage is as high as 50 percent or not - of the surface rocks - but, yes, there is some filleting, and I - you'll notice in the small football-size rocks, there is a fillet pattern around them. There is filleting here, of course, very close to the LM, and it's hard to tell whether it's natural or whether it's from the LM exhaust.

05 01 27 28 LMP-LM — I concur completely with that.

05 01 27 31 CC — Roger; that's all the preprepared questions. I'll check and make sure there's no last minute ones here.

05 01 27 41 LMP-LM — Okay, I might comment that looking at our footprints - with the MET track and our footprints out to the ALSEP site over to the camera - both looking down-Sun and cross-Sun, that the fresh dirt we've kicked up and turned over is noticeably darker - browner - than the more mousy brown, lighter brown undisturbed regolith that's on top.

05 01 28 11 CC — Roger, Ed. That's interesting.

05 01 28 54	CC	Ed, the last time you left the ALSEP site, can you give us the - The last time you happened to look at the number 1 geophone, was it still in place properly? Over.
05 01 29 10	LMP-LM	That's affirm. All 3 geophones were in good shape when I left them.
05 01 29 16	CC	Okay.
05 01 30 07	CC	Antares, Houston. We're having some problem with the signal strengths on the ALSEP. Is there any chance that the central station could have been disturbed such that the antenna - antenna alinement would no longer be proper? Over.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 01 30 34 LMP-LM Not to my knowledge.

05 01 30 36 CDR-LM No, I don't think either one of us went by there again. I took some pictures of it, but nobody touched it after the antenna was alined.

05 01 30 45 LMP-LM Well, I touched it, of course, in turning the number 5 switch off and on; but, gee, I didn't do anything.

05 01 30 54 CC Roger.

05 01 31 11 CDR-LM Hey, Houston; we'd like to proceed with the checklist now. I'd like to make a request that we plan starting the time line tomorrow 1 hour early, so that we'll be able to get in a 30-minute extension and still have time after we get back in to have a leisurely stowage.

05 01 32 01 CC Okay, Al. We'll go along with that all the way. We'll plan to start 1 hour early; in fact, if - we're not recommending it, but if you want to start earlier than that, we'll be ready to support. You don't need to worry about support here. Over.

05 01 32 24 CDR-LM Well, Let's see. Our nominal rest period ends at 130 hours and 30 minutes. We'll be a good 6 hours - 6 hours and a half. Why don't we say 129 hours even - you wake us up if we haven't called you by then.

05 01 32 50 CC Okay, we're checking that figure, and I'll give you a confirmation here if I get it.

05 01 33 01 CDR-LM Okay. I don't think we're going to sleep more than 6 hours anyway. And we'll be in bed so that we have 6 and a half hours. The way we're going now, all we have to do is rig the hammock.

05 01 33 12 CC Roger.

05 01 33 23 LMP-LM Houston, if you concur, I'll go ahead and select DOWN VOICE BACKUP. Turn the POWER AMP OFF and get the VHF antenna to AFT, which constitutes the last part of my comm checklist.

05 01 33 36	CC	Okay, Ed; stand by 1.
05 01 34 03	CC	Antares, Houston. One final question. We noticed your H_2O separator in the PLSSs were running kind of fast. Do you have any problem at all with water in your suits?
05 01 34 13	LMP-LM	No, neither one of us.
05 01 34 16	CC	Okay, I got that a little wrong. It's the separator in the LM suit loop; so, it'd be a problem with water while you on the LM suit loop.
05 01 34 28	LMP-LM	None that we've recognized so far.
05 01 34 32	CC	Okay. We'll go along with - we'll ring the alarm at 129 hours, and I think that completes all the items we have for you. You are clear to go ahead with the last three steps on, before configuring for sleep. Over.
05 01 34 52	LMP-LM	Very good. We'll press with that now. Thank you so much.
05 01 41 39	CC	Antares, Houston. Don't bother to acknowledge, but we're getting ready to do a station handover. You may hear a burst of noise. Over.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 02 56 -- BEGIN LUNAR REV 22

05 04 54 -- BEGIN LUNAR REV 23

05 06 52 -- BEGIN LUNAR REV 24

05 08 51 -- BEGIN LUNAR REV 25

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 08 25 54	CDR-LM	Houston, Antares.
05 08 25 59	CC	Antares, Houston. Over.
05 08 26 05	CDR-LM	Roger. Good morning, good morning. Reading you loud and clear. How me?
05 08 26 30	CDR-LM	Well, we're reading you loud and clear, Fredo. How do you read us?
05 08 26 34	CC	I read you loud and clear, Al. Good morning. We had a little mixup on whether we're configured properly or not. I guess we are. You're loud and clear.
05 08 26 47	CDR-LM	Okay. We're up and running this morning. We're assuming we have a STAY for EVA-2 and our crew status this point is we've had no medication.
05 08 27 03	CC	Roger, Al.
05 08 27 11	CDR-LM	That we've had no medication and the shape of the crew is excellent. The PRD reading is as before: commander, 16051; and LMP, 07049.
05 08 27 25	CC	Roger. Copy that.
05 08 27 37	CDR-LM	And any time you want to give us the lift-off update and the consumables update, we're ready to go.
05 08 27 46	CC	Okay. I haven't got that ready to go yet, Al. I'll call you when I do.
05 08 28 15	CC	Antares, Houston. I have the consumables numbers for you. Over.
05 08 28 27	CDR-LM	Okay. Go ahead.
05 08 28 29	CC	For a GET of 129:00; RCS A, 80 percent; B, 77 percent; descent O_2 is 66.7 percent; and ascent NA and slash 96 percent; descent water, 40.7 percent; and ascent is 98.4/98.4 percent. The - stand by 1 on the last. The amp-hours on the descent BATs are 834; and, on the ascent BATs, they're 572. Over.

05 08 29 43 LMP-LM Okay. I copy GET of 129:00; RCS of 80 and 77; O_2, rather, descent oxygen, 66.7; ascent is NA and 96; descent water, 40.7; ascent water is 98.4/98.4; ampere-hours remaining descent is 834; ascent is 572.

05 08 30 08 CC Readback is correct, Ed. Good morning.

05 08 30 17 LMP-LM Good morning, Gordon. How is it back in Houston this morning?

05 08 30 24 CC I'm not sure, Ed. I haven't been outside in quite a while. But we're wondering if you'd give us an estimate of your sleep there.

05 08 30 39 LMP-LM Well, not very much. I slept 4 and one-half to 5 hours at the most. Been kind of dozing the rest of the time.

05 08 30 47 CDR-LM And about 4 hours for the CDR.

05 08 30 50 CC Roger. Antares, we still have - are showing the water separator speed off scale high. And one question, they can maybe resolve, the reason. On the lithium hydroxide canister, we'd like to know if the flow limiters are on those - on both the one you took out a short time ago, and the one that you put in. Did you happen to notice?

05 08 31 31 CDR-LM That's affirmative. We had the ... flow limiters on both.

05 08 31 36 CC Roger, Al.

05 08 33 18 LMP-LM Okay, Houston. I'm changing back to power primary and ... - -

05 08 33 28 CC Ed, you were cut out there by another conversation. Will you say again, please?

05 08 33 36 LMP-LM Roger. I'm going to PRIMARY POWER AMP and back to PRIMARY VOICE.

05 08 33 41 CC Roger, Ed.

05 08 33 47 CC We'd like you to stay in DOWN VOICE BACKUP, Ed.

05 08 35 42	LMP-LM	Houston, Antares. How do you read?
05 08 35 46	CC	Loud and clear, Ed.
05 08 35 51	LMP-LM	Okay. There you are. We're ready to proceed with the IMU aline if one is ready.
05 08 35 59	CC	Check. Just 1 second.
05 08 36 33	CC	Antares, Houston.
05 08 36 37	LMP-LM	Go ahead.
05 08 36 38	CC	We'd like you to hold off for about 5 minutes on that, until we can give you an uplink, and that will result in a much better alinement. Over.
05 08 36 51	LMP-LM	Okay.
05 08 37 13	LMP-LM	Roger. Houston, we better get the computer up and operating for you here. May we press on with that?
05 08 37 26	CC	That's affirmative, Ed. Go ahead.
05 08 42 10	CC	Antares, Houston.
05 08 42 15	LMP-LM	Go ahead.
05 08 42 16	CC	We'd - we're seeing a fluctuating signal strength. Like to verify that you're at PRIMARY POWER AMP and on the erectable. Is that correct?
05 08 42 28	LMP-LM	That's affirmative, but let me check just a second.
05 08 42 46	LMP-LM	Antares, Houston. Do you read now?
05 08 42 48	CC	Roger. Loud and clear.
05 08 42 52	LMP-LM	Okay. As I went from SECONDARY to PRIMARY, I never got past OFF on the POWER AMP.
05 08 42 59	CC	Roger, Ed.
05 08 44 21	LMP-LM	Houston, we're at POO and DATA. Standing by your uplink.
05 08 44 25	CC	Roger.

05 08 46 17	CC	Antares, Houston. We're starting your uplink now.
05 08 46 23	LMP-LM	Okay.
05 08 50 09	CC	Antares, Houston. The computer is yours and you're clear to do the P57 any time.
05 08 50 18	LMP-LM	Okay, Duke. Thank you, Gordon.
05 08 54 32	CC	Antares, Houston. I have the NOUN 34 number for you when you're ready for it.
05 08 54 42	LMP-LM	Roger. Stand by 1.
05 08 55 11	LMP-LM	Okay, Houston. I assume you mean the lift-off table. Go ahead.
05 08 55 17	CC	Negative. I meant the time you need about three steps more of P57, REV 31, lift-off time. I do have the table, if you want that one first, too.
05 08 55 30	LMP-LM	Oh, okay. Right now. Go ahead and give this one.
05 08 55 34	CC	Okay. The one for the P57, REV 31 lift-off, 142:25:33.82. Over.
05 08 55 51	LMP-LM	Roger. 142:25:33.82.
05 08 55 56	CC	That's right. And any time you get a chance, I'll give you the table.
05 08 56 19	CDR-LM	Okay, Houston. Are you ready for VERB 74?
05 08 56 26	CC	Stand by.
05 08 56 31	CDR-LM	Okay. Here it comes.
05 08 56 32	CC	No. Not yet, Al.
05 08 56 40	CDR-LM	Okay. I'll stand by. Do it again when you're ready.
05 08 56 46	LMP-LM	And I'm ready to copy the lift-off table.
05 08 56 50	CC	Okay, Ed. Start at REV 26, lift-off at 132:36:23; 27 is 134:34:42; 28, 136:33:03; 29, 138:31:25; REV 30, 140:29:46; 31 is 142:28:07.

05 08 57 54	LMP-LM	Okay. 26 is 132:36:23; 27, 134:34:42; 28, 136:33:03; 29, 138:31:25; 30, 140:29:46; 31, 142:28:07.
05 08 58 16	CC	That's all correct, Ed.
05 08 58 42	CC	All right, Al, this is Houston. I guess we got that first VERB 74 you gave us, so we won't need another one.
05 08 58 52	CDR-LM	Okay. Very good. We'll press on with P57.
05 08 58 58	CC	Roger.
05 09 06 58	CC	Antares, Houston.
05 09 07 04	LMP-LM	Go ahead.
05 09 07 06	CC	Couple of items. When you get to the point where you're cleaning and lubricating the PGA neckrings, wristrings, and so forth, we'd like to emphasize to you to take special care, especially with Ed's suit. Have you been briefed on the leak problem on Ed's suit?
05 09 07 28	LMP-LM	We talked about it a little bit, but not in detail.
05 09 07 35	CC	Okay - -
05 09 07 36	LMP-LM	Let us finish this P57 and then we'll talk about it, Gordon.
05 09 07 39	CC	Okay. Fine.
05 09 09 41	CC	Antares, Houston. When you get a chance there, give us DOWN VOICE BACKUP. We need to get you in that configuration before Stu comes around the horn here in about 3 minutes.
05 09 10 04	LMP-LM	You have it.
05 09 10 15	LMP-LM	Houston, you have DOWN VOICE BACKUP.
05 09 10 18	CC	Roger.
05 09 17 00	LMP-LM	Houston, Antares. How do you read?

05 09 17 13	CC	Good morning, Antares. Or good evening. How are you doing?
05 09 17 20	LMP-LM	Pretty good. How are you?
05 09 17 23	CC	Real good. What can we do for you, Ed?
05 09 17 28	LMP-LM	We were supposed to be picking up a pre-EVA-2 briefing. We're standing by.
05 09 17 33	CC	Okay. We're working on it back here, Ed. And we'll be with you here shortly. Tentatively, I think they're planning - -
05 09 17 43	LMP-LM	Okay.
05 09 17 45	CC	Okay. Tentatively, I think we're planning on - towards the end of your EVA-2, prior to ingress, you can be thinking about this, of going back and taking a look at the ALSEP antenna, but other than that at the moment there looks like there are no major changes. We'll get to you shortly.
05 09 18 06	LMP-LM	Okay, Gene-o. How are things going there?
05 09 18 09	CC	Real good. You guys did a super outstanding job yesterday. And I'll tell you, you took two of us with you on every step.
05 09 18 27	LMP-LM	Gene, if we are going to realine the antenna, I think we ought to do it at the start of the EVA.
05 09 18 35	CC	Okay. We'll make that input. You got any more comments concerning that, Al? Would you - you'd rather get it at the beginning, is that correct?
05 09 18 47	CDR-LM	That's correct. I think if we have to do it at all, then we'll go ahead and get it done right away, because Ed can be doing something else while I'm doing that.
05 09 18 59	CC	Okay. I'll make that input, directly.
05 09 22 06	CC	Antares, Houston.
05 09 22 11	CDR-LM	Go ahead.

05 09 22 13 CC Okay, Al. We're just taking an over - overall look at your comm signal strengths and what have you, and we'd like - -

05 09 22 20 CDR-LM Go ahead, Houston.

05 09 22 23 CC How are you reading?

05 09 22 29 CDR-LM We read you loud and clear.

05 09 22 30 CC Okay, Ed. We - or, Al, we're taking a look at your overall comm, matching signal strengths and what have you. We're interested in what POWER AMP you're using right now. What's the position of your TRANSMITTER/RECEIVER and what antenna you're on now. We'd also like you to give us what those positions were during your sleep period, if you remember.

05 09 22 56 LMP-LM Okay, Gene-o. We're on PRIMARY - PRIMARY DOWN VOICE BACKUP, and the only difference is we were on SECONDARY - SECONDARY DOWN VOICE BACKUP, I believe. Yes, we went on SECONDARY TRANSMITTER/RECEIVER. It called for SECONDARY POWER AMP; and we were on DOWN VOICE BACKUP, and we've just gone to PRIMARY TRANSMITTER/RECEIVER as per checklist, and PRIMARY POWER AMP, a few minutes ago.

05 09 23 33 CC Okay. And you've been on the EVA antennas the whole time.

05 09 23 38 LMP-LM That's affirmative.

05 09 23 40 CC Okay. Thank you.

05 09 23 43 LMP-LM Let's see if what I'm telling you - let's see if what I'm telling you is correct. Let me flip back here.

SEPARATE SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 09 13 26 CC Hello, Kitty Hawk. Good morning, Kitty Hawk. This is Houston. Over.

05 09 13 39 CMP Hello, Houston; Kitty Hawk.

05 09 14 01 CC Hello, Stu. Good morning. You're loud and clear.

05 09 14 09	CMP	Roger. Same here; must have been a good comm attitude.
05 09 14 14	CC	Roger. I guess we're coming up in about roughly 15 minutes starting this bistatic radar; and I have some pads to get up plus a little discussion; so, if you'll grab the Solo Book, I'll give you a couple of them right now.
05 09 14 39	CMP	Okay. I've got it.
05 09 14 42	CC	Okay. Got a map update, REV 26, for page 33.
05 09 14 51	CMP	Go ahead.
05 09 14 52	CC	LOS is 131:05:17; 180 at 131:30:08; AOS, 131:51:34. Go ahead.
05 09 15 15	CMP	Okay. 131:05:17, 131:30:08, 131:51:34.
05 09 15 24	CC	Okay. You got that one okay. Same page, the vertical stereo photo pad: T-start, 131:44:21; T-stop, 132:32:42. Over.
05 09 15 49	CMP	Roger. 131:44:21, 132:32:42.
05 09 15 56	CC	You got that one okay. And the page before, your consumables update. For a GET of 129:55; RCS total, 64 percent; quad A, 67; Baker, 61; Charlie, 66; Delta, 63. H_2 tank 1, 56; tank 2, 56; O_2 tank 1, 79; tank 2, 78; tank 3, 26 percent. Over.
05 09 16 43	CMP	Okay. 129:55; RCS total, 64; quads, 64, 67, 61, 63; H_2, 56, 56; O_2, 79, 78, 26.
05 09 17 03	CC	Roger. That's correct, Stu.
05 09 17 25	CC	Stu, this is Houston. Would you give us POO and ACCEPT, and we'll give you a state vector.
05 09 17 36	CMP	Okay. You have it.
05 09 18 20	CC	Stu, this is Houston. Do you have time for a little conversation?
05 09 18 23	CMP	Yes, go ahead.

05 09 18 30	CC	Okay. As far as the plan ahead for today, REV 25 and 26, there are no changes in the Solo Book. We need to know if you, by any chance, got up early and did anything more to the Hycon in the way of the procedures that Mattingly gave to you last night. If you didn't, anyway, we need to find out the answer on the Hycon by the next REV or so, so we can choose the plan that we're going to take depending on the status to get Descartes photos. Over.
05 09 19 13	CMP	Well, I planned on doing that, but I didn't make it, Gordon. I'll try to get to it just as soon as I can.
05 09 19 20	CC	Okay. I guess he probably went into great detail. The main thing is to determine if the shutter looks like it's working right. And if the shutter is working right and it's advancing film, even though it's making noise, they'll tell us it's worth at least trying to use it. If the shutter is not working, we'll NO-GO it and just go all the way with the Hasselblad 500 millimeter.
05 09 19 55	CMP	Okay. I'll try to get on it.
05 09 19 58	CC	And at any rate, we're going to take at least one pass with the 500 millimeter to be sure. Also, we're looking like we may give you a stowage change to improve L/D. That will be coming later if we decide that it's necessary. And there is a change to what we gave you for normal docking procedures. If you can turn to the docking part of the Solo Book, I might as well give you that right now.
05 09 20 44	CMP	Okay. We've got a little while before we get to that one, Gordon. If it's all right with you, why don't we hold off; and I'll get to cracking here.
05 09 20 52	CC	Okay. Fine.
05 09 21 32	CC	Stu, Houston. We're going to send up another uplink. What it is is an uplink to - something in the computer called FANG, which is your short burn/thrust constant. It should take out the slight error that you saw on the first burn.

05 09 21 53	CMP	Hey, that's a good show. Appreciate those updates.
05 09 22 20	CC	Stu, this is Houston. Can you give us a quick handle on how well you slept last night.
05 09 22 32	CMP	Oh, I slept about normal. I guess I probably got about 6 hours sleep, maybe 5 and a half, 6.
05 09 22 41	CC	Roger.
05 09 22 46	CMP	And I had no medication, and I guess there's no sense in filming out my dosimeter or even getting it out of my pocket. I've got the broken one.
05 09 22 55	CC	Roger.
05 09 23 11	CMP	And, Gordon, just so you'll know, I'll work on that Hycon over here during the eat period from 130:40, starting in that time frame; and I won't get a chance to give an answer to you, I guess, until we come back around on the other pass; but I'll, regardless of how it turns out, you want me to press ahead with the normal procedures here at 131 on that pad 30 on the 131:40, huh?
05 09 23 53	CC	That's affirmative, Stu. And an answer by that time will be plenty good enough. The next two REVs should be all nominal configures. And we're through with the computer, also.
05 09 24 10	CMP	Okay.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 09 24 14 LMP-LM Okay, Gene. I was wrong on that. We went to OFF on the POWER AMPLIFIER as per checklist when we went to DOWN VOICE BACKUP during the sleep period and we came back up to PRIMARY as per checklist this morning. I was thinking that we were in SECONDARY, but we didn't go by the checklist, so it had to be OFF.

05 09 24 41 CC Okay, Ed. We got that, now. And we'd like - we'd like you to put your water SEP in at number 2 position, if you would please.

05 09 24 55 LMP Okay. Stand by.

SEPARATE SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 09 26 33 CC Kitty Hawk, Houston.

05 09 26 38 CMP Go ahead, Houston.

05 09 26 39 CC Okay, we're all configured for the bistatic radar test down here; if you'll go ahead and do the procedure as shown on 130-10 in the book, VHF ANTENNA LEFT, in OMNI Charlie; and we'll talk to you next time around, I guess.

05 09 27 08 CMP Okay. I understand that we're all configured, and you've got all your commands in. And you want me to go to VHF LEFT and S-BAND - I meant to OMNI Charlie, now.

05 09 27 27 CC That's affirmative, Stu.

05 09 27 32 CMP Okay. I verify VHF ANTENNA LEFT, and I'm going to OMNI Charlie. And guess I'll talk to you later.

05 09 27 42 CC Adios.

05 10 49 -- BEGIN LUNAR REV 26

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 09 31 24 CDR-LM Houston, Antares.

05 09 31 32 CC Go ahead.

05 09 31 37	CDR-LM	Okay. We're ready to start our timer up on the EVA-2 PREP.
05 09 31 45	CC	Okay. And we're pushing them to get an answer on this briefing real quick here. I understand you're ready to push your timer up on EVA-2 PREP.
05 09 31 57	CDR-LM	That's affirm.
05 09 31 58	LMP-LM	And we don't - We can get that answer any time, Gene; as we go out the door even.
05 09 32 04	CC	Yes. That's affirm. We're with you for pressing on at this time. How is - how did your neckrings and wristrings look? Were they in pretty bad shape, dirt- and dustwise?
05 09 32 19	LMP-LM	I don't think they were. My right wristring was a little bit dirty. The neckring didn't look bad. The left one wasn't bad. Al's are in pretty good shape.
05 09 32 29	CDR-LM	Yes. It was kind of a surprise to me. No visible grit to speak of at all.
05 09 32 43	LMP-LM	Okay.
05 09 32 44	LMP-LM	Mark. And start timing.
05 09 32 46	CC	Okay.
05 10 01 00	CDR-LM	Houston, Antares.
05 10 01 03	CC	Antares, Houston. Go ahead.
05 10 01 08	CDR-LM	Just to keep you advised, we're starting PLSS donning on EVA-2 PREP.
05 10 01 14	CC	Okay, Al.
05 10 17 07	LMP-LM	Houston, Antares.
05 10 17 11	CC	Go ahead, Antares.
05 10 17 15	LMP-LM	Okay, Fredo. We're at the PLSS comm check portion of our PREPing mode. We will follow checklist except we will reverse the LMP's and the CDR's audio panel like we did yesterday.

05 10 17 31	CC	Okay. And, Ed, we're going to have to hold for about 3 minutes to make the checks here because we need to do some reconfiguring.
05 10 17 44	LMP-LM	Okay. Give us a call when you're ready.
05 10 18 25	CC	And, Antares; Houston.
05 10 18 31	LMP-LM	Go ahead.
05 10 18 33	CC	Okay. And while we got this little bit of wait time here before you get on the PLSSs all the way, why don't I get you to get your map out and let me give you some changes on the task.
05 10 18 52	LMP-LM	Okay. You want the EVA-2 map out, right?
05 10 18 54	CC	That's affirm.
05 10 19 17	CC	And you still there, Antares?
05 10 19 22	LMP-LM	Affirmative. We're getting the map out now, Fredo.
05 10 19 25	CC	Okay. I might give you some general comments. I guess the basic change is due to the need to get back out to the ALSEP and verify the antenna orientation. And I'll have some later instructions for you on that one. And in the process of buying that time, we're going to need to be back at the LM at about 45 to 50 minutes rather than the nominal 35 to do that job. We're going to have to change in one case - well, actually change what's documented to grab samples at a couple of places along the way.
05 10 20 08	LMP-LM	Okay. I thought we were going to try to do the antenna job first, Fredo.
05 10 20 12	CC	Okay. I guess the rationale, Ed, was that it wasn't really felt that it would save that much time to do it there since y'all had been operating in parallel anyway and it alters our nominal; plus, with respect to the priorities; it's just desired to save that until last in case we have to cut any more.
05 10 20 38	CDR-LM	Okay. Are you getting anything at all with the ALSEP now?

05 10 20 42	CC	I guess there's a sig - They are getting signals but they're low signal strength, Al. And the only things that's going to help is if indeed an antenna lead or something physically jarred the central station so the antenna is offset from the way you left it.
05 10 21 06	CDR-LM	Okay.
05 10 21 09	CC	They've already tried the switching on all the electronics they had.
05 10 21 17	LMP-LM	Okay. We're ready to ... the changes for EVA-2.
05 10 21 22	CC	Okay. At site B, that'll be a grab sample at that stop.
05 10 21 50	CC	Okay. At site F - -
05 10 21 55	LMP-LM	Okay. I've got a grab - Hold it. Fredo, we got a grab sample at site B now. Let's get straight on our term "grab sample." You want no photography at all. Is that affirmative? Or do you want some?
05 10 22 09	CC	The photography there will be the pan, Ed. And that'll be it.
05 10 22 17	LMP-LM	Okay. No documentation of the sample at all.
05 10 22 21	CC	That's affirm.
05 10 22 26	LMP-LM	Okay. Press on.
05 10 22 27	CC	Okay. Now down to Weird. The same thing there. Grab sample.
05 10 22 37	LMP-LM	Okay. Grab sample at Weird.
05 10 22 43	CC	Okay. And then basically I've written in here - It's actually what should be on your closeout part of the cuff checklist. But at that time the CDR will go to the ALSEP, and I'll have some instructions to follow on that, Al. And at that point, Ed would proceed to the boulder field that's north to take care of the weigh bags with documented samples from that area.

05 10 23 15	CDR-LM	Okay. I get the ALSEP back and Ed gets the boulders.
05 10 23 22	CC	Okay. And that's about it. With respect to the nominal time line.
05 10 23 31	CDR-LM	Okay. That's simple enough.
05 10 23 34	LMP-LM	How many of those big boulders do you want, Fred?
05 10 23 38	CC	How many can you fit into the weigh bags?
05 10 23 44	LMP-LM	About - -
05 10 23 46	CC	Don't put more than 10 pounds in that 1-pound bag.
05 10 23 51	CDR-LM	... He's going to bring them back like a baby in his arms.
05 10 23 54	LMP-LM	We'll have to pick up the LM and carry it over there.
05 10 23 58	CC	How much you been eating lately, Ed?
05 10 24 03	CDR-LM	They're not really too bad. They're probably no more than 3 or 4 feet maximum dimension.
05 10 24 10	CC	Okay. In about a minute, Kitty Hawk will be going around the corner and we won't have our configuration problem, and we'll be able to proceed after that with the comm check.
05 10 24 22	CDR-LM	Okay. We're standing by and setting up for it now.
05 10 24 25	CC	Roger, Al.
05 10 27 47	CC	And, Antares; Houston. We're ready for the comm checks. One other item I did neglect since it wasn't on the map task, at your closeout, we're also deleting the organic sample.
05 10 28 07	LMP-LM	Okay. You'll have to remind us of that, Fred. It's on our checklist.
05 10 28 13	CC	Okay, sure will. And, Antares; Houston. We'd like NORMAL VOICE.

05 10 30 03	CC	Antares, Houston.
05 10 30 17	CC	Hello, Antares; Houston.
05 10 30 47	LMP-LM	Houston, Antares. How do you read now?
05 10 30 50	CC	I read you loud and clear, Antares. We need you to go back to PM and go from DOWN VOICE BACKUP to NORMAL VOICE and then start in again with the ...
05 10 31 05	LMP-LM	Okay, I'm in PM now. I'll switch to DOWN VOICE BACKUP and back to VOICE.
05 10 31 11	CC	Okay. Switch to DOWN VOICE and then back to VOICE, good.
05 10 31 31	LMP-LM	Houston, how do you read now?
05 10 31 34	CC	Loud and clear, Antares.
05 10 31 38	LMP-LM	Okay, I'm going to FM and close the TV circuit breaker.
05 10 31 42	CC	Roger.
05 10 32 03	LMP-LM	... How do you read now?
05 10 32 08	CC	Okay, Antares; Houston. Got a little bit of background static. Give me another checkdown.
05 10 32 44	LMP-LM	Houston, Antares. How do you read?
05 10 32 50	CC	Go ahead, Antares. I'm reading you about 3 by 3 now.
05 10 32 57	LMP-LM	Okay, I'm on FM. The TV is closed. PRIME-PRIME employed. Okay?
05 10 33 05	CC	Okay, you're coming in loud and clear now.
05 10 33 10	LMP-LM	Okay. We're proceeding with the checklist. Modified that we will relay through the CDR's panels.
05 10 33 27	LMP-LM	VOX's MAX. ... RECEIVE. Okay, Houston, I'm switching to SECONDARY now. SECONDARY TRANSMITTER/ RECEIVER.

05 10 33 49	CC	Okay, Ed.
05 10 34 00	LMP-LM	Okay, how do you read now? We're not transmitting.
05 10 34 24	LMP-LM	Houston, Antares. How do you read?
05 10 34 26	CC	I read you loud and clear, Antares.
05 10 34 31	LMP-LM	Okay. We're proceeding on with the VHF configuration.
05 10 34 38	CDR-LM	OFF, OFF.
05 10 34 44	LMP-LM	All right.
05 10 35 21	LMP-LM	VHF A ... Your A T/R, on, two. Your PLSS, OFF.
05 10 35 45	LMP-LM	Okay, it sounds all right now.
05 10 35 59	LMP-LM	A RECORDER, ON; HF ANTENNA to EVA. All right, Houston, I'm going to comm now - to PLSS comm.
05 10 36 18	CC	Roger, Ed.
03 10 36 38	LMP-LM	Okay. Here I am, MODE A. Okay. ... Yes, I was - leave it in. Leave it in.
05 10 39 00	LMP-LM	Okay. Here, I'll pull mine. Okay, they are up.
05 10 39 21	CDR-LM	Flag P; Press flag O, O_2. ...
05 10 39 35	LMP-LM	And I read you loud and clear.
05 10 39 39	CDR-LM	Roger; and my PLSS O_2 is reading 85 percent.
05 10 39 42	LMP-LM	Okay. I go B, you go A.
05 10 39 45	CDR-LM	Okay, now. How do you read?
05 10 39 52	LMP-LM	Loud and clear. How me?
05 10 39 53	CDR-LM	Loud and clear. Okay, both AR. How do you read AR?
05 10 40 05	LMP-LM	Loud and clear. How me?

05 10 40 06	CDR-LM	Read you loud and clear. And I have a tone.
05 10 40 08	LMP-LM	Houston. How do you read Ed?
05 10 40 11	CC	Okay, Ed. I read you loud and clear.
05 10 40 16	LMP-LM	Okay, Fredo. And I have an O - PLSS O_2 quantity of 87 percent.
05 10 40 34	CDR-LM	And this is Al with a PLSS O_2 quantity of 85 percent. How do you read?
05 10 40 40	CC	Roger, Al. We copied the quantity and you're coming in loud and clear.
05 10 40 46	CDR-LM	Okay. We're proceeding with final systems PREP. Okay. Verify CABIN REPRESS ECS breaker.
05 10 40 54	LMP-LM	Closed.
05 10 40 55	CDR-LM	SUIT FAN DELTA-P, SUIT FAN 2; open.
05 10 40 56	LMP-LM	Okay.
05 10 40 59	CDR-LM	Hey, we got a caution?
05 10 41 02	LMP-LM	Yes - Wait a minute. We do not have a caution yet.
05 10 41 15	CDR-LM	It'll take a little while. In the meantime, go ahead, SUIT GAS DIVERTER, PULL-EGRESS.
05 10 41 21	LMP-LM	Okay, SUIT GAS, PULL-EGRESS.
05 10 41 24	CDR-LM	CABIN GAS RETURN, EGRESS; SUIT CIRCUIT RELIEF, AUTO.
05 10 41 31	LMP-LM	EGRESS, and SUIT CIRCUIT RELIEF, AUTO.
05 10 41 35	CDR-LM	Okay, while we're waiting for the caution and warning, come turn around and I'll ... your OPS - O_2 actuated - if you'll bend forward slightly.
05 10 42 15	CDR-LM	Okay. All your flaps are snapped. No Irish pennants. And the actuator is on, connecting it to the RCU. It's connected. And you can put your ISOL - SUIT DISCONNECT back this way.

05 10 42 47	LMP-LM	Okay.
05 10 42 51	CDR-LM	Disconnect the LM O_2 hoses; let me get those.
05 10 43 05	CDR-LM	Off, it is off.
05 10 43 10	LMP-LM	What's off?
05 10 43 11	CDR-LM	That is off. Okay, there's - -
05 10 43 13	LMP/ CDR-LM	ECS, yes, water SEP. Okay.
05 10 43 15	CDR-LM	Okay, connect the OPS O_2 hose. Blue to blue.
05 10 43 30	CDR-LM	Blue to blue and locked.
05 10 43 32	LMP-LM	Okay. Okay, the purge valve.
05 10 43 40	CDR-LM	Hey, I have one.
05 10 43 44	LMP-LM	... LO.
05 10 43 47	LMP/ CDR-LM	LO.
05 10 44 17	CDR-LM	... Okay, you're locked.
05 10 44 19	LMP-LM	Okay.
05 10 44 25	CDR-LM	PGA DIVERTER valves, vertical.
05 10 44 29	LMP-LM	... vertical.
05 10 44 33	CDR-LM	Okay.
05 10 44 34	LMP-LM	... and repeat. Okay.
05 10 44 38	CDR-LM	Right here.
05 10 44 40	LMP-LM	Unstow OPS O_2 actuator. ... are coming forward.
05 10 45 04	LMP-LM	Connecting it. Okay.
05 10 45 11	CDR-LM	Okay. SUIT ISOL valve to DISCONNECT. I got it. Okay.
05 10 45 21	LMP-LM	Actuator to RCU SUIT ISOL valve.
05 10 45 22	CDR-LM	Got that.

05 10 45 23	LMP-LM	Connect O_2 hoses. Ouch!
05 10 45 39	LMP-LM	Okay.
05 10 45 40	CDR-LM	Okay, connect the OPS PLSS with the blue and lock.
05 10 45 45	LMP-LM	Okay.
05 10 45 57	LMP-LM	Locked. Have your purge valve?
05 10 46 06	CDR-LM	Locked and LO.
05 10 46 07	LMP-LM	LO. A, in locked.
05 10 46 24	LMP-LM	Okay, it's locked. The lockup lock's locked.
05 10 46 26	CDR-LM	Okay. DIVERTER valves, vertical.
05 10 46 28	LMP-LM	Vertical.
05 10 46 29	CDR-LM	Verify items prepared for jettison. ECS LiOH cartridge and brackets - it's in there. Hammocks, PLSS batteries and LiOH cartridges. Waste, bags.
05 10 46 50	LMP-LM	And drink.
05 10 47 26	CDR-LM	Okay. Shut off the DESCENT WATER VALVE.
05 10 47 31	LMP-LM	WATER VALVE, CLOSED.
05 10 47 34	LMP-LM	Okay, just like that. Watch your set. And strap's set.
05 10 47 48	CDR-LM	Okay, PLSS FAN, ON; vent flag, clear.
05 10 47 51	LMP-LM	Fan, ON.
05 10 47 56	CDR-LM	Vent flag, clear.
05 10 47 58	LMP-LM	Vent flag, clear.
05 10 48 04	CDR-LM	Hey, you ready for your helmet?
05 10 48 05	LMP-LM	Yes.
05 10 48 26	LMP-LM	Get all the stuff up. Get that? ...

05 10 48 37	CDR-LM	Okay.
05 10 48 39	LMP-LM	Okay.
05 10 48 47	CDR-LM	All righty.
05 10 49 24	CDR-LM	Okay, I believe that's good.
05 10 49 26	LMP-LM	... Locked?
05 10 49 30	CDR-LM	You're locked.
05 10 49 31	LMP-LM	Great.
05 10 49 54	CDR-LM	Hey, can you see your controls?
05 10 49 55	LMP-LM	Yes.
05 10 49 57	CDR-LM	Mine?
05 10 49 59	LMP-LM	Yes.
05 10 50 00	CDR-LM	Okay, your LEVA is installed. Check your drink bag position.
05 10 50 13	LMP-LM	... you're pressurized. Okay, can you reach it?
05 10 50 18	CDR-LM	Yes, I got it.
05 10 50 30	LMP-LM	Okay. ...
05 10 50 54	CDR-LM	...
05 10 51 03	LMP-LM	Cable's coming out.
05 10 51 18	LMP-LM	I think it made it in the back. Here we go.
05 10 51 22	CDR-LM	Sounds better. Okay.
05 10 51 48	LMP-LM	It's latched.
05 10 52 04	LMP-LM	Bags.
05 10 52 05	CDR-LM	Right here.
05 10 52 06	LMP-LM	Let me look behind now. You look at the other side. Yes, I was afraid of that. Okay, now you are all tucked down.

05 10 52 23	CDR-LM	Okay, LCG is positioned as required; open the LCG PUMP breaker.
05 10 52 27	LMP-LM	Let's take a shot of cold air and chill down, if you don't - cold water spigot.
05 10 52 33	CDR-LM	Yes. Do you want me to go ahead and disconnect my -
05 10 52 37	LMP-LM	Okay. Okay.
05 10 52 47	CDR-LM	Okay, go ahead. I'll be putting these hoses in the back, here.
05 10 52 50	LMP-LM	Okay. You track it and then from those you hook it up while you're at it. I'll hold it for you. Go ahead.
05 10 53 04	CDR-LM	Okay. I think - that ought to do it.
05 10 53 28	LMP-LM	...
05 10 53 49	CDR-LM	Okay.
05 10 53 59	LMP-LM	... there. It went. Can't do two things at once.
05 10 54 38	LMP-LM	Get it locked?
05 10 54 40	CDR-LM	Yes.
05 10 54 42	LMP-LM	Sure? It didn't feel like it. Okay.
05 10 54 48	CDR-LM	Okay, you ready?
05 10 54 50	LMP-LM	Okay, LGC PUMP, opening.
05 10 54 53	CDR-LM	Okay. Here, I'll get this.
05 10 55 01	LMP-LM	Okay. ...
05 10 55 36	LMP-LM	Here, I'll get them for you.
05 10 55 51	LMP-LM	Okay, you're locked. Okay, verified. Helmet and visor, alined and adjusted.
05 10 56 00	CDR-LM	...

05 10 56 01	LMP-LM	Okay. Torso tiedown and adjusted it. I'm going to pull it down a little bit more today - this stiff suit. ... Okay.
05 10 56 37	LMP-LM	Okay, O_2 connectors, three.
05 10 56 40	CDR-LM	Turn around. They're locked; red locked, blue locked.
05 10 56 46	LMP-LM	Purge valves, one.
05 10 56 48	CDR-LM	Purge valve's locked.
05 10 56 49	LMP-LM	Water connectors, one.
05 10 56 51	CDR-LM	Water connector's locked.
05 10 56 52	LMP-LM	Comm connectors, one.
05 10 56 54	CDR-LM	Comm connector's locked.
05 10 56 55	LMP-LM	Okay, ... for me.
05 10 56 59	CDR-LM	Okay, helmet and visor alined and adjusted.
05 10 57 02	LMP-LM	Do you verify that?
05 10 57 03	CDR-LM	My torso tiedown is okay, three O_2 connectors.
05 10 57 09	LMP-LM	Okay, three O_2 connectors, verified locked and lock locked.
05 10 57 14	CDR-LM	One purge valve.
05 10 57 15	LMP-LM	One purge valve, in, and lock locked.
05 10 57 18	CDR-LM	Water connector.
05 10 57 19	LMP-LM	Water connector.
05 10 57 20	CDR-LM	And comm connector.
05 10 57 21	LMP-LM	Locked and locked.
05 10 57 24	CDR-LM	Take a look at the EVA circuit breakers.

05 10 57 27 LMP-LM Okay. Wait a minute. Hold it. Let me move there. Move those containers here. Okay, EVA circuit breakers.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 10 56 13 CDR-LM Okay.

05 11 00 13 CDR-LM ***...

05 11 00 45 CDR-LM I think that did it. Now try it.

05 11 00 50 LMP-LM No. Something is catching on it, Al.

05 11 01 00 CDR-LM ***it off.

05 11 01 01 LMP-LM Huh?

05 11 01 02 CDR-LM ***it off?

05 11 01 15 LMP-LM Yes. ***perfectly straight ...

05 11 01 35 LMP-LM That felt good.

05 11 02 13 LMP-LM ***go in here.

05 11 02 23 LMP-LM Okay. Got it.

05 11 02 25 CDR-LM Okay. Four wrist locks locked; both straps adjusted. Verify PLSS DIVERTER in MIN.

05 11 02 35 LMP-LM Okay. DIVERTER in MIN.

05 11 02 36 CDR-LM And then PLSS pump ON.

05 11 02 38 LMP-LM Pump ON.

05 11 02 40 CDR-LM Okay. PRESS REGs A and B to EGRESS.

05 11 02 52 LMP-LM Okay. Thank you. Okay. PRESS REGs A and B.

05 11 02 55 CDR-LM PRESS REGs A and B to EGRESS.

05 11 03 00 LMP-LM PRESS, EGRESS.

05 11 03 04 CDR-LM Okay. Pressure integrity check. Turn your PLSS O_2 ON. Should get tone on. O_2 flag, O.

05 11 03 16 LMP-LM O_2, ON. There we go.

05 11 03 19 CDR-LM Got it?

05 11 03 20 LMP-LM Flag 0.

05 11 03 21 CDR-LM Flag 0.

05 11 03 23 LMP-LM There's the tone. O_2 flag 0.

05 11 03 28 CDR-LM PRESS flag feed.

05 11 03 33 LMP-LM PRESS, 0.

05 11 04 08 CDR-LM PRESS flag cleared, 3.1.

05 11 04 10 LMP-LM And mine's cleared.

05 11 04 12 CDR-LM Okay.

05 11 04 21 CDR-LM And I'm stable at 3.7.

05 11 04 22 LMP-LM I'm not quite there, yet. Okay. There it is.

05 11 04 29 CDR-LM And the O_2 flag is clear.

05 11 04 31 LMP-LM Mine's clear. My O_2 is off.

05 11 04 33 CDR-LM Okay. And we're stabilized at 3.7.

05 11 04 37 CDR-LM And O_2 coming OFF.

05 11 04 38 LMP-LM 3.7, starting the check.

05 11 05 41 LMP-LM Okay. There's 40. I have about 0.22.

05 11 05 51 CDR-LM Okay, Houston; 0.22 drop on the LMP, and 0.15 drop on the CDR. Okay. PLSS O_2 ON.

05 11 06 02 CC Okay. We copy.

05 11 06 07 LMP-LM Okay. PLSS O_2 is ON. And O_2, flag clear, tone is ON.

05 11 06 18 CDR-LM Okay. And the pressure is back up to 3.7.

05 11 06 21 LMP-LM Okay.

05 11 06 24 LMP-LM And, Houston, we're ready for CABIN DEPRESS.

05 11 06 27 CC Okay. We're GO, Ed.

05 11 06 31 LMP-LM Okay.

05 11 06 32 CDR-LM Okay. Okay. Circuit breaker ECS CABIN REPRESS, open.

05 11 06 44 LMP-LM CABIN REPRESS breakers, open.

05 11 06 47 CDR-LM And CABIN REPRESS valve, closed.

05 11 06 55 LMP-LM It's closed.

05 11 06 57 CDR-LM Okay. I'll get the - -

05 11 07 01 LMP-LM Forward or the overhead?

05 11 07 03 CDR-LM I'll get the forward.

05 11 07 04 LMP-LM Okay.

05 11 07 09 CDR-LM Okay. Going down.

05 11 07 14 LMP-LM Okay. We're going drop - go to AUTO at 3.5.

05 11 07 19 CDR-LM Coming down.

05 11 07 21 LMP-LM Okay. There's 4.5. 4. 3.5. Okay.

05 11 07 31 CDR-LM We're back in AUTO. Cuff gage reading 4.9.

05 11 07 35 LMP-LM And so is mine.

05 11 07 38 CDR-LM Okay.

05 11 07 39 LMP-LM Okay.

05 11 07 42 CDR-LM Cabin at 3.5.

05 11 07 43 LMP-LM That's verified.

05 11 07 44 CDR-LM LM suit, 3.6 to 4.3.

05 11 07 46 LMP-LM That's at 4.5.

05 11 07 47 CDR-LM And PGA is greater than 4.8, and it's coming down.

05 11 07 52 LMP-LM And mine's coming down. Okay. Start the wrist watch.

05 11 07 57	CDR-LM	Okay, Houston. Time zero -
05 11 07 58	CDR-LM	MARK.
05 11 08 01	CC	Okay. We got it start.
05 11 08 06	LMP-LM	***time zero. Open the - -
05 11 08 09	CDR-LM	Coming OPEN.
05 11 08 22	LMP-LM	***2 pounds.
05 11 08 24	CDR-LM	Okay.
05 11 08 45	LMP-LM	One pound.
05 11 09 15	LMP-LM	Four-tenths.
05 11 09 18	CDR-LM	Okay.
05 11 09 32	LMP-LM	Okay. ***give it a try.
05 11 09 44	CDR-LM	Not yet.
05 11 09 46	LMP-LM	Okay.
05 11 09 53	LMP-LM	Water flag A.
05 11 10 26	LMP-LM	Okay. Turn PLSS feedwater ON.
05 11 10 44	LMP-LM	Feedwater, ON.
05 11 10 48	CDR-LM	Can you get the - Can you reach the feedwater for me?
05 11 10 53	LMP-LM	Yes. Okay. Just a second. Let me get the -
05 11 11 10	LMP-LM	Okay.
05 11 11 15	CDR-LM	Okay. ***get a water flag A?
05 11 11 17	LMP-LM	And mine is cleared.
05 11 11 20	CDR-LM	Already clear?
05 11 11 21	LMP-LM	Yes. Well, we used them yesterday. It shouldn't take too long.

05 11 11 30	LMP-LM	Okay. I've got preamps and an ECS light. Better - SEP component light is ON. Switch the lighting to the ANNUNICATOR to the DIM position. And I'll stop DET. Okay. Oh, I think I see what my suit problem is, Al. I've got a broken cable in my wrist.
05 11 12 12	CDR-LM	Oh, really?
05 11 12 13	LMP-LM	Yes. See, I - I can't control the right hand.
05 11 12 21	CDR-LM	***
05 11 12 22	LMP-LM	***pull it back to the inside on me.
05 11 12 24	CDR-LM	Pull it there?
05 11 12 26	LMP-LM	I can pull it, but I can't turn it this way and make it stay there. See, it's doing it by itself.
05 11 12 32	CDR-LM	Okay. We have both water bags clear. Hatch is coming open.
05 11 12 39	CC	Roger, Al.
05 11 12 40	CDR-LM	And you want to get my antenna on the way out.
05 11 12 41	LMP-LM	Yes.
05 11 12 45	CDR-LM	Okay.
05 11 12 46	LMP-LM	Okay. Watch the hatch cover. Kick it closed with your knee - I mean the han - handle cover.
05 11 12 56	CDR-LM	Okay.
05 11 13 06	LMP-LM	Okay. You're going to have to lean toward me.
05 11 13 09	CDR-LM	All right.
05 11 13 10	LMP-LM	You're hung up on the purse. There you go.
05 11 13 12	CDR-LM	Coming over your way.
05 11 13 14	LMP-LM	Okay. Okay. Now hold it while I get your hatch - get your antenna.

05 11 13 23 LMP-LM Okay. You're GO. Go right on out.

05 11 13 37 LMP-LM Back straight over there. Now you're in good shape.

05 11 13 44 CDR-EVA Okay, Houston. Al is on the porch.

05 11 13 47 CC Roger, Al.

05 11 14 04 CDR-EVA Okay. I'm ready for jettison bag, Ed.

05 11 14 07 LMP-LM Okay. Let me get my checklist open here.

05 11 14 32 CDR-EVA Okay. Got it.

05 11 14 45 CDR-EVA And it's clear.

05 11 14 54 LMP-LM Okay.

05 11 15 10 LMP-LM ***a minute. I'll come down and get it.

05 11 15 12 CDR-EVA That's all right.

05 11 15 17 LMP-LM Just hand it to me unless you're - -

05 11 15 20 CDR-EVA Okay.

05 11 17 04 CC Okay. We got - -

05 11 17 05 LMP-LM Houston, Al's on the surface.

05 11 17 06 CC Roger, Al. And we got a good picture here, and - -

05 11 17 09 LMP-LM ... the LEC.

05 11 17 10 CC - - we just saw you hop off.

05 11 17 13 CDR-EVA Okay. And the LEC - ETB's ready to come down.

05 11 17 30 LMP-LM Wait a minute. Let me get a little tension on it. Okay.

05 11 17 35 CDR-EVA Okay. Coming down.

05 11 17 55 CDR-EVA Okay. Slow it just a sec.

05 11 17 59 LMP-LM Okay.

05 11 18 02 CDR-EVA Okay. I've got it.

05 11 18 06 LMP-LM ***

05 11 18 07 CDR-EVA Let it go.

05 11 18 09 LMP-LM I'm checking the circuit breakers.

05 11 18 59 LMP-LM Okay. Houston, I'm about ready to egress.

05 11 19 19 LMP-LM Houston, Ed - -

05 11 19 20 CC Roger, Ed. You're cleared to come out.

05 11 19 26 LMP-LM Okay.

05 11 19 54 LMP-EVA And Houston, Ed's on the porch.

05 11 19 56 CC Roger, Ed.

05 11 20 03 LMP-EVA Starting down the ladder.

05 11 20 22 LMP-EVA Well, it's nice to be out in the sunny day again.

05 11 20 25 CDR-EVA Yes, it's a beautiful day here in Fra Mauro Base.

05 11 20 29 CC The Sun ought to be a little higher today.

05 11 20 35 CDR-EVA Yes, going on oxygen today.

05 11 20 40 LMP-EVA Beautiful day for a game of golf.

05 11 20 46 LMP-EVA Okay.

05 11 21 20 CDR-EVA Ed, I started to get a picture of home sweet home right straight up there.

05 11 21 25 LMP-EVA Yes. Could you undo my EVA antenna, please?

05 11 21 30 CDR-EVA Okay.

05 11 21 44 CDR-EVA Okay, you're now undone.

05 11 21 46 LMP-EVA Okay. I've been undone before.

05 11 21 52 CDR-EVA I really like this.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 11 12 02	CMP	Houston, do you read Kitty Hawk?
05 11 12 06	CC	Kitty Hawk, Houston. You're way down in the mud there. Try it again.
05 11 12 12	CMP	Okay, how do you read?
05 11 12 14	CC	Okay, you're still real weak, Stu.
05 11 12 22	CMP	Stand by a second.
05 11 12 33	CC	Try it again now, Kitty Hawk.
05 11 12 39	CMP	Okay, Houston; Kitty Hawk. How do you read?
05 11 12 42	CC	Hey, there, I got you loud and clear.
05 11 12 49	CMP	Okay, you ready for some words on the Hycon?
05 11 12 51	CC	We're standing by.
05 11 12 56	CMP	Okay. I did that little routine that Ken talked to me about last night; and, sure enough, that noise we hear is the shutter oscillating; and you put the power on MODE switch, STAND BY, and the shutter sits there and oscillates back and forth. If you hit - if you go to AUTO and when the intervalometer times, the shutter appears to stop while - during the FMC. When the FMC kicks up, the shutter appears to stop at that point, then goes back to oscillating again. It does the same thing in single-frame mode.
05 11 13 43	CC	Okay, Stu. I think when you go to AUTO in the intervalometer time the shutter appears to stop. Does it a - kind of follow the intervalometer setting at all?
05 11 14 02	CMP	Yes. And the - and the - the FMC operates and the shutter appears to stop, and you know then ... Hello, how do you read?
05 11 14 24	CC	Okay. I think I've got you again now -
05 11 14 27	CMP	Hello, Houston. How do you read?

05 11 14 30	CC	Okay, I've got you again now, Stu. How am I?
05 11 14 33	CMP	Okay. Okay, you're loud and clear. And it does the same thing in the mode - in the single; whenever you hit the button, why the FMC operates and the shutter appears to stop, and then starts back oscillating.
05 11 15 01	CC	Okay, Stu. When the shutter does oscillate on the thing, does it kind of go back and forth or does it seem like it keeps going around? In the same - you know, does it seem like it keeps going around in the same direction or does it oscillate back and forth?
05 11 15 27	CMP	Well, I guess I might have to look at it again to be ver - be real certain but I - yes, it goes back and forth. I might check that in a little bit if I get the chance - or when I get the chance, but it looked like it was just sitting there going back and forth on the thing.
05 11 15 54	CC	Okay, Stu. Stand by 1.
05 11 16 34	CC	Okay, Stu. What we're thinking is that - you know the shutter kind of goes back and forth anyhow; and if it goes back and forth kind of at the intervalometer setting, and the spools rotate, you know, to indicate that the film is in fact moving, it looks like it may be operating in - in the AUTO mood - in the AUTO mode okay and we could probably be able to get some pictures. Now if that's a completely - you know, if the shutter kind of oscillates, not with respect to the intervalometer setting; it may not be working correctly, and I guess I'm still not quite clear in my own mind that if the shutter's oscillating back and forth at the rate of the intervalometer setting.
05 11 17 40	CMP	That's a negative on that one, Ron. It's a fast oscillation, like the check that Ken wanted me to make was the intervalometer set on 60 and - and so every, every second we - the intervalometer triggers and FMC operates, but the shutter in between, is just banging back and forth.
05 11 18 11	CC	Okay, I understand now.

05 11 18 18	CMP	And - and the osciallation on the shutter appears to stop at the time the intervalometer triggers.
05 11 18 29	CC	Okay - -
05 11 18 31	CMP	You know, I looked down the lens with a flashlight and I see - I looked down the lens with a flashlight and I see the shutter is sitting there going back and forth and it appears to freeze at the time the intervalometer triggers it ... back again.
05 11 19 01	CC	Okay, Kitty Hawk; Houston. You faded out again there, I missed your last comment.
05 11 20 33	CC	Kitty Hawk, Houston.
05 11 20 39	CMP	Go ahead, Houston.
05 11 20 41	CC	Okay. It looks like you - you're working on the HIGH GAIN there. We got PITCH of minus 84, and YAW - a PITCH of minus 84, and a YAW of 346.
05 11 21 14	CC	Okay. I think we should have you now, Stu.
05 11 21 27	CMP	Yes. It looks - it looks pretty good, now.
05 11 21 29	CC	Hey, it's beautiful. Okay. When the shutter does stop on the thing there at the 1-second intervals, can you see the shutter slip, at all?
05 11 21 48	CMP	No. I - I thought it might stop out there. No, I couldn't. And also when I - when I open - put magazine W in, I noticed the slit was right out in the middle of the - of the magazine there, if that means anything; and I didn't - couldn't particularly see the slip, when the - when the shutter stopped. But I can look for that again. You know, it's a little difficult to tell what I'm looking behind, to see whether I really should be able to see the slit or not. But I can't check it out for you right now. We've got the DC camera running off the scientific box, over there. Well, I guess you - unless you don't particularly want the HIGH BIT RATE anyway. But I can go ahead and power it up here in a minute and run through it, while you're on the line and answer any questions.

05 11 22 07	CC	Okay. It doesn't look like that's going to cost us anything there. Don't forget you got the Langrenus B for your photo target there.
05 11 22 10	CMP	Yes. I'm watching for that one.
05 11 22 16	CC	And, Stu, while I've got you here, I want you to slip over your flight plan there on 132:42 for the north galactic pole attitude. I got a different pitch attitude.
05 11 22 30	CMP	Okay. Would you hold that 1?
05 11 22 32	CC	Okay.
05 11 25 10	CC	Kitty Hawk, Houston. OMNI Bravo.
05 11 28 13	CC	Kitty Hawk, Houston. I know you're looking out the window there at Langrenus now, but when you set up for the camera there, let's try a 10 frame per second instead of 60 - 10 frames per minute, I mean, instead of the 60, for the frame rate.
05 11 28 34	CMP	Stand by. I'll get that in a minute.
05 11 34 14	CC	Kitty Hawk, Houston. Looks like the first thing we ought to whip up you here is some 500-millimeter procedures. So if you've got a place to copy those down - there's about 11 steps on it. And, the next REV we'll use the 500-millimeter.
05 11 34 41	CMP	Okay. Stand by.
05 11 35 09	CMP	Okay to read the ... right now ... take ...
05 11 35 14	CC	Stand by 1, Stu. I just barely got you there.
05 11 35 28	CC	Okay. Kitty Hawk, try the HIGH GAIN, the PITCH, minus 50; YAW, 181.
05 11 36 11	CMP	Okay. How do you read now?
05 11 36 12	CC	Okay. You're real weak, Stu. How do you read me?
05 11 36 20	CMP	You're loud and clear. Coming in ...

05 11 36 23	CC	Okay. I could just barely hear you, but if you're reading me good, why don't you go ahead and let me know when you're ready to copy some 50-millimeter procedures?
05 11 36 34	CMP	Okay. I'm ready to copy.
05 11 36 38	CC	Okay. Step 1, configure camera CM4/EL/500/BW-PCM cable; the 16-millimeter control cable, (f/11) 1/250th, infinity; 42 frames, 5-second intervals; magazine Papa. Step 2, set COAS in left-hand rendezvous window; adjust for plus 10 degrees. VERB - Step 3, VERB 49, manuever to high-resolution photo attitude. And just a note: time to start the maneuver and the maneuver attitude will be updated. Step 4, change your DAP R_1 to 11103 and, Stu, we talked about that - whether to use a 2 degree or half degree per second, there. I personally prefer the - you know the, 2 and the R_1. And, then if you don't quite hack it, you know, ... the load direct. Okay. Step 5 - -
05 11 38 55	CMP	...
05 11 38 57	CC	I missed that, say again.
05 11 38 59	CMP	You know I never got a chance to try that ..., but I'll, if I get a chance ...
05 11 39 12	CC	Okay. I didn't quite hear that, but I think you got it. Step 5, zero DET. Step 6, configure the DSE; HIGH BIT RATE, RECORD FORWARD, COMMAND RESET. Step 7, at T-start, EL camera on and DET startup. Step 8, at T-start plus 1 minute, ORDEAL, pitch 305, track Descartes with COAS.
05 11 40 31	CC	Are you still with me, Stu?
05 11 40 43	CC	Okay, I can't read you at all, now, Stu.
05 11 40 53	CMP	...
05 11 41 14	CC	Okay, Stu, I'm going to go ahead and read you step 9. At T-start plus 3 minute 28 second, ORDEAL, pitch 215; terminate tracking; EL off. Step 10, configure DSE to LOW BIT RATE. Step 11, record frame number.

05 11 42 03	CC	And, in the blind, that's it.
05 11 42 18	CMP	Okay, how do you read, Ron?
05 11 42 21	CC	Okay, you're really weak, Stu. I don't know, if you - if you can read the AGC meter on the high gain, there. Maybe I can read you, if you can keep the high gain on.
05 11 43 35	CC	Okay, Kitty Hawk; Houston, let me try one more time here. If you're reading me okay, I've got some more flight-plan updates for you here.
05 11 43 50	CMP	Okay, I'm reading you loud and clear, Ron.
05 11 43 52	CC	Okay, Stu, you're still down, but let's do the flight-plan update. At 132:40, change your pitch attitude on the north galactic pole there, change the pitch attitude to 280; HIGH GAIN angles, PITCH, minus 81; YAW 210.
05 11 44 35	CC	Okay, skip on over in your solo book there to time at 133:31.
05 11 44 57	CC	Delete the VERB 49 maneuver to the LTC attitude. And delete, at 133:40, the proceg - PRO to start the pitch rate. And delete all reference to LTC photography, target 2/8. Okay, at 134:00, add - You still with me, Stu?
05 11 46 01	CMP	No, I didn't get all of it, you dropped out for a while. I picked back up here at 133:40.
05 11 46 16	CC	Okay, Stu, at 133:31 -
05 11 46 37	CMP	Go ahead.
05 11 46 47	CC	Okay, Stu, at 133:31, delete the VERB 49 maneuver to the LTC target. And at 133:40 - -
05 11 47 00	CMP	I got that, forget it.
05 11 47 03	CC	Say again.
05 11 47 07	CMP	I said forget AOS. ... VERB 49 for the COAS ...
05 11 48 15	CC	Man, this comm is terrible; I can't read you.

05 11 48 25	CMP	Okay, if we're going to stop here now, I've got to get on to the ...
05 11 48 31	CC	Okay.
05 12 08 14	CC	Okay, Kitty Hawk; Houston. Noise stopped down here, we may have some comm now.
05 12 08 25	CMP	Hey, how about that, Houston? Looks like we got a good signal strength.
05 12 08 31	CC	Beautiful. Man, oh man, that's great to hear your voice like that. Okay, Stu. I want to make sure that we get our 500-millimeter stuff up to you, and make sure you have that before we do anything else.
05 12 08 46	CMP	Okay.
05 12 08 51	CC	Okay, I'm not sure where I faded out on the update I was going to give to you. I passed up delete the vertical LTC photography stuff at 133:30. Did you get that?
05 12 09 10	CMP	That's affirmative. I got a 133:30, no VERB 49 maneuver, no PRO at ORDEAL 328, and delete all LTC targets, 2 dash 18.
05 12 09 23	CC	Okay there now. How about over at 134?
05 12 09 31	CMP	No, I didn't get anything there.
05 12 09 33	CC	Okay, at 134, add - I've got a VERB 49 to roll, 0; pitch, 248; and yaw, 0. Over.
05 12 09 55	CMP	Okay, at 134, VERB 49 to 0, 248, and 0.
05 12 09 59	CC	Okay. And then use 500-millimeter porcedures, and did you get all of those?
05 12 10 14	CMP	That's affirmative. Let me just recap here slightly.
05 12 10 17	CC	Okay. Wait 1, Stu. Let me get you your T-start time for the 500-millimeter there is at 134:20 - at 134:20, and T-start time is 134:20:19.
05 12 10 38	CMP	Okay. I had the ... and now tell me again, T-start.

05 12 10 46 CC Say again, Stu.

05 12 10 51 CMP I did not get that last bit about the times. Give me those again.

05 12 10 55 CC Okay. At 134:20 in the flight plan there, T-start is 134:20 - 134:20:19. Okay. And, now we can go ahead and review those 500-millimeter procedures.

05 12 11 16 CMP Okay.

05 12 11 32 CMP Okay. I'm going to configure the camera CM4, EL, 500, black and white, PCM cable, and 16-millimeter control cable, f/11, 1/250th, infinity. I'm going to shoot 42 frames with me manually flicking them off every 5 seconds. I'll use magazine P, P as in Papa. And, I'll use the COAS, set on 10 degrees, and do the VERB 49 maneuver. Probably won't change the DAP, last tracking went real well at MINIMUM IMPULSE.

05 12 12 24 CC Okay, we'll - look, while he's talking about that tracking - -

05 12 12 31 CMP I'll zero the - I'll zero the event timer. I'll configure the DSE, HIGH BIT RATE, RECORD, FORWARD, COMMAND RESET. I guess I'll do that just prior to T-start. At T-start, I'll turn the camera on, start the event timer, and at T-start plus a minute, I should be in an ORDEAL pitch of 305, and I'll start the COAS track of Descartes; and at T-start plus 328, should be around an ORDEAL pitch at 215. I'll terminate the track, turn the camera off, got to LOW BIT RATE, record the frame number.

05 12 13 12 CC Okay. Sounds real good there, Stu. Looks like you got it under control. I don't know, have you ever used that 16-millimeter camera instead of the intervalometer, you know, on the PCM cable?

05 12 13 26 CMP No, I sure haven't.

05 12 13 28 CC Okay. I've checked that out real good; and, every time you punch it, just like on a 16-millimeter, you take a picture, you know. And it'll reach all the way over to your left hand there, so you

		got that in your left hand and flipping away with your right hand on the MINIMUM IMPULSE, you know.
05 12 13 47	CMP	Okay. That shouldn't be any problem. That COAS track and MINIMUM IMPULSE is extremely smooth, Ron. It just hangs right there.
05 12 13 56	CC	Beautiful. Okay, the only difference as you notice; the rest of them are going to be at a zero roll so you'll be pitching the opposite direction on the thing as you did then, you did for the one for the - the last pass there.
05 12 14 12	CMP	Okay.
05 12 14 14	CC	And, I got some - -
05 12 14 15	CMP	I'm flexible, I'll be able to handle that.
05 12 14 19	CC	Beautiful, I'm sure you can. Okay, at AOS, I got some AOS PITCH and YAW angles for you. At about 133.50, in there.
05 12 14 51	CMP	Okay. Go ahead.
05 12 14 53	CC	Okay. And, PITCH of minus 59, and YAW plus 345, instead of OMNI B, there.
05 12 15 10	CMP	Okay. In lieu of OMNI B, PITCH, minus 59; YAW, plus 345.
05 12 15 15	CC	Roger. You'll be coming over the hill there in your lunar libration attitude.
05 12 15 29	CMP	Okay. And, the - on magazine Q on that vertical stereo, I ended up on frame number 187.
05 12 15 38	CC	Roger. 187 on magazine Q. And, on page 33 there, do you have your torquing and angles for your P52?
05 12 15 51	CMP	Roger. Minus 00.036, minus 00.157, plus 00.091 at a time of 131:18:30.
05 12 16 09	CC	Roger. Minus 0.036, minus 0.157, plus 0.091, at 131:18:30.
05 12 16 20	CMP	That's affirmative.

05 12 16 22	CC	Okay. Looks like you may have some time to mess around with this LTC, probably around 134, 35 or somewhere around there. Maybe before that. But, basically, it looks like it - Well, we're really not sure that it works or not, but we think it probably won't. But as a final check on it, if you get a chance, do the same procedures, as kind of before. Except, put your frame rate down to 10 frames per minute instead of 60. And, that'll be a slower operation there, and kind of observe, first of all, looking through the lens you should be able to see the shutter slit or at least a piece of tape-looking-like stuff, you know, where the shutter slit is; and kind of get an idea of what's happening to the shutter slit if you can. And, from what I understand, what you said before is that, it looks like it's zigging back and forth until the intervalometer hits - hits the thing, and then it kind of stops for a second or something, and then it starts zigging back and forth, again. Is that kind of correct?
05 12 17 33	CMP	That's affirmative. That's - that's the way it looked a while ago.
05 12 17 40	CC	Okay.
05 12 17 41	CMP	It freezes on the intervalometer ... trips.
05 12 17 46	CC	Okay. I understand it freezes when the intervalometer - kind of trips the system, so to speak.
05 12 17 56	CMP	That's true, and it also does it when you have the ... in signal and you push the button.
05 12 18 03	MCC	I don't know what the problem is; we've got a good signal strength.
05 12 18 06	CC	You faded out on that one, Stu, I missed it.
05 12 18 14	CMP	Okay. And it has the same operation in both switch signals, when you push the signal ... button.
05 12 18 24	CC	Okay. You might try tweaking up your HIGH GAIN there a little bit, Stu. I can't hear you.

05 12 18 35	CC	YAW is plus 210.
05 12 18 49	CMP	I'm showing a real good signal strength, Ron.
05 12 18 53	CC	Okay. You're just real weak, but clear now. So, I think I can hear it.
05 12 19 01	CMP	Okay. How's that?
05 12 19 07	CC	Okay. Real weak, but clear, I think.
05 12 20 01	CC	Kitty Hawk, Houston.
05 12 20 06	CMP	Go ahead, Houston; Kitty Hawk.
05 12 20 08	CC	Okay, Stu. We're going to rewind - start the tape recorder rewinding at LOS on the thing. And, when you see the barber pole, indicating that it's completely rewound, then go ahead and do your normal procedures, and start at LOW BIT RATE, you know, COMMAND RESET, and et cetera.
05 12 20 28	CMP	Yes. That will be a good deal, you know at the start of that stereostrip, I checked the tape at LOS, and it was gray, and by the time we got to the start of the stereostrip it had - I guess it hadn't been rewound.
05 12 20 44	CC	Roger.
05 12 20 45	CMP	I wound it back, and we only got about 45 seconds of HIGH BIT RATE on the start of that stereostrip.
05 12 20 54	CC	Okay. Understand.
05 12 21 20	CC	Okay, Stu. We got about 2 minutes of - until LOS, and you might be advised that Ed and Al are out roaming around the lunar surface, working up toward Cone - Cone Crater. I kind of lost track of exactly where they are but - -
05 12 21 37	CMP	Sounds ... Sounds real good. Thank you.
05 12 22 44	CC	Kitty Hawk, Houston. About 30 seconds to LOS. Your 180 for REV 27 is 133:28:29.
05 12 23 00	CMP	Okay. 133:28:29.

05 12 23 03	CC	Roger. LOS and AOS are off about a minute.
05 12 23 10	CMP	Okay. Hey, Ron, I - I find I can find my way without using that 180 time. Why don't we just discontinue that if things - ...
05 12 23 25	CC	I'll catch it next time around; I missed it.
05 12 47 --		BEGIN LUNAR REV 27

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 11 22 02	LMP-EVA	Al?
05 11 22 03	CDR-EVA	Yes.
05 11 22 04	LMP-EVA	One more problem here. My gold visor's caught. I can't seem to - -
05 11 22 13	CDR-EVA	Okay.
05 11 22 14	LMP-EVA	- - pull down.
05 11 22 23	CDR-EVA	Okay.
05 11 22 25	LMP-EVA	In there. Thank you. Want some help?
05 11 22 28	CDR-EVA	No, it's okay. All righty.
05 11 22 32	LMP-EVA	Okay, we're all set.
05 11 23 19	LMP-EVA	***two spares right up here.
05 11 23 26	CDR-EVA	Okay.
05 11 23 28	LMP-EVA	They fit up there okay.
05 11 24 00	CDR-EVA	Watch your foot. Back up.
05 11 24 09	LMP-EVA	Okay.
05 11 24 11	CDR-EVA	That's a pretty neat jig there.
05 11 24 16	LMP-EVA	Yes.
05 11 24 36	CDR-EVA	Okay, while you're down there, pick up the - handle. Okay, very good.

05 11 24 57 LMP-EVA Here, do you want to read it?

05 11 25 00 CDR-EVA Okay, I think so, after we - -

05 11 25 03 LMP-EVA ***it off a little.

05 11 25 05 CDR-EVA ***it off, maybe. ***be easy.

05 11 25 12 LMP-EVA Do you want the brush?

05 11 25 19 LMP-EVA Get a - get a clean little brush out of there.

05 11 26 04 LMP-EVA Okay. Let's turn it over.

05 11 26 28 LMP-EVA Little things proceed to eat your time line up.

05 11 27 31 CC And, Al and Ed, we're got about 10 minutes left now to complete the MET load.

05 11 27 40 LMP-EVA Okay, Fredo. It'll be completed easily in that time.

05 11 27 46 CC Very good. We're going to need all we can get.

05 11 28 02 CDR-EVA Okay. In accordance with your desires, we are leaving the organic sample out of SRC number 2. Is that correct?

05 11 28 09 LMP-EVA No, no. That isn't the sample he referred to, I don't believe. Sample underneath the LM.

05 11 28 21 CC Stand by, Al.

05 11 28 24 CDR-EVA ***did you read, Houston?

05 11 28 36 CC Okay, Albert, continue as nominal now.

05 11 28 44 CDR-EVA Okay.

05 11 29 48 LMP-EVA ... this is going to jerk that cable out yet.

05 11 29 51 CDR-EVA Okay. Let's run over the MET stowage. We have the ... extension handles, and two pairs of tongs. Okay, we have two core tube cap assemblies. We have tether and gnomon. We have a hammer, we have a small scoop, six core tubes, 35-bag dispenser, trenching tool, a 16-millimeter camera and - may I have that last brush again please?

05 11 30 44 CDR-EVA Okay. Thank you.

05 11 31 19 LMP-EVA Okay.

05 11 31 22 CDR-EVA Can load up a MAG right here if we want.

05 11 31 26 LMP-EVA Okay. I'll have some MAGs in a minute.

05 11 31 28 CDR-EVA Okay. There you got it.

05 11 32 02 CDR-EVA Okay. I got it. Houston, on the 16 millimeter, we're putting magazine Hotel-Hotel.

05 11 32 12 CC Roger, Al. Hotel-Hotel.

05 11 32 17 CDR-EVA Roger.

05 11 32 55 CDR-EVA Can I help you there?

05 11 32 56 LMP-EVA No. I'm getting up.

05 11 33 02 CDR-EVA ***out yet?

05 11 33 03 LMP-EVA Yes, there's some more in there. And, Houston, on the 16-millimeter MAGs, I put Foxtrot-Foxtrot and GG, George-George, in the MET stowage.

05 11 33 21 CC Roger, Ed.

05 11 33 22 LMP-EVA I'm putting Hasselblad Kilo-Kilo - on one of the MET storage areas.

05 11 33 36 CC Roger. Kilo-Kilo Hasselblad MAGs.

05 11 33 42 LMP-EVA Yes.

05 11 34 02 LMP-EVA I've got the closeup camera turned on. Is that all MAGs.

05 11 34 09 CDR-EVA There's one more Hasselblad back there.

05 11 34 20 CDR-EVA Okay, there's an extra - 16 millimeter going in here.

05 11 34 29 LMP-EVA Okay.

05 11 34 36 CDR-EVA Okay. We have 16-millimeter camera, and two and a half magazines, two SESCs and MSSC, two 70-millimeter cameras, and one extra magazine black and white, and we have a partial magazine of color. Closeup camera's turned on, and we need some more weigh bags.

05 11 35 04 LMP-EVA Have you gotten the polarizing filter and the TDS yet, Al?

05 11 35 11 CDR-EVA The polarizing filter is - is - is on the end, and the TDS I'll be getting now.

05 11 35 21 LMP-EVA Okay. So it looks like the MET stowage is complete. Let me look over my list. 70-millimeter MAGs -

05 11 35 30 CDR-EVA Negative. We need some more weigh bags.

05 11 35 34 CC Roger, Al and Ed. I show you short the weigh bags, MESA brush, and a map.

05 11 35 40 LMP-EVA Okay. The MESA brush is there and the map is there.

05 11 35 46 CC Roger.

05 11 35 47 CDR-EVA Okay. Here we come.

05 11 35 51 LMP-EVA Did you close that?

05 11 36 21 LMP-EVA Okay. TDS sample is on.

05 11 36 30 LMP-EVA Okay. And we need two weigh bags on.

05 11 36 41 LMP-EVA That's all the weigh bags we have there.

05 11 36 42 CDR-EVA Pardon.

05 11 36 43 LMP-EVA That's all the weigh bags we have there; we have two more in here.

05 11 36 47 CDR-EVA Okay. We have a total of four.

05 11 36 54 LMP-EVA Okay. Why don't we get them stowed on outside then.

05 11 36 58 CDR-EVA Okay. Why don't you put this one on the back?

05 11 37 08 CDR-EVA And I'll put this one down here.

05 11 37 34 CDR-EVA Okay, the METs loaded, Houston.

05 11 37 37 CC Roger, Al. The METs loaded.

05 11 37 47 CDR-EVA Okay. We'll go to pick up the - -

05 11 37 50 LMP-EVA LPM right now.

05 11 37 51 CDR-EVA - - LPM; and then, we'll move the television camera after that.

05 11 37 55 CC Okay. We're right about on the time line.

05 11 37 56 LMP-EVA Just watch the cables. ...

05 11 38 00 CDR-EVA Got it?

05 11 38 01 LMP-EVA Okay. I got it. That's the cable.

05 11 38 07 CDR-EVA It'll go around the S-band.

05 11 38 29 CC You really look neat there.

05 11 38 35 CDR-EVA Say again.

05 11 38 36 CC I said that really looks neat. I can see it bouncing a little bit, and your tracks are quite visible.

05 11 38 44 CDR-EVA It bounces a little.

05 11 38 54 CDR-EVA Okay, up on top of the hill.

05 11 39 24 CDR-EVA And it's very level there.

05 11 39 46 LMP-EVA Okay. The pallet's removed; the thermal cover is replaced.

05 11 40 02 CDR-EVA And, let's do this slow.

05 11 40 20 LMP-EVA Okay. It's all yours.

05 11 40 25 CDR-EVA Okay.

05 11 40 35 LMP-EVA ... Give you a little more slack. You up there?

05 11 40 41 CDR-EVA Got it?

05 11 41 00 CDR-EVA Number 1 in the Sun.

05 11 41 13 LMP-EVA Okay.

05 11 41 14 CDR-EVA I got it.

05 11 41 17 LMP-EVA Okay. We'll take off the electronics package. Throw away the caging device.

05 11 41 40 LMP-EVA High scale, ON.

05 11 42 28 CDR-EVA ***clear. Okay. Clear.

05 11 42 47 LMP-EVA Houston, you wanted LPM temperature. It's 125.

05 11 42 51 CC Roger, Ed. 125.

05 11 43 16 CDR-EVA Okay. Okay.

05 11 43 26 LMP-EVA All right. And, Houston, the LPM is loaded on board the MET.

05 11 43 31 LMP-EVA I'll turn on that if you'll turn the camera around.

05 11 43 35 CDR-EVA Yes. I just wanted to give - get a good - direction actually. Our sight to A, directly toward the center of the crater - -

05 11 43 48 LMP-EVA Yes, that's right over that way.

05 11 43 51 CDR-EVA And it's - *** - about 350 meters, a thousand feet.

05 11 43 59 LMP-EVA Okay. We'll start off that direction and take a look around.

05 11 44 02 CDR-EVA Okay, and I'll aim the camera towards Cone.

05 11 44 06 LMP-EVA Okay.

05 11 44 10 CDR-EVA Okay, Houston. We're going to try to put the TV camera in the shade, and aim it up towards Cone. I'm not sure we're going to be successful in doing that.

05 11 44 24 CC Okay, Al. We don't want to tarry too long on that one - -

05 11 44 27 CDR-EVA And I'll - -

05 11 44 28 CC - - We're about 2 minutes behind starting out. And, the settings, you can leave them just as they are right now.

05 11 44 39 CDR-EVA ***. Say again.

05 11 44 40 CC Okay. The settings that are on the TV are - right now, are good.

05 11 44 48 CDR-EVA You don't want to aim it toward Cone Crater?

05 11 44 51 CC That's affirmative, Al. You can do that task, but we won't worry too much about fineness on aiming it. The settings on the camera right now should be good.

05 11 45 03 CDR-EVA Okay. We'll aim it up toward Cone. It's going to be fairly close to the Sun.

05 11 45 11 CC Roger, Al.

05 11 45 12 CDR-EVA We'll see what happens.

05 11 45 28 CDR-EVA Do you have the image of the Sun, yet? Do you have the image of the Sun, yet?

05 11 45 42 CC Okay. We have a little bit of a glare there, but we have a picture, Al.

05 11 45 48 CDR-EVA I'm going to bring it a little further to the right.

05 11 45 49 CC Roger, Al. I think we can see the slopes - -

05 11 45 52 CDR-EVA How's that?

05 11 45 54 CC Left flank of Cone coming in.

05 11 46 00 CDR-EVA Okay. Okay, you're looking at Cone.

05 11 46 08 CC Roger, Al. We have little bit of a glare across the center; but in the background, we can see the rest of Cone.

05 11 46 19	CDR-EVA	Okay. Okay, we will probably be off the camera to the right.
05 11 46 44	LMP-EVA	Think we ought to check our position right about here, Al. See if we can find out where we are.
05 11 47 03	CDR-EVA	Okay. While you're checking your position, I'll be using the closeup.
05 11 47 26	CDR-EVA	Okay. Taking the picture of the MET track, Houston.
05 11 47 29	CC	Roger, Al.
05 11 47 30	CDR-EVA	With the closeup and the sunrise at - at 11 o'clock.
05 11 48 11	CDR-EVA	Okay, 30, one, and two. My track's at 11, 303, and 4; footprints, Sun at 10 o'clock.
05 11 48 22	CC	Roger, Al. I copied the frame numbers. And we still have you in the picture.
05 11 48 30	CDR-EVA	Okay. Head on out, man.
05 11 48 31	LMP-EVA	Yes, let's go.
05 11 48 32	CDR-EVA	You get it?
05 11 48 33	LMP-EVA	I don't know exactly where we are.
05 11 48 35	CDR-EVA	Well, keep the map in your hand - -
05 11 48 36	LMP-EVA	Right.
05 11 48 37	CDR-EVA	- - and keep going. I got this.
05 11 48 39	LMP-EVA	If I can locate a familiar crater.
05 11 48 46	CDR-EVA	Okay, Houston. We're headed just about toward the center of Cone Crater.
05 11 48 52	LMP-EVA	Okay, Al. Is this North Triplet right here to - to our right? It is, isn't it?
05 11 48 58	CDR-EVA	Yes, sir.
05 11 48 59	LMP-EVA	Okay. This nice big depression over here.

05 11 49 06 CDR-EVA Houston, we're again proceeding directly toward the center of the crater, point A. As Ed pointed out, we're passing north of North Triplet. The area over which we are passing again, of course, is pockmarked by craters. However, the land is generally flat right here. We have a - sort of a - a - I was going to say mesa but I really don't think it's a mesa. It's more of a ridge, which extends to the southeast, almost normal to our path of travel. I think point A is probably down in that valley.

05 11 49 57 LMP-EVA Yes. Look, Al. I've spotted it. See the crater almost directly up front from us, in the valley? Right in the middle valley.

05 11 50 04 CDR-EVA Right.

05 11 50 05 LMP-EVA - - I think that - that's Weird - -

05 11 50 06 CDR-EVA Okay.

05 11 50 07 LMP-EVA - - and if we head to the north of that, we're in business.

05 11 50 09 CDR-EVA Okay. That means that point A is, in fact, then, in the valley.

05 11 50 14 CC Roger, Al.

05 11 50 21 CDR-EVA The - There seem to be quite a few large rocks as we progress along here. ***rocks of up to 2 or 3 feet in size, and one would - would fairly easily postulate these came directly from Cone Crater. Of course, we will - get samples of these a little further along.

05 11 50 50 LMP-EVA A little further to the left. Okay. Point A, Al, is right - not quite in the valley. It's right beyond over here.

05 11 51 11 CDR-EVA Okay. ***subdued craters now.

05 11 51 15 LMP-EVA Yes.

05 11 51 16 CC Okay. Is there any basic change in the - -

05 11 51 17 LMP-EVA ... right here.

05 11 51 20	CC	Any basic change in the surface texture as you're heading out across toward A, there?
05 11 51 27	LMP-EVA	No. It looks all the same, Fredo.
05 11 51 30	CC	That's what I was afraid of.
05 11 51 32	LMP-EVA	We're - Fredo, see the crater - see the crater 60 meters to the west of point A?
05 11 51 45	CC	Roger, Ed.
05 11 51 46	LMP-EVA	- - the sharp one?
05 11 51 48	CC	Okay. I think I have it on the chart.
05 11 51 50	LMP-EVA	Okay. We're coming up on that one right - Okay, we're coming up on that one right now. It's the sharper one in the east, north-south line of about three craters. And our traverse, supposedly, passes right between them. Got it?
05 11 52 06	CC	Okay. We got you right on the map, Ed.
05 11 52 11	LMP-EVA	Okay. The - the kind of doublet crater, supposedly just south of our track at 71 and CT and CT 0.3. We're passing exactly on the south rim of those two, now.
05 11 52 32	CC	Roger, Ed.
05 11 52 37	CDR-EVA	Probably A - right here, is it not?
05 11 52 38	LMP-EVA	It's right over here to our left a little bit, Al. I believe. Now, let me see.
05 11 52 52	CC	And one other question from here. Did the blocks you described as you moved across there, do they appear to be in the form of rays from Cone or are they pretty widely spread?
05 11 53 09	CDR-EVA	No. We don't see any ray pattern, I would say. They're fairly generally scattered.
05 11 53 14	LMP-EVA	They may form a pattern when we get to the top and can look at them in plain view, Fredo.

05 11 53 20 CC Very good.

05 11 53 22 LMP-EVA Fred, right here in the center of these three are A. Okay. Buy that?

05 11 53 34 LMP-EVA Well, it's pretty close. I don't think it's exactly at A, but it's close.

05 11 53 39 CC Okay, I'll - -

05 11 53 40 LMP-EVA ... using this -

05 11 53 41 CC - - I'll clock you at A, right now.

05 11 53 44 LMP-EVA Okay. That large crater to your right, Al, just doesn't show up. Ah ha! It does, too. That's the one. Just beyond that is A.

05 11 53 56 CDR-EVA That's what I thought. About 20 feet ahead of me, right?

05 11 53 59 LMP-EVA Yes, yes.

05 11 54 00 CDR-EVA Okay, babe. Fred, the surface, here *** about that, is - is textured. It - it is, of course, a very fine grain dusty regolith, much the same as we have in the vicinity of the LM. But, there seems to be small pebbles - more small pebbles here on the surface than we had back around the LM area. And the population of larger rocks, perhaps small boulder size, is more prevalent here. Okay, this is probably pretty good.

05 11 54 32 LMP-EVA Yes, this a good place for A and y'all might also comment, Fredo, that the - they have an appearance, here, quite often like raindrops - a very few raindrops have splattered the surface. It gives you that appearance. Obviously, they haven't; but it's that sort of texture, in places.

05 11 54 52 CDR-EVA Yes, I think - I was - I was just about to say that there's a relationship between the texture and these small surface pebbles. Okay, point A.

05 11 55 04 LMP-EVA Okay, at point A, we do a double core LPM. I'll start with the LPM and a pan.

05 11 55 13 CDR-EVA Okay, I'll start with the TDS.

05 11 55 23 CDR-EVA Fred, did you read? We're ...

05 11 55 26 CC Roger, I copied - copied all of that.

05 11 55 36 CDR-EVA The point where we're sampling is - just about in the center of three craters of almost equal size. I would say, perhaps, 20 meters in diameter. The ones to the north in *** are more fresh, more sharp; the one to the left is more subdued. I'm pretty sure we're just about where point A is on the map; it fits very close - it fits the description of it.

05 11 56 39 CDR-EVA Okay. In the TDS, Houston; serial number 1002.

05 11 57 13 CDR-EVA And the frame counter on the closeup is now 305.

05 11 57 20 CC Roger. Serial number 1002 and 305.

05 11 57 28 CDR-EVA Roger. And I'm now dusting that sample.

05 11 57 38 CDR-EVA Remark before he starts, that number 3 block on this sample appears to have a smudge on it, before I start - a very light black smudge.

05 11 57 51 CC Okay. We copied, Al.

05 11 57 55 CDR-EVA Okay.

05 11 57 58 LMP-EVA Okay, Fred. The LPM is in place; I'm level - It's leveled and alined, and I'm returning to the MET.

05 11 58 05 CC Okay. Give me a call when you get there, and I'll start the timing.

04 11 58 14 LMP-EVA Okay. I'm here, now.

05 11 58 16 CC Starting the clock.

05 11 58 21 LMP-EVA Okay. May I get a Hasselblad.

05 11 58 23 CDR-EVA Sure. You may have a Hasselblad. What would you like?

05 11 58 28 LMP-EVA I'll take mine, if you don't mind.

05 11 58 30 CDR-EVA Okay, Senor.

05 11 58 34 LMP-EVA No, Sun. I want f/8. ***

05 11 59 07 LMP-EVA And, Houston. The locater shot for the placement of the MET - of the LPM is frame 7, magazine MM.

05 11 59 20 CC Roger. And, you can go with reading.

05 11 59 23 LMP-EVA I'll take two of them.

05 11 59 28 LMP-EVA Yes, I took two shots of that for your locators.

05 11 59 32 CC Roger, Ed. And, we're GO for the readings.

05 11 59 37 LMP-EVA Okay. Be there in a second.

05 11 59 51 LMP-EVA Huh, Fredo?

05 11 59 59 CC Go ahead, Ed.

05 12 00 00 LMP-EVA Okay. I'm on high scale. X is 9.6, 54.2; B, 7.3.

05 12 00 19 CC Okay. Copied.

05 12 00 22 LMP-EVA 9 - 9.6; Y, 3.8; B, 6.7; X, 9.6; Y, 3.7; B, 6.5.

05 12 00 50 CC Okay. I got all - all readings, Ed.

05 12 00 56 LMP-EVA And that was the high-scale reading.

05 12 00 58 CC Roger. High scale.

05 12 01 25 CDR-EVA And, Al, now verifying the second TDS, serial number 1001.

05 12 02 21 CDR-EVA Let's see. Fredo, I'm leaving the LPM number 2, and - -

05 12 02 38 CC Okay. Let me know when you're back at the MET.

05 12 02 44 LMP-EVA Okay. Just a second. I wanted to tell you that in my leveling of these things, the bubble is tangent to the inner circle to the north, on both the first and the second - a alinement.

05 12 03 00 CC Roger. Copy, Ed.

05 12 03 08 LMP-EVA And, I'm back at the MET.

05 12 03 13 CC Okay, and the clock's - starting it.

05 12 03 19 LMP-EVA Okay.

05 12 03 27 CC And, while we got a few seconds there, Ed. The raindrop pattern you mentioned, is it - is it pretty general or is it just here and there that you noticed this texture?

05 12 03 40 LMP-EVA It seems to be fairly general, Fred.

05 12 03 54 CDR-EVA Okay, Houston, the TDS sampling is complete, and the final counter closeup is reading 311.

05 12 04 06 CC Roger, Al. I copied on 1001, serial number final count, 311. And Ed, you can - you're GO for the readings.

05 12 04 18 LMP-EVA Okay.

05 12 04 26 CDR-EVA Get in there, baby. Okay.

05 12 04 28 LMP-EVA Okay, Fredo. On high scale again; X, 01.1 - - oh, okay.

05 12 04 46 CDR-EVA Hold it. Now, hold it a minute. Oh, okay.

05 12 04 50 LMP-EVA Roger. You pumped the ... you turn it on. X, 1.1; Y, 3.7; B, 4.0; X, 1.1; Y, 3 - No, Y is 4.0; B, 3.7; X, 1.1; Y, 3.9; B, 3.6. Over.

05 12 05 40 CC Okay, Ed. We've got all of your readings.

05 12 05 46 LMP-EVA Okay. Returning the third one.

05 12 05 50 CDR-EVA Okay, we got closeup shots: 12, 13, and 14; and 12 - all at 9 o'clock shadow, 12 and 14 are two typical examples of the raindrop picture pattern which Ed - of which he spoke. Now, 13 is a picture of a foot track - -

05 12 06 12 LMP-EVA Tread.

05 12 06 13 CDR-EVA - - a foot track in the same - area.

05 12 06 21	CC	Roger, Al.
05 12 06 23	CDR-EVA	And I see some - I see a fairly large rock here at the - at the north of these three craters. It's embedded right at the rim. It's about 2 feet long. I can see some crystals in it. It has a good pellet pattern. I'm shooting a closeup of that. And the Sun angle again will be 9 o'clock.
05 12 06 46	CC	Roger, Al.
05 12 07 02	CC	Okay, and Al, a word from the back room says go at least two crater diameters away from - I guess, the crater you're just describing, when you get ready to take the double core.
05 12 07 17	CDR-EVA	Okay, we'll try to put it in the center of the three craters to get all three - well, to get whatever strategically we have here, and the last pellets, picture shadow 9 o'clock, was 18.
05 12 07 40	CC	Roger, Al.
05 12 07 46	CDR-EVA	Okay. And since I've already taken a couple of pictures of the MET tracks, I won't do it - any more of that here, and probably won't again unless we see some difference in these tracks. They're fairly what you might expect because they're smooth; they're well packed and vary in depth only as a function of the - of the surface tension.
05 12 08 24	LMP-EVA	Fredo, I've left the LTM, returning to the MET. Had a little trouble with it that time. The bubble is tangent on the east side of - of the center ring.
05 12 08 34	CC	Okay. On the east side. Let me know when you get there.
05 12 08 39	LMP-EVA	I'm at the MET.
05 12 08 41	CC	Starting the clock.
05 12 09 00	CDR-EVA	Okay, all set up for the double core here.
05 12 09 02	LMP-EVA	Okay, I'll be with you in a second. I have a pan to take, and I'll be right with you. Be careful with the Velcro on the tongue. You can see it came off, except for one bunch.

05 12 09 11	CDR-EVA	Yes, I see it. Why don't we just - ... it's about the right size.
05 12 09 17	LMP-EVA	It'll go in that outer pocket of mine. I'll carry it - one of us can carry it when we ...
05 12 09 22	CDR-EVA	It won't go down that way. Also, 16-millimeter MAG.
05 12 09 26	LMP-EVA	Okay.
05 12 09 28	CDR-EVA	Okay. Core tubes.
05 12 09 35	LMP-EVA	Okay, Fredo. You about ready?
05 12 09 38	CC	Okay, 1 minute. You go ahead.
05 12 09 44	LMP-EVA	Okay, Y - this is high scale. Y is 1.0. I'm sorry. X is 1.0; Y is 8.1; B is 6.6. Second set: X is 1.0; Y is 8.1; B is 6.6. Third set: X is 1.0; Y, 8.1; B is 6.65.
05 12 10 20	CC	Roger, Ed. And I assume all of those were high scale again.
05 12 10 27	LMP-EVA	Beg your pardon. Those were all high scale. That's affirmative.
05 12 10 30	CC	Okay. We got them.
05 12 10 38	CDR-EVA	Okay. The bottom core tube will be number 2. No tab. Top core tube will be number 3. No tab.
05 12 10 54	CC	Roger, Al. Top, number 3, no tab; bottom, number 2, no tab.
05 12 11 03	CDR-EVA	That is correct.
05 12 12 04	LMP-EVA	Okay. And a pair of tongs -
05 12 12 14	CC	And have you started reeling it up yet, Ed?
05 12 12 19	LMP-EVA	I'm starting it right now, Fred.
05 12 12 22	CC	Yes. I just - -
05 12 12 23	LMP-EVA	The electronics are in the box, and I'm - picking up the reel, now.

05 12 13 23	LMP-EVA	Oh, no.
05 12 13 24	CDR-EVA	What's the matter.
05 12 14 28	LMP-EVA	This is a can of worms.
05 12 14 31	CC	You're having some problem reeling it in there, Ed?
05 12 14 38	LMP-EVA	Yes. An awful lot of problem with it, Fred. The set in the cable is so much that if I ever let go of the handle, it winds down about three or four turns on me; and I have to - at least - then I have to take it back out. And the cable is all bunched up and curled out here. I'm not sure I'm going to get wound or not.
05 12 15 00	CC	Roger, Ed.
05 12 15 13	LMP-EVA	... a different method of holding it.
05 12 15 25	CDR-EVA	Okay, Houston. A couple of quick stereos in the locater of the core tube as it's about to be driven, and the ... of the LM is in the background.
05 12 15 40	CC	Roger, Al.
05 12 16 02	LMP-EVA	Okay, Fredo. I got the LPM reel, reeled in just enough to keep it off the ground. I'm trailing a can of spaghetti here.
05 12 16 13	CC	Okay, Ed.
05 12 16 24	LMP-EVA	Al, you haven't taken a pan, have you?
05 12 16 28	CDR-EVA	No.
05 12 16 29	LMP-EVA	Okay. I'm starting with the pan.
05 12 16 35	CC	Okay. Just in the way of bookkeeping, we need the double core, and the pan, and a sample.
05 12 16 44	LMP-EVA	Okay.
05 12 18 16	CDR-EVA	Okay, Houston. We got almost two complete - tubes here, about one and seven-eighths tubes, I would say.

05 12 18 28 CC Roger, Al.

05 12 19 16 LMP-EVA Okay, Houston. The pan is completed. I took it from the rim of a - old crater with fresh crater right in the bottom of it, and several small - small ones around it.

05 12 19 30 CDR-EVA Yes. That's a pretty blocky one, that new one. I think if we take samples from right along that rim there, you'd probably get some of that from the bottom.

05 12 19 35 LMP-EVA Yes. Okay.

05 12 19 38 CC Okay. We copied, Al and Ed.

05 12 19 40 LMP-EVA ...

05 12 19 50 CDR-EVA Okay. And the core bit, just for the fun of it, is going in bag 2 November. If we can get it back.

05 12 20 00 CC And Al, they'd like a description of the surface where you drove the core tube.

05 12 20 31 CDR-EVA Okay, Fred. Nothing, but it's the same textured pattern of which we spoke coming up in this traverse.

05 12 20 46 LMP-EVA Uh oh.

05 12 20 48 CDR-EVA What?

05 12 20 49 LMP-EVA Where's our color chart?

05 12 21 02 CDR-EVA Here you go. Did you read the core tip?

05 12 21 09 CC Roger, Al. We've got that, and for your information, that we're about 5 minutes behind in the total time line, for departing A.

05 12 21 23 CDR-EVA Okay.

05 12 21 31 CDR-EVA Continuing - our description of the surface, it appears to be a scattered population of very small blocks, some of which Ed is going to photograph here, and his documented sample. I believe they came from the crater to the north of the sampling sites. Other than that, the pebble core-sample

site is not unique to the traverse, so far. The first core went in fairly easily. I had some *** difficulty with the last core.

05 12 22 25 CC Roger, Al.

05 12 22 52 LMP-EVA Okay. Seven -

05 12 23 05 CDR-EVA Get that by yourself?

05 12 23 06 LMP-EVA Yes.

05 12 23 59 LMP-EVA And, Houston, the rock I'm sampling is a - seems to be a fairly typical one of this little crater - multiple crater that we're working around right now near A, and it's going into the bag 3 November.

05 12 24 23 CC Roger, Ed. Copy 3 November.

05 12 24 28 LMP-EVA Oops. It's breaking apart on me as I pick it up. I'll try to get most of the pieces.

05 12 24 35 CC Roger, Ed. And, and we need to move on here to B; and before we depart A, we're going to need an EMU check.

05 12 24 52 CDR-EVA Okay. This is Al's EMU reading 3.75; oxygen is reading 71; I have no flags; I'm on MIN cooling; and I'm comfortable.

05 12 25 03 LMP-EVA Al.

05 12 25 04 CDR-EVA Yes.

05 12 25 06 LMP-EVA Can you hand me another baggy?

05 12 25 08 CDR-EVA Okay.

05 12 25 11 LMP-EVA Houston, I can't get all of this sample in 3-N. That's going to be able to go in 3-N and the next one. It looked like it was fractured, and when I picked it up, it fractured into about four pieces.

05 15 25 31 CDR-EVA Okay.

05 15 25 37 CC Roger, Ed.

05 12 26 12 CDR-EVA Okay. Now, head out the hill to B.

05 12 26 16 LMP-EVA Okay.

05 12 26 17 CC Okay. And we still need an EMU check from you, Ed.

05 12 26 24 LMP-EVA Okay, Fred. I'll give it to you in a minute.

05 12 26 31 CDR-EVA Can you catch up with me, now?

05 12 26 32 LMP-EVA Yes, I'll catch up. Go ahead.

05 12 26 34 CDR-EVA Okay. Al's heading up with the MET. Over A, we go down into a valley. We drop down - fairly consistent slope of approximately 8 to 10 degrees. The texture, here again, is pretty much the same on the surface. The - basic regolith, of course - of course, is the fine material which is now, at this particular Sun angle, kind of a grayish brown, with the light pebbles on the surface making the raindrop - the small pebbles on the surface making the raindrop pattern.

05 12 27 32 LMP-EVA And, Houston, I'm treading along behind Al now. I'm starting to catch up with him. As I tried to describe for you before, the MET tracks make a very smooth pattern in the - in the surface, reminiscent of - of driving a tractor through a plowed field. It smooths it out and makes a very smooth, distinct pattern, and probably, oh, a quarter of an inch deep, no more.

05 12 28 00 CC Roger, Ed.

05 12 28 10 LMP-EVA It leaves gaps every now and then as it bounces.

05 12 28 14 CDR-EVA I think you found B.

05 12 28 18 LMP-EVA Yes. It's this big crater over here, isn't it?

05 12 28 20 CDR-EVA It's way up the hill.

05 12 28 21 LMP-EVA Pardon?

05 12 28 23 CDR-EVA I think it's up the hill.

05 12 28 25 LMP-EVA Oh, that's right. B is the crater we go - This is the crater we go by on the way to B.

05 12 28 30 CDR-EVA Roger.

05 12 28 47 CDR-EVA Okay, Houston. I'm looking for a contact somewhere in here, but it's not apparent at this point. Surface texture seems to be very much the same; ***the standpoint of furrow-bearing properties, it's still about the same softness, and it still has the same raindrop pattern.

05 12 29 11 CC Roger, Al.

05 12 29 16 LMP-EVA Oh, Fredo. You wanted a EMU check from me. I'm at 3.7, going 67 percent. I'm on MIN cooling; no flags.

05 12 29 37 CC Roger, Ed.

05 12 29 39 LMP-EVA And continuing the description a little bit, Houston. The - Trying - trying to think of an adequate description or comparison to something we've already seen, but I don't think there is one. Incidentally, I see a string of craters down to the south - a string of boulders to the south of us that may prove to be a ray pattern as we come from Cone. And I observe, as we get closer to the - to Cone, the number of large boulders is increasing. We're going to go past some here in a couple of minutes - near - about a 20-foot-wide, fairly fresh crater. The boulders - a dozen of them or so - are 4 or 5 feet in diameter.

05 12 30 35 CC Roger, Ed.

05 12 30 36 LMP-EVA There's nothing around them.

05 12 30 41 CDR-EVA Okay. Let's see if we can find us - -

05 12 30 43 LMP-EVA This crater is the one, I think, Al, it's halfway between A and B, isn't it?

05 12 30 58 CDR-EVA Yes, I think so. This little - -

05 12 31 01 LMP-EVA Can you see the boulders off to the side there on ...?

05 12 31 03 CDR-EVA I'm not sure very well. I think -

05 12 31 14 LMP-EVA Ah! You should be able to spot that little chain of craters just to the south of it. On the map - if that - if that's where we think we are.

05 12 31 27 CDR-EVA Ed, I don't see any craters right there.

05 12 31 31 LMP-EVA Kind of small.

05 12 31 33 CDR-EVA That will make us right here, huh?

05 12 31 34 LMP-EVA Pardon?

05 12 31 36 CDR-EVA There's no big one to go with it. A sharp one to go with it. ... one right up there. How about that?

05 12 31 50 LMP-EVA Yes. Let's take a look.

05 12 31 52 CDR-EVA That's probably Weird right up there. We're probably about even with Weird right now, although you can't see it on the ridge.

05 12 31 59 LMP-EVA That's Weird, that big one right over there, Al.

05 12 32 01 CDR-EVA Yes, that's what I say. I think B is that deep crater right directly ahead of us, Ed.

05 12 32 07 LMP-EVA No, I disagree. I think - see that crater right over there that we came by? To the south, the big one?

05 12 32 15 CDR-EVA Yes.

05 12 32 17 LMP-EVA I think this is the crater that - That's B. I think this boulder field, we can see it here if we look.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 12 32 29 CDR-EVA This crater right here?

05 12 32 31 LMP-EVA Yes.

05 12 32 39 LMP-EVA We have to be considerably past Weird.

05 12 32 41 CDR-EVA Not even halfway to the rim of Cone yet.

05 12 32 33 CC And, Al and Ed. I don't think you have to worry too much about the exact position of site B. If you're - it appears you're getting close to the general area, and that should be good enough on B.

05 12 33 10 LMP-EVA Okay. I think we're very close to it. I think this crater we just went by is probably it, but it's very hard to tell, Fredo. I don't see anything else that might be it, unless it's the next crater up. Al, I've spotted it. That crater - next crater up is this one right here.

05 12 33 29 CDR-EVA ...

05 12 33 31 LMP-EVA Pardon.

05 12 33 32 CDR-EVA Where at?

05 12 33 33 LMP-EVA Right behind you. That crater is that crater right up there. That crater is the crater over to the left of it.

05 12 33 41 CDR-EVA Where do you think B is?

05 12 33 42 LMP-EVA I think B's the one we just passed, back there where we were talking.

05 12 33 47 CDR-EVA All right.

05 12 33 48 LMP-EVA And here's the little - Ah hah, it is! Here's the little double crater right beside it. Look here. See, there's that crater; see, there's the little double crater; it's right there in front of you.

05 12 34 01 CDR-EVA Okay, let's grab sample B.

05 12 34 02 LMP-EVA ... sample B.

05 12 34 07 CC Okay. And, Al and Ed, this is a grab sample at B, and we need the panorama. And while somebody's doing that, we can get our site description.

05 12 34 22 CDR-EVA I'll get a pan, Ed.

05 12 34 23 LMP-EVA Okay. And while Al takes the pan, I'll go ahead and give you a site description. The area here is in an area considerably more boulders, a larger boulder field, more numerous boulders than we've seen in the past. We've just come into it as we - as we approached B from A. Now there are - there were boulders to the north of us; we previously talked of boulders to the north, and doggone it, they may turn out to be a ray pattern. It looks suspiciously like - like one. However, where we are now, we're about on the edge of a general boulder population lining the flank of Cone Crater. Now they're not too numerous at this point. They're somewhat patchy. There's a lot of them buried, half buried, a few of the smaller ones sitting on the surface. There are - These boulders are filleted, and we'll have to sample that filleting later. The surface texture - the fine is very much - appears very much the same as what we've been walking on all along. And about the only difference we could see is probably a larger number of smaller craters. I say probably; they're so numerous that unless you really make a population count, you can't tell. A large - I'm guessing a larger number of craters - probably secondaries from Cone perhaps - and certainly a larger number of boulders lying around. Now, most of these boulders are rounded; there are a few angular ones; there are a few rocks with angulars but - angularities - but by and large, you can see edges that have been chipped off indicating the beginning of a smoothing process. And some of them are far beyond the beginning of smoothing. They're worn down pretty well. And most of the rough edges are where they have fractured and perhaps turned over. Most of them appear to be along fractures of where other rocks are sitting near them that might have once been a part of that boulder.

05 12 36 47 CC Roger, Ed. And has Al got the grab sample completed and up?

05 12 36 55 LMP-EVA He's - -

05 12 36 56 CDR-EVA I'm grabbing it now.

05 12 36 57 LMP-EVA - - grabbing it now.

05 12 37 00 CDR-EVA We're going to give you a quick stereo on it.

05 12 37 03 CC Okay. And we need the fine count before departing B; and, right now, we're about 15 minutes behind in the time line.

05 12 37 17 LMP-EVA Okay, Fredo, we expect that we're going to fall behind you; there's no way we can help it. We'll pick it up later.

05 12 37 23 CC Roger.

05 12 37 26 CDR-EVA Well, we'll see about that.

05 12 37 35 CDR-EVA Okay. Grab sample from the west rim of Bravo Crater, bag 5 November.

05 12 37 42 CC Roger, Al, - -

05 12 37 43 LMP-EVA Now, Fredo, to complete this description. We are standing on a fairly high point - well, not really on a high point, about halfway up the slope. To our north and slightly to the west of us seems to be the low point in this area. It's surrounded by a rim that's reminiscent of a very, very old crater. The topography doesn't show up on the map, but it, indeed, is there. About 500 yards to the north and west is the lowest point that I can see in this area. Okay, you ready to press on.

05 12 38 27 CDR-EVA Yes, as soon as I get my handle screwed back on here.

05 12 38 30 LMP-EVA Okay, the next stop is the top of Cone. Let's get everything secured for that trip.

05 12 38 37 CC Okay. And we'd like the frame count for each part - -

05 12 38 38 CDR-EVA Okay, Houston. Yes. Yes, you've got a frame count of 34 from Al.

05 12 38 53 LMP-EVA And 29 from Ed.

05 12 38 57 CC Roger; 34 and 29.

05 12 39 02 CDR-EVA Handle was loose.

05 12 39 05 LMP-EVA Handle work loose for you.

05 12 39 07 CDR-EVA Yes.

05 12 39 10 LMP-EVA Okay. I've got the MET.

05 12 39 13 CDR-EVA Okay. You want to go first and I'll follow.

05 12 39 15 LMP-EVA Okay. To the top of Cone Crater.

05 12 39 19 CDR-EVA Yes. Now let's -

05 12 39 22 CC Okay, we're starting the clock - -

05 12 39 23 CDR-EVA ...

05 12 39 27 LMP-EVA Yes.

05 12 39 28 CDR-EVA We'll just go almost to the east here, and then I'll go by Flank.

05 12 39 32 LMP-EVA Yes. East and a little to the - -

05 12 39 33 CDR-EVA See, there's Flank up there.

05 12 39 36 LMP-EVA Yes. I can just barely see the rim of it on the far side of it.

05 12 39 39 CDR-EVA Right, so we probably ought to head directly for Flank and on up from there.

05 12 39 43 LMP-EVA Okay.

05 12 39 52 CDR-EVA Okay, and -

05 12 39 59 LMP-EVA Houston, as we go across here, this ground is - Al probably previously described it, but it's very undulating. I would suspect that there is not 10 yards at the most between what were once old craters. They are most of them worn down, but the surface is continuously undulating. There's hardly a level spot anywhere.

05 12 40 30 CC Roger, Ed.

05 12 40 35 LMP-EVA Lots of - As we come on up toward Cone, we're getting to see lots more buried rocks, bigger rocks.

05 12 40 51 CDR-EVA We're keeping our eyes open for a contact here. But I guess the Sun angle makes it very difficult to see. However, I expect that by the time we get a little closer up to Flank - Let me pull it for a while.

05 12 41 06 LMP-EVA I have to shift hands. I'm good.

05 12 41 08 CDR-EVA Okay. By the time we get a little closer up the Flank, we might find some kind of a contact. The ridge of Cone Crater to the north is very apparent, as we expected that it would be. It stretches off into the distance and meets with the far horizon.

05 12 41 38 CC Roger, Al.

05 12 41 46 LMP-EVA Fredo, I'm trying to find something distinctive to say about some of these craters we're going by, and it's very hard to do so. They're all smooth-walled except the very freshest one; and we're coming by a very fresh one now, which is rubblely on the in - Hey! It may even - That has some pretty good chunks of rubble on the insides. This is about the freshest crater this size we've seen, Al.

05 12 42 16 CDR-EVA That's correct. This is a very fresh crater. It's about ... it's about opposite to the crater at stop E. It's a crater about 20 meters in diameter and about 2 meters deep, and I'll get a quick - - rock from the side.

05 12 42 42 CC Roger.

05 12 42 43 LMP-EVA Al just dropped down on a knee to pick up a rock, and he went - went in 3 or 4 inches. Need some help, Al?

05 12 42 52 CDR-EVA Yes, I think so. I can't get any.

05 12 42 55 LMP-EVA Okay. Come on, give me your hand.

05 12 42 56 CDR-EVA Wait a minute, I got it now. Okay.

05 12 43 01 LMP-EVA Okay. Come on up.

05 12 43 02 CDR-EVA Okay (grunt). Thank you.

05 12 43 05 LMP-EVA You're on your feet.

05 12 43 08 CDR-EVA Okay. That's just a quick hand sample from the side of that crater.

05 12 43 11 LMP-EVA Do you think you're following us and know about where we are, Fredo?

05 12 43 17 CC Well, the board, I think, is reading for you just past the position abeam of E, looking about halfway between D and E - -

05 12 43 28 CDR Yes, that's it, and - ...

05 12 43 32 LMP-EVA Yes. And we're starting uphill now. Climb's fairly gentle at this point but it's definitely uphill.

05 12 43 43 CDR-EVA Okay, Baby! Okay, I got it.

05 12 43 44 LMP-EVA Almost turned, didn't it.

05 12 43 45 CDR-EVA Yes. Okay, that sample from the west rim of the crater, which we described as block E, is in bag 6.

05 12 43 53 CC Roger, Al. Bag 6.

05 12 44 04 CDR-EVA Okay. The going is still very smooth as far as the area that we're able to pick out. Of course, we're tracing a kind of sinuous course here, staying out of the crater.

05 12 44 29 CDR-EVA And, Fredo, to help further locate us, if you can, we're going by two very - well, fairly fresh craters. I don't think quite as fresh as the one we were just talking about. The eastmost one is fresher than - The westmost one is the freshest. They're separated about 75 to 100 feet, and they're about 25 to 30 feet across and 5 or 6 feet deep, 5 feet deep, I guess. The westmost one has got small blocks in it. The eastmost one is very smooth.

05 12 45 12 CC Roger, Ed. And, you described the blocks there a couple of times. I think you used the term "rubble," now. By that I assume you implied they were just lying loose - nothing really in place.

05 12 45 26 LMP-EVA I'm not sure that's quite true, Fred Some of it looked like stuff that belonged there, that had not fallen there.

05 12 45 35 CDR-EVA There's a lot of glass in that rock, Ed.

05 12 45 36 LMP-EVA Yes. Oh, there sure is. It looked like some of that so called rubble looked like it had - might be the residual of an impact just lying in the bottom. And, Houston, we're passing a rock much too big to pick up. There's a whale of a lot of glass in it.

05 12 45 55 CC Roger. About how big is it?

05 12 45 56 CDR-EVA ... like it was splattered with glass.

05 12 45 57 LMP-EVA Yes. It looks - It's about foot and a half, 2-footer - yes, about a foot and a half across.

05 12 46 07 CC Roger, Ed. And we copy the glass - -

05 12 46 08 CDR-EVA That was a glass splatter, Fred.

05 12 46 30 LMP-EVA And, I'm going on MEDIUM cooling for a minute.

05 12 46 34 CC Okay. And, Al and Ed, why don't we take a little rest here for a minute, and we'd like another camera count, too.

05 12 46 46 LMP-EVA Like a what? We haven't taken any pictures since the last one, I don't think.

05 12 46 52 CC Okay, Ed.

05 12 46 56 CDR-EVA Okay. We'll slow down the traverse here.

05 12 46 58 LMP-EVA Okay.

05 12 47 07 CDR-EVA Should be Flank right here, Ed.

05 12 47 12 LMP-EVA Pardon.

05 12 47 13 CDR-EVA Should be Flank right over here.

[redacted]

05 12 49 47	CC	Say that last again, Ed.
05 12 49 52	LMP-EVA	Just talking. Never mind.
05 12 50 10	CC	And, Ed, now we're going to have a site handover here.
05 12 50 31	CDR-EVA	Okay, Houston. The pan is complete on magazine - magazine Lima, Lima. Frame count is 57.
05 12 50 45	CC	Roger. 57, Al.
05 12 50 52	CDR-EVA	You're breaking up, Fred.
05 12 50 55	CC	Copied 57. How's that?
05 12 51 06	CDR-EVA	Reading him? Ed, are you reading?
05 12 51 08	CC	Okay, - -
05 12 51 09	LMP-EVA	Yes, I read.
05 12 51 11	CC	Ed. Do you read Houston? - -
05 12 51 13	LMP-EVA	I can't read Fred now. Fredo, you're breaking up completely.
05 12 51 25	CDR-EVA	Okay.
05 12 51 35	CDR-EVA	(Sigh) Start on up toward the rim?
05 12 51 37	LMP-EVA	Yes. Just 1 second, though. I think I got it.
05 12 51 42	CDR-EVA	Okay, I'll head on out.
05 12 51 51	LMP-EVA	Fredo, can you read?
05 12 51 54	CC	Go ahead, Ed.
05 12 51 55	LMP-EVA	Well, I'm getting a feedback on my own voice.
05 12 52 03	CDR-EVA	Okay. Ed, I'm coming through.
05 12 52 04	LMP-EVA	Okay. Do you want me to pull awhile, Al?
05 12 52 05	CDR-EVA	No, that's all right.
05 12 52 09	LMP-EVA	...

05 12 52 15	LMP-EVA	I can't really spot this - this crater, but I think I know where we are. We're pretty close to where you said we were.
05 12 52 28	CDR-EVA	Houston, your transmissions are still unreadable.
05 12 52 31	CC	Roger, Al. I hadn't been talking. How do you read me now? - -
05 12 52 33	CDR-EVA	Is that Flank over there?
05 12 52 35	LMP-EVA	I think it's dead ahead of you, Al. Oh, wait a minute. This is probably it, right here. Yes.
05 12 52 43	CDR-EVA	Am I right?
05 12 52 44	LMP-EVA	Yes. Let's just doublecheck and see.
05 12 52 49	CDR-EVA	It's got a - about a 4-meter-radius crater in the south wall.
05 12 53 01	LMP-EVA	That has to be it.
05 12 53 05	CDR-EVA	Okay, Houston. We're going by Flank on the way up. We're passing to the north side of it.
05 12 53 13	CC	Roger, Al. Copy.
05 12 53 20	CDR-EVA	Fred, you're still unreadable.
05 12 53 27	LMP-EVA	Let me pull awhile, Al. You're having all the fun (laughter).
05 12 53 37	CDR-EVA	Well, we still have a little way to go.
05 12 53 38	LMP-EVA	Yes. We sure do. Putting the map away.
05 12 53 45	CDR-EVA	Huh?
05 12 53 46	LMP-EVA	I'm just putting the map away.
05 12 53 48	CDR-EVA	All right.
05 12 54 09	LMP-EVA	Okay.
05 12 54 17	LMP-EVA	Fredo, you back with us.

05 12 54 20	CC	Okay, I'll try again. How do you read, Ed?
05 12 54 25	LMP-EVA	Okay. That's much better. You got a background squeal.
05 12 54 30	CC	Okay. Evidentally, that station switch gave us some problem.
05 12 54 37	CC	I've been copying both of you all the way though. We have you now just passing point -
05 12 54 55	CC	Okay. We've been copying both of you all the way most of the time, and I have you by A point now.
05 12 55 02	LMP-EVA	That's affirmative. And the grade is getting pretty steep.
05 12 55 10	CC	Have you got any estimate?
05 12 55 20	LMP-EVA	And the soil here is a bit firmer, I think, than we've been on before. Except around what - the mounds in between craters where it's been thrown out. But, by and large, it seems to have a little firmer footing. We're not sinking in as deep (heavy breathing).
05 12 55 47	CC	That should help you with the climb there.
05 12 55 55	LMP-EVA	Yes. It helps a little bit. Al's picked up the - Al's got the back of the MET now, and we're carrying it up. I think it seems easier.
05 12 56 04	CDR-EVA	Left, right, left, right.
05 12 56 09	CC	There's two guys here that figured you'd carry it up.
05 12 56 15	LMP-EVA	Say again.
05 12 56 17	CC	Said there's two guys sitting next to me here that kind of figured you'd end up carrying it up.
05 12 56 25	LMP-EVA	It will roll along here, except we just move faster carrying it.
05 12 56 33	CDR-EVA	Okay. You want to rest here with this rock.
05 12 56 34	LMP-EVA	Okay.

05 12 56 36	CDR-EVA	This is the first big boulder we've seen, Houston. I think it's worthwhile taking a picture of it with the closeup. Go on and keep going.
05 12 56 45	LMP-EVA	I'll pull on up. We probably ought to take a pan to locate everything here, while you're taking a closeup.
05 12 56 54	CC	Okay. I understand, Al. You're shooting a closeup shot of a big boulder.
05 12 57 03	CC	About what's the size of this one, Al?
05 12 57 09	CDR-EVA	Okay. The shot's been taken on the closeup counter number 317. Sun angle was 8 o'clock. The - this particular one is only about 12-feet long by about 4-feet wide. It's about one-third buried. It's old, very weathered. There are some evidences of some crystal shining through some of the fractures.
05 12 57 39	LMP-EVA	And I'm taking a Hasselblad of the rock and will take a pan now from - at this location. Help document our course going to the top of Cone Crater.
05 12 57 52	CC	Roger. Copy.
05 12 58 53	LMP-EVA	And I can look right across into the breach in the north rim of Old Nameless. We're about even with it now.
05 12 59 08	CC	Okay, and copied, Ed. And was there any noticeable - -
05 12 59 10	LMP-EVA	That was frame - -
05 12 59 11	CC	- - dust on the large boulder?
05 12 59 19	LMP-EVA	Not where I took the picture, but some fillets around the bottom.
05 12 59 24	CC	Okay, copy now.
05 12 59 30	LMP-EVA	Okay. And 44, Fred, was my frame count.
05 12 59 34	CC	Roger, Ed.

05 12 59 35 LMP-EVA I believe that was - if I remember it.

05 12 59 39 LMP-EVA Now, I'm going to move on out. Al's ahead of me here.

05 13 00 19 CDR-EVA Okay. We're starting up the last flank of the crater now, Houston. The slope is probably about - oh, 18 percent. The surface texture is still pretty much the same as far as the raindrop pattern is concerned. But we seem to find an increasing population of smaller rocks.

05 13 00 52 CC Roger, Al.

05 13 00 53 LMP-EVA The small rocks and smaller - smaller, fresher craters, as well. Well - Wait a minute, maybe I'm being deceived. With this slope, the Sun angle is entirely different than it is on the flat land. The craters look sharper in these shadows (heavy breathing).

05 13 01 13 CDR-EVA Okay. Let's make an EMU stop.

05 13 01 20 LMP-EVA Okay. Let me ...

05 13 01 21 CDR-EVA I'd like to stop and rest here for a minute.

05 13 01 24 LMP-EVA Okay.

05 13 01 30 CDR-EVA Boy, I tell you, we're really going to get a panorama. We've got a tremendous one of areas in already. And we're not quite to the rim. Head towards out [sic] Old Nameless over there, right along our track, or just south of our track I should say. We made the right approach; we came up through the valley and over the range and down into the bowl. Couldn't have planned it better.

05 13 02 00 LMP-EVA I thought we were in a low spot with the LM, but it turns out we're really not in the lowest spot around, I don't think.

05 13 02 09 CDR-EVA Well, I don't know, no. I tell you it's probably the lowest spot right - -

05 13 02 12 LMP-EVA Oh, right in that particular local area.

05 13 02 14 CDR-EVA - - in that area. Yes.

05 13 02 15 LMP-EVA But that's the lowest spot over to the right that I was talking about. And there's a low spot - -

05 13 02 21 CDR-EVA Well, there's a crater over there. It's true, yes.

05 13 02 22 LMP-EVA Yes. Doggone, you can sure be deceived by slopes here. The Sun angle is very deceiving.

05 13 02 30 CDR-EVA Yes.

05 13 02 31 LMP-EVA Okay, let me pull a while. You ready to go?

05 13 02 32 CDR-EVA Yes. All set.

05 13 02 38 LMP-EVA Okay, let me go back to MIN cool, MINIMUM cool first.

05 13 02 53 CDR-EVA I guess right straight up is the best way to go.

05 13 02 55 LMP-EVA Beg your pardon?

05 13 02 56 CDR-EVA Right straight up is the best way to go.

05 13 02 57 LMP-EVA Yes, I think so.

05 13 03 01 CDR-EVA Stay away from the rocks.

05 13 03 04 LMP-EVA Okay. Get a little momentum going.

05 13 03 19 CDR-EVA Okay, Houston. We're proceeding onward now.

05 13 03 22 CC Roger, Al.

05 13 03 27 LMP-EVA And the boulder fields that Al pointed out - the rocks and boulders are getting more numerous toward the top here. However, it's nothing like the rubble and the large boulders that we saw at the Nevada test site. Now, this is surprising to me. I expected it to be more like that. But it is not, at least not where we're looking now (heavy breathing).

05 13 04 01 CDR-EVA Well, we haven't reached the rim, yet.

05 13 04 02 LMP-EVA Oh boy, we got fooled on that one. I'm not sure that was Flank we were in a minute ago either. Wait a minute. Yes, it is. The rim's right here.

That's the - that's the east - little shoulder running down from the Cone. That's Flank over there. We're going to hit it on the south side. We'll have to move on around of it. This looks like easy going right here (heavy breathing). See, there's the boulder field that shows in the photograph - right up ahead of us.

05 13 04 54 CDR-EVA There's a crater up there, Ed.

05 13 04 55 LMP-EVA Yes. Pardon?

05 13 04 57 CDR-EVA Crater up there.

05 13 05 05 CC Okay, Al and Ed. They'd like you to take another stop here.

05 13 05 14 CDR-EVA Okay. We're really going up a pretty steep slope here.

05 13 05 20 CC Yes. We kind of figured that from listening to you.

05 13 05 27 CDR-EVA Okay. Well, now, that's apparently the rim of Cone over there. And we're about - almost 2 hours now. Is that right, Fred?

05 13 05 48 CC Okay. We're showing 1:57 and a half now, Al.

05 13 05 56 CDR-EVA Okay. That's at least 30 minutes up there.

05 13 06 06 CC Yes.

05 13 06 10 CDR-EVA And - I would say we'd probably do better to go up to those boulders there, ... use that as the turnaround point.

05 13 06 22 LMP-EVA Yes. It's going to take longer than we expected.

05 13 06 25 LMP-EVA Our positions are all in doubt now, Fredo. What we were looking at was a flank, but it wasn't really - the top of it wasn't the rim of Cone. We've got a ways to go yet.

05 13 06 37 CC Okay, Ed. And - -

05 13 06 38 CDR-EVA Well, perhaps you can think - perhaps you can think with us if you want. I'd say that the

rim is at least 30 minutes away. We're approaching the edge of the boulder field here on the south flank.

05 13 06 56 LMP-EVA Let's look at that map.

05 13 06 58 CDR-EVA And what I'm proposing is perhaps we use that as the turnaround point. It seems to me that we spend a lot more time in traverse if we don't, and we don't get very many samples.

05 13 07 10 CC Roger, Al. And, just a couple of questions they have up now. Like your note, if you do see any dust, particularly on the top surfaces of boulders in the area. And, any comparisons between the boulders you see distributed around. Are they all the same or do some types appear different?

05 13 07 38 LMP-EVA It's too early to make that darn judgment, but we'll tell you when we get there. We're not really in that boulder territory yet.

05 13 07 44 CDR-EVA I think, Fredo, if you'll keep those questions in mind, the best thing for us to do is to get up here and document a sample what I feel is pretty sure Cone ejecta. And then, when we head down - Sun, we'll be able to see these subtle variations and rock types a lot better than we are right now.

05 13 08 04 CC Roger, Al.

05 13 08 10 CDR-EVA Well, let's head for these two babies up here.

05 13 08 40 LMP-EVA Hey, Al.

05 13 08 41 CDR-EVA Yes.

05 13 08 42 LMP-EVA I'd - No, let's keep going around this crater, but - ... right here.

05 13 08 59 CDR-EVA Well, maybe. I thought we'd get those boulders up there, Ed.

05 13 09 03 LMP-EVA Yes.

05 13 09 04 CDR-EVA They undoubtedly came from -

05 13 09 05 LMP-EVA Yes. Let's head right for that boulder field at the top. I think we'll be where we want to be.

05 13 09 09 CDR-EVA Right here.

05 13 09 10 LMP-EVA Pardon.

05 13 09 11 CDR-EVA Right here.

05 13 09 12 LMP-EVA Yes, right - Clear on up at the top, you mean.

05 13 09 13 CDR-EVA No.

05 13 09 14 LMP-EVA Huh?

05 13 09 15 CDR-EVA I don't think we'll have time to go up there.

05 13 09 16 LMP-EVA Oh, let's give it a whirl. Gee whiz. We can't stop without looking into Cone Crater. We've lost everything if we don't get there.

05 13 09 28 CDR-EVA I think we'll waste an awful lot of time traveling and not much documenting.

05 13 09 33 LMP-EVA Well, the information we're going to find, I think, is going to be right on top.

05 13 09 37 CC We establish - -

05 13 09 43 CDR-EVA Okay, Ed. Look at this - you're going through - just kicked up a layer of some very light gray fine underneath the - -

05 13 09 51 LMP-EVA Yes. As you look back along your path, there's quite a bit of it.

05 13 09 55 CDR-EVA Yes, this crater - -

05 13 10 10 LMP-EVA Fredo, How far behind time line are we?

05 13 10 17 CC Okay. The best I can tell right now - about 25 minutes down now.

05 13 10 32 LMP-EVA Okay.

05 13 10 33 CDR-EVA We'll be an hour down by the time we get to the top of that thing. You got six samples.

05 13 10 42 LMP-EVA Well, I think we're going to find what we're looking for up there.

05 13 10 51 CC Okay, Al and Ed. In view of your assay of the - where your location is and how long it's going to take to get to Cone, the word from the backroom is they'd like you to consider where you are the edge of Cone Crater.

05 13 11 13 LMP-EVA Think you're finks.

05 13 11 23 CC Okay. That decision, I guess, was based on Al's estimate of another, at least, 30 minutes and, of course, we cannot see that from here. It's kind of your judgment on that.

05 13 11 42 LMP-EVA Well, we're three-quarters there.

05 13 11 54 LMP-EVA Why don't we lose our bet, Al, and leave the MET and get on up there? We could make it a lot faster without it.

05 13 12 05 CDR-EVA No. I think what we're looking at right here in this boulder field, Ed, is the stuff that's ejected from Cone.

05 13 12 15 LMP-EVA But not the lowermost part, which is what we're interested in.

05 13 12 20 CDR-EVA Okay. We'll press on a little farther, Houston. And keep your eye on the time.

05 13 12 26 CC Okay. And, as of right now, we have a 30-minute extension.

05 13 12 46 CC And Al, did you copy 30-minute extension?

05 13 12 52 LMP-EVA We got it.

05 13 12 53 CDR-EVA Yes. That's affirmative, Fred. Thank you.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 13 11 33 CC Kitty Hawk, Houston. I've got your data now.

05 13 12 32 CMP Hello, Houston. How do you read Kitty Hawk?

05 13 12 36	CC	Kitty Hawk, Houston. I think I got you that time. Kind of weak though.
05 13 12 44	CMP	Okay. It looks like we're in lockup, here. You're loud and clear.
05 13 15 09	CC	Kitty Hawk, Houston. We got rid of the background noise now; probably have some good comm here.
05 13 15 18	CMP	Roger, Ron. That - that's the highest signal strength I've seen so far.
05 13 15 23	CC	Man, that's the best I've heard you. Sounds real good.
05 13 15 29	CC	Hey, Stu, I guess the one thing I really didn't get out of you in talking about the Hycon camera, do you have any confidence - confidence at all in that thing?
05 13 15 48	CMP	Well, I guess I really don't know the inner workings well enough to - to say that, Ron. The racket sure does sound bad; but, when you see the - see the frame counter going, you figure it's doing something. I don't really know. I didn't get a chance to look at it. I thought, as soon as we finish up here, I'll - I've got it out; and, we get a chance, why, we'll - we'll run through an exercise here with - with you on the loop and maybe we can then arrive at some conclusion.
05 13 16 26	CC	Okay.
05 13 16 48	CC	Just for your information, Al and Ed are just about on the edge of Cone Crater now.
05 13 16 59	CMP	Oh, great. How was the climb?
05 13 17 03	CC	Well, it was a little further away, I think, than they really thought it was going to be. They're going to go - go up on the west rim, I guess, instead of the east rim. What it looks like right now. It's kind of the southwest rim. They're sending back all kinds of good-deal information about the soil and texture and what have you - the rocks.

05 13 17 50	CC	And Stu, I guess you've been taking a look - haven't you? - at the - in our landmark book there in the De - Descartes COAS pictures?
05 13 18 02	CMP	That's affirmative.
05 13 18 03	CC	Roger.
05 13 22 20	CC	Kitty Hawk, Houston.
05 13 22 26	CMP	Go, Houston.
05 13 22 27	CC	Okay, Stu. I've got some HIGH GAIN angles for you for after the COAS maneuver. A PITCH of minus 48 and a YAW of 177.
05 13 22 51	CMP	Okay. PITCH, minus 48; YAW, 177.
05 13 22 54	CC	Roger.
05 13 23 27	CMP	Well, I sure hate to ruin this good comm, but I'll start my maneuver.
05 13 23 31	CC	Okay.
05 13 24 39	CC	Kitty Hawk, Houston. OMNI Bravo.
05 13 28 38	CC	Kitty Hawk, Houston. OMNI Charlie.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 13 14 02	CDR-EVA	Okay. Stop at this little rise here and take a panorama.
05 13 14 06	LMP-EVA	Okay.
05 13 14 25	CDR-EVA	Okay, Al's going to MEDIUM flow.
05 13 14 30	LMP-EVA	Okay, I'll take a pan from here.
05 13 14 34	CC	Roger, Ed.
05 13 14 40	CDR-EVA	Well, I'll tell you, it's a fantastic view from here. As this pan will show.
05 13 15 06	CDR-EVA	We're approaching the edge of the rugged boulder field to the west rim. It appears as though the

best for us to do will be go to the west rim and document from there even though the Sun angle may not be quite as good. Well, we're pushing on in that direction.

05 13 15 35 CC Roger, Al. - -

05 13 15 36 CDR-EVA Al's back to MIN flow.

05 13 15 37 CC You're moving to the west then.

05 13 15 49 CDR-EVA Al is back to MIN flow, and we're moving again.

05 13 16 03 CC And, Al and Ed, Deke says he'll cover the bet if you'll drop the MET.

05 13 16 14 LMP-EVA It's not that hard with the MET. We need those tools. No, the MET's not slowing us down, Houston. It's just a question of time. We'll get there.

05 13 16 30 CC Roger, Al.

05 13 16 39 LMP-EVA Give you a hand, Al.

05 13 16 40 CDR-EVA It's all right.

05 13 16 45 LMP-EVA You caught a boulder with your wheel when you went around that corner.

05 13 17 02 LMP-EVA Al?

05 13 17 03 CDR-EVA Yes.

05 13 17 04 LMP-EVA Head left. It's right up there.

05 13 17 07 CDR-EVA Yes. I'm going there.

05 13 17 57 LMP-EVA You need a little more lift. Go right up through there. I'll give you a hand.

05 13 18 15 CDR-EVA Okay. We're now right in middle of the boulder field on the west rim. We haven't quite reached the rim yet.

05 13 18 51 CDR-EVA Okay. Want to rest here a minute?

05 13 18 52 LMP-EVA Yes.

05 13 18 58	LMP-EVA	Let's take a look at the map. I think we're closer than that (heavy breathing).
05 13 19 09	CDR-EVA	I'll just go ahead slowly with this.
05 13 19 24	CDR-EVA	Okay. Another crater.
05 13 19 29	LMP-EVA	Yes. The rim's right up here.
05 13 19 40	LMP-EVA	Let's see if we can spot this one, Al - -
05 13 19 42	CDR-EVA	Okay.
05 13 19 43	LMP-EVA	- - on the map.
05 13 19 45	CC	Okay. And, Al, it looks like you'd be a little more comfortable there if you're on INTERMEDIATE.
05 13 19 56	CDR-EVA	Yes. Okay. We're resting now.
05 13 19 59	LMP-EVA	Look. Let me show you something.
05 13 20 02	CDR-EVA	Okay.
05 13 20 05	LMP-EVA	Here's that crater. We're down here. We got to go there.
05 13 20 11	CDR-EVA	What crater?
05 13 20 13	LMP-EVA	That crater right there is that one right there.
05 13 20 18	CDR-EVA	Okay.
05 13 20 26	CDR-EVA	Want to pull for a while?
05 13 20 28	LMP-EVA	Yes.
05 13 20 31	CDR-EVA	Okay. We're about the maximum elevation now, Houston. It's leveled out a little bit. And it looks like we'll be approaching the rim here very shortly.
05 13 20 46	CC	Roger, Al. And you can leave the dial in INTERMEDIATE. We're fat on the - for the feedwater.
05 13 20 56	CDR-EVA	Okay. Thank you.

05 13 21 01 LMP-EVA Let me set mine. If we're in that good of shape, let me set mine, Houston, if I'm okay, too.

05 13 21 07 CC That's affirmative, Ed. I guess the low item is the battery.

05 13 21 15 LMP-EVA Okay.

05 13 21 27 LMP-EVA Oops! It's going over. Got it.

05 13 21 43 LMP-EVA Fantastic stabilization; Al, it's going to turn over.

05 13 21 50 CDR-EVA Okay. We better reconnoiter here. I don't see the crater yet.

05 13 21 57 LMP-EVA I agree. ***rock under my wheels.

05 13 22 28 CDR-EVA See this boulder pattern and all that we're in here right now? This boulder field and all?

05 13 22 33 LMP-EVA I thought it was on the south rim.

05 13 22 37 CC And, Al and Ed, do you have the rim in sight at this time?

05 13 22 45 LMP-EVA Oh, yes.

05 13 22 46 CDR-EVA It's affirmative. It's down in the valley.

05 13 22 51 CC I'm sorry. You misunderstood the question. I meant the rim of Cone Crater.

05 13 22 58 CDR-EVA Oh, the rim. That is negative. We don't - haven't found that yet.

05 13 23 10 LMP-EVA This big boulder right here, Al, which stands out bigger than anything else - ought to be - ought to be able to see it.

05 13 23 17 CDR-EVA Well, I don't know what the rim is still - way up here from the looks of things.

05 13 23 23 CC And, Ed and Al, we've already eaten in our 30-minute extension and we're past that now. I think we'd better proceed with the sampling and continue with the EVA.

05 13 23 37 LMP-EVA Okay, Fredo.

05 13 23 40 CDR-EVA Okay. We'll observe with a pan from here. I'll take that.

05 13 23 47 LMP-EVA All right, I'll start sampling.

05 13 24 26 CDR-EVA Okay, Houston. We are in the middle of a fairly large boulder field. It covers perhaps as much as a square mile. And - as the pan will show, I don't believe we have quite reached the rim yet. However, we can't be too far away and I think certainly we'll find that these samples are pretty far down in Cone Crater.

05 13 25 00 CC Roger, Al.

05 13 25 13 LMP-EVA Okay. ...

05 13 25 35 CDR-EVA Okay, you about to start taking documented samples?

05 13 25 38 CC Right here.

05 13 25 40 CDR-EVA All righty. I would say, Houston, that most of these boulders are the same brownish gray that we've found. But we see one that is definitely almost white in color. A very definite difference in color, which we'll document. We noticed that beneath this dark brown regolith, there is a very light-brown layer. And I think we'll get a core tube right here to show that. As a matter of fact, I think I'll do that right now.

05 13 26 14 CC Roger, Al. And for your information, we won't be doing the polarimetric experiment.

05 13 26 25 CDR-EVA I understand, you will not be.

05 13 26 27 CC That's affirmative. You can delete that one.

05 13 27 23 CDR-EVA Hey, I'll bring back the MIN cool.

05 13 27 26 CC Roger, Al. And, Ed, I need an opinion. Do you think you'd be able to deploy and take the second and last LPM reading at this location?

05 13 27 43 LMP-EVA Yes, we can take it at this location.

05 13 27 46 CC Okay. What I have on the board here to perform - and I guess we'll call it C prime - is a sample, and I guess you already got a pan - I thought somebody did - and the LPM then.

05 13 28 05 LMP-EVA Okay.

05 13 28 08 CDR-EVA Okay. Let me suggest that we take one of these football-sized rocks from here, too, Fredo.

05 13 28 14 LMP-EVA Yes.

05 13 28 15 CC Roger, Al. Very good.

05 13 28 24 LMP-EVA This area that we're in right now is - we're sampling in - is a pretty darn rugged boulder-strewn area. One of the smaller rocks I've sampled is going into 7-N.

05 13 29 15 CC And, Al and Ed. When you can work it in, we'd like an EMU check.

05 13 29 27 CDR-EVA Okay. Al, 3.75 and reading 52 on the oxygen; and I'm in MEDIUM flow and I'm comfortable; no flags.

05 13 29 39 LMP-EVA Okay. I'm reading 3.75; I'm 48 on oxygen; I'm now at MIN flow, having just shifted, and I'm comfortable.

05 13 29 48 CC Roger.

05 13 29 49 LMP-EVA Okay. LPM deploy.

05 13 30 21 CDR-EVA Okay. The core tube sample turned out to only be about three-quarters of a tube. The area is apparently very rocky, but I did get down into the second layer of the underlying layer of the regolith, which was white as opposed to being dark brown.

05 13 30 50 CC Roger, Al. Understand you got down to another layer that looked white below the dark brown.

05 13 31 02 CDR-EVA On second thought, forget that core tube. It's too granular and most of the material came out of the tube. I'll just ... a couple samples, and bag it, of the two top layers.

05 13 31 19	CC	Roger, Al.
05 13 31 48	CC	Okay - -
05 13 31 49	LMP-EVA	Hey, Fredo; I'm having a hard time leveling the - Okay, there it is.
05 13 32 02	CC	And, Al. About what sample-bag number are you up to now?
05 13 32 08	LMP-EVA	7-N was the last one I put in.
05 13 32 11	CDR-EVA	Okay, Fredo, we're up on 12 here. I don't know whether that's consecutive or not. ... not.
05 13 32 27	LMP-EVA	Fredo, I'm - I'm back at the MET having left the LPM; took my time.
05 13 32 40	CC	Roger, Ed - -
05 13 32 41	LMP-EVA	The LPM is alined about 3 degrees to the north of the east-west line.
05 13 32 49	CC	Okay. 3 degrees to north.
05 13 32 55	LMP-EVA	And it is level, the bubble just about in the center.
05 13 33 02	CC	About what's the size of the largest block y'all have passed, Ed?
05 13 33 09	LMP-EVA	That we've gone past?
05 13 33 10	CC	That's right - -
05 13 33 11	LMP-EVA	Oh, 25 feet long.
05 13 33 24	CDR-EVA	Hand me the shovel, please, Ed.
05 13 33 25	LMP-EVA	Roger.
05 13 33 31	CDR-EVA	Thank you.
05 13 33 48	LMP-EVA	Get ready - You ready to read the LPM?
05 13 34 01	LMP-EVA	Fredo. Houston, you still with us?
05 13 34 04	CC	Affirmative, Ed. You go ahead with the reading - -

05 13 34 08 LMP-EVA I'm going to read the LPM.

05 13 34 12 CC Go ahead, Ed.

05 13 34 13 LMP-EVA Okay. I'm on low scale, 4.9 on X; Y, 4.6; Z, 6.5; X, 4.9; Y, 4.6; Z, 7.0; X, 4.9; Y, 4.5; Z, 7.5. And it's still going up in Z. Better give you one more set. X is 4.6, Y is 4.4, Z is 8.0, and it seems steady at that level.

05 13 35 12 CC Roger, Ed, copied all four sets. And all were taken on low settings, and you can discard the instrument at this point.

05 13 35 30 LMP-EVA Okay. It is done.

05 13 35 32 CC And, Al. Did you say you had taken a sample of the white boulder or was that too large to sample?

05 13 35 48 CDR-EVA No. Right now I'm sampling a layer that is sort of a light gray just under the regolith. That went in bag - number 9, and bag number 10 was a sample of some of the surface rocks that were - that were right around that area. It looks like kind of a secondary impact that has disrupted the surface regolith and gone on down into the gray area.

05 13 36 16 CC Roger, Al.

05 13 36 18 CDR-EVA Okay. You want to - -

05 13 36 21 LMP-EVA Oh, we'll make - make a grab sample here as well as documenting. ...

05 13 36 43 CC Okay. And, Ed, is the LPM still in your immediate area?

05 13 36 52 LMP-EVA Yes.

05 13 36 53 CC Okay. They wanted a temperature reading off of it.

05 13 37 02 CDR-EVA Okay, he'll get it for you in a minute.

05 13 37 04 LMP-EVA I'll get it ...

05 13 37 23 CC Okay. And, Al - -

05 13 37 25 LMP-EVA Do you want the ...

05 13 37 26 CC - - did you mention either seeing a white boulder or a brown - a brownish gray boulder earlier?

05 13 37 39 CDR-EVA I mentioned there's a boulder definitely whitish in color, Fred. We'll be over there in a minute. Not in our immediate vicinity. But it definitely looks worthwhile sampling.

05 13 37 50 CC That's affirmative - -

05 13 37 51 LMP-EVA ...

05 13 37 52 CC ... would like a sample from the white boulder; go ahead, Ed.

05 13 37 58 LMP-EVA 125 on the LPM.

05 13 38 01 CC Roger, copy.

05 13 38 10 LMP-EVA Okay. Where is it you're headed for, Al?

05 13 38 13 CDR-EVA Well, - -

05 13 38 14 LMP-EVA I'll get the bag.

05 13 38 15 CDR-EVA - - the first thing that we ought to do, if we want to drag the MET with us, is - see that white boulder down there.

05 13 38 23 LMP-EVA Yes. I saw it. Let's grab a - -

05 13 38 26 CDR-EVA We can sample both types of boulders right down in our area, so let's go on down there.

05 13 38 31 LMP-EVA Right.

05 13 38 33 CDR-EVA And can you give us a feel, Houston, about when you'd like us to leave the area.

05 13 38 41 CC Okay. Estimated time of departure is in about 8 minutes, 7 and a half minutes.

05 13 38 50 CDR-EVA Okay.

05 13 38 51 LMP-EVA Okay. Brought the hammer.

05 13 38 58 LMP-EVA I'll grab it.

05 13 38 59 CDR-EVA Okay. I guess we just run down there this way, huh?

05 13 39 08 LMP-EVA Yes.

05 13 39 11 CDR-EVA Okay. ... One of these boulders, Fredo, is broken open. They're really brown boulders on the outside, and the interface that's broken is white, and then another one that most of it is white. They are right in the same area.

05 13 39 33 CC Okay, Ed. I assume you're going to sample some of those.

05 13 39 39 LMP-EVA That's where we're headed right now. It's about 50 yards away.

05 13 39 45 CDR-EVA Why don't you go on down and start, and let me bring the MET down.

05 13 39 48 LMP-EVA All right. Yes. It's further than it looks.

05 13 39 53 CDR-EVA That's the order of the day.

05 13 40 24 LMP-EVA Okay, Fredo. I'm right in the midst of a whole pile of very large boulders here. It's - See what I can do to grab a meaningful sample.

05 13 40 40 CC Roger, Ed.

05 13 40 48 LMP-EVA First of all, let me start my photographing. This whole area.

05 13 41 35 LMP-EVA They're awful darn big, but there's hardly anything that I can find. Let's see if I can chip one.

05 13 41 52 CC Okay, Ed and Al, - -

05 13 41 53 LMP-EVA Okay, Fredo - -

05 13 41 57 CC To get - to get us back on the old time line here, when you depart C here, we'd like to proceed directly to F, Weird. And we'll pick back up from that point. En route you can make grab samples as you see fit.

05 13 42 20 LMP-EVA Okay.

05 13 42 22 CC And another note I'll remind you of - -

05 13 42 24 LMP-EVA ... I've chipped some - -

05 13 42 25 CC - - later on. Go ahead. I'm sorry.

05 13 42 31 LMP-EVA I've chipped off one of the white rocks. I put it in bag 13-N. I'll photograph it. There don't seem to be any samples of the white rocks lying around that are small enough for me to sample and be sure they're what I'm looking for.

05 13 42 52 CC Roger, Ed. 13-N.

05 13 43 12 CDR-EVA And Al is just going around picking up hand-size grab samples from the immediate vicinity of where Ed's - is operating. I have a couple that are going in bag 16.

05 13 43 30 CC Roger, Al.

05 13 44 29 CDR-EVA ***help with that one?

05 13 44 30 LMP-EVA That's all right, I can do it.

05 13 44 35 CDR-EVA There's a football-size rock, Houston, coming out of this area, which will not be bagged. It is - appears to be the prevalent rock of the boulders of the area.

05 13 44 41 LMP-EVA That's better.

05 13 44 55 CC Roger, Al, we copy.

05 13 44 56 CDR-EVA That can go in one of the Z-bags.

05 13 45 00 CDR-EVA Okay. Do you have a sample of that white rock?

05 13 45 03 LMP-EVA Yes, I got one batch of particles.

05 13 45 06 CDR-EVA Put it right in here.

05 13 45 09 LMP-EVA I don't think it'll go.

05 13 45 10 CDR-EVA Yes. Core tube's out of the way. ...

05 13 45 22 CDR-EVA Okay. We'll just try back that way.

05 13 45 24 CC Okay, Al and Ed. We have about 1 more minute here at C.

05 13 45 33 CDR-EVA Okay. We're moving on down the hill now. Okay. Can you see Weird from here?

05 13 45 41 LMP-EVA No.

05 13 45 44 CDR-EVA Kind of hard to find.

05 13 45 47 LMP-EVA I can't even see Triplet from here (laughter).

05 13 45 52 CDR-EVA Okay, let's - -

05 13 45 53 LMP-EVA Wait a minute, Al. Let me take one quick look at the map before we move. Waste a minute looking.

05 13 45 59 CDR-EVA Why don't you take the map and I'll just head down to the general area of the LM, and you'll probably get enough elevation view from down there so we can see Weird.

05 13 46 13 CDR-EVA Okay. We're leaving C now.

05 13 46 23 CC Roger, Al. And to rephase the question earlier, on the way back down, you might integrate any distinction in the lithology on the way back with a better Sun angle and you're free to take grab samples en route to Weird.

05 13 46 35 CDR-EVA Okay.

05 13 46 36 LMP-EVA Al, I think that's Weird to the north - I mean just to the left of North Triplet. And North Triplet appears to me to be right behind the LM.

05 13 46 48 CDR-EVA Yes.

05 13 46 49 LMP-EVA You agree?

05 13 46 51 CDR-EVA It's between - it's halfway between those two large boulders and one way down.

05 13 46 59 LMP-EVA Yes, I think that's right. Uh-huh, that's the one.

05 13 47 02 CDR-EVA Okay.

SEPARATE, SIMULATANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 13 46 44 CC Kitty Hawk, Houston. We should have you now.

05 13 46 53 CMP Okay, Ron. You're loud and clear.

05 13 46 54 CC Okay. You're loud and clear there, Stu. How does it go?

05 13 47 01 CMP Okay. Went real smooth, and the frame number is 48.

05 13 47 06 CC Roger. Frame 48. And you think you got some good flicks, huh?

05 13 47 15 CMP That's affirmative. I was touching it off once every 5 seconds and it was - it held right in there. And they should be good.

05 13 47 25 CC Beautiful! Okay. I guess you're pressing then to checking out the LTC, right?

05 13 47 36 CMP That's affirmative. I'll get it stretched out here and get it up and then get on with you and tell you what I see.

05 13 47 45 CC Okay.

05 13 55 01 CMP Okay, Houston. Kitty Hawk.

05 13 55 04 CC Roger. Go, Stu.

05 13 55 07 CMP Okay. As far as whether or not the shutter is oscillating or going in one direction, I can't tell. We did run out of film on this magazine W and that made it a little easier to see in there. With this shutter sticking like this, you're going to expose any film underneath it because, you know, it's moving at fast enough rate that I can see through and see the platen now. I can see the holes in the platen with the shutter oscillating. It goes fast. I'd say it's a couple of three times a second oscillation. Or at least that's the noise level, now. I'm not sure what the shutter's doing it's moving so fast. In AUTO and in single frame, when you push the button, the shutter does stop for just an

instant, and just randomly, you will see the slit. Now it's not always there. Sometimes it's there, sometimes it isn't, sometimes it's a different width on the slit. Now, why don't we start there, and then I'll entertain the questions.

05 13 56 37 CC — Okay, Stu. That sounds like that's a good explanation of what's happening. The shutter is oscillating back and forth and it does expose the film every time it oscillates, it looks like. And even in single frame, it stops - -

05 13 56 52 CMP — Yes. Well, I don't know whether - -

05 13 56 55 CC — Yes. Go ahead, Stu.

05 13 57 00 CMP — I don't know whether it's oscillating or whether, you know, it's - I guess it would have to be though. That thing flips back and forth. Suffice it to say, there's always a slit over the film, the thing's moving so fast. I mean I can see through to the platen.

05 13 57 33 CC — Okay, Stu, as far as the oscillating or whipping all of the way around, what we simulated here on the ground, is that the shutter just goes around and around in there. And you know - you get a real clicking - dot dot dot dot - you know, something like that. And I guess you've tried your frame rates at 10 frames a second.

05 13 57 53 CMP — That's affirmative, it's on 10, and the intervalometer works. And on the cycle of 10 a minute, why the shutter stops and then takes back up again.

05 13 58 10 CC — Okay. Is the counter counting at the intervalometer setting, more or less?

05 13 58 19 CMP — That's affirmative.

05 13 58 21 CC — Okay. So, my impression is that it's getting multiple exposures on each frame. Is that correct?

05 13 58 39 CMP — Yes, that would be it. Any film that's behind is going to be exposed as the slit moves back and forth. And like I say, the rate is fast enough that with your eye, you know, you can look right

		through the shutter in the center and see the holes in the platen while it's doing it's clicking thing.
05 13 59 04	CC	Okay, understand.
05 13 59 15	CMP	And maybe if you could drum up any more questions, why - you know, this is a pretty good time; I've got the beast out here.
05 13 59 22	CC	Okay, we've got our photo guys, here, I'll give them a poll and see if they've got any questions.
05 13 59 29	CMP	Okay. Hey, Ron, I want to make sure I'm making myself clear; so, keep asking me until you get across what you want to know.
05 13 59 43	CC	Okay, Stu.
05 14 00 29	CC	Okay, Stu. One question here. While the curtain is - or the shutter, you know, is clicking, sliding back and forth there, is the frame counter counting at that time or is it only counting - you know, kind of like when it's supposed to?
05 14 00 50	CMP	The frame counter is counting when it is supposed to.
05 14 01 02	CC	Okay, the frame counter is counting when it's supposed to, and while the shutter is erratic, flipping back and forth or round and around, whatever it's doing, the frame counter is just standing still. Is that correct?
05 14 01 17	CMP	That is affirmative. It does not move with this clicking or with the shutter oscillation. It only counts either when you hit the single frame or when the intervalometer times.
05 14 01 32	CC	Okay, understand.
05 14 02 11	CC	Okay, Stu. It looks like we're still so uncertain on the Hycon, that we want to press on and use the 500 millimeter on the next REV. And we will not use the Hycon on the next REV.
05 14 02 43	CMP	Okay, I guess we need to talk a little bit about how we're going to do this, Ron.

05 14 02 48 CC Okay, I've got some flight-plan updates here for you. Starting out at 135:20 in your solo book, there.

05 14 03 03 CMP Okay. 135:20; I'm there.

05 14 03 05 CC Okay. Delete the VERB 49 maneuver and press on to 135:35. Delete the ORB RATE.

05 14 03 31 CC Delete - I hate to say this - delete King photo, before there at 135, about 45. And also delete the fan Crater strip there, target 4.

05 14 04 10 CMP Okay, I've got you. Go ahead.

05 14 04 14 CC Okay. And, of course, delete all references to the LTC photo on target 6. And then at 136:00, on page 38.

05 14 04 30 CMP Okay, go ahead.

05 14 04 32 CC Okay. And VERB 49 to roll 0, pitch 249, and yaw 0. Use 500-millimeter procedures. T-start, 136:18:40.

05 14 05 41 CC And, Kitty Hawk, Houston. Did you copy that?

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 13 47 11 CDR-EVA Okay. These rocks - these boulders in this field here appear to be very weathered, obviously not by atmosphere, but eroded by some process, because they all show cracks. They show evidences of being broken up either by impact or subsequently. And it looks to me as though these rocks are really pretty old.

05 13 47 47 CC Roger, Al. And do you have anything left on the 16-millimeter or has it been running on the MET.

05 13 47 57 CDR-EVA No, it hasn't. We might turn it on now - follow the progress.

05 13 48 00 CC Roger, Al.

05 13 48 10 CDR-EVA Is it running now?

05 13 48 13 LMP-EVA Yes.

05 13 48 15 CDR-EVA Have you checked the setting on it?

05 13 48 18 LMP-EVA Yes, I did.

05 13 48 22 CC And, Al. Without taking any extra time, if you come across any boulders large enough, we might fill the ... on the way down. If you haven't already done that on the way up.

05 13 48 38 CDR-EVA I don't think we're going to find any along our path big enough, Fredo. The very largest ones are off to the right - south of us a bit - set up the hill a bit more.

05 13 48 49 LMP-EVA Let's go on - Are you on the thing back there?

05 13 48 52 CDR-EVA No.

05 13 48 53 LMP-EVA Okay.

05 13 48 54 CDR-EVA Want me to hold your back?

05 13 48 55 LMP-EVA No, that's all right.

05 13 49 01 LMP-EVA ... you're going to go over here in a minute.

05 13 49 37 LMP-EVA ... I can't get you. Okay.

05 13 49 50 CDR-EVA All right, here again, Houston. The texture here appears to be - The regolith appears to be a lot of pebbles, approximately a quarter of an inch on down to go along with the fine. And the same texture pattern we spoke of before and photographed also here.

05 13 50 15 CC Roger, Al.

05 13 50 23 CDR-EVA Okay. Why don't we stop here to see if we're really going to Weird.

05 13 50 30 LMP-EVA Man, that - the LM doesn't seem like it's getting much closer.

05 13 50 34 CDR-EVA Is that Weird right down there, do you think?

05 13 50 37 LMP-EVA Huh? No, Weird is - let's see; Weird is almost due east of the LM.

05 13 50 48 CC And, Al and Ed. We'd like - we need an EMU check.

05 13 50 56 CDR-EVA Okay; this is Al. 3.75 and 45 percent; and I'm on MEDIUM flow, and I'm comfortable.

05 13 51 06 LMP-EVA Okay, this is Ed. I'm on 3.75; MIN flow, 40 percent, and very comfortable. And there is Weird, Al. You can see the triple crater in it.

05 13 51 17 CDR-EVA Okay - -

05 13 51 18 LMP-EVA It's got the white spot.

05 13 51 19 CDR-EVA Roger.

05 13 51 20 LMP-EVA Got it?

05 13 51 21 CDR-EVA Yes. With the boulder in the near foreground.

05 13 51 23 LMP-EVA Yes.

05 13 51 37 CDR-EVA Okay. We're now out of the boulder field, Houston. And proceeding on down the flank.

05 13 51 44 CC Roger, Al.

05 13 51 50 CDR-EVA And, I believe, - just get a shot - let's get a sample of that baby right there. Let's grab some from that one.

05 13 51 54 LMP-EVA Okay.

05 13 51 57 CDR-EVA We're just going to get a quick grab here of a rock, and I'll - I'll photograph it because it's got some tremendous fillets in it. Don't hit the fillets until I photograph it. ... and let me get a quick shot there. Okay, and a quick pan across there. That looks like - Yes, we ought to get a piece of that baby.

05 13 52 35 LMP-EVA No, man; that's hard, hard, hard! Look at that - that ... in it.

05 13 52 44 CDR-EVA Yes. Okay, here's a piece of it. Bag?

05 13 52 57 LMP-EVA ... lay them back here. Crystals here, don't lose it.

05 13 53 05 CDR-EVA Okay, that was about - it's about where we - No, I guess not.

05 13 53 15 LMP-EVA Hold it a minute. Hold it! Let me get this bag. This darn bag dispenser is not doing what it's supposed to do.

05 13 53 24 CDR-EVA Go ahead and take two. No.

05 13 53 28 LMP-EVA Houston, the rock we're taking is in 14-N.

05 13 53 33 CC Roger, Ed. 14-N. - -

05 13 53 34 LMP-EVA ... a filleted rock. Large filleted rock that Al photographed. Okay, let's go on. Do you want me to pull awhile?

05 13 53 42 CDR-EVA No, just watch everything. We don't want anything to drop off.

05 13 53 47 LMP-EVA And you want me to hold back a while?

05 13 53 49 CDR-EVA No, no, let's just let it run. Long as we don't lose anything.

05 13 53 55 LMP-EVA No. It's holding in very well. If it doesn't turn over. A little higher c.g. now than we had before with that big rock in there.

05 13 54 18 CDR-EVA Fredo, can you give us an idea at about what time we should arrive at Weird?

05 13 54 24 CC Stand by 1.

05 13 54 53 LMP-EVA That 16-millimeter bounces all over every place.

05 13 54 56 CDR-EVA Well, maybe it could - could - It's taken photos from every view.

05 13 55 17 CDR-EVA Okay. I hate to make a grab here that's not from this crater. It looks like that cuts fairly deep, though.

05 13 55 28 LMP-EVA Yes. Let's - Hey, here's a whole batch of them right down here, Al. Let's grab those.

05 13 55 34 CDR-EVA Which way, left or right?

05 13 55 35 LMP-EVA Off to the left and ahead - around that little crater. They're all from this same area.

05 13 55 42 CDR-EVA Houston. Unable to see any stratigraphy in any of these craters. The slumping has been such that its pretty much destroyed.

05 13 55 56 LMP-EVA I'll grab this one right here.

05 13 55 58 CDR-EVA ...

05 13 56 00 CC Roger, Al. And ... positionwise, you're past Flank now. Is that correct? Or at lease a mean position of Flank?

05 13 56 15 CDR-EVA No, we're not, Fredo. We're - No, we're not at Fank - at Flank yet. I'd say we're probably 15 minutes away from Weird. Did you go it on board?

05 13 56 27 LMP-EVA As a matter of fact, I think this is Flank right here.

05 13 56 31 CDR-EVA Get it on board?

05 13 56 32 LMP-EVA Yes, I've got the rock on board.

05 13 56 33 CDR-EVA Okay, let's press.

05 13 56 35 CC Roger. And one other question that's up there is to check for the stratigraphy reported earlier of the light gray-white layer below the top, if you see that exposed anywhere?

05 13 56 50 CDR-EVA Okay. Now, we did not see that until we started approaching the edge of the boulder field. The - There's no evidence of that at all that we noticed.

05 13 57 01 LMP-EVA Not down this far. One thing I did notice - further outside of where we saw the white underneath - but it looked like an impact had been of the white rock or it was a splatter of white. And it was just outside where Al was reporting that the underlying layer was white. As a matter of fact - No, that just - The Sun angle was causing it. Right now, some of the spray that we're kicking up looks white underneath, but I'm convinced it's just the angle. ... I looked back the other way, and it's not substantiated.

05 13 57 45	CC	Roger, Ed.
05 13 58 09	LMP-EVA	Hold it.
05 13 58 12	CDR-EVA	That's what I'm trying to do.
05 13 58 47	CDR-EVA	Okay, we're moving along pretty well, Fred, at this point. And I'd say we're still probably about 10 minutes away from Weird.
05 13 58 55	CC	Very good, Al. Looks kind of like you're making a little better time going down than up.
05 13 59 05	LMP-EVA	Yes, the slope's a different way, Fredo. In this case, the MET helps.
05 13 59 22	CDR-EVA	Okay, don't let me lose that baby. That's it right there with the three - -
05 13 59 24	LMP-EVA	Yes.
05 13 59 25	CDR-EVA	- - with the three rocks beyond it.
05 13 59 26	LMP-EVA	Yes. We're getting down to the place where ... to see it.
05 13 59 40	CDR-EVA	This is probably Flank right here, or is it?
05 13 59 48	LMP-EVA	I'm not going to say until I get down and look at the exact pattern. It probably is, Al. But if this is really Flank, we should have been at the top of Cone Crater where we were.
05 14 00 01	CDR-EVA	Yes, I know.
05 14 00 03	LMP-EVA	I think we've already passed by it.
05 14 00 12	CC	Okay. It maybe - looks down here, Ed - that maybe what you're looking at there, if you've got another Flank-size crater is the one by E.
05 14 00 24	LMP-EVA	No, this is a big crater. It's 40, 50 meters across. It has a fairly sharp crater in the south edge of it, which is - -
05 14 00 42	CC	Okay, that looks like it may be the one by E.

05 14 00 43	LMP-EVA	- - 20, 30 feet across. Yes, I think that's it, Fredo. And it's - No, it's at least 50 or 60 feet deep.
05 14 01 03	CDR-EVA	Why don't we just grab a couple from right here.
05 14 01 04	LMP-EVA	Yes. Okay.
05 14 01 21	CDR-EVA	That baby came apart. Very soft.
05 14 01 29	LMP-EVA	Yes, it's falling apart as you pick it up; very crumbly, isn't it?
05 14 01 32	CDR-EVA	Okay. You got a bag ready?
05 14 01 33	LMP-EVA	Yes.
05 14 01 35	CDR-EVA	Very, very soft rock ... that crater, plus another one very close to us with crystal in it. ... now going into bag.
05 14 01 46	LMP-EVA	15-N.
05 14 01 47	CDR-EVA	Okay.
05 14 01 49	CC	Okay, copied 15-N.
05 14 01 56	CDR-EVA	...
05 14 01 57	LMP-EVA	Not quite; let me get it in there.
05 14 02 02	CDR-EVA	Stay behind me; we don't want to leave anything now.
05 14 02 04	LMP-EVA	Okay.
05 14 02 05	CDR-EVA	Okay ... right there.
05 14 02 07	LMP-EVA	Yes, we're going right for Weird. Head right for the big boulder. Then Weird's right beyond it.
05 14 02 12	CDR-EVA	All right.
05 14 02 31	CDR-EVA	Easy.
05 14 02 34	LMP-EVA	Okay, keep going.
05 14 02 51	LMP-EVA	This is Ed. I'm going back through INTERMEDIATE cooling.

05 14 02 54	CC	Roger, Ed.
05 14 03 07	LMP-EVA	The - One of the problems of going down hill here is that you have defric - essentially defraction, I guess, around your body, and it creates a halo effect in your shadow, and you just can't see a darn thing right in front of you.
05 14 03 31	CC	That's okay, Ed, - -
05 14 03 32	LMP-EVA	... either blacked out or washed out right - Kind of blacked out - kind of washed immediately - immediately down-Sun of you. We're going predominantly down-Sun now.
05 14 04 07	CDR-EVA	Okay, Fred, we're still moving, and - that's about 3 minutes away now from Weird.
05 14 04 17	CC	Roger, Al.
05 14 04 23	LMP-EVA	The crater we are going by now, we're just to the north of it, Fredo, is an old subdued crater.
05 14 04 32	CDR-EVA	If you want to run over behind that boulder over there, and I'll try and talk to you.
05 14 04 36	LMP-EVA	You're the one that has to get behind it and try to talk to Houston.
05 14 04 38	CDR-EVA	Oh, that's right. Okay.
05 14 04 40	LMP-EVA	I'll pull the MET. Go ahead.
05 14 04 41	CDR-EVA	Okay. On second thought, maybe it's not big enough. I'll help.
05 14 04 51	LMP-EVA	No, don't think it is.
05 14 04 53	CDR-EVA	No, I guess not. Sure is a big old boulder. I'll take a picture of it anyway.
05 14 05 11	CC	Okay, and this - this big boulder, Al, is - you're just about at Weird now. Is that - is that right?

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 14 05 23 CDR-EVA - - a couple of hundred meters short of Weird.

05 14 05 42 CDR-EVA This country is so rolling and undulating, Fred, with rises and dips everywhere, that you can be going by a fairly good-size crater and not even recognize it.

05 14 05 57 CC Roger.

05 14 06 00 LMP-EVA Okay, I'm back with you. Okay, I think this is Weird right - to our right here - forward, Al. See that fresh one right there? I think that's the fresh one of the Weird pattern.

05 14 06 19 CC Okay, Al and Ed; on the Weird task, we'd like to pan and grab samples at Weird; and we'll pick up most of our tasks that we had bypassed at E - when we get to Triplet.

05 14 06 39 LMP-EVA Okay.

05 14 06 41 CDR-EVA Okay, I'll get the pan. I think ... is right in here.

05 14 06 46 LMP-EVA Where are you?

05 14 06 47 CDR-EVA Behind you, to your left. Any ... in there?

05 14 06 54 LMP-EVA No, I didn't think so; I think this is it right here.

05 14 06 58 CDR-EVA It looks too small, I believe. Well, anyway, yes, we're in the area, Houston. We've got a minute to find it.

05 14 07 10 CC Okay, Al, I think the - the pan will fill us in as to the exact position.

05 14 07 18 CDR-EVA Okay, panning's underway, now.

05 14 07 48 CDR-EVA Okay, pan is complete.

05 14 07 51 CC Roger, Al.

05 14 07 53 CDR-EVA Did you get a grab sample, Ed?

05 14 07 56 LMP-EVA I just - I got some right up here, Al.

05 14 07 59 CDR-EVA Okay.

05 14 08 32 CC And I guess this is going in bag 16. Is that right, Ed?

05 14 08 40 LMP-EVA This is in bag 17, Fred. Sixteen got used some time back.

05 14 08 46 CC Okay.

05 14 08 50 CDR-EVA Okay; let's press on.

05 14 08 52 LMP-EVA Okay. This darn rig - it's hard to fold up.

05 14 08 55 CDR-EVA We've got a pan and a grab sample. What else do we want from here, Houston?

05 14 08 58 CC Okay, that's - that's it, Al. We would like to proceed on to the north Triplet, and I'll give you a - the a - the tasks when we get there.

05 14 09 15 CDR-EVA Okay, we'll try to get to north Triplet.

05 14 09 18 LMP-EVA You ran out from under me just as I was picking it up.

05 14 09 20 CDR-EVA (Laughter) Sorry.

05 14 09 28 LMP-EVA Okay.

05 14 09 36 CDR-EVA Okay.

05 14 09 38 LMP-EVA Oh, man.

05 14 10 04 CC Okay, Al and Ed - -

05 14 10 08 LMP-EVA There's some blocks over there ...

05 14 10 09 CC - - for your stop for the E, we'd like that - take an estimated one-crater diameter short of the crater - North Crater.

05 14 10 24 LMP-EVA You want us to stop one-crater diameter short.

05 14 10 26 CC That's affirm; because some of the items coming up are the core and the trench - triple core.

05 14 10 34 LMP-EVA Okay. I think we're seeing the rim of the Triplet series right ahead of us, aren't we, Al?

05 14 10 50 CDR-EVA I would say so, yes. We can say that's the rim of the North right there.

05 14 10 53 LMP-EVA Yes. It's got boulders on it, and that's the only thing big enough to have boulders. We're probably about one diameter out right now.

05 14 11 02 CDR-EVA I'd say we are. Right here.

05 14 11 07 LMP-EVA The way we've been estimating distances today, that rim has to be at least 6 miles from here.

05 14 11 12 CDR-EVA Okay, Houston; we're about 1 diameter to the east of North Triplets.

05 14 11 18 LMP-EVA To the west of - yes, east of the Triplets. Excuse me.

05 14 11 21 CC Okay, copied, and - -

05 14 11 23 CDR-EVA Okay.

05 14 11 24 CC The number 1 item is the triple core.

05 14 11 30 CDR-EVA Okay.

05 14 11 32 LMP-EVA Where's the third core tube?

05 14 11 34 CDR-EVA Well, why don't you use clean ones?

05 14 11 36 LMP-EVA I don't have clean ones.

05 14 11 37 CDR-EVA Yes, you do. They're down in this pocket right there. Let me - -

05 14 11 40 LMP-EVA This one?

05 14 11 41 CDR-EVA - - let me get my camera tightened up.

05 14 11 43 LMP-EVA This one's been used.

05 14 11 44 CDR-EVA No, no, no. In here, Ed.

05 14 11 48 LMP-EVA Oh, okay.

05 14 11 49	CDR-EVA	The three tabs should be clean.
05 14 11 51	LMP-EVA	All right.
05 14 11 54	CDR-EVA	Okay, we'll pull it back together here.
05 14 12 06	LMP-EVA	...
05 14 12 26	LMP-EVA	Now, I'm clear to the bottom of that, I think.
05 14 12 31	CDR-EVA	Okay; we've got the camera back together. Okay, Fredo, for your info, the CDR's COMMANDER is reading 117.
05 14 12 39	CC	Roger, Al, 117.
05 14 12 52	CDR-EVA	Okay, I'll get it.
05 14 12 57	LMP-EVA	Start with this one. We've only got two fresh ones in here. You've got four out that are used; or that look like they're used.
05 14 13 07	CDR-EVA	The three tabbed ones, we haven't used yet. Let me get them, Ed.
05 14 13 37	LMP-EVA	Okay. I'll take the tabbing off of this one.
05 14 13 43	CDR-EVA	Yes, I think that's the best way to go. Let's make - make them 1, 2, 3 for simplicity's sake.
05 14 13 52	LMP-EVA	I don't have a mat from that one; where did it go?
05 14 13 56	CDR-EVA	The bottom one will be number 1 tube with a tab, Fredo.
05 14 14 02	CC	Roger.
05 14 14 06	LMP-EVA	Here's your number 3.
05 14 14 08	CDR-EVA	Okay. Hold on to that one. Okay? And the other one will be number 2 with a tab.
05 14 14 33	CDR-EVA	And the top one will be number 3 with a tab.
05 14 14 37	CC	Roger, Al. And we're going to subtract off 15 minutes from that 30-minute extension due to a - PLSS oxygen.

05 14 14 51 CDR-EVA Okay.

05 14 14 54 CC So that gets us about - -

05 14 14 57 CDR-EVA ...

05 14 15 03 CC Okay. This gives us approximately - -

05 14 15 05 CDR-EVA Go ahead.

05 14 15 06 CC - - 25 minutes at stop ...

05 14 15 13 CDR-EVA 25 minutes until what?

05 14 15 16 LMP-EVA ... Okay, I got this one. Go ahead; start your trench, if you like.

05 14 15 34 CDR-EVA Okay. I'll dig the trench in the far wall of this crater here, Ed.

05 14 15 54 LMP-EVA Right.

05 14 16 46 LMP-EVA Fredo, I've tried to push in the core tubes - triple core tube - I get maybe a - oh, 3 to 4 inches of pushing in by hand. And it's just surface stuff; a very soft - It will not support the weight of the core tubes. Now, I've got it balanced, and I can take a picture of it, perhaps.

05 14 17 16 CC Okay. We're reading you Ed.

05 14 17 46 LMP-EVA Okay. We'll try to drive it.

05 14 18 00 CC And do I understand correctly, Ed; you're taking care of the triple core - on your own there?

05 14 18 09 LMP-EVA That's affirm. Al's digging - busy with his trench.

05 14 18 16 CC Okay; very good.

05 14 18 25 LMP-EVA I'll go over and help him photograph it in - in a while. And it - it's not going in easy, Fred.

05 14 18 39 CC Roger, Ed.

05 14 19 14 LMP-EVA I'll try driving it a bit more, but I think I'm on solid rock; and, I'm about one core tube down.

05 14 19 23	CC	Roger, Ed. Solid rock, about one core tube down.
05 14 19 30	LMP-EVA	Yes.
05 14 19 38	CC	Okay. The recommendation, Ed, is to pull it up and move - over a bit and try it again.
05 14 19 50	LMP-EVA	The way this one feels, it'll be the same thing.
05 14 20 04	CC	Okay. Ed; and when you pull it out, they'd like to save the bottom core, and replace it with another one there when you try - before you try again.
05 14 20 19	LMP-EVA	Okay.
05 14 20 34	CC	How's the trench going, Al? Are you getting - getting down there?
05 14 20 40	CDR-EVA	I've got a trench here. It's going fairly easily, but I need the extension-angle handle to get it deeper so - no way to edge through that. I'm cutting into the rim of a crater which is approximately - say, 6 meters in diameter, has a depth of about three-quarters of a meter. And we're back in about one diameter away from the north ... Triplet. The trench is going through at least three layers that I can see. The fine-grain surface, dark browns; then, a layer of what appears to be quite a bit of black; and then, a third layer of some very light material. And, we should be able to sample all three of these.
05 14 21 33	CC	Roger, Al.
05 14 21 34	LMP-EVA	Core tube cap. Core tube cap on that sample is in 18 N.
05 14 21 43	CC	Roger, Ed. Roger, Ed.
05 14 22 02	CDR-EVA	And a very interesting looking rock with really fine-grain crystals in it. It's a grab sample, Houston, from that same crater in which I'm digging. It's too large for a bag; it's dark brown; dark part is fractured. It's fracture face is very light gray with very small crystals.

05 14 22 28 CC Roger, Al; and if you can't get any with your samples down in the trench itself that have any rock segments, you might include those as part of your sample.

05 14 22 42 LMP-EVA ...

05 14 22 44 CDR-EVA What's that, Ed?

05 14 22 45 CDR-EVA Put it in that side bag if you can; these are all - all full back here.

05 14 22 50 CDR-EVA Okay.

05 14 22 52 LMP-EVA Let me help you.

05 14 23 01 LMP-EVA ...

05 14 23 03 CDR-EVA Are you about through with the extension handle, or are you going to - -

05 14 23 06 LMP-EVA Go ahead and take it. I don't really need it to drive.

05 14 23 12 CDR-EVA I'll go over and cut that baby, and we'll - through here.

05 14 23 40 CDR-EVA Okay, Houston; I know that - we did not mention this white layer - down in this area before - that was so obvious to us just below the surface up near the flank of Cone. But it appears as though it is - quite a bit - well, it's relatively deep, as far as visual observation is concerned. And certainly not any would be picked up by foot-prints, or tracks or the like. But there appears to be some of that here in this trench.

05 14 24 18 CC Roger, Al.

05 14 24 20 LMP-EVA Fredo, did you get my - get my report that the core tube tip - tip was in 18 N?

05 14 24 28 CC Roger, Ed. I got that; 18 N.

05 14 24 34 LMP-EVA Okay, and I have taken the bottom core of that one, which was core 1 flag; and it's now by itself - as a single core tube; and I'm going to replace

that with - number 1 unflagged, which is the one Al started to use earlier but didn't get anywhere with it.

05 14 25 00 CC Okay. Number 1, unpegged, on the bottom.

05 14 25 15 CDR-EVA You know what's happening in this trench; it's the - surface fines are so loose that they're just falling down covering the layering that we want to get. I'll tell you, we're not going to get a classic vertical wall here, Houston, on this trench.

05 14 25 59 LMP-EVA Yes.

05 14 26 20 CC And, Ed. Are you having any better luck on the triple core this time?

05 14 26 27 LMP-EVA I've got it in about half a tube. But I'm - getting ready to take a picture of it so you can locate it; and then, we'll go ahead and drive it the rest of the way in.

05 14 26 36 CC Roger, Ed.

05 14 27 00 LMP-EVA Okay, Fredo. There's three frames here, probably 69, 70, 71, that are core tubes. The first one's the aborted one that I couldn't - couldn't get in. The second one - the second picture is the - this new attempt, and a 15-foot shot that I raised up and took a locator shot on the horizon of it. I think it might go.

05 14 27 29 CC Very good, Ed.

05 14 27 48 LMP-EVA Okay, I'm getting down low enough; I'm going to have to have an extension handle to finish driving it, I think.

05 14 27 54 CDR-EVA Okay, I'll give it back to you. I'm really kind of through with this trench.

05 14 28 00 CC Roger, Al.

05 14 28 05 CDR-EVA Yes.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 14 05 48	CMP	Roger. Okay, a readback. We're marking off the 135:20, no VERB 49 maneuver; 135:35, no PRO on the ORDEAL; and marked off in blood is the King photos, the Fan Crater photos; deleting any reference to LTC target 6; and, at 136, we'll do a VERB 49 maneuver to 0, 249, 0; use the 500-millimeter procedures; T-start at 136:18:40.
05 14 06 31	CC	Okay, that's good. And then I've got your map update for REV 28 on page 37, there.
05 14 06 42	CMP	Okay, now. This is another track of Descartes. Is that right, Ron?
05 14 06 50	CC	That's affirmative. And stand by 1. I may have a slightly different aim point there.
05 14 07 00	CC	That's affirmative.
05 14 07 01	CMP	Okay. Ron, have you got your Descartes COAS out?
05 14 07 10	CC	Sure do.
05 14 07 13	CMP	Okay, mark down the aim point. The aim point is shown on it, that crater right by the center of the X.
05 14 07 23	CC	Right.
05 14 07 24	CMP	That did show up when I first started. So, see right up toward the top of the page, two craters right together? I meant move up about a - oh a quarter of an inch from the center. Can you see a little doublet there?
05 14 07 41	CC	Okay. I think I'm with you. Yes.
05 14 07 46	CMP	Okay. That was my aim point on that pass. Those - those two showed up better at first, before this one down here. So I picked up on them. And you know that's essentially between the two bright ones and about 3/16ths of an inch up from the center of the COAS as shown on it.

05 14 08 12	CC	Okay. I think - I'm not sure which way is up. Is it the bottom of the page or the top of the page now that you're talking about? I - I got a little doublet kind of - -
05 14 08 22	CMP	Okay.
05 14 08 23	CC	- - toward - toward the bottom of the page.
05 14 08 27	CMP	No, no. Take - take the center of the COAS and move toward the top of the page about a quarter of an inch. They're not really touching each other, but there are two small craters there, just to the left of the center line of the COAS.
05 14 08 43	CC	Okay. I've got you. I've got you.
05 14 08 49	CMP	Okay, that was my aim point on that - on that pass, and it - it stayed pretty good.
05 14 08 58	CC	Okay, real good. Do you think you can pick up the - you know the - the aim point as on the COAS? As - as shown on the picture for this REV?
05 14 09 12	CMP	Yes, I think so. I - I can probably get down there ...
05 14 09 20	CC	Okay. That'll be real good. And then if we have - -
05 14 09 22	CMP	Before we go any further - Hey, Ron, before we press on, would anybody object to me going wide dead band here? Would that affect the comm or anything?
05 14 09 34	CC	Yes, it does, Stu. We talked about that, and you're fat on fuel. So let's stay in narrow dead band here, so we'll keep the comm. You're - -
05 14 09 48	CMP	Okay - -
05 14 09 49	CC	- - You're about 90 - -
05 14 09 50	CMP	- - Very good then. I interrupted - -
05 14 09 54	CC	- - You're - -

05 14 09 55	CMP	Go ahead, Ron.
05 14 09 56	CC	- - You're about 90 pounds above the flight plan there.
05 14 10 11	CMP	Okay. So on this pass I'll try to hit this aim point dead center. Actually, I was under the impression that the place we really want to aim is a little to the south and a little to the west from where the center of this is marked here on this map. Why don't you verify that for me, and we'll talk about it when we come around.
05 14 10 36	CC	Okay. Yes, I remember ... talking about it, and I was going to make a little equilateral triangle with those two craters that were right in the - pretty close to the center of the X, you know, just a little bit, like you say, to the south there. And I'll verify that for sure, though.
05 14 10 56	CMP	Okay.
05 14 11 23	CC	And, Stu, here I've got your map update for REV 28 there on page 37.
05 14 11 35	CMP	Okay. Go ahead.
05 14 11 38	CC	Okay. 180 is 135:26:51.
05 14 11 49	CMP	Okay. 135:26:51, and guess I was talking about this when we went AOS [sic] last time. I - I'm really not - I - I don't need that time. I can - I can find my way around real good. Why don't we just dispense with padding that up and save the chatter?
05 14 12 09	CC	I figured you'd say that. You know we've had real good training on where we are up there so - plus the fact you can whip in the P21 if you really get lost on the thing, so it sounds like a good idea.
05 14 12 31	CMP	Okay. And do you have data on me now, Ron?
05 14 12 36	CC	That's affirmative. We even have HIGH BIT RATE this time.

05 14 12 45	CMP	Well, how about that? I know after all this talking and everything, I just happened to look over here. My cabin pressure is - is up. What do you say about it there? I'm reading on the gage here about 5.8 or so.
05 14 13 05	CC	Let me make a quick check with EECOM.
05 14 13 20	CC	Yes, Stu. You know you pumped it up before you went to bed last night, and the - just the ... accumulator is kind of - you know building it up a little bit. And you just got a real tight cabin. We don't think it's a problem at all.
05 14 13 40	CMP	Okay. You just don't breathe much when you're in here by yourself, huh?
05 14 13 43	CC	Yes, I guess that's it.
05 14 13 56	CC	And, Stu, go for the point as depicted in the COAS picture.
05 14 14 08	CMP	Okay. I'll put her on there dead center.
05 14 14 11	CC	Okay.
05 14 14 52	CMP	Okay, Ron. Just to make sure I understand here now. Really, I won't do anything the way the flight plan is now, until 136 when I go for another Descartes track? You verify that?
05 14 15 09	CC	Yes, that's right. And, let me do some checking here. I don't know if you're going to be able to sneak in any pictures of King, you know, as you're coming up there or not.
05 14 15 26	CMP	Okay. Well, I'll - I can use the time to get this thing stowed, ready for my hiking buddies.
05 14 15 33	CC	Okay. Speaking of your hiking buddies, they're about - It looks like a little more than halfway back from Cone, heading back toward the LM. Okay. One other flight-plan change I got here on the - -
05 14 15 49	CMP	Okay. Real fine.

05 14 15 50	CC	- - reference to the batteries. At - Flip over to 137.
05 14 16 05	CMP	Okay, 137.
05 14 16 07	CC	Okay. And put, "Charge battery A," at that point in time. And take battery B off of charge at that time, instead of at 136:15.
05 14 16 34	CMP	Okay. I'll move "Charge battery A" from 136:15 to 137.
05 14 16 39	CC	Roger.
05 14 20 34	CC	Okay, Kitty Hawk; Houston here. You got about a minute to go before you go around the horn.
05 14 20 43	CMP	Okay. We'll see you in a few minutes.
05 14 20 46	CC	Okay.
05 14 45 --		BEGIN LUNAR REV 28

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 14 29 19	CDR-EVA	Okay, Fred. Bag 19 for the sample of the surface fine - that is, from the surface layer of the trench.
05 14 29 32	CC	Roger, Al. Bag 19 is the sample of the surface fines.
05 14 29 42	CDR-EVA	I am unable to take from the walls of the trench the type of material - the blocky type of material that I could see when I was digging; so, I'll just get a ... full of that, and we'll mix the surface with the second layer.
05 14 30 05	CC	Roger, Al. How deep did you finally end up getting down?
05 14 30 14	CDR-EVA	Well, the trench is about a foot and a half deep. I gave up actually not because it was hard digging, but because the walls kept falling in on it; and it was covering all the evidence of stratigraphy.

05 14 30 26 CC Roger, Al.

05 14 30 31 LMP-EVA And, Houston. I'm over 40 feet - 50 feet from where Al is; and on the east side of these craters, I have the triple core in about a tube and a quarter; and it's tightening up again. I just don't think it's going to go the rest of the way.

05 14 30 52 CC Okay, Ed.

05 14 30 53 LMP-EVA I'm maybe driving a millimeter a stroke. I'll hit it a few more licks, and I'll see if we can break through or move it a little more. No, that's as far as it is going, Houston; one and a quarter.

05 14 31 17 CC Okay, Ed. We'll just take your judgment on that; when you don't think you can get it in any further, you can stop there.

05 14 31 33 LMP-EVA Okay. I think I could probably beat it for the next 10 minutes, Fred, and not get another inch out of it.

05 14 31 39 CC Well, I don't think you need the exercise, you may as well extract it now.

05 14 31 46 LMP-EVA I agree. I'll take a picture of it, a final picture of it, to show you how far we got with it.

05 14 32 10 CDR-EVA Okay, Houston; this is Al. And bag 21 is kind of a collection of the combination of the top two layers. Second layer is a thin layer of small glassy-like pebbles. I was unable to separate them by the trench method, so I gave it to you mixed up in that bag; and the last bag will be pebbles from the bottom layer.

05 14 32 40 CC Okay, Al. And about - what's the thickness of the intermediate layer there?

05 14 32 49 CDR-EVA Well, it's really ephemeral [laughs] - it's almost - it's very thin; I would say no more than a quarter of an inch thick, and I just noticed it because of the difference of the grain structure as I was digging the trench.

05 14 33 05 CC Roger, Al.

05 14 33 13 CDR-EVA And in bag 20, 2 0, we'll fill a sample of the bottom material; also, mixed up with the - some of the surface material has fallen down in on top of it. And that's about - call it 18 inches below surface.

05 14 33 38 CC Roger, Al; and when you and Ed can work it in, we need another EMU check.

05 14 33 49 CDR-EVA Okay.

05 14 33 57 CDR-EVA This is Al, at 3.75 and reading - about - -

05 14 34 07 LMP-EVA Oh, hell.

05 14 34 10 CDR-EVA Reading 35; I have no flags; and I'm in - negative flow now, going to min flow; and feeling good.

05 14 34 20 CC Okay; and what kind of misery are you having now, Ed?

05 14 34 26 LMP-EVA 3.75; 32 percent. Minimum - wait a minute - I'm in medium cooling and doing great.

05 14 34 42 CC Okay.

05 14 34 43 LMP-EVA Now, my problem is I can't get the - driving down - driving down to that rock, I couldn't get the core cap off; I'll get some help from Al, soon as he puts his handful of samples down. Okay, that's great.

05 14 35 05 CDR-EVA Okay, let me get rid of this pincher.

05 14 35 09 CC Okay. On the - the agenda here, we have remaining documented samples, and we need a pan.

05 14 35 21 LMP-EVA Roger. We'll get it for you.

05 14 35 22 CDR-EVA Oh, God.

05 14 35 23 LMP-EVA Get another one; get that one; we've got plenty.

05 14 35 34 LMP-EVA Look at it.

05 14 35 35 CDR-EVA Yes.

05 14 35 37 CC Okay. And, Al, one question, did you get the SESC sample out of the bottom of the trench?

05 14 35 49 CDR-EVA Well, I told you the trench was kind of a miserable thing, because the walls kept falling down. And I could get a sample from the bottom, but it wouldn't be the bottom, I'm afraid.

05 14 36 05 LMP-EVA Okay, Fredo, the bottom - bit on this ... was bit - what - 23? Isn't it, Al? That's the one you did.

05 14 36 15 CDR-EVA Twenty-three.

05 14 36 17 CC Roger, Ed.

05 14 36 19 LMP-EVA Right, 23.

05 14 36 26 CDR-EVA Okay, we need a pan from here; I can get that.

05 14 36 29 LMP-EVA Okay.

05 14 36 42 LMP-EVA Okay.

05 14 36 44 CC And, Al, when you get done with the pan, I guess we'd still like the SESC sample from the bottom of the trench, even though it probably isn't the bottom.

05 14 36 57 CDR-EVA Well, I'll tell you, I'll go back and whack at it a little bit. See what I can do.

05 14 37 14 CC Okay. And, Al and Ed, we have about 8 minutes left here at Triplet.

05 14 37 26 CDR-EVA Roger. You're still counting on a quick trip out to the ALSEP antenna?

05 14 37 35 CC That's affirm, Al. That's included in this time, and when - when you start out, we'd like you to make some grab samples as you pass by North Triplet.

05 14 37 51 CDR-EVA Okay.

05 14 38 01 LMP-EVA And, Fredo, the triple core tube, the second core didn't have anything in it. As soon as I opened it up, a little bit fell out, and the second core tube is empty.

05 14 38 15 CC Roger, Ed.

05 14 38 17 LMP-EVA Even though it drove down - even though it drove in about 3 inches, it didn't get anything.

05 14 38 26 CC Okay, Ed.

05 14 38 31 CDR-EVA Okay.

05 14 38 34 LMP-EVA Okay, I'll put a bit back on that one. Save it.

05 14 38 48 CC Okay, and when you get done there, Ed, I guess you can proceed with getting some documented samples before we have to depart.

05 14 38 58 LMP-EVA Okay.

05 14 39 08 CDR-EVA Okay. SESC can: that's over in that pocket, right?

05 14 39 11 LMP-EVA Yes.

05 14 39 31 LMP-EVA Okay. Documented samples coming up.

05 14 39 48 CDR-EVA This white stuff on the rim here, Ed?

05 14 39 51 LMP-EVA Beg your pardon?

05 14 39 52 CDR-EVA These white rocks on the rim here?

05 14 39 54 LMP-EVA Yes. Document some of that. Here's a rock right here.

05 14 40 01 CC Okay, has Al moved over by the rim of North Crater now?

05 14 40 07 LMP-EVA Oh, no, we're still at the same place.

05 14 40 09 CDR-EVA Negative.

05 14 40 11 LMP-EVA That's pretty well disturbed, Al; I'll grab it - I'll grab it without much documentation.

05 14 40 15 CDR-EVA Okay.

05 14 40 18 CDR-EVA We're digging the bottom of the trench for you, Fredo.

05 14 40 21	CC	Okay, Al.
05 14 40 28	CDR-EVA	I'm redigging the trench.
05 14 40 40	LMP-EVA	I'm picking up one of the - so-called whiter rocks, Fredo, near the area where Al is digging. Since it's already disturbed, I'm not going to waste time on much documentation. Kind of a - -
05 14 40 57	CC	Roger, Ed.
05 14 41 01	LMP-EVA	Man, it's going into 25 Nancy.
05 14 41 53	CC	Okay. We have about 3 and a half minutes left at Triplet.
05 14 42 01	CDR-EVA	Okay, we're packing up now.
05 14 42 04	LMP-EVA	One more documented sample.
05 14 42 06	CC	Okay, there is a special request. Rather than grab samples at the North Crater rim there, they'd like to get a documented sample of a partially buried rock.
05 14 42 21	LMP-EVA	Okay. I was going to try to get you one of those right here, but it looks pretty big. I think maybe I can get it anyhow.
05 14 42 31	CC	Okay, Ed.
05 14 43 12	CDR-EVA	Oh, no.
05 14 43 35	CDR-EVA	I can't believe it.
05 14 43 36	LMP-EVA	What's the matter, Al?
05 14 43 37	CDR-EVA	Oh, that - seal came off that thing.
05 14 44 39	CC	Okay, Ed and Al, we're going to have to be departing Triplet here - and that one brief stop at the North rim to pick up one documented sample - and get on back to the LM area if we're going to pick up the remaining tasks, there.
05 14 45 01	CDR-EVA	Okay. Okay, you're right.

05 14 45 14	LMP-EVA	..., this documented sample that I got of the buried rock, it's too big for regular weigh bags. See what I can do with it. A regular sample bag - I'm sticking one over it, but it'll never close. Okay, it's going in it. And will probably stay, but it won't close it.
05 14 45 53	CC	Okay, that'll probably be all right, Ed. We're going to have to move out now.
05 14 46 02	LMP-EVA	It's bag 26 N.
05 14 46 04	CC	Okay, Ed.
05 14 46 16	LMP-EVA	Okay. I'll grab the gnomon. We're on our way.
05 14 46 22	CDR-EVA	... the last I see of that son-of-a-bitch.
05 14 46 31	LMP-EVA	They're miserable, aren't they?
05 14 46 38	CDR-EVA	Okay.
05 14 46 42	LMP-EVA	Oh, let me do it - let me grab it for you.
05 14 46 44	CDR-EVA	What? That thing? What do you mean - that can?
05 14 46 48	LMP-EVA	Yes.
05 14 46 49	CDR-EVA	Forget it?
05 14 46 50	LMP-EVA	Okay.
05 14 46 51	CDR-EVA	I'm never going to use it again. Okay, headed for the LM. We're probably about 2 minutes away from the LM, Houston.
05 14 47 05	CC	Roger, Al.
05 14 47 11	CDR-EVA	Okay, everything's on so far.
05 14 47 41	CDR-EVA	Okay, we're - -
05 14 47 43	LMP-EVA	I think we're closing on it.
05 14 47 45	CDR-EVA	Right. Here's the - -
05 14 47 48	LMP-EVA	Triplet right up ahead of us.

05 14 47 50 CDR-EVA Could be.

05 14 47 51 LMP-EVA We'll have to do a little bit to the north to get around it, I think.

05 14 47 56 CDR-EVA Yes.

05 14 47 58 LMP-EVA We're approaching Triplet from the - from the east, that's North Triplet from the east. There's some - a little rock field down here - a small boulder field, Al. Want to get a documented sample from it?

05 14 48 18 CDR-EVA Okay.

05 14 48 23 LMP-EVA Looks good. Yes, looks like they might have come from there.

05 14 48 28 CDR-EVA Oops.

05 14 48 30 LMP-EVA Did you lose something?

05 14 48 32 CDR-EVA You lost you know what.

05 14 48 35 LMP-EVA Oh, no. What?

05 14 48 38 CDR-EVA (Laughter) This shiny can.

05 14 48 40 LMP-EVA Damn SESC, huh?

05 14 48 44 CDR-EVA Okay, the shiny can is retrieved. Press on. Go ahead to ..., Ed, right down the middle and get a documented sample there.

05 14 48 56 LMP-EVA Okay.

05 14 49 02 CDR-EVA Man, that pile of rocks - beautiful, right to - right to your left. Oh, just the right size.

05 14 49 10 LMP-CDR Okay.

05 14 49 11 CDR-EVA Don't walk over them!

05 14 49 13 LMP-EVA No, I'm trying to stay away from them.

05 14 49 14 CDR-EVA There you go.

05 14 49 15 LMP-EVA Are these the ones - the ones over here?

05 14 49 17 CDR-EVA Yes.

05 14 49 18 LMP-EVA Okay.

05 14 49 20 CDR-EVA God damn that thing.

05 14 49 23 LMP-EVA Okay.

05 14 49 29 LMP-EVA Gnomon is in place.

05 14 49 36 CDR-EVA Okay, why don't - -

05 14 49 38 LMP-EVA I'll get the - Go ahead. I'm on this side; I'll get the stereo.

05 14 49 44 CDR-EVA Okay.

05 14 49 47 LMP-EVA Get the locator.

05 14 49 51 CDR-EVA Yes. Can't even see the camera settings.

05 14 49 58 LMP-EVA Yes, that's got so much dirt on them. Okay, 7 foot.

05 14 50 02 CC Okay, Ed and Al, as soon as you wrap this one up, you're going to have to press on back to the LM, or we're going to be really tight on the closeout.

05 14 50 12 LMP-EVA Okay.

05 14 50 13 CDR-EVA Okay.

05 14 50 30 CDR-EVA All covered with ...

05 14 50 32 LMP-EVA ..., huh? Yes. God damn, it's bigger than we thought. Al, we'll grab sample that one; I'll get you another one here.

05 14 50 39 CDR-EVA Okay. Listen, just put it in that - in that thing. And let's press - because we don't have the time.

05 14 50 44 LMP-EVA All right. I'll grab it, and let me take a picture - an extra picture here.

05 14 50 48 CDR-EVA All right. I'll grab one right here in the foreground.

05 14 50 52 LMP-EVA Okay.

05 14 50 54 CDR-EVA Okay, bag 27 Nancy.

05 14 51 00 CC Roger, Al. Twenty-seven, Nancy.

05 14 51 02 LMP-EVA And another documented sample - a larger documented sample than we thought we were getting here, Fredo. Again, it was a buried rock; and it's too big for the sample bag; so, it'll go into the weigh bag.

05 14 51 15 CDR-EVA ... Can you get it?

05 14 51 17 LMP-EVA Yes.

05 14 51 29 CDR-EVA Okay.

05 14 51 30 LMP-EVA It has a very definite shape; I think you'll be able to sort it out.

05 14 51 35 CDR-EVA Okay.

05 14 51 36 LMP-EVA Okay, let's march for the LM.

05 14 51 42 CC Okay, Al and Ed. I guess we can skip the rim of North Crater and proceed right on back to the LM area.

05 14 51 52 LMP-EVA Okay. That's where we are. We're at the - we are at the rim of North Crater.

05 14 51 58 CC Okay.

05 14 52 00 LMP-EVA We're on the west - -

05 14 52 01 CC I think you misunderstood the message. We can proceed right on by the rim - We have the buried rock samples now, and head on back to the LM. That's the Antares.

05 14 52 16 LMP-EVA That's right. That's where we're headed.

05 14 52 19 CDR-EVA Okay, that's where we're headed.

05 14 52 27 CDR-EVA Hold it.

05 14 52 29 LMP-EVA I'll get it; keep going. He lost the core tube.

05 14 52 34	CDR-EVA	Okay. Got it?
05 14 52 36	LMP-EVA	I'll have it in a minute. I got it.
05 14 52 50	CDR-EVA	Okay.
05 14 53 24	LMP-EVA	Everything still hanging on? Yes. Everything is still there.
05 14 53 29	CDR-EVA	Good.
05 14 54 02	CDR-EVA	Okay, we're approaching the LM now. Coming in at Fra Mauro Base.
05 14 54 14	CC	Roger, Al, and I guess from here, we'll - we can split up; and Ed can take the MET and proceed to the cluster of boulders he had reported earlier to the north of the LM; and you can proceed out to the ALSEP.
05 14 54 33	CDR/ LMP-EVA	Okay.
05 14 54 35	CDR-EVA	I'd suggest - well, you can do it the way you want to - I guess you can do without the ...
05 14 54 41	LMP-EVA	Without the MET, yes.
05 14 54 44	CDR-EVA	Without the MET, because there's nobody to - if anything falls off, we've lost all those goodies.
05 14 54 49	CC	Okay, that's it - -
05 14 54 50	LMP-EVA	I'll just take a couple of rock bags, put on my tongs and camera, and go.
05 14 54 54	CC	That's a good point, Ed.
05 14 54 56	CDR-EVA	Okay, Al's on the way.
05 14 54 57	CC	Yes. That'd be fine.
05 14 55 04	LMP-EVA	Okay. Al's on the way out to the ALSEP.
05 14 55 17	LMP-EVA	As a matter of fact, Fredo, I'm just going to take a weigh bag and no sample bag; that way I can get more. The size of these rocks - the sample bags are too small, anyhow.

05 14 55 32	CC	Roger, Ed. Okay, Al, the first thing when you get to the central station - is to check the alinement and verify the alinement and leveling.
05 14 55 50	CDR-EVA	Okay, I'm just going to go through the same procedure.
05 14 55 53	CC	Okay, and I got - I got a ... for you on the azimuth.
05 14 55 54	CDR-EVA	- - on the antenna setup, that is - - All right. Let me give you a call when I get there, and when I'm alined and level.
05 14 56 35	LMP-EVA	Okay, Fredo, my plan: I'm out in the area of the boulder field; I'm going to photograph many of the boulders, the rocks, the broken ones, the big ones, what have you - and then, grab as many of the different fragments as I can around these piles of broken boulders. I - now, that I'm here, I see a large number of inclusions - I can't tell whether they're crystals or not - I think that they are. And I'll grab as many of these - and give you before and after shots as I can - of a whole weigh bag full of rocks.
05 14 57 09	CC	Okay, Ed. That sounds great.
05 14 57 20	CDR-EVA	Okay, the center alinement on the ALSEP has changed very little. Ought to be a slight change in the bubble level. Stand by.
05 14 57 32	CC	Roger, Al.
05 14 58 09	CDR-EVA	Okay. Alined and level.
05 14 58 13	CC	Okay, Al - -
05 14 58 14	CDR-EVA	What level are you reading?
05 14 58 16	CC	The - setting we need is now - actually a change in the azimuth reading to 16 minus 16.00.
05 14 58 32	CDR-EVA	Minus 6.00.
05 14 58 37	CDR-EVA	Okay, 16.00.
05 14 58 39	CC	Okay, would you verify elevation is still at 6.41?

05 14 58 46 CDR-EVA 6.41 is still elevation.

05 14 58 49 CC Okay, stand by 1, Al.

05 14 58 51 CDR-EVA Standing by your ... Okay.

05 14 59 22 CC Okay, Al. You can proceed back to the vicinity of the LM, and with the time remaining that you had for the ALSEP, shoot a few closeup pictures here. We've got about 4 minutes left.

05 14 59 37 CDR-EVA Okay. Are the ALSEP signals satisfactory?

05 14 59 43 CC That's affirmative.

05 14 59 47 CDR-EVA Okay. Heading back to the LM.

05 15 00 57 CC And, Al; Houston.

05 15 01 03 CDR-EVA Go ahead, Houston.

05 15 01 04 CC Okay, a little change in the targets; when you get back to the LM, we'd like the TV turned to look at the MESA area, so we can watch the closeout number 1; and then, you can shoot a quick picture of the solar wind.

05 15 01 26 CDR-EVA Roger, I'm going for the camera, now.

05 15 01 30 CC Okay. And we haven't changed the settings, Al; so, it should - should be in good shape when you turn her to the MESA.

05 15 01 56 CDR-EVA Okay. We'll be setting at 22.

05 15 02 03 CC Okay. We need a little more to the right, Al.

05 15 02 08 CDR-EVA Yes. I'm just setting it up, Fred.

05 15 02 11 CC Okay.

05 15 02 16 CDR-EVA Okay, that's f/22. How does that look?

05 15 02 25 LMP-LM Well, a little more - more to the left. Just a minute.

05 15 02 35 CDR-EVA I'm shooting f/22 in peak. How does that look?

05 15 02 43 CC Okay, if you can tilt it just up slightly, Al, that'll be it. That's good - got good azimuth on it, now.

05 15 02 58 CDR-EVA Okay. How's that?

05 15 02 59 CC Okay, that's great; and you can go shoot the solar wind, now.

05 15 03 07 CDR-EVA It's on the side of a hill; that's a problem out here.

05 15 03 11 LMP-EVA Okay, Fredo, I'm heading back from the boulder field. I've sampled two of the larger boulders in the area. Rocks broken from them and lying on them; and I've taken a pan; and I have a - maybe a third of a weigh bag full of small rocks from these boulders.

05 15 03 28 CC Okay; very good, Ed. We need to proceed now with the regular program.

05 15 03 36 LMP-EVA Okay.

05 15 03 39 CDR-EVA What setting would you like on that solar wind shot, Fredo?

05 15 03 42 CC Stand by.

05 15 04 35 CC Okay, Al. I'd go ahead and use your - your standard down-Sun picture if that's the direction you're shooting it in. They don't have an input here. Okay, the last - -

05 15 04 47 CDR-EVA All right.

05 15 04 48 CC - - just got an input. They want f/11 at 1/25th.

05 15 04 57 CDR-EVA Okay. Will do.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 15 09 37 CC Kitty Hawk, Houston. How we doing?

05 15 09 43 CMP Howdy. Getting along real fine.

05 15 09 48 CC Okay, Stu. We've got you this time, I think.

05 15 10 00	CMP	Yes. I'm reading you loud and clear.
05 15 10 03	CC	Okay, Stu. We'd like to give the high gain a chance here to do its stuff with the SERVO ELECTRONICS POWER in SECONDARY. So what we'd like to have you do is go to SECONDARY with the HIGH GAIN SERVO ELECTRONICS POWER switch. Switch your - While your TRACK mode in MANUAL, set in a PITCH of minus 58, a YAW of 185, and BEAM WIDTH to WIDE. And then go into a normal acquisition, you know, trying to get it to AUTO and then MEDIUM and then down to NARROW. If for some reason that doesn't work, well then go on back to the way we've been - been doing it there in MANUAL, MEDIUM, and PRIMARY ELECTRONICS.
05 15 11 04	CMP	Okay. Now, the ELECTRONICS are in SECONDARY now, Ron. They have been since yesterday.
05 15 11 12	CC	Oh, okay. Well, why don't we press on anyhow and try a normal acquisition on the thing, then? Put your PITCH to minus 58, YAW to 185.
05 15 11 22	CMP	All right.
05 15 11 24	CC	And we'll see if it'll track in AUTO at all, or if it'll - -
05 15 11 27	CMP	Okay. We'll give it a go.
05 15 11 54	CC	We got NARROW.
05 15 11 57	CMP	Well, how about that, sports fans! There's AUTO and NARROW, good and solid.
05 15 12 01	CC	Yes. It worked, looks like. Okay. Let's go ahead and leave it there, Stu. And let's see if it'll track when you start to maneuver to the COAS tracking attitude.
05 15 12 17	CMP	Okay.
05 15 12 59	CC	And, Stu, for your information, Al and Ed are back at the LM. Al's down there hitting golf balls. Seeing how far he can hit them.
05 15 13 11	CMP	How's that coming out?

05 15 13 13	CC	Al - looks like he had a couple of slices there, but then finally go - got a hold of one and really drove it down the old lunar surface.
05 15 14 00	CC	Stu, you doing anything now? Do you want to talk about these normal docking procedures, changed there on page 52?
05 15 14 12	CMP	Okay. Just a second. Let me float out from under the couch here and get my book.
05 15 14 17	CC	Okay.
05 15 14 49	CMP	Okay. I'm on page 52.
05 15 14 54	CC	Okay, Stu. Let me talk about it here a minute - for a little bit. As you know, normal procedures are we go whipping on in there, we get contact with the drogue, and then, as soon as we get capture, we go to CMC, FREE. Well, the basic difference there is that we want the LM to do a little bit of thrusting. If for some reason, you know, it doesn't go to - the capture light, just don't capture, when you make contact. So, we just want you to press on in there, contact the drogue, and report contact to the LM. And then at that point, the LM is going to do a plus X. And, then as soon as you get capture on the thing, you go to CMC, FREE.
05 15 15 55	CC	So at about 1 - -
05 15 15 58	CMP	Okay. Go ahead, Ron.
05 15 16 06	CC	Okay. Just to have it down in writing there, where it says translate to capture latch at about 144:07 or 08 in there somewhere, change that to, "translate to a contact with drogue."
05 15 16 32	CMP	Okay. "Translate to contact with drogue."
05 15 16 34	CC	And then add, "report contact to the LM," immediately following that.
05 15 16 47	CMP	Okay. I'll write that down. I'm sure I won't have to tell him.

05 15 16 50	CC	I don't think so either (laughing). But, that's his cue to go ahead and plus-X, if necessary, you know.
05 15 17 03	CMP	Okay. I've got that - -
05 15 17 04	CC	Okay.
05 15 17 05	CMP	- - Translate to contact with drogue, report contact to LM, and CMC, FREE, at capture.
05 15 17 12	CC	Yes. That's right. CMC, FREE, at capture. The thing we didn't want to be is have you in CMC, FREE, and the LM pushing against you, you know? In other words, don't go to CMC, FREE, until you get capture.
05 15 17 28	CMP	Okay.
05 15 17 29	CC	And, that's it.
05 15 17 35	CMP	Very good.
05 15 22 13	CMP	..., Ron that S-band's hanging - the antenna's hanging right in there. We should have done that days ago, huh?
05 15 22 18	CC	Yes. It looks like it's done pretty good so far. Let me see how the signal strength's doing with INCO here.
05 15 22 38	CC	Okay, Stu. It looks like it's tracking okay here. When you lose the high gain, switch to OMNI Delta.
05 15 22 49	CMP	OMNI Delta.
05 15 22 59	CC	The guys are really having a ball down there on the lunar surface throwing away their tools. Making javelins out of them and everything.
05 15 31 10	CMP	Houston, 14.
05 15 31 15	CC	Ok - Okay, Stu. I can just barely read you.
05 15 31 22	CMP	Disregard me. I was just going to ask you a question about the EVA. I'll catch you later.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 15 05 34 CC And, Al; Houston.

05 15 05 39 CDR-EVA Go ahead.

05 15 05 40 CC Okay. They'd like for you to return your camera so you don't have to bother removing the magazine from it. You can just put the whole camera in the ETB.

05 15 05 54 CDR-EVA Roger.

05 15 05 56 CC Okay, and, I guess, so you don't get confused, that means we'll be bringing back both cameras.

05 15 06 05 LMP-EVA Yes, understand that.

05 15 06 06 CDR-EVA Okay. Now, the camera is in, and magazine Lima-Lima has got a hundred and - nine.

05 15 06 20 LMP-EVA Okay, Houston. I understand, now. The contaminated sample under quad 3 is not to be taken.

05 15 06 30 CC That's affirm, Ed.

05 15 06 34 LMP-EVA Okay. Okay, I'm putting my camera in the ETB.

05 15 07 06 CC Okay, Ed; Houston.

05 15 07 07 LMP-EVA Let me put that bag in there just a minute. Go ahead.

05 15 07 13 CC I stand corrected. What they really wanted was to bring Al's camera back, instead of yours; so, we'll only be bringing one camera, the CDR's.

05 15 07 31 LMP-EVA Okay, Houston.

05 15 07 37 CDR-EVA Ed, give me this, now.

05 15 08 03 LMP-EVA Right. Right. Fredo, correct me, now; MAG Kilo-Kilo has never been used. Is that correct?

05 15 08 11 CC Stand by.

05 15 08 17 CDR-EVA Houston, while you're looking that up, you might recognize what I have in my hand as the handle for

the re - contingency sample return; it just so happens to have a genuine six iron on the bottom of it. In my left hand, I have a little white pellet that's familiar to millions of Americans. I drop it down. Unfortunately, the suit is so stiff, I can't do this with two hands, but I'm going to try a little sand trap shot here.

05 15 08 53 LMP-EVA Hey, you got more dirt than ball that time.

05 15 08 58 CDR-EVA Got more dirt than ball. Here we go again.

05 15 09 01 CC That looked like a slice to me, Al.

05 15 09 03 CDR-EVA Here we go. Straight as a die, one more.

05 15 09 20 CDR-EVA Miles and miles and miles.

05 15 09 26 CC Very good, Al. And - answer Ed's question earlier there; Kilo-Kilo was used for the window shots, Ed; so, you ought to bring it back.

05 15 09 43 LMP-EVA Hey, that's right. We got some of that to start with, didn't we?

05 15 09 46 CC Yes.

05 15 09 49 LMP-EVA Okay.

05 15 10 14 LMP-EVA How many films did we take with this ... there.

05 15 10 17 CDR-EVA I'd say between 17 and 18.

05 15 10 30 CC Okay, Ed; Houston.

05 15 10 32 LMP-EVA Go ahead.

05 15 10 33 CC One additional item on the return is to bring back the 100-foot tether. That should also go in the ETB.

05 15 10 48 LMP-EVA Okay. Okay, there's three cassettes and three frames.

05 15 11 41 LMP-EVA Okay. The closeup camera cassette is removed, Fred.

05 15 11 47 CC Roger, Ed.

05 15 11 51 LMP-EVA And stowed. ... going in.

05 15 12 17 CDR-EVA Houston, do you read me?

05 15 12 19 CC Loud and clear, Al.

05 15 12 21 CDR-EVA Yes, okay. Okay, tell me about this tube, Ed. Has this got anything in it?

05 15 12 26 LMP-EVA No, that's - that's one that has nothing in it. Before you throw it, get the number. That's the tube that we didn't get anything from.

05 15 12 37 CDR-EVA Okay. Okay. In SRC-1, Fredo, we have the organic control sample, and we have four core tubes.

05 15 12 56 CC Roger.

05 15 13 01 CDR-EVA And let's see - -

05 15 13 23 CDR-EVA We have one SESC.

05 15 13 41 CDR-EVA Get it in without dropping it again.

05 15 14 09 CDR-EVA Okay.

05 15 14 25 LMP-EVA Okay, where's the SWC bag?

05 15 14 29 CDR-EVA It should be on top of the MESA, Ed.

05 15 15 00 CDR-EVA Also, in the SRC, we have - -

05 15 15 05 LMP-EVA ... won't fit.

05 15 15 15 CDR-EVA - - one weigh bag, which is mostly documented samples.

05 15 15 20 CC Roger, Al.

05 15 15 22 LMP-EVA That's closed.

05 15 15 27 CDR-EVA Close the bag. That supposed to go in here, too?

05 15 15 35 LMP-EVA No, that - it goes in the ETB.

05 15 15 38 CDR-EVA Okay. Pick up the core tubes now, maybe.

05 15 15 41 LMP-EVA Okay.

05 15 15 42 CDR-EVA Get the rocks here.

05 15 15 58 LMP-EVA This baby's what's hurting us.

05 15 16 26 LMP-LM We didn't get anything in that magnetic sample container, did we?

05 15 16 29 CDR-EVA No, we did not. TDS stuffs up there.

05 15 16 33 LMP-EVA I've got it.

05 15 16 34 CDR-EVA Good.

05 15 16 39 LMP-EVA Your feet are about to get tangled up in the - TV cable again. You'll fall.

05 15 16 43 CDR-EVA Okay.

05 15 16 59 CDR-EVA Oh my God ... Try it.

05 15 17 06 LMP-EVA Okay. Contaminated samples, scratched, Ed; 30-millimeter camera MAG; 16 MAGs; closeup camera MAGs; SWC; TDS; magnetic samples - we didn't get a magnetic sample; map. Say, are you going to have any weigh bags?

05 15 17 27 CDR-EVA Yes, we'll have some weigh bags. These two.

05 15 17 41 CDR-EVA Okay.

05 15 17 46 LMP-EVA Okay. You got them? Okay.

05 15 17 52 CDR-EVA Houston. That completes SRC-1; then, we have the - we're going to control sample 1 SESC container, four core tubes in one bag of documented samples.

05 15 18 07 CC Roger, Al.

05 15 18 12 CDR-EVA Okay. Now can you fit - -

05 15 18 22 LMP-EVA This is what?

05 15 18 23 CDR-EVA This rock in this bag if we put it this way.

05 15 18 28 LMP-EVA I'll give it a try. Wait for me there, just a second ...

05 15 18 39 CDR-EVA Well, it won't go.

05 15 18 41 LMP-EVA All right. We need to place D-27 bag, right?

05 15 18 46 CDR-EVA Yes. Either that or else put that in the weigh bag, and take this up with it.

05 15 18 56 LMP-EVA Okay, I'm getting you a bag for it.

05 15 18 58 CDR-EVA Okay, we'll use that one, then. Here's your two-way bag for going ETB.

05 15 19 07 LMP-EVA How are you fixed to load, there?

05 15 19 10 CDR-EVA I'm getting loaded. We'll probably have to make two trips.

05 15 19 16 LMP-EVA Okay. Let me - - That baby's right here, so we don't lose them.

05 15 19 57 CDR-EVA Okay. I'll put that in the weigh bag on my next trip. Thank you.

05 15 20 02 LMP-EVA That can just be a separate trip by itself.

05 15 20 04 CDR-EVA No ...

05 15 20 05 LMP-EVA ... Hold it up. Okay. Now, have you got everything, Al? Got all the others in here?

05 15 20 12 CDR-EVA Yes, let me do one more check here. See if we got some more in this bag.

05 15 20 18 LMP-EVA These weigh bags are going to be - you're going to make a separate trip out of them, huh?

05 15 20 21 CDR-EVA I guess we'll have to, Ed. I sure can't get it in there, now.

05 15 20 29 LMP-EVA Okay. Fredo, how much time have we got?

05 15 20 36 CDR-EVA We should be in pretty good shape.

05 15 20 42 LMP-EVA Houston, how much time do we have left?

05 15 20 47 CC Stand by, Ed.

05 15 20 58 LMP-EVA That do it - -

05 15 20 59 CC Okay, we've got about 18 minutes, now.

05 15 21 05	LMP-EVA	Oh, we've got lots of time, okay. Watch your feet again.
05 15 21 09	CDR-EVA	Yes, I'm watching them.
05 15 21 13	CDR-EVA	Okay. You have the ETBs stowed, right?
05 15 21 16	LMP-EVA	ETBs, stowed.
05 15 21 17	CDR-EVA	How are the SRCs doing?
05 15 21 19	LMP-EVA	Okay.
05 15 21 20	CDR-EVA	Now, let's see what we got left. There's the greatest javelin throw of the century!
05 15 21 31	LMP-EVA	I believe it is.
05 15 21 33	CDR-EVA	Old Lefty, himself. Outstanding! Right in the middle of the crater. Stayed up.
05 15 21 40	LMP-EVA	Stabilized - wasn't bad at all.
05 15 21 42	CDR-EVA	Beautiful. Beautiful.
05 15 21 50	LMP-EVA	Okay.
05 15 21 51	CDR-EVA	... documented sample bag.
05 15 21 52	LMP-EVA	Okay, we missed one there, didn't we?
05 15 21 53	CDR-EVA	Put that in the weigh bag.
05 15 21 58	CC	Okay, Ed, I didn't hear the solar wind call-off there. Did you get that one, too?
05 15 22 07	LMP-EVA	Yes. Yes, Fred. It's in the ETB, now.
05 15 22 19	CC	Okay, and did - -
05 15 22 21	LMP-EVA	Okay. We'll just have these three weigh bags, then.
05 15 22 24	CC	Okay, did the 100-foot tether also get into the ETB.
05 15 22 30	LMP-EVA	That's affirmative; it's there.

05 15 22 36 CDR-EVA Okay. Okay; we'll take - take those along.

05 15 22 47 LMP-EVA Yes. How we going to handle them?

05 15 22 53 CDR-EVA I'll put them in the ... ship.

05 15 22 55 LMP-EVA Yes.

05 15 23 03 CC And, Al and Ed, I just wanted to pick once again on the camera MAGs to make sure you got four 70s and four 16-millimeter MAGs. I guess one of the 70s is on a camera.

05 15 23 18 LMP-EVA That's firm, Fredo.

05 15 23 21 CDR-EVA The other one is in the MET.

05 15 23 23 CC Okay.

05 15 23 25 LMP-EVA I think we've cleaned it all.

05 15 23 32 CDR-EVA Okay, let's press on. You want to -

05 15 24 05 CDR-EVA Want to head on up the ladder? I'll hand you the - SRC. I believe if - you'll stomp your feet on the way up, it'll be as effective as the brush was yesterday.

05 15 24 19 LMP-EVA Okay. You're probably right.

05 15 24 22 CDR-EVA Okay.

05 15 24 23 LMP-EVA Did you - I saw you over here. Did you get a picture?

05 15 24 26 CDR-EVA I did.

05 15 24 28 LMP-EVA Of the LM in the foreground?

05 15 24 30 CDR-EVA Yes.

05 15 24 34 LMP-EVA Yes. Okay, you ready to go up?

05 15 24 37 CDR-EVA Sure.

05 15 24 38 LMP-EVA All right, Fredo, I'm starting up the ladder.

05 15 24 40 CC Roger, Ed.

05 15 24 46 LMP-EVA How's that doing?

05 15 24 47 CDR-EVA Looks good. Shaking the heck out of the LM.

05 15 24 51 LMP-EVA What?

05 15 24 53 CC Okay. Something must have got caught in the cable; we just saw the TV go over.

05 15 25 02 CDR-EVA Well, we finally did it to you, sorry.

05 15 25 04 CC Okay.

05 15 25 07 CDR-EVA I'll go set it - I'll go set it back up again.

05 15 25 09 CDR-EVA Get it?

05 15 25 10 LMP-EVA Yes.

05 15 25 15 CDR-EVA Okay. Fix up the television camera.

05 15 25 46 CDR-EVA Okay, Fredo, you're going to have a real practical problem here. Probably be able to see what the lunar dust does to a camera lens.

05 15 25 54 CC Okay.

05 15 25 59 CDR-EVA Aim it back at the LM. Do you see anything at all?

05 15 26 06 CC Yes. I think it's a better picture. Lunar dust helps the TV picture, I guess.

05 15 26 10 CDR-EVA (Laughing) Okay, we'll see to it that a little - TV lenses get dusted in the future; if - cut you down four stops, Fred.

05 15 26 21 CC Yes, that looks - yes - just about had it centered, there. That's good, Al.

05 15 26 31 CDR-EVA Okay.

05 15 26 34 LMP-EVA Did you see that mighty leap, Fredo?

05 15 26 37 CDR-EVA Okay, Ed, you can start on up, now.

05 15 26 40 LMP-EVA I'm already halfway up.

05 15 26 41 CDR-EVA Okay, good show.

05 15 26 43 LMP-EVA Rock box in one hand.

05 15 26 49 CDR-EVA Okay.

05 15 27 09 CDR-EVA How are you doing?

05 15 27 10 LMP-EVA Fine. Let me get some of my ... up here.

05 15 27 15 CDR-EVA Okay.

05 15 27 25 LMP-EVA How far back do I have to look?

05 15 27 27 CDR-EVA This far.

05 15 27 30 LMP-EVA About there.

05 15 27 32 CDR-EVA Yes, say about there.

05 15 27 40 LMP-EVA Hell, I'm looking the wrong way.

05 15 27 44 CDR-EVA Okay, shall we press on?

05 15 27 48 LMP-EVA ... seconds. There it is.

05 15 27 55 CDR-EVA We got two loads of the ETB.

05 15 27 57 LMP-EVA Okay. Thank you.

05 15 27 59 CDR-EVA Okay.

05 15 28 03 LMP-EVA Let's have a quick look at Earth from the - -

05 15 28 05 CDR-EVA Yes.

05 15 28 06 LMP-EVA - - surface.

05 15 28 07 CDR-EVA Oh, we have some pictures of the LM in the foreground; so, hope it comes out all right.

05 15 28 13 LMP-EVA Pretty small sliver left, isn't it?

05 15 28 15 CDR-EVA Yes. Not much.

05 15 28 51 CDR-EVA Okay, why don't you take the first ETB as soon as you're ready; then, we can run the tracker light thing in between. Okay, stand by. You ready for it?

05 15 29 09	CDR-EVA	Read me, Ed?
05 15 29 12	LMP-EVA	Okay.
05 15 29 14	CDR-EVA	Houston, do you read?
05 15 29 16	CC	Roger, Al. Houston reads you loud and clear.
05 15 29 17	LMP-EVA	Read me, Al?
05 15 29 19	CDR-EVA	Yes. I read you. Yes, I read you, Al - or, Ed.
05 15 29 23	LMP-EVA	Okay, I'm ready to bring it up.
05 15 29 25	CDR-EVA	Okay, stand by. I'm going to get around a little bit more, here. Okay, let her go.
05 15 29 30	CDR-EVA	Very good.
05 15 30 41	CDR-EVA	Fredo, is the ALSEP antenna still doing okay?
05 15 30 45	CC	Stand by Ed. Roger, Al; they're getting good signal.
05 15 30 54	CDR-EVA	Okay, that's good.
05 15 32 27	LMP-LM	Okay, Al, bring it down.
05 15 32 29	CDR-EVA	All righty, coming back down.
05 15 32 44	LMP-EVA	Okay, hold it there. Okay.
05 15 32 49	CDR-EVA	Okay, I have it. Little more -
05 15 32 53	LMP-EVA	Huh?
05 15 32 54	CDR-EVA	A little more down, please.
05 15 32 56	LMP-EVA	Okay, you got it?
05 15 32 57	CDR-EVA	Okay. I've got it, now. Thank you.
05 15 33 05	CDR-EVA	Okay. Hook on there. God damn.
05 15 33 54	CDR-EVA	Okay, that bag is so big it won't pull in the ETB very well; I'll just bring it up by myself.
05 15 34 01	LMP-EVA	Okay. You ready to bring the other two up?

05 15 34 04 CDR-EVA Just a second.

05 15 34 25 CDR-EVA Okay, you can take the string, now, if you like.

05 15 34 28 LMP-EVA Okay. Here she comes.

05 15 34 59 CDR-EVA Okay, it's all yours.

05 15 35 01 LMP-EVA Okay, I've got it.

05 15 35 05 CDR-EVA Don't I check the tracking light, now, before I come up?

05 15 35 08 LMP-EVA Yes.

05 15 35 09 LMP-EVA Got your ... out of the way.

05 15 35 13 CDR-EVA I'm not looking at it. Let me know when you turn around.

05 15 35 21 LMP-EVA Okay, I took a picture. Your track light, closed. Okay, here it comes.

05 15 35 39 CDR-EVA Okay. Let's see. Yes, track light's working.

05 15 35 47 LMP-EVA Okay. Okay.

05 15 35 52 CDR-EVA Okay, Houston, crew of Antares is leaving Fra Mauro base.

05 15 36 00 CC Roger, Al, you and Ed did a great job. Don't think I could have done any better myself.

05 15 36 10 LMP-EVA That's debatable, isn't it, Fredo?

05 15 36 14 CC Well, I guess not now, Ed.

05 15 36 33 CDR-EVA Okay, the dust is knocked off.

05 15 36 54 CDR-EVA How'd you like one more bag of rocks?

05 15 36 57 LMP-EVA Okay, if you'll take one LEC.

05 15 37 03 CDR-EVA Okay. ... wait a minute. Let me get -

05 15 37 10 LMP-EVA Wait a minute. I'm just about to it.

05 15 37 13 CDR-EVA Okay.

05 15 37 27 LMP-EVA I'm running out of room in here, Al. Take this while you're at it, before you come in.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 15 37 58 LMP-LM Okay.

05 15 38 02 CDR-EVA Okay. The ... tank has already been discarded, Houston.

05 15 38 07 CC Roger, Al.

05 15 38 12 CDR-EVA Okay, and - -

05 15 38 14 LMP-LM Could you push it a little further?

05 15 38 16 CDR-EVA Huh?

05 15 38 17 LMP-LM No. Okay. Now I've got it.

05 15 38 22 CDR-EVA ... it up on top of the pile.

05 15 38 24 LMP-LM Man, the pile is high in here too. Your ETB loads, an SRC, and an extra rock bag.

05 15 38 33 CDR-EVA Okay.

05 15 38 37 LMP-LM Okay.

05 15 38 38 CDR-EVA If you're ready, get over behind the door, and - -

05 15 38 40 LMP-LM Okay. That's all of it. I'm moving out of your way.

05 15 38 43 CDR-EVA - - coming on in.

05 15 38 50 LMP-LM There's something caught in the door. Okay. I see what it is. It's that - -

05 15 38 56 CDR-EVA Thing down there, huh?

05 15 38 57 LMP-LM Okay. Push it down in the detent. The helmet bag strap. Okay. And, Al, it looks like there's a piece of Velcro laying right in the door. Can you reach it before I pull the door closed? That's it. It's one of those off the MET.

05 15 39 20 CDR-EVA Yes.

05 15 39 24 LMP-LM All right, come on in.

05 15 39 27 CDR-EVA Okay.

05 15 39 47 CDR-EVA We have to have more door than that, Ed.

05 15 39 49 LMP-LM All right, just a minute. Wait a minute; back out, Al. I've got to turn. Okay, now come on in.

05 15 39 57 CDR-EVA Beautiful.

05 15 40 01 LMP-LM Okay, straight up. Straight up here.

05 15 40 08 CDR-LM Okay.

05 15 40 09 LMP-LM Fine shape.

05 15 40 13 CDR-LM All righty.

05 15 40 24 CDR-LM I keep hitting on something back here.

05 15 40 26 LMP-LM Yes, you're hitting on the - still.

05 15 40 29 CDR-LM Okay.

05 15 40 33 LMP-LM Now you seem clear. Okay, Houston, the door is closed. Let's take this PLSS.

05 15 40 43 CDR-LM FEEDWATER valves.

05 15 40 49 LMP-LM WATER VALVE is CLOSED.

05 15 40 51 CDR-LM ... the suits.

05 15 41 00 LMP-LM The FEEDWATER valve is CLOSED.

05 15 41 02 CDR-LM Okay, let me go down and get the forward hatch, and I'll lock it.

05 15 41 16 CDR-LM Okay. The forward hatch is closed and locked.

05 15 41 19 LMP-LM Okay. Say, can you get the dump valve while you're there?

05 15 41 22 CDR-LM Yes. Okay, dump valve, AUTO.

05 15 41 31 LMP-LM And dump valve, AUTO. RESET.

05 15 41 36 CDR-LM I just checked this.

05 15 41 41	LMP-LM	Okay.
05 15 41 44	CDR-LM	All righty.
05 15 41 45	LMP-LM	Okay. Look up there. You're caught again. There, you're all right.
05 15 41 50	CDR-LM	Okay.
05 15 41 51	LMP-LM	Okay. Lighting: annunciator/numeric, BRIGHT.
05 15 41 54	CDR-LM	Okay.
05 15 41 55	LMP-LM	CABIN REPRESS, upturning. Get it - turn it to AUTO.
05 15 42 05	CDR/ LMP-LM	There it is.
05 15 42 09	LMP-LM	CABIN REPRESS, AUTO.
05 15 42 11	CDR-LM	Okay. SUIT PRESS circuit breaker coming closed.
05 15 42 15	LMP-LM	Cabin pressurizing. Standing by for your ... valve.
05 15 42 21	CDR-LM	Okay, Houston. The cabin is repressured.
05 15 42 25	CC	Very good, Antares.
05 15 42 36	LMP-LM	Okay. PRESS REG A and B going to CABIN. ... PLSS oxygen off ...
05 15 42 51	CDR-LM	Okay. We're at 2.5.
05 15 42 53	LMP-LM	2.5; PLSS O_2, OFF.
05 15 42 56	CDR-LM	PLSS O_2 is OFF.
05 15 43 22	CDR-LM	Okay. Cabin warning light is OFF.
05 15 43 24	LMP-LM	Okay. We're at 5 pounds.
05 15 43 28	CDR-LM	Steady at about 4.6.
05 15 43 31	LMP-LM	Can't beat pressurized air.

05 15 43 38 LMP-LM Okay. The ... is coming up. Okay.

05 15 43 48 CDR-LM Okay. Verify EVA circuit breaker configuration.

05 15 43 51 LMP-LM Okay.

05 15 44 06 LMP-LM Mine's good.

05 15 44 08 CDR-LM Okay, mine's good.

05 15 44 11 LMP-LM SUIT FAN 2, closed; SUIT FAN DELTA-P, closed; ECS caution and water SEP component lights, out. ... Get her up. ... Okay. We can doff gloves.

05 15 44 18 CDR-LM Okay. Gloves off. Over to comm panels. Verify the safety's on the dump valve. There it is. But, DESCENT WATER valve, OPEN.

05 15 44 40 LMP-LM Okay. Okay, DESCENT WATER valve is open. OPEN.

05 15 44 54 CDR-LM Okay.

05 15 44 56 LMP-LM Okay. Purge valve.

05 15 44 59 CDR-LM Let's see. Have we got - ...

05 15 46 06 LMP-LM Pardon?

05 15 46 07 CDR-LM Yes. I just checked - rechecking it, to be sure we had everything.

05 15 46 11 CDR-LM Okay. Purge valves. Stow in the purse.

05 15 46 17 LMP-LM Okay.

05 15 46 18 CDR-LM And disconnect the - -

05 15 46 22 LMP-LM OPS O_2 hose. -

05 15 46 23 CDR-LM OPS O_2 hose. Somewhere.

05 15 46 26 LMP-LM Right there. Okay.

05 15 46 32 CDR-LM Okay. Connect O_2 hoses red to red and blue to blue.

05 15 46 42 LMP-LM PUMP, OFF, and the FAN, OFF.

05 15 46 44	CDR-LM	Stand by 1, Ed. Will you verify this hose for me?
05 15 46 46	LMP-LM	Okay.
05 15 48 01	LMP-LM	Okay. They're locked.
05 15 48 04	CDR-LM	Okay. SUIT FLOW. Yes.
05 15 48 08	LMP-LM	PUMP, OFF; and FAN, OFF.
05 15 48 10	CDR-LM	Good. PUMP, OFF; and FAN, OFF. That's PLSS water from PGA. Get ..., Ed. Hey, Ed. Okay.
05 15 48 30	LMP-LM	Hey. Is this your water?
05 15 48 31	CDR-LM	And connect LM water to PGA. Do you want to go? ...
05 15 49 08	LMP-LM	Get it?
05 15 49 09	CDR-LM	Yes. Got that one.
05 15 49 27	LMP-LM	It's a real bitcher, huh?
05 15 49 30	CDR-LM	Okay. Okay; close the LCG PUMP breaker.
05 15 49 38	LMP-LM	LCG PUMP breaker is closed.
05 15 49 40	CDR-LM	Okay. PLSS mode, both, to 0, and connect the -
05 15 49 47	MS-LM	...
05 15 49 50	CDR-LM	We'll do it together.
05 15 49 51	LMP-LM	Yes.
05 15 49 52	CDR-LM	We'll set our panels alike.
05 15 49 54	LMP-LM	Yes.
05 15 49 55	CDR-LM	And, we'll talk and set it up ...
05 15 49 59	LMP-LM	Okay.
05 15 50 00	CDR-LM	Okay?
05 15 50 01	CDR-LM	0.0.

05 15 51 20 CDR-LM Houston, Antares.

05 15 51 24 CC Go ahead, Antares.

05 15 51 28 CDR-LM Okay, we're on spacecraft comm now, and we're proceeding with the PLSS OPS undock - docking, I should say.

05 15 51 37 CC Roger, Al.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 15 38 08 CC Kitty Hawk, Houston. If you read, it's about 30 seconds from T-start time.

05 15 44 00 CMP Houston, do you read Kitty Hawk?

05 15 44 02 CC Okay, Kitty Hawk. This is Houston. We've got you now.

05 15 44 10 CMP Okay. Well, that should have been right on the target, Ron. And my frame counter is 87.

05 15 44 19 CC Roger. 87 on that one. And while I think about it, on page 35 there, we missed your percent remaining on the galactic survey and lunar libration - camera.

05 15 45 03 CMP Okay. After the lunar libration, I'm reading 60 percent.

05 15 45 07 CC Roger. 60 percent.

05 15 50 27 CC Kitty Hawk, Houston. Got too much background noise here. We're trying to get the high gain. Can you roll left 60 degrees? And then try to acquire on the HIGH GAIN a PITCH of minus 50, YAW of plus 50.

05 15 50 56 CMP Okay. Ron. Let me hold off for about 2 or 3 minutes, if you would, please.

05 15 51 01 CC Okay.

05 15 51 10 CC And then when you get there, we'll be giving you an update, and also I've got some P24 pads for you.

05 15 51 21	CMP	Okay.
05 15 54 40	CMP	Hey, Ron. Give me those HIGH GAIN angles again.
05 15 55 39	CC	Kitty Hawk, Houston. Those angles were PITCH at minus 50, the YAW at plus 50.
05 15 56 39	CMP	Houston, you read Kitty Hawk?
05 15 56 41	CC	Okay, Kitty Hawk; Houston. Man, that's a lot better on the ears, now.
05 15 56 52	CC	Okay; you want to whip it - whip into POO and ACCEPT, and we'll ship you up a state vector and also a clock SYNC.
05 15 57 06	CMP	Okay on POO and ACCEPT.
05 15 57 10	CC	Okay. And you about ready to start copying pads on page 40 there for RP-4?
05 15 57 21	CMP	I'm ready; go ahead.
05 15 57 22	CC	Okay. T_1, 137:38:43; 43:33; 45:13; 46:01. It's south 02. Ansgarius N, 137:51:34; 56:24; 58:04, 58:52, south 06. Okay, for DE-2, T_1, 138:11:23; 16:13; 17:53; 18:41; north 08. Okay, for Encke, E, T_1, 138:31:14; 36:04; 37:44; 38:32; south 22. And read back.
05 15 59 20	CMP	Okay, RP-4, 137:38:43; 43:33; 45:13; 46:01; south 02. Ansgarius N, 137:51:34; 56:24; 58:04; 58:52; south 06. 138:11:23; 16:13; 17:53; 18:41; north 08. 138 - Encke E, 138:31:14; 36:04; 37:44; 38:32; south 22.
05 16 00 20	CC	Beautiful readback there, Stu.
05 16 00 26	CMP	Okay, we're all set.
05 16 00 30	CC	And Al and Ed are back in the LM, now.
05 16 00 41	CMP	How many golf balls did Al have with him?
05 16 00 45	CC	Well, I thought I saw three real good swings, there.

05 16 00 52	CMP	Great.
05 16 00 55	CC	And, Kitty Hawk; Houston. The computer is yours.
05 16 01 02	CMP	Okay. Thank you.
05 16 02 19	CC	Hey, Kitty Hawk; Houston.
05 16 02 24	CMP	Go ahead.
05 16 02 26	CC	We noticed - maybe a little more fuel usage there. Did possibly you hit a couple of DIRECT switches maybe? On that COAS target or something?
05 16 02 39	CMP	Yes.
05 16 02 40	CC	Yes.
05 16 02 41	CMP	Yes, I did. The - You need three hands to get that going where you've got one hand on that fool camera control and then to throw the switch; so, I was taking a couple of pictures and I used the DIRECT for a little bit there.
05 16 02 57	CC	Okay, that clears it up. I figured that maybe what it might have been and just wanted to check.
05 16 03 49	CC	And, Kitty Hawk; Houston. If you want to dig out your G&C Checklist there, on page G9-4, I got a couple of constants to change there in that erasable load.
05 16 04 18	CMP	Okay. I'm ready to copy.
05 16 04 21	CC	Okay. On page G9-4, column Delta, line 10, change it from 02210; change it to 02263.
05 16 04 49	CMP	Okay, 9-4, under Delta, line 10, now reads 02263.
05 16 04 57	CC	Okay, and then on line 11, same column, Delta, change it from 36321; change it to 15472.
05 16 05 16	CMP	Okay. 15472 for Delta, line 11.
05 16 05 22	CC	Okay. And these are those - the erasable locations that we changed yesterday on the thrust model, you know.

05 16 05 31	CMP	Okay.
05 16 05 46	CC	Hey, Stu, just out of curiosity, when you whipped by Lansberg Bravo there, did you get - you think you got some 250-millimeter pictures of that area? You know when you had the long pass?
05 16 06 03	CMP	Yes. Yes, I should have got some - some good ones of Lansberg B.
05 16 06 10	CC	Okay.
05 16 06 11	CMP	It was - They were 500.
05 16 06 14	CC	Oh, okay. Beautiful.
05 16 07 35	CC	Okay, Stu. You can go ahead and whip into wide dead band there for a while, if you want. It looks like we've got a good high gain now.
05 16 07 47	CMP	Okay.
05 16 07 49	CC	And also, in looking through this P24 there, it looks like we're changing the shutter speeds on each one of those things for the DAC. Just a reminder.
05 16 08 02	CMP	Okay.
05 16 08 38	CC	And, Stu, just for a matter of information here on further planning, right now we're looking at REV 30 - where we've got our zero-phase things - the forwards and backwards. And we'll probably go ahead and do the backwards zero phase, but not the forward, and do another COAS maneuver on the Descartes area.
05 16 09 06	CMP	Okay. Sounds good.
05 16 09 20	CC	And if you got a half a minute here, you might pull out your Descartes COAS picture again, and I can explain your aim point for that pass.
05 16 09 36	CMP	Okay. I've got it right here.
05 16 09 38	CC	Okay. As you look at the page, you've got a picture of the COAS in there. And - on the east side, or

			toward the bottom of the page, you can see a little doublet about 1 and - 1 and a half marks or 1 and a third marks down from the center of the COAS. Right on the vertical COAS line.
05	16	10 13	CMP — Yes. I've got that.
05	16	10 16	CC — Okay. It's just east - -
05	16	10 19	CMP — Is that the aim point?
05	16	10 20	CC — That's the aim point, by golly.
05	16	10 27	CMP — What are we doing way over there?
05	16	10 29	CC — Well, it's just a little further east than the two bright craters, you know.
05	16	10 38	CMP — Okay. Yes.
05	16	10 46	CC — And - -
05	16	10 47	CMP — Okay. I'll make that the aim point.
05	16	10 48	CC — Okay. See, and then you started out a little bit west of the aim point on the map, and then we got one right at the aim point. And then we're getting these just a little further east, so we'll have some stereostrips quite a ways through the area there.
05	16	11 30	CC — Okay. Another thing, Kitty Hawk. To help balance the quads a little bit there, you can whip back into VERB 48 there and use Bravo Delta for roll.
05	16	11 47	CMP — Okay.
05	16	13 25	CC — Hey, Stu. You might like to know - I don't know where they're going to put all those rocks they found down there on the surface, but the LM was full, so you better find a place for them.
05	16	13 41	CMP — Yes. That's what I been doing, is trying to get things organized for the avalanche.
05	16	13 46	CC — (Laughter) Okay.
05	16	18 13	CC — Kitty Hawk, Houston.

05 16 18 19	CMP	Go ahead, Houston.
05 16 18 21	CC	Okay, Stu. We got about 2 minutes until LOS here. Just for a little bit of advance planning, we're pretty sure we'd like to bring the probe back with you. So - and right now we're thinking about stashing it down there between A-6 and A-10, you know, down betw - betw - below the LMP's couch there somewhere.
05 16 18 59	CMP	Okay. Well, you know that - Okay. You know, you don't put the probe between A-6 and A-10, you know; it goes on top of A-10.
05 16 19 13	CC	(Laughter) Yes, I know, Stu. It's - I don't know - it's - We'll work out the stowage down there. But it looks like maybe you can stick the point, you know, down in there somewhere, or at least get part of it down between the two of them. And I realize there isn't much room. It'll be mostly on top.
05 16 19 42	CMP	Yes, that ought to take care of the L-over-D problem.
05 16 19 45	CC	Yes. RETRO's kind of happy about that.
05 16 44 --		BEGIN LUNAR REV 29

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 15 59 13	CC	Antares, Houston.
05 15 59 18	LMP-LM	Go ahead.
05 15 59 19	CC	Okay, Ed. We want to check ASCENT O_2 pressure here before you get your gloves on to repress. So, would you give us a call prior to donning your gloves?
05 16 12 54	LMP-LM	Houston, we're getting ready to don gloves.
05 16 12 56	CC	Okay. And, Al, before you put your gloves on, I wonder if we could make this ASCENT O_2 check, now? You ready to go?
05 16 13 06	LMP-LM	Tell me which one.

05 16 13 08	CC	Okay. We'd like DESCENT O_2, CLOSED; the PLSS FILL, OPEN; and ASCENT 1 OXYGEN, OPEN.
05 16 13 33	LMP-LM	Okay. You have it. The DESCENT O_2 is closed, the PLSS FILL is OPEN, and ASCENT number 1 is OPEN.
05 16 13 38	CC	Very good, Ed. And stand by just a minute now, and we'll get some readings here.
05 16 13 50	CC	Okay, Al. And quantity looks good here, so we can turn ASCENT O_2, OFF; ASCENT O_2 1 to CLOSE; PLSS FILL, CLOSED; and DESCENT O_2, back OPEN.
05 16 14 03	CDR-LM	Okay, that's done. And it sounds good to us.
05 16 14 11	LMP-LM	Okay. Could we press on now?
05 16 14 13	CC	Okay. You can press on. Thank you very much.
05 16 19 09	CDR-LM	Houston, Antares. We're depressing the cabin for jettison now.
05 16 19 12	CC	Okay, Al. We're watching that and it's looking good. Suits are looking good.
05 16 19 16	CC	Okay, Antares. Could you verify SUIT RELIEF in AUTO, please?
05 16 19 50	CDR-LM	Okay, Houston. SUIT CIRCUIT RELIEF is now in AUTO.
05 16 19 54	CC	Okay; thank you, Al.
05 16 23 40	CDR-LM	Okay, Houston. We're going to jettison now.
05 16 23 43	CC	Roger, Al.
05 16 24 33	CC	You guys really registered the seismometer on those last ones.
05 16 25 44	LMP-LM	That's good. Good heavy throw.
05 16 25 55	CC	We're hoping you cleared the Velcro on those before you left.
05 16 26 04	CDR-LM	That's affirmative. We got it.

05 16 26 06	CC	Great. Thank you.
05 16 30 04	CDR-LM	Okay, Houston. EVA-2 POST through.
05 16 30 08	CC	Okay. Very good, Al.
05 16 30 11	CC	Antares, Houston.
05 16 30 16	LMP-LM	Go ahead.
05 16 30 17	CC	Roger. Ed. Troops on the ground here seem to think that the best place to stow that 100-foot tether will be over there in the left-hand stowage compartment.
05 16 30 31	LMP-LM	Okay. We got quite a few things I think, to stow here. We'll get with you and tell you where we're putting them.
05 16 30 37	CC	Okay. Very good.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 17 16 54 CC Antares, Houston.

05 17 17 01 LMP-LM Go ahead.

05 17 17 03 CC Okay, I hadn't heard from you in a while, Ed. Just wonder how are things going?

05 17 17 11 CDR-LM Well, we're pressing along, here, Fred. We're pretty well along in our stowage. And if you look at the Surface Checklist, we're at the top of the second column at page 7-5.

05 17 17 29 CC Okay. Very good, Al.

05 17 17 34 CDR-LM And we'll have a late report of the location of all the stowage for you here momentarily.

05 17 17 39 CC Okay.

05 17 17 46 CDR-LM And then, we'll probably eat; and then, we'll probably rest for a while.

05 17 17 49 CC Sounds good.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 17 09 19 CC Kitty Hawk, Houston. We've got you on LOW BIT RATE now. Lot of background noise here, and I probably won't be able to hear you very much, but you're in a - an - a not - not-as-good high-gain antenna attitude.

05 17 09 40 CMP Okay.

05 17 10 56 CC And, Kitty Hawk; Houston. I show you about 30 seconds from T_1 on the Ansgarius N.

05 17 11 06 CMP Roger.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 17 30 04 CDR-LM Houston, Antares.

05 17 30 07 CC Go ahead, Al.

05 17 30 13 CDR-LM Were you planning on this EVA-2 debriefing? If so, what time?

05 17 30 20 CC Okay, I guess whenever you're ready, Al. Do you happen to have any weight check bars on the rocks?

05 17 30 31 CDR-LM Affirmative. We gave you the weights - we gave you the weights of the rocks that we put in the left-hand stowage yesterday. We have some additional rocks that are in the ISA. Total weight of the ISA is 50 pounds. Total weight of the SRC is 29 pounds, and we have a couple of large rocks in the sample bag, that's B-27 and that weight is 30 pounds.

05 17 31 18 CC Okay, Al. Copy that. Looks like a pretty good haul.

05 17 31 28 CDR-LM Yes, sure does. And we'll be ready for a debriefing in about another 10 minutes.

05 17 31 38 CC Okay, Al, just give us a call. We've got some - some of the questions ready here, any time you're ready.

05 17 31 48 CDR-LM Okay, we'll give you a buzz shortly.

05 18 00 24 CC Antares, Houston.

05 18 00 31 LMP-LM Go ahead.

05 18 00 33 CC Okay, just wondered, are both of you still tied up with the stowage? Aside from the debriefing, we do have a little bit of a steerable comm check we need to get out of the way; and, if you are free, Ed, maybe we can tackle that now.

05 18 00 54 LMP-LM Okay, Fredo. We're ready to go with you here in just 1 second.

05 18 01 00 CDR-LM If you have pads or anything, you can work with me on before the debriefing, I'm ready to start.

05 18 01 06 CC Okay, I'll turn it over here to Joe and he can take - read you up this little test they want to do on the steerable.

05 18 01 58 LMP-LM Hello, Houston; Antares. Joe, do you read?

05 18 02 01 CC You bet, Ed. We're just getting switched around on the comm down here; and what we want to do, Ed,

is to verify this acquisition and tracking capability. First thing we'd like to do is to go to the TRACK MODE switch to the SLEW position, and slowly rotate the PITCH knob over the entire range, and verify corresponding travel on the meters, and also, listen to the antenna driving if you can. After you've done that, we'll do the same thing with the YAW knob. So, first of all, go TRACK MODE to SLEW, and rotate the PITCH knob, and see if you get corresponding travel and see if you can hear it rotating.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 17 15 35	CC	Kitty Hawk, Houston. Time to start your camera and shutter speed should be 1/250th.
05 17 35 05	CC	Kitty Hawk, Houston. I missed your T_1 time call there; but it's time to start the camera, now, on BE-2.
05 17 41 57	CMP	Okay, Houston. Kitty Hawk. I'll give you those gyro torquing angles in a minute.
05 17 42 12	CC	Kitty Hawk, Houston. You can try it. I might be able to copy them.
05 17 42 21	CMP	I'll catch you in about 2 or 3 minutes, Ron.
05 17 42 24	CC	Okay.
05 17 51 04	CMP	Well, I - Houston, 14.
05 17 51 09	CC	Okay. You're way down in the mud there, Kitty Hawk, but go.
05 17 51 15	CMP	Okay. I saw the LM again when I went across them.
05 17 51 22	CC	Hey, by golly. That's amazing; that's great.
05 17 51 29	CMP	Yes. It's a little harder without the long shadow that it was putting out yesterday. I - what I was doing was just playing around. I should have been - gotten P24 and marked on it, but that was a good mark that I - I mean a good pass that I had yesterday.

05 17 51 46	CC	Roger.
05 17 51 50	CC	Hi, Stu.
05 17 51 55	CMP	Hi, Fredo.
05 17 51 57	CC	I haven't got to talk to you in a couple of days.
05 17 52 04	CMP	Well, you've been tied up.
05 17 52 08	CC	Yes. Just a little bit.
05 17 55 31	CC	Kitty Hawk, Houston. The camera ought to be running.
05 18 04 51	CC	Okay, Kitty Hawk. The lack of noise is music to my ears.
05 18 04 59	CMP	Okay.
05 18 05 02	CC	And - -
05 18 05 03	CMP	Looks like you have a good lockup here.
05 18 05 05	CC	Yes, it's working fine. And we're standing by for your magazine percentage and also your P52.
05 18 05 14	CMP	Okay. The magazine percentage is 35.
05 18 05 19	CC	Roger; 35.
05 18 05 21	CMP	And, let me find my P52.
05 18 06 10	CMP	And, the P52, if you're ready.
05 18 06 13	CC	Ready to copy.
05 18 06 17	CMP	Okay. Minus 00.002, minus 00.166, minus 00.005; torque at 137:18:00.
05 18 06 37	CC	Do you want to talk about your NOUN 05 today?
05 18 06 44	CMP	No, I had all zeros on this one.
05 18 06 48	CC	I figured as much. Okay. We copy: minus .002, minus .166, and a minus .005; torque's at 137:18:00.

05 18 07 06	CMP	Roger. Hey, is Fredo still there?
05 18 07 13	CC	Yes, wait 1. He's talking to the "LMies" right now.
05 18 07 17	CMP	No, that's all right - that's all right. I was just - you know, not only seeing the LM, I saw the Sun glinting off the ALSEP, I'm sure. And I was just wondering if it was deployed out by that crater at about CL 0.8 or 85/65.
05 18 07 44	CC	Okay. I got a map here. Looks like it was about pretty close to CR and 63, is the ALSEP.
05 18 07 59	CMP	C what?
05 18 08 01	CC	Charlie-Romeo and 63. It's really Charlie-Quebec 0.9 and about a 63.2.
05 18 08 22	CMP	Okay.
05 18 08 36	CC	Where did you say you thought you saw a bright spot there?
05 18 08 42	CMP	Well, now, I'm wondering if I got my direction from the LM - you can get the LM because it's by the Triplet.
05 18 08 52	CC	Right.
05 18 08 53	CMP	And, I just looked out and saw the bright spot going toward - parked out by another crater. And I'm thinking maybe I got my directions from the LM wrong. Is ALSEP out by that crater called Neighbor on the map?
05 18 09 16	CC	Wait a minute; I don't have Neighbor on this particular map I'm looking at. ALSEP is kind of between Doublet and Triplet, if you can see that part of it there. And, it's toward Doublet from the LM.
05 18 09 34	CMP	Yes, well that's where I called - that's where I said the first time, and it didn't fit in. You told me Charlie-Quebec 0.9.
05 18 09 45	CC	Wait 1, Stu, until I get the right - same map you're looking at.

05 18 10 11	CC	Okay. I was looking at a smaller map. It's got some more numbers in there. You're right. It's really right there by Neighbor, just east - just south of Neighbor. It's right in a line between the center crater of Triplet and Doublet.
05 18 10 53	CMP	Well, now, the coordinates that I called the first time just - you know, I didn't compare the map when I was looking through the sextant, but it looked to me like the - just judging on here, the ALSEP would be about CL 0.9 and right at 65, maybe 64.9. And, see, there's a little crater. See that little crater right there at about CL 8 and maybe 64 - 64.5, or something like that.
05 18 11 34	CC	Okay. Yes, I think that - I think that was the ALSEP - -
05 18 11 36	CMP	Yes, I think right there is - Yes. I can see the Sun shining off the beauty.
05 18 11 42	CC	Yes. That was it; that was it.
05 18 12 15	CC	Okay, Kitty Hawk there. Maybe we ought to whip into the update - map update or the flight-plan update for the next REV. And we'll start out with the zero-phase pad backward on page 43.
05 18 12 28	CMP	And, Houston; Kitty Hawk.
05 18 12 31	CC	Houston, go.
05 18 12 36	CMP	Okay, Ron. Where we going to do - we going to have the first zero phase and then shoot Descartes?
05 18 12 43	CC	That's affirm.
05 18 12 48	CMP	Okay. Sounds like a good idea.
05 18 12 54	CC	Yes, it ought to be pretty good. And for the zero-phase backward pad, roll angle is 195.4; pitch, 344.4; yaw, 359.9. T-start, 139:41:42. You write down your switch time - is 758. And, just a note - -
05 18 13 41	CMP	Okay. 195.4 -
05 18 13 46	CC	Just a note there, Stu. When you start the DAC and stop the DAC, give a call so we can get a time hack on it.

05 18 14 04	CMP	Okay. 195.4, 344.4, 359.9, 139:41:42. Switch is 758, and I give you a mark for start and stop of the DAC on the camera.
05 18 14 20	CC	Okay. Mighty fine. And, at the bottom of the page there on - at 140, add a VERB 49 maneuver. VERB 49 to a roll, 028; pitch, 253; and yaw, 0. That's to the COAS striking attitude.
05 18 14 53	CMP	Okay. 140, a VERB 49 to 028, 253, and 0 degrees.
05 18 15 00	CC	And, as you notice, you got a little bit of roll in there; so, you ought to have fun tracking this one with a little pitch and yaw, minimum impulse, you know.
05 18 15 11	CMP	Roger.
05 18 15 12	CC	Okay. On page 44, got a little deletion there. Delete the VERB 49 at the top of the page, there. Say goodbye to Isadora and Compella; delete photo-target 7, there. And, in all that place in there, put the 500-millimeter procedures. And, at 140:15, put your T-start time of 140:15:13. And, then, you can go ahead and delete the zero-phase observations forward looking - which is kind of the rest of the page, there.
05 18 16 20	CMP	Roger. It looks like we'll just delete everything else.
05 18 16 23	CC	Yes, that's right. And the target point for that one is, as we mentioned before, you know about one and a third of those marks down the COAS, east of the depicted COAS position there.
05 18 16 45	CMP	Okay. I'll try to pick up that little Doublet there.
05 18 16 49	CC	Okay.
05 18 17 54	CC	Okay, Kitty Hawk. We got about 1 minute to LOS here. Al and Ed are completing a debriefing from their EVA. And I think they had - got about 160 pounds of stuff - 167 pounds of stuff coming back up to you.

05 18 18 18 CMP Jolly good.

05 18 18 20 CC Roger.

05 18 18 23 CMP 160 pounds of rocks and a probe, huh?

05 18 18 27 CC Yes. You betcha.

BEGIN LUNAR REV 30

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 18 04 18 LMP-LM Houston, Antares.

05 18 04 20 CC Roger, Ed. Go ahead.

05 18 04 24 LMP-LM Okay. I'm watching the antenna out the window, the shadow of it anyhow. And the needles, and it does drive over the entire range in both PITCH and YAW. There's a great deal of undamped - well, it's lightly damped oscillation. It takes it quite a while to stabilize after you pick the particular setting of the thumb wheels, but it eventually gets there.

05 18 04 54 CC Okay. Very good, Ed. Let's check the acquisition now. If you'll put the - Set the PITCH to plus 120 and YAW to minus 38, and you're in SLEW position, and verify that you get a signal strength greater than 3.

05 18 05 41 LMP-LM Okay, Joe. I've got a signal strength of 3.8.

05 18 05 44 CC 3.8. Okay, very good. Now, go to AUTO and see if the signal strength comes up any; and also, notice, if you will, that the PITCH and YAW meters move any from your present position.

05 18 06 07 LMP-LM Okay. The signal strength stayed the same, and I'm indicating on the needles 130 and minus 40.

05 18 06 18 CC Okay. Understand, 130, one three zero, and minus 40.

05 18 06 26 LMP-LM Yes.

05 18 06 30 CC Okay, and now stand by - -

05 18 06 32 LMP-LM In flight, Joe, if you'll remember it - let me say that, in flight, there were a couple of times it locked on beautifully; however, in order to get it to lock on, I had to get the main lobe up. It would not lock on with just having signal strength up around 3.2 or 3.4. I had a signal strength up around 3.8 before I went to AUTO; or if I went to AUTO with less than that, it just drove off and went to the stop. Several times, however, it locked up and was tracking very nicely and then proceeded a few seconds later or a few minutes later, to pop an antenna circuit breaker. So I think that it's overheating somewhere and either - either that or some problem in the electronics that's causing it to pop circuit breakers.

05 18 07 25 CC Yes, okay. That sounds like a pretty good analysis, Ed; and stand by just a second. We'll have a couple of more little things to try here before we terminate this.

05 18 07 48 CC Okay, Ed. Now, what we'd like to do is to let me - let me read this through before you do each step, but go back to the SLEW position and set the PITCH and YAW angles the same as what you're reading now, on AUTO track. That's 130 and minus 40, and let's make sure that we're in that position.

05 18 08 15 LMP-LM Okay. Going to SLEW and selecting the thumb wheel position to match the needles.

05 18 08 38 LMP-LM Okay, Joe. It was pretty close that time.

05 18 08 41 CC Okay, very good. Now, what we want you to do is to - while you're in SLEW position, try the PITCH control, OFF; rotate PITCH control, 8 degrees, clockwise; and then go back TRACK MODE to AUTO, and see if it will reacquire.

05 18 08 58 LMP-LM Okay, 8 degrees clockwise.

05 18 09 35 LMP-LM Now, it seems to have come back in 8 degrees, Joe.

05 18 09 39 CC Okay, beautiful. Okay, let's go back to SLEW, and set the angles up again at 130 and minus 40, and we'll do the same thing with the YAW control. We'll rotate it 8 degrees clockwise and then back to AUTO and see if it'll track back.

05 18 09 59 LMP-LM Okay.

05 18 10 30 LMP-LM YAW seemed to come back in, Joe.

05 18 10 32 CC Okay. That's about all we can check, I guess, Ed. Let me - let me give you a configuration that we'd like to go to in the event that we do have tracking problems during ascent, because we would like to maintain HIGH BIT RATE, if possible. Let me know when you have - have a pencil out and a card that you can copy it on. Maybe the AGS - your AGS card there would be a good place to have it.

05 18 11 07 CC And for your information - -

05 18 11 08 LMP-LM Okay, Joe, I'm ready.

05 18 11 09 CC Okay, very good. I was just going to say there's only five items here; so, it won't be very much. We'd like in event that you do lose steerable now, we'll go DOWN VOICE BACKUP; BIOMED, LEFT; AUDIO MODE to ICS/PUSH-TO-TALK; and to HIGH BIT RATE. And, of course, we want AFT OMNI during the ascent.

05 18 12 01 LMP-LM Okay, I've got four of them, Joe. The next to the last one, I guess I don't have. DOWN VOICE, BACKUP; BIOMED, LEFT; HIGH - HIGH BIT RATE, and what was the next to the last mode? And then AFT OMNI.

05 18 12 13 CC Okay. AUDIO MODE to ICS/PUSH-TO-TALK, Ed.

05 18 12 29 LMP-LM Okay. ICS/PTT.

05 18 12 32 CC Okay, very good, and that configuration only in - event we lose track in the - with the steerable.

05 18 12 43 LMP-LM Okay. Will do, Joe.

05 18 12 45 CC Okay. Thank you, Ed, and I'll give you back to Fredo here. Stand by just a minute.

05 18 13 01 CC And, Antares; Houston. We're standing by with the debriefing questions here whenever y'all are both ready to go.

05 18 13 16 CDR-LM Yes, we're ready to go right now, Fredo.

05 18 13 19 CC Okay. Okay, the first question is to describe texture or fracture patterns or any surface characteristics of the large boulders, in the boulder fields you were describing at Cone Crater.

05 18 13 54 CDR-LM You want textures and patterns of the boulders themselves?

05 18 13 59 CC That's - that's affirmative, Al.

05 18 14 18 CDR-LM Well, we made some remarks, as I recall, coming back down about the fact that they looked weather-beaten, the fact that they maybe were fairly soft rocks, because they - they look very much like rocks that have been weather-beaten due to the atmosphere. I think that was one of the types of textures that we noted. We noted other rocks that were very fine grained crystalline rocks and - and essentially very smooth on the outside. We have a sample of one of those, football size. These are really the only two textures that I noticed. Did you notice any in addition to that?

05 18 15 07 LMP-LM Well, no. I can't say that I did specifically. It wasn't really a matter of being able to describe what we saw in this particular case; because, at that point, we were so rushed that all we were trying to do was see different things and grab it without really noting how it necessarily differed. The only thing that I recall about these craters - or these boulders was that they were - There were inclusions or variations within the rock; and I assume that they were crystals within the rock, or some crystalline forming in the rock. I don't know that that's true; they might have been, for example, a breccia with not just a conglomerate in them, and I don't know whether that's true or not either. There simply wasn't time to look at them in that detail; so, we just grabbed, photographed, and ran; and I would be kind of at loss to give you an articulate description of really what those rocks are like.

05 18 16 12 CDR-LM I do think we have good samples of two types that we saw on the west rim of the crater. Ed got a small piece of a light-colored rock, and we

actually brought back one that was typical of - of the other - reddish brown rocks.

05 18 16 36 CC Okay, Al. Very good.

05 18 16 39 CDR-LM I should say - Okay.

05 18 16 45 CC Okay. The second question was, I guess, one that was asked somewhere along the way. And, did you ever notice there being dust on tops of any of the boulders around Cone?

05 18 17 11 LMP-LM Let me make a stab at that, Fredo. I noticed some of the rocks - the smaller boulders that were closer to the ground were covered with dust, but I recall boulders that were not covered with dust; and, for example, the boulders down here closer to the LM, the last boulder field I went to, did not have any appreciable dust on those rocks. And the white ones I sampled up near Cone Crater did not have any appreciable dust on them; however, others did. As a matter of fact, there was one of the boulders in that group of the white boulders that I photographed for you, but it was too big to do anything with. It had brown and white; and I couldn't tell what kind of a contact it was, whether the white part was because it had been broken away or whether it was a contact of two different materials. It was just - There just wasn't time to investigate that sort of phenomena; so, we tried to simply sample the two types and photograph it. But, as far as dust is concerned, I think we've seen both; and, among the larger boulders, there are certainly a large number that do not have any dust on them.

05 18 18 32 CC Okay, Ed.

05 18 18 33 CDR-LM I think that's generally true that we probably would have been aware of dust. I think that's generally true that we would have been aware of dust, because there certainly was a lot of filleting, and we tried document that for you. But, I'd say, generally speaking, there was no dust on any of them - on the surface of any of rocks that we saw.

05 18 18 52 CC Roger, Al. And the next question. When you were high on the slopes of Cone, could you tell any differences in the surface color tone, when you looked back in the area to the south and to southwest?

05 18 19 20 CDR-LM Well, of course, the obvious difference was in the bright craters. Those - those are always noticeable, and those were there. Beyond that, I wasn't aware of any marked contrast in color, Joe.

05 18 19 37 LMP-LM Well, I - I don't know whether it's a figment of my imagination or not. I've always - I always noted going up there this morning, or thought I noted, that the area around Old Nameless was - There were some darker patches, but we were so preoccupied with finding our way to the top of Cone Crater that I neither observed it or made remarks about that observation, nor really observed it that much more closely.

05 18 20 07 CC Roger, Ed. Hopefully, maybe the pans will pick that up. Okay, next question on. This is for Ed. When you attempted the second triple core, and I think you really answered this in real time, but I just to get it straight, did you think you hit another rock, like you mentioned bedrock on the first attempt, or did it just get progressively harder to drive?

05 18 20 38 LMP-LM Well, I wasn't quite sure, Fredo, I thought that I hit rock again; but after I pulled it out, it could very well have been just a compaction type of phenomenon where it just quit driving; and I don't know the answer. I - it felt like in driving it, that I'd hit something pretty solid, but it wasn't as though I had hit a very sharp line of rock as opposed to soft material. It went down fairly well, and then it tightened up and then it just stopped.

05 18 21 18 CC Okay, Ed. To back up a little further back in time, we missed when the double core was - test was done. About how far could you push the tube down before you started hammering?

05 18 22 12 LMP-LM ... out the window and it's starting to vibrate and shudder a little bit, and we're going to lose it in a minute, probably about the circuit breaker.

05 18 22 22 CC Okay, Ed. We're - we lost you there for a little bit. I guess you can, if you get it locked on, just leave it SLEW, running on AUTO.

05 18 22 34 LMP-LM That's where you are.

05 18 22 36 CC Okay. I didn't get the answer there, Ed, on how far that double core got manually pushed in before you started hammering on it.

05 18 22 49 LMP-LM Al had the rest of that, and I didn't put it in.

05 18 22 55 CDR-LM Are you talking about the first one, Fred?

05 18 22 59 CC That's affirm, Al.

05 18 23 04 CDR-LM Okay. The double core that I took in the vicinity of point A - went in about 2 to 2 and a half to 3 inches, no more than 3 inches.

05 18 23 18 CC Roger, Al. If I can find the next question, I asked - this answer - -

05 18 23 28 LMP-LM ... Fredo. It would be - what?

05 18 23 32 CC Go ahead, Ed.

05 18 23 33 LMP-LM If they went that far, I'd be surprised, going back to it.

05 18 23 38 CC Okay, Ed. The question 5 is kind of the same as the first one, and I assume your answer will probably be the same. But the question is: could you describe and in any more detail, and I guess it's really saying did you think you saw any stratigraphy at all in the way the ejecta was laying around Cone Crater?

05 18 24 11 CDR-LM I saw a couple of boulders that I thought had some stratigraphy in them, but - it certainly wasn't - you know - obviously not in the classic sense. There was - Well, as a matter of fact, we took a sample from one that looked like it had some

stratigraphy in it on the way back down. We grabbed a quick sample from one. Well, it didn't jump out and become obvious, however.

05 18 24 38 CC Okay, and a little - -

05 18 24 40 CDR-LM Fred, everything here especially seems to be pretty darn subtle. And I am convinced there was stratigraphy there because we saw suggestions of it. Just like I'm convinced I see some lineations out here or some suggestions of them, but they don't jump out and hit you in the face; and we'll probably have to go over the photographs and talk about each one of these samples in detail before we can really bring out the picture on it. I just can't remember a lot of those very subtle things.

05 18 25 17 CC Okay, and I assume, on a little bit larger scale, you couldn't detect anything with respect to the hinge/flap [?] type relation in that boulder field around Cone?

05 18 25 34 LMP-LM No, we sure couldn't see that at all. I'm sure it was there, if we'd just had time, but we couldn't see it.

05 18 25 41 CC Okay. And this one is for - for Al. About how deep were you down in - with the trench, Al, when - when the side walls started caving in?

05 18 26 01 CDR-LM Well, actually, the first cut I took was down to about 6 inches and there was some caving at that time. The side walls were standing probably about 70 to 80 degrees. The next cut I took made the walls a little more steep, closer to the vertical perhaps 80, 85; and, at that point, they started coming down. Fine-grain regolith, at the top of the cut, just a couple down into - into the trench.

05 18 26 32 CC Okay, and I guess I asked you in real time the - the thickness of the intermediate layer, but they'd also like to know if you have any estimate on the thickness of the very top layer.

05 18 27 00 CDR-LM No, I sure don't. It wasn't - as I say, stratigraphy in the classic sense, because it all started to crumble after the first couple of strokes. That

was the place where you, Ed, put the sample of some white-colored material. It was very close to the surface.

05 18 27 21 LMP-LM Is the upper layer that you're talking about, the brown, and the next one, and the white? It seems - The brown seemed to be showing the white in some places after an inch or 2 inches. I'm not sure it's another layer. But it had to be. I - I can't find another explanation for it, but it seemed to be very thin; 1 or 2 inches at the top layer.

05 18 27 49 CDR-LM I think that's probably a pretty good call. I'd say maybe 2 inches; then, of course, we had that - that thin layer of very glassy material, which I collected, and then the bottom whiter material which Ed got a sample of, as well as the ones I took.

05 18 28 10 CC Okay, and you've already answered the next part of this question, which was distinction between layers. You had both color and textural distinctions there that told you you had the layering; and I guess the last part, maybe, you've answered too, but it's a - question is whether the wall caving you think maybe was a natural event or do you think it was due to the dragging the trench tool to the cut?

05 18 28 52 CDR-LM Well, I'm not sure I had an unnatural shovel - and I'm not quite sure what the question is now that I think back about it again. What - You mean that - -

05 18 29 09 CC Actually, I thought you answered that Al, because you - -

05 18 29 15 CDR-LM ...

05 18 29 19 CC Your previous comment indicated that it started caving in with your first stroke; and if that was true then, it looks like the trenching tool helped bring the walls down.

05 18 29 36 CDR-LM Well, I'm sure that it did. Actually, it was on about the second stroke where it started to occur because the first strike there was a - the walls were a lot steeper. But, I'm sure the tool had a lot to do with it.

05 18 29 54 CC Okay, the next question. When we were sort of quickly passing by North Triplet Crater on the way back to Antares, you mentioned in passing there coming upon a little boulder field; and the question is: do you think this boulder field was tied in some way to North Triplet, possibly part of a ray?

05 18 30 31 CDR-LM Well, we probably - We inferred they were boulders. I think that we thought they were a field - a field of - of ejecta material from that particular crater, and therefore, we took some samples there. Is that the spot you are referring to?

05 18 30 50 CC Yes. That's it, Al.

05 18 30 55 CDR-LM Yes. If we inferred they were boulders, that was incorrect. They were just hand samples of approximately 8 to 10 inches but all lumped together as though they had been ejected from that crater and right in our path, and we took a couple of samples from those, that area.

05 18 31 11 LMP-LM As a matter of fact, there were boulders which we also thought came out of probably the same area; but there wasn't anything around the boulders that seemed small enough and obvious enough to grab on the run, like we tried to do with this bunch of samples.

05 18 31 28 CC Okay. The next question is: did you see any evidence of downslope creep with respect to the Cone Crater fillets you saw on the uphill-side rocks?

05 18 31 51 LMP-LM Yes, I did, and I'm not - I'm not so sure but what part of the - the lineation that I was talking - talking about would not be found on Cone in a circular - around - around the crater mouth. I saw these same things up there. I described them before, so I didn't say anything about it again; but my guess is that they go circular around Cone Crater. Now, that may be entirely wrong.

05 18 32 30 CC You mean kind of like contour lines, Ed?

05 18 32 32 LMP-LM ... probably for direction. That's what I'm suggesting, but it's merely a suggestion, and I didn't follow them out. I didn't check them that closely

to - to be able to prove it; but where I did see them, they were, indeed, kind of parallel to the slope - I mean parallel to the rim of the crater, in other words, around the crater.

05 18 33 01 CC Very good, Ed. Next question. The difficulty you had at the last there climbing up to Cone rim, was that due primarily to the terrain slope or did the soil conditions change again that made - caused you to have some greater problems?

05 18 33 32 LMP-LM I think probably both. I think we just entirely underestimated the difficulty in going that far and getting that high, and in such a short period of time. It's a darn hard climb to try to do rapidly, and the soil is a little bit - bit thin and mushy. And the suits are bulky; it's all those problems rolled in, Fred; we just - It was too ambitious, I guess.

05 18 34 02 CDR-LM Let me say that I don't - I don't really think that the composition of the soil changed very much. Matter of fact, that was one thing that struck me about the whole area: the consistency of the - of the texture of the regolith outside of soft areas, of course, in crater rim. I think as far as the progress up there, it was due to the grade and the boulders and the rocks that we had to go around; but really, as far as the surface texture is concerned, as far as the bearing strength of the surface, I thought the outside of the crater rim, that it was unusually consistent all the way through. And the thing that surprised me was the pattern of - of the raindrop pattern with these very small sort of pebbles, which is decidedly different than we had down here in this area where we landed.

05 18 35 03 LMP-LM I think we remarked on the similarity of the surface. I think I remarked, at one spot, that it seemed to be getting a little harder up there, but that seemed to have been isolated. It wasn't true in general; just - it seemed to be in that one local area. And certainly, as Al pointed out, the softest areas, by and large, are crater rims, fairly fresh crater rims. And when you run in through one of those, you get some fairly soft material; but, otherwise, it's about like you saw here near the LM on television, the way we were pressing into that.

05 18 35 48 CC Roger. The next question is, how abundant and what was the distribution of glass that you saw around on the surface or, I guess, in one case you mentioned it, there draped on the rocks.

05 18 36 10 CDR-LM Yes, we went roaring past one rock; and, well, what looked like glass - I'm pretty sure that it was, and I'm sure there are other samples of that out here, but we did not see them. The - that was really the only example of glass that - that I could positively identify - come close to positively identify as being glass per se. There are some crystalline rocks out here, and I'm sure we got some samples for you.

05 18 36 46 LMP-LM I concur with that. I'm surprised that we didn't obviously see more glass. A lot of the smaller rocks that we did pick up that were sample size were so darn dirty that they may have glass in them, but they're just covered with it - this dirt which clings to everything. And why the big rocks, the big boulders that you asked about earlier, are not covered in the same way, I don't know. Maybe some of them are, but it really covers up what the rock is made of and it probably obscured a lot of glass that we just didn't even see.

05 18 37 27 CC Okay. We - we need to make a quick comm switch here, Ed. We're having trouble staying with you from Madrid. We'd like you to go from FM to PM.

05 18 37 44 LMP-LM You got it.

05 18 37 46 CC Okay. How do you read now?

05 18 37 51 LMP-LM Loud and clear, Fredo.

05 18 37 53 CC Okay, that was the reason for comm loss a little while back on the steerable. The - the next question here - actually let's see - ... Did you notice the dust adhering to the MET particularly and if so, what parts?

05 18 38 21 LMP-LM If you got a direct hit with mud - with this dust, Fred, if it's sprayed on something, it seems to stick. It just covers everything. And, I'm looking down out the window at the MET; surprisingly enough, it doesn't look too bad. The fenders,

the wheels, the lower parts, the - the legs, yes, they're - they're pretty covered with dirt; and there's quite a bit spread up and spattered around a little bit; but it looks surprisingly good, as a matter of fact. Maybe it just doesn't have enough porous surface.

05 18 39 09 CC Okay, Ed. One more question here. You mentioned seeing blocks around the rim of - of North Triplet. Did you happen to get a look far enough down there to see if you also saw either blocks or ray patterns from Center Triplet Crater?

05 18 39 34 LMP-LM Fredo, the - It's so darn undulating here, that was part of our problem. We couldn't even see Central Triplet Crater. We knew it was there, but you can walk in some of these undulations and get lost from each other, if you're not careful. You just can't find where you are. And, we couldn't even see anything from Central Triplet and know it was from that.

05 18 40 06 CC Okay; and, I guess, one last question here to clear up what ended up in the SCSC. How did the bottom of the trench, the question; this is for Al. Did you primarily end up with fine-grained or coarse-grained material in the SCSC?

05 18 40 32 CDR-LM It's all fine-grained material. Some of it is from the surface, and, unfortunately, when I opened the first canister, the seal came off the canister in the bottom, so I had to go back and regroup and get another one - take another sample. But I think I got mostly from the bottom of the crater - bottom of the trench; however, it is all fine-grained. There's nothing of any greater size.

05 18 41 08 CC Okay, that's - that's about it. Thank you very much. Guess you can think about getting breakfast now.

05 18 41 16 LMP-LM Okay. Thank you.

05 18 41 20 CDR-LM Okay. That was a good job of getting us sorted out there, when we got behind the time line, and we appreciate that help.

05 18 41 28	CC	Well, we thank you again for doing a great job, Al and Ed. I think we have picked up everything we needed there.
05 18 41 39	LMP-LM	Gee, I sure hope so. It sure - sure was a panic from our point of view.
05 18 41 44	CC	Well, we kind of knew that before we got there.
05 18 41 46	LMP-LM	There were some things that we'd like to have done - yes, I think you're right, Fredo. There are so many things we'd like to have done; so many things to do, so many interesting things to look at here, and we didn't even have the chance to scratch the surface. We hope we've brought back something that you can sort out, as time goes on.
05 18 42 05	CC	Well, it's a little better than that sandpile out behind the training building anyway, though, isn't it?
05 18 42 12	CDR-LM	Oh, man.
05 18 42 13	LMP-LM	Don't you know it.
05 18 42 14	CDR-LM	It really is. It's fantastic up here.
05 18 42 37	CC	And, Antares; Houston. We'd like to try AUTO TRACK again on the steerable.
05 18 42 50	LMP-LM	You've got it.
05 18 42 52	CC	Okay.
05 18 42 57	CDR-LM	And how's our - and how's our friendly Command Module Pilot doing? Is he going to be ready to pick us up with a nominal launch time?
05 18 43 07	MCC	You bet, Al, I've been talking with him all morning here, and he's really whipping around, getting a lot of pictures, and doing a lot of landmark tracking. He said he's picked you up on two passes now, and he also saw the reflections from the ALSEP on his last pass up through there.
05 18 43 29	CDR-LM	Was he shooting sextant camera?

05 18 43 33 MCC On one pass he was - -

05 18 43 36 CDR-LM ... his visual?

05 18 43 37 MCC Just visual on his last pass, though.

05 18 43 42 CMP-LM Very good. How about the Hycon? Did he ever get that going?

05 18 43 46 MCC That's negative.

05 18 43 51 CDR-LM That's too bad.

05 18 43 54 MCC Yes, that's right.

05 18 43 57 CDR-LM Yes, around the - the ALSEP, from the top of Cone Crater, it's so bright, it stands out like a little jewel. I'm not surprised at all that Stu could see it.

05 18 44 13 MCC He was really convinced that that's what he saw. And he didn't even know where it was, you know, and he asked me where it was, and came back, and sure enough confirmed it, and that's where it was.

05 18 44 26 CDR-LM That's very good.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 18 49 32	LMP-LM	Houston, Antares.
05 18 49 35	CC	All right, Houston. Go.
05 18 49 41	LMP-LM	Hey, Ron. Tell them that this HIGH GAIN antenna is setting here, kind of wobbling, and making all sorts of racket, when it should be setting very still and quiet, and was until just a minute or so ago. Now it seems to be starting to go unstable, or at least neutrally stable, and it's not driving wildly, but it's making a hell of a racket. It's just kind of wobbling, around a neutral point.
05 18 50 05	CC	Okay, INCO copies that, and we'll let you know on it.
05 18 53 10	CC	Antares, Houston.
05 18 53 17	LMP-LM	Go ahead.
05 18 53 18	CC	Okay, they've made some configuration change on the ground station hookup down here to you; and for some reason, they think that that may have helped your antenna chatter, or whatever. The thing seem to be steadier now?
05 18 53 36	LMP-LM	It steadied out for a minute or so, and now it's picking up again.
05 18 53 41	CC	Okay.
05 18 53 42	LMP-LM	Why don't they accept the fact that the damn thing is about to quit on us?
05 18 53 54	CC	Okay, Antares; Houston here. They'd like you to go back and select the lu - the lunar stay - the erectable.
05 18 54 07	LMP-LM	Okay.
05 19 13 41	CDR-LM	Houston, Antares; we have the crew's station - crew's status report for you.
05 19 13 47	CC	Okay, go ahead, Al.

05 19 13 52 CDR-LM Okay, on the PRD, Commander, 16052; LMP, 7050. Negative medication; we're all in excellent health and excellent spirits.

05 19 14 07 CC Okay, Al, sounds great.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 19 06 17 CC Okay, Kitty Hawk; Houston here, if you read. You got less than 30 seconds to start your camera for zero phase.

05 19 15 23 CC Kitty Hawk, this is Houston. We got too much background noise again. I can't read you.

05 19 15 32 CMP Okay. Let me see if I can pick up the HIGH GAIN.

05 19 15 40 CC No. I just can't make you out. Maybe you can get me on the HIGH GAIN there.

05 19 15 48 CMP It ought to be getting better real fast.

05 19 15 52 CC Hey. By golly. That's much better.

05 19 15 58 CMP Okay. And stand by just 1. I'll make a - I want to make a couple of notes here.

05 19 16 02 CC Okay.

05 19 16 04 CMP And you - you've got the tape back again. I hit COMMAND RESET there so I could get - keep the tape running. I don't know when it went off during the pass.

05 19 16 13 CC Okay. We copy.

05 19 18 20 CMP Okay, Ron. I'm back with you.

05 19 18 24 CC Roger. Go ahead, Stu, with your frame number and whatever. I mean your percent. No, I was right the first time, frame number.

05 19 18 42 CMP Roger. Frame number 83.

05 19 18 46 CC Copy 83.

05 19 24 39 CC Kitty Hawk, Houston. OMNI Charlie.

05 19 34 36	CC	Kitty Hawk, Houston. About 30 seconds to T-start.
05 19 34 43	CMP	Roger.
05 19 43 41	CC	Kitty Hawk, Houston. The HIGH GAIN angles: PITCH, minus 30; YAW, 125.
05 19 43 57	CMP	Okay.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 19 40 22	CC	Antares, this is Houston; over.
05 19 40 30	LMP-LM	Go ahead, Houston.
05 19 40 31	CC	Roger, Antares. Your old Maroon Team on station down here. We'd like to go to the pre-lift-off comm configuration, as modified earlier, to check out the HI BIT RATE TELEMETRY lock; over.
05 19 40 50	LMP-LM	Okay, stand by.
05 19 41 25	LMP-LM	Okay, Bruce, are you ready to try that?
05 19 41 28	CC	Roger.
05 19 41 34	LMP-LM	Okay, here I go.
05 19 41 56	LMP-LM	Antares to Houston. How do you read Antares?
05 19 41 59	CC	Okay, Antares, I'm reading you loud with a good bit of background noise on the circuit, as you might expect, but comm is okay.
05 19 42 08	LMP-LM	Thank you, Bruce, and I'll return to the other setup.
05 19 42 10	CC	No, negative. We would like for you to stay in this configuration for the time being so we can see how comm and telemetry holds in.
05 19 42 24	LMP-LM	Okay, Houston.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 19 46 37	CMP	Houston, Kitty Hawk.

05 19 46 39	CC	Okay, Kitty Hawk. Go - a little background noise, but go ahead. You're good shape now. Background noise is from the LM.
05 19 46 55	CMP	How about that? Okay. The tracking went pretty good. It's getting at - this Sun angle at the - I didn't pick up at Doublet. However, I knew where it should be, and I got another little one in that area. So I think the track is pretty close to the - the area you wanted. The track - the tracking went all right. However, in the heat of the battle there, I did not get the tape recorder going, so we didn't get the HIGH BIT RATE on that track. And the frame number is 126.
05 19 47 42	CC	Okay. We copy that, Stu. And don't leave the dark slide out of that magazine when you take it off. Okay? It's a pretty important magazine.
05 19 47 55	CMP	Okay.
05 19 53 50	CC	Kitty Hawk, Houston, request POO and ACCEPT there, and we'll ship you a state vector or two.
05 19 53 52	CMP	Roger. You have it, POO and ACCEPT.
05 19 53 54	CC	Okay. And also, Stu, I've got your consumables update and your P27 pad here, if you're ready to copy. Start with consumables first.
05 19 54 09	CMP	Okay. I'm ready. Go ahead.
05 19 54 11	CC	Okay. Consumables GET 140:40; total 60 percent. Okay, now I'll read the quads off the problem Charlie. 61, 60, 60, 60; H_2: 52, 52; O_2: 77, 76, 25.
05 19 54 50	CMP	Okay. 140:40; 60 - 61, 60, 60, 60; 52, 52; 77, 76, 25.
05 19 55 04	CC	Okay, that's correct. Whip over to page 26 there, and I'll give your P27 for the CSM.
05 19 55 15	CMP	Okay.
05 19 55 18	CC	Okay. VERB 71; GET, 142:25:00; Index 21: 01, 501, 00, 002, 77, 730, 75, 126; Index 6 is 77, 472, 41,

		104, 77, 633, 56, 122; Index 12: 60, 206, 77, 562, 00, 766, 25, 263, 04, 076; Index 17: 27, 204, 06, 071, 10, 560. Read back.
05 19 56 54	CMP	Okay. Verb 71; 142:25:00; 21: 01, 501, 00, 002, 77, 730, 75, 126; 77, 472, 41, 104, 77, 633, 56, 122; 60, 206, 77, 562, 00, 766, 25, 263, 04, 076; 27, 204, 06, 071, 10, 560.
05 19 57 43	CC	Okay. Beautiful readback there, Stu.
05 19 57 49	CMP	Okay.
05 19 59 07	CC	Kitty Hawk, Houston. We've got a few more things to go on the uplink there. Can you still give us POO and ACCEPT?
05 19 59 17	CMP	Roger. You've still got it.
05 20 02 13	CC	Kitty Hawk, Houston. Computer is yours.
05 20 02 20	CMP	Okay. Thank you.
05 20 04 01	CC	Kitty Hawk, Houston. I've got your ascent pads for you.
05 20 04 17	CMP	Okay. Go ahead.
05 20 04 19	CC	Okay. Direct ascent rendezvous pad: GETI of lift-off, 142:25:42.00; NOUN 37; 143:10:54.00. And the T_{ig} for one REV late: lift-off is 142:24:04. Okay. Your coelliptic rendezvous - Oh, wait a minute. I'm sorry. CSM weight: 34417. Coelliptic rendezvous pad: lift-off T_{ig} is 142:28:12.50; CSI, 143:26:36.60; NOUN 37; 145:11:30.00. And ready for readback.
05 20 05 39	CMP	Okay. Copy. Direct ascent - oh, before I start, give me that - that for one - one REV late. What - what T_{ig} do you have there?
05 20 05 51	CC	Okay. That's just set the lift-off for one REV late. Wait a minute. Hold it. That's the wrong number. For some reason, it doesn't match up here.

05 20 06 05	CMP	That's what I was thinking.
05 20 06 07	CC	Yes. You're right. Okay. Copied it down wrong. Sorry. Okay, T_{ig} for one REV late is 144:24:04.
05 20 06 31	CMP	Okay. Direct ascent: 142:25:42.00; 143:10:54.00; lift-off one REV late: 144 plus 24 plus 04. CSM weight, 34417. Coelliptic: 142:28:12.50; 143:26:36.60; 145:11:30.00.
05 20 07 06	CC	Okay. Good readback, Kitty Hawk. And we probably won't have MSFN relay the next time you come around here. As a matter of fact, I just got the word, we will not have any MSFN relay when you come around the next time.
05 20 07 27	CMP	Okay.
05 20 13 19	CC	Kitty Hawk, Houston. We have your torquing angles.
05 20 13 27	CMP	Okay. Torqued at 140:53:20.
05 20 13 32	CC	Roger. 53 at 20.
05 20 15 46	CC	Kitty Hawk, Houston. About 1 minute to LOS there. All systems are GO, and we'll see you coming around the other side.
05 20 15 57	CMP	Kitty Hawk, Roger.
05 20 41 --		BEGIN LUNAR REV 31

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 19 52 17	CC	Antares, this is Houston. Over.
05 19 52 24	LMP-LM	Go ahead, Houston.
05 19 52 26	CC	Antares, Houston. We'd like you to return to the previous comm configuration, utilizing the erectable antenna. Over.
05 19 52 37	LMP-LM	Roger.
05 19 54 12	CC	Antares, this is Houston. How do you read?

05 19 54 18	LMP-LM	Loud and clear, Bruce.
05 19 54 20	CC	Okay, Ed, whenever you all are through eating, would you give us a call, please? And I've got a - a batch of pads to pass up to you.
05 19 54 32	LMP-LM	Okay. I'll be ready to copy here in about 30 seconds.
05 19 54 35	CC	Okay.
05 19 55 54	LMP-LM	Okay, Bruce; what do you want to send me first?
05 19 55 57	CC	All right, Ed. We'll send up the ascent pad for the direct rendezvous, first. Over.
05 19 56 22	LMP-LM	Okay. Ready to copy.
05 19 56 29	CC	Understand you're ready, Ed.
05 19 56 35	LMP-LM	That's affirmative.
05 19 56 38	CC	Okay. Ascent pad, direct rendezvous: 142:25:42.00; 5542.9, 0031.3, minus 000.3; address 47, plus 37741, plus 01757, plus 58843, plus 56968, plus 0031.3, plus 0190.9; NOUN 37, 143:10:54.00; LM weight, 10744, 34417; T_{ig}, one REV late, 144 plus 24 plus 04. Read back. Over.
05 19 58 18	LMP-LM	Okay. 142:25:42.00; 5542.9, 0031.3, minus 000.3; plus 37741, plus 01757, plus 58843, plus 56968, plus 0031.3, plus 0190.9; 143:10:54.00; 10744, 34417; T_{ig}, one REV late, is 144:24:04.
05 19 59 01	CC	Antares, Houston. The readback correct. Ascent pad for a coelliptic-type rendezvous follows when you're ready.
05 19 59 15	LMP-LM	Ready to copy.
05 19 59 17	CC	Ascent pad coelliptic sequence: 142:28:12.50; 5532.5, 0038.0, minus 000.4; address 47, plus 37741, plus 01757, plus 58614, plus 56968, plus 0038.0; the balance for the pad is NA. Read back. Over.

05 20 00 17 LMP-LM Roger. 142:28:12.50; 5532.5, 0038.0, minus 000.4; plus 37741, plus 01757, plus 58614, plus 56968, plus 0038.0. And that next to the last one should be 5 - yes, plus 56968.

05 20 00 51 CC Roger. Readback correct. And now I have the CSI pad, itself, for you.

05 20 01 06 LMP-LM Okay. CSI. Ready to copy.

05 20 01 07 CC Roger. CSI: NOUN 11, 143:26:36.60; NOUN 37, 145:11:30.00; 051.6, plus all balls; 0206.6, 0311.5, plus 051.6, plus all balls, plus 001.1. Read back. Over.

05 20 01 59 CC Hey, can you give us POO and DATA?

05 20 02 06 LMP-LM You have it.

05 20 02 29 CC Antares, Houston. Standing by for a CSI pad readback. Over.

05 20 02 36 LMP-LM Roger. NOUN 11 is 143:26:36.60; 145:11:30.00; NOUN 81, plus 051.6, plus all zeros; and 0206.6, 0311.5, plus 051.6, plus all zeros, and is it plus or minus 001.1?

05 20 03 17 CC Antares, Houston. The last value is positive, that is, plus 001.1. Readback correct. Over.

05 20 03 26 LMP-LM Okay.

05 20 03 30 CC And we're starting the uplink for you. I now have the consumables update.

05 20 03 56 LMP-LM Ready to copy.

05 20 03 57 CC Roger. Consumables update for 140 hours even: RCS Alfa, 80; Bravo, 78; descent oxygen, 38 percent; ascent tank 2, 97 percent; tank 1 reading is invalid, but it's approximately the same quantity. Descent water, 23 percent; ascent water, 98 percent each; descent ampere-hours, 488; ascent, 572. Read back. Over.

05 20 04 39 LMP-LM Roger. At 140 hours, RCS is 80, 78; descent O_2 is 38, ascent is 97 percent, and probably

97 percent; water is 23; ascent is 98, 98; ampere-hours: descent is 488, ascent is 572.

05 20 05 10 CC — Roger. Out.

05 20 05 25 CC — Antares, Houston. Ascent amp-hours were 572. Is that affirmative?

05 20 05 33 LMP-LM — That's affirm. Got it.

05 20 05 34 CC — Roger. Then I've got an update to your Time Line Book and an up late - date to the Surface Checklist. Let's hold off on the Surface Checklist update, but the Time Line Book whenever you're ready.

05 20 05 54 LMP-LM — Okay. Go ahead, Bruce.

05 20 06 03 CC — Roger. On page 14 of the Time Line Book.

05 20 06 18 LMP-LM — Okay.

05 20 06 24 CC — Okay. Down immediately prior to the block that says 60 contact. We want you to insert a VERB 48 DAP load; and in R_1 of the DAP, we're looking for 13002 to give you four-jet translation in the docking procedure. Over.

05 20 06 59 LMP-LM — Okay. I understand.

05 20 07 02 CC — And immediately after the 60 contact block, we would like to add in TTCA COMMANDER. Let me read through it once quickly, and then I'll go through it again slowly, if you want to write it down verbatim. TTCA COMMANDER: thrust plus-X at contact, until CMP confirms capture or for 10 seconds whichever occurs first. And then, under "Confirmed docking with CSM," change that to "Confirm capture report to CSM." Would you like me to go through it a word or two at a time so you can write it out, or do you just want to make a notation to that effect? Over.

05 20 07 50 LMP-LM — Now, you want to confirm capture as plus-X until barber pole or 10 seconds, whichever is greater.

05 20 07 59 CC — Roger. After contact.

05 20 08 00	LMP-LM	Whichever occurs first, excuse me.
05 20 08 01	CC	Right. Whichever occurs first.
05 20 08 03	LMP-LM	Right.
05 20 08 39	LMP-LM	Houston, Antares. It is my understanding that the docking originally will be tried in the nominal fashion; is that correct?
05 20 09 20	CC	Antares, Houston. This is a modification to the nominal procedure. We anticipate using it on the first attempt. If, of course, Stu calls con - calls "Capture," prior to the time that you start thrusting, why that would not be necessary. But, nominally, you would start your plus-X thrusting, when you feel a good solid contact.
05 20 09 49	LMP-LM	This is even on the first attempt at docking?
05 20 09 54	CC	That's affirmative, Antares.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 20 19 28	CC	Antares, Houston. The computer is yours.
05 20 19 35	LMP-LM	Okay.
05 20 22 35	CC	Antares, this is Houston. Over.
05 20 22 41	LMP-LM	Go ahead.
05 20 22 43	CC	Roger. In your Lunar Surface Book, we're deleting the uplink at lift-off minus 35 minutes. There's no P22 required.
05 20 22 58	LMP-LM	Roger. Thank you.
05 20 23 01	CC	And, also, in the Surface Check List at - on page 8-1, under your S-band comm configuration that reads S-BAND-PM, PRIMARY, PRIMARY, VOICE, PCM, OFF/RESET, we're changing that to PM, PRIMARY, DOWN VOICE BACKUP, in accordance with the comm configuration we've passed to you previously.
05 20 23 38	LMP-LM	Okay. We're going to lift-off in DOWN VOICE BACKUP, then.
05 20 23 40	CC	That's affirmative, unless we instruct you otherwise later on. And you can delete all references that goes to the slewable antenna - to the steerable antenna, such as that found on page 8-6, putting you in TRACK MODE, AUTO, and all that. Over.
05 20 24 02	LMP-LM	Gee, Bruce. I thought that we were going to go off NORMAL, and if we had trouble go to this new procedure.
05 20 24 10	CC	Negative. Our base line, now, is to lift-off in this mode if we expect the OMNI comm to improve as you fly through the profile and pitchover. Over.
05 20 24 27	LMP-LM	Okay. Understand.
05 20 24 29	CC	And, in this connection, since you are lifting off in ICS/PTT, we won't be monitoring the - the intercom loop within the cabin, and we'd like to encourage you to comment freely on how things are

progressing and read stuff out to us, as the occasion seems appropriate. Over.

05 20 24 55 CDR-LM Well, we don't want to comment freely, but we'll comment reasonably.

05 20 25 02 CC Roger; out.

05 20 25 47 LMP-LM All right, Houston. We're starting through our checklist, and lift-off minus is 01:15.

05 20 25 52 CC Okay. Stand by, please.

05 20 27 18 CC Antares, this is Houston.

05 20 27 24 LMP-LM Go ahead.

05 20 27 25 CC Roger. Having passed you the changes through the comm configuration at minus 1 hour and 15 minutes, we'd like to hold off on going into the DOWN VOICE BACKUP mode and ICS/PTT until lift-off minus 50 minutes. That is, just prior to the RCS hot-fire check, as we're advised that on Apollo 12, the hot-fire check blew the erectable antenna over. If the erectable antenna is still standing after the hot-fire check, we'd prefer to come back into the NORMAL voice configuration until sometime shortly before lift-off. Over.

05 20 28 12 LMP-LM Okay, Bruce. Why don't you call the comm in real time and we'll respond?

05 20 28 18 CC Wilco, Ed.

05 20 35 09 CC Antares, Houston.

05 20 35 15 LMP-LM Go ahead.

05 20 35 16 CC Okay. Latest revision to the communications plan. At this time, we would like you to select the steerable antenna and AUTO TRACK MODE, and give us your evaluation of the amount of grinding and motor noise you get out of it and try to form an opinion whether we think it will be satisfactory for lift-off. If it seems like it's making too much noise or behaving erratically at the present, we will then go into the SLEW position on the steerable antenna, maintain comm up until just

prior to lift-off, where we want to return to AUTO and attempt to make it in the AUTO position. If it proves unsatisfactory during ascent, we'll request AFT OMNI DOWN VOICE BACKUP and ICS/PTT. Over.

05 20 36 11 LMP-LM Sounds good for me. Okay. Switching now.

05 20 36 14 CC Roger, Ed.

05 20 36 42 LMP-LM Okay, Bruce. It's nice and quiet for the moment.

05 20 36 46 CC Okay. Very good, Ed. And - -

05 20 36 47 LMP-LM I'll let you know if it starts - -

05 20 36 48 CC - - during ascent, if you perceive that you've lost the steerable, why don't wait for us to call you to switch over? Over.

05 20 37 00 LMP-LM Will do.

05 20 37 36 LMP-LM Houston, Antares. Are all of my AGS constant on page 8-5 good?

05 20 37 48 CC Stand by, please, Ed.

05 20 37 58 LMP-LM Some of them are on the ascent pad, Bruce, but there's some that aren't.

05 20 38 06 CC Roger, Ed. Except for those values which are loaded on the pad, the ones you have in the checklist are good. Over.

05 20 38 14 LMP-LM Okay, thank you.

05 20 38 36 LMP-LM Houston, Antares. The rendezvous radar test is satisfactory.

05 20 38 41 CC Roger, Antares.

05 20 49 50 CDR-LM Houston, are you ready for the hot fire of the jets?

05 20 49 56 CC That's affirmative, Antares.

05 20 50 02 CDR-LM Okay. Here we go.

05 20 50 57	CDR-LM	Okay, Houston. The antenna blew over.
05 20 51 01	CC	Roger, Antares.
05 20 51 09	CC	How about the flag?
05 20 53 40	CDR-LM	Hey, Houston, the hot-fire check's complete. We're satisfied here.
05 20 53 46	CC	Antares, Houston. We concur. It looked good from down here. I have your K-factor update.
05 20 53 56	LMP-LM	Okay, go ahead.
05 20 54 00	CC	Antares, Houston; K factor, 140, plus 00, plus 00.36. Read back. Over.
05 20 54 15	LMP-LM	Roger; 140, 00, plus 00.36.
05 20 54 21	CC	Roger; and, with respect to the comm situation again, Ed, if you have to switch to the AFT OMNI antenna prior to making the 30-degree yaw maneuver, delete the yaw maneuver; that is, remain in the belly band. If you have to switch after making the yaw maneuver, do not change; that is, remain with the 30-degree yaw; over.
05 20 54 47	LMP-LM	Okay, we've got that.
05 20 54 50	CC	And, for your information, due to the CSM orbit, which is currently about 61.5 by 58.2, we're anticipating a TPI burn DELTA-V on the order of 100 feet per second, vice the lower 60-some feet - vice the 90 feet per second in the flight plan.
05 20 55 16	LMP-LM	Okay, we understand.
05 20 55 30	CC	And, for your information, Antares, your thruster firings were also monitored by the seismometer. You're coming through loud and clear. Over.
05 20 55 43	LMP-LM	That's good.
05 21 10 34	CC	Antares; Ed. We'd like to get BATs 5 and 6 on line now, and 1 and 3, off, if you can do it without interrupting the P57. Over.

05 21 10 47	LMP-LM	Just 1 second.
05 21 11 14	LMP-LM	Have it just a second, Bruce.
05 21 16 06	CC	Antares, Houston. Did you call?
05 21 16 12	LMP-LM	Negative. That was the other Antares.
05 21 16 34	CC	Antares, Houston. We copy your address 47 and 53. Over.
05 21 16 43	LMP-LM	Okay, thank you.
05 21 17 44	LMP-LM	Houston, Antares.
05 21 17 45	CC	Go ahead, Antares.
05 21 17 52	LMP-LM	Do we want to stay with the computed 047 and 053, or shall I reload the pad?
05 21 17 58	CC	That's affirmative, Ed; and we're only reading four digits on the DEDA. Is that 01706?
05 21 18 09	LMP-LM	That's affirmative.
05 21 18 10	CC	Roger. Out.
05 21 18 15	LMP-LM	What was the affirmative, to reload or to stay with what I have?
05 21 18 19	CC	The affirmative was to stay with the computed values that are already in the computer.
05 21 18 26	LMP-LM	Thank you.
05 21 18 51	CC	Antares, Houston.
05 21 18 58	LMP-LM	Go ahead.
05 21 18 59	CC	Roger. You can take descent battery 2 off, as per the checklist. Keep descent battery 4 online until our call. Over.
05 21 19 11	LMP-LM	Okay.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 21 04 59	CC	Kitty Hawk, Houston. Are you having an SOS sandwich there for lunch?
05 21 05 06	CMP	Not quite, but I sure wish it was.
05 21 05 09	CC	(Laughter) Okay. When you get a chance there, Stu, you can go ahead and terminate BAT A charge.
05 21 05 21	CMP	Okay. I'll do it right now.
05 21 05 24	CC	Okay. And while you're floating over there, you might be advised that the TPI DELTA-V will probably be - more than likely be - around 100 feet a second instead of about 90 or so, you know?
05 21 05 41	CMP	Okay.
05 21 05 47	CC	And your ascent pads are good the way they are.
05 21 05 55	CMP	Okay.
05 21 05 56	CC	Antares is pressing on in good shape there. They're getting set for the liftoff, about 39 minutes yet. And, as you might notice here, we're on separate air-to-ground loops. So I'll be talking to you through this pass, and I'll relay all information on up to you. When you go to the P20 attitude, the OMNI antennas just make all kinds of noise racket down here, so I may not be able to hear you, but I think you've been hearing me most of the time. So I'll just go ahead and relay, probably in the blind, most of the time line.
05 21 06 37	CMP	All right.
05 21 10 55	CC	Kitty Hawk, Houston.
05 21 10 59	CMP	Go ahead.
05 21 11 01	CC	Okay, Stu, we're going to bring the probe back with us, or you guys are, anyhow. And for TEI, just go ahead and stow it underneath the right-hand couch - you know, with the straps like we normally do, there, for temporary storage. And then, on the way - -

05 21 11 23	CMP	Okay.
05 21 11 24	CC	- - back, we'll give you some permanent stowage instructions, during transearth coast. Also, your VHF acquisition time - that's when you come over the horizon for the VHF there - will be 142:20:18.
05 21 11 55	CMP	Okay, 142:20:18; and, Ron, I'm going to be off the comm here, probably about 4 or 5 minutes.
05 21 12 03	CC	Okay; understand.
05 21 15 45	CMP	Okay, Ron; I'm back on.
05 21 15 48	CC	Okay; mighty fine, Stu.
05 21 22 40	CC	Okay, Stu. It looks like you're getting about ready to maneuver, there. Just want to let you know the LM's in good shape. About the only thing that's even pending is the - their steerable antenna, and it looks like it may not be tracking correctly on the thing. So they may be using their OMNI antennas.
05 21 23 04	CMP	Okay.
05 21 23 24	CMP	Okay, thank you, Ron. We'll see you on OMNI Delta, here.
05 21 23 29	CC	Okay. You may see me; I won't see you. We'll hope, maybe it'll work. Hey, by the way, that's a beautiful job whipping around out there - we got some real good selenodetic updates, and I'm sure we got a bunch of good pictures, by golly.
05 21 23 48	CMP	Thank you.
05 21 29 33	CC	Kitty Hawk, Houston. The APS is pressurized. Antares has a GO for lift-off; direct rendezvous on this pass.
05 21 29 45	CMP	Roger. Thank you, Ron.
05 21 29 50	CC	Roger.

TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 21 26 56	LMP-LM	Houston, we're standing by to pressurize the ascent helium.
05 21 27 03	CC	Antares, Houston. You're GO on that, one at a time, please.
05 21 27 11	LMP-LM	Got you; will go.
05 21 27 33	CDR-LM	Okay, there's number 1, Houston.
05 21 27 36	CC	Roger; stand by.
05 21 29 03	CC	Antares, Houston. You are GO on the second.
05 21 29 14	CC	Antares, this is Houston. You are GO for lift-off this pass; direct rendezvous; guidance control, PNGS. Over.
05 21 29 26	CDR-LM	Roger, GO for lift-off. Direct rendezvous; guidance, PNGS.
05 21 29 32	CC	Roger. Out.
05 21 31 23	CC	Antares, Houston. You can treat BATs 2 and 4 per the checklist, over.
05 21 31 31	LMP-LM	Okay, here we go.
05 21 32 18	CC	Antares, Houston. Both batteries 5 and 6 are looking good.
05 21 32 26	LMP-LM	Thank you.
05 21 41 02	CDR-LM	Antares, Kitty Hawk. VHF voice check. How do you read me?
05 21 41 34	CC	Antares, Houston. I'm mark at 4 minutes; stand by.
05 21 41 37	CDR-LM	Antares to Kitty Hawk. VHF check. How do you read?
05 21 41 38	CC	MARK, 4 minutes.
05 21 41 44	CDR-LM	Okay. We're right with you.

05 21 41 46	CC	Roger. Out.
05 21 41 50	CMP	Well, I can read you somewhat.
05 21 41 56	CC	And, Antares, Kitty Hawk is trying to read you on VHF.
05 21 43 04	CDR-LM	Kitty Hawk, Antares. How do you read?
05 21 43 08	CMP	Read you about 3 by, Al. How me?
05 21 43 17	CC	Antares, Houston. Kitty Hawk is reading you 3 by on VHF.
05 21 43 26	LMP-LM	Roger. We're not reading him.
05 21 43 32	CC	Okay. We'll pass that to him.
05 21 43 35	LMP-LM	And Antares is counting - counting down to 2 minutes. 3, 2, 1 -
05 21 43 42	LMP-LM	MARK. Two minutes and counting.
05 21 43 44	CC	We concur.
05 21 43 51	CC	Kitty Hawk, Houston. Little less than 2 minutes; everything is GO.
05 21 43 59	CMP	Okay, Houston.
05 21 44 00	CDR-LM	400, set 10000.
05 21 44 10	LMP-LM	Okay. 400 - -
05 21 44 11	CDR-LM	400 plus 10000.
05 21 44 17	LMP-LM	Plus 10000.
05 21 44 19	CDR-LM	Okay.
05 21 44 20	LMP-LM	***is REPRESS.
05 21 44 26	CDR-LM	Okay, Houston. The MASTER ARM is ON. The A and B lights are on. Okay. 367 readout and - -
05 21 44 36	CC	Roger. We confirm both systems ARMED.
05 21 44 37	CDR-LM	... one. Okay.

05 21 44 42	CC	Kitty Hawk, Houston. Antares has got ascent engine on.
05 21 44 50	CMP	Okay. How do you read, Antares?
05 21 44 51	CDR-LM	There's our boy. Reading you loud and clear. We are 45 seconds and counting.
05 21 44 59	CDR-LM	Roger. I - I've been reading you. You're coming through loud and clear.
05 21 45 03	CDR-LM	Okay, be up to see you shortly.
05 21 45 04	LMP-LM	Okay. Hello.
05 21 45 06	CMP	Roger. I'm waiting.
05 21 45 08	CDR-LM	Okay. DSKY's on time.
05 21 45 11	LMP-LM	Have a nice cool one set up.
05 21 45 30	CDR-LM	Okay. The abort stage is set. ASCENT ENGINE is ARMED. 6, 5, 4, 3, 2, 1, 0 -
05 21 45 42	LMP-LM	IGNITION.
05 21 45 43	CDR-LM	We have ignition - -
05 21 45 44	LMP-LM	What a lift-off!
05 21 45 45	CDR-LM	- - And LIFT-OFF.
05 21 45 46	CC	Roger. Ignition.
05 21 45 52	LMP-LM	... Pitchover.
05 21 45 53	CDR-LM	There's pitchover. 10 seconds.
05 21 45 54	CC	Roger.
05 21 45 57	LMP-LM	Okay, baby.
05 21 45 58	CDR-LM	Pitchover's good.
05 21 46 03	CC	We confirm AUTO ignition.
05 21 46 08	CDR-LM	That's affirmative. AUTO ignition.

05 21 46 19	LMP-LM	And here we're going across Cat's Paw.
05 21 46 25	CDR-LM	Watch the ball. Everything looks good, Houston.
05 21 46 36	CC	Roger. You're looking good from down here, Al.
05 21 46 37	CDR-LM	Coming up on 1 minute.
05 21 46 39	LMP	Al - -
05 21 46 40	CDR-LM	2, 1 -
05 21 46 41	CDR-LM	MARK, 1.
05 21 46 43	LMP-LM	Mark, 1. Little bit low and slow, but PGNS are - -
05 21 46 57	CDR-LM	Okay, you want to give me a 623?
05 21 47 00	LMP-LM	Okay. PGNS and AGS together.
05 21 47 04	CDR-LM	Okay. Yaw is complete, Houston.
05 21 47 06	CC	Roger.
05 21 47 14	CDR-LM	Take a look at the target again. 54829313. Targeting is still good. Okay.
05 21 47 33	CDR-LM	On 2. Okay. Coming up on 2 minutes. 3, 2, 1 -
05 21 47 41	CDR-LM	MARK, 2.
05 21 47 42	LMP-LM	H-dot is good. H-dot's right on. H is right on. PGNS and AGS are together.
05 21 47 51	CDR-LM	Okay. Steering is good. PGNS looks good, Houston.
05 21 47 55	CC	We copy, Al. And you're GO from down here.
05 21 48 02	CC	Kitty Hawk, Houston. Antares is GO.
05 21 48 05	CDR-LM	Had any luck? Tight as a drum.
05 21 48 07	CMP	Roger. I'm getting their VHF.
05 21 48 34	LMP-LM	Okay. The steering is still good, Houston; coming up on 3 minutes.
05 21 48 40	CDR-LM	3, 2, 1 -

05 21 48 41	CDR-LM	MARK it.
05 21 48 43	LMP-LM	Mark. Three minutes.
05 21 48 54	CDR-LM	V_I is good, H-dot is good, H is ***, PGNS and AGS agree.
05 21 48 56	CDR-LM	Okay.
05 21 48 57	LMP-LM	***in oscillation in our RCS pressures, but I'm sure it's ***
05 21 49 05	CC	Okay. RCS looks good from down here, Ed.
05 21 49 12	CDR-LM	***31.
05 21 49 13	CC	And you're GO from the ground at 3 and one-half. Everything is nominal.
05 21 49 21	CDR-LM	Okay, Bruce. Looks good here.
05 21 49 26	CC	Kitty Hawk, Houston. Antares is still GO from the ground.
05 21 49 34	CMP	Roger. Thank you.
05 21 49 42	LMP-LM	MARK. Four.
05 21 49 43	CDR-LM	4, 4.
05 21 49 47	LMP-LM	Fire is good.
05 21 49 48	CDR-LM	... Pitch is good.
05 21 49 49	LMP-LM	H-dot is good; H is good; AGS are right together.
05 21 49 59	CC	Antares, Houston. You're GO from the ground; looking good.
05 21 50 05	CDR-LM	Okay.
05 21 50 14	CC	Antares, Houston. We show all sources, PGNS, AGS, and MSFN, in good agreement.
05 21 50 22	LMP-LM	That's good.
05 21 50 23	CDR-LM	Okay. Thank you. About 225 to go, and the plane looks good.

05 21 50 31	LMP-LM	Looking better. That's good.
05 21 50 34	CC	Kitty Hawk, Houston. PGNS, AGS, and MSFN are all in good agreement.
05 21 50 37	CDR-LM	Now, you can stop your camera, if you want.
05 21 50 41	LMP-LM	Okay. ...
05 21 50 42	CMP	Thank you.
04 21 50 45	CDR-LM	Okay. We're going to be on ... at 5:30.
05 21 51 08	CDR-LM	*** 5:30 to -
05 21 51 11	CDR-LM	MARK it.
05 21 51 14	LMP-LM	5:30. ... is good; H-dot's good; H is good; PGNS and AGS agree.
05 21 51 39	CDR-LM	Okay. Let's take one more at 6:30.
05 21 51 41	LMP-LM	All right.
05 21 51 50	CC	Antares, this is Houston. Trim the PGNS ... - -
05 21 51 51	CDR-LM	Let's take a look at 6:30.
05 21 51 52	LMP-LM	That's what you said. Okay.
05 21 51 58	CDR-LM	Right. Take a look at 85 versus 500 for a minute.
05 21 52 04	CDR-LM	... 946.
05 21 52 05	LMP-LM	Okay. I'll stay with 500.
05 21 52 09	CDR-LM	Okay. Very good.
05 21 52 10	LMP-LM	You're looking good. There's 800, 750, 600, 550, 500. Main valves are OPEN - -
05 21 52 28	CDR-LM	Okay. Main valves OPEN; ASCENT stage, CLOSED.
05 21 52 29	LMP-LM	- - ASCENT stage, CLOSED. 350, 300, 250, 200, 150, 100, 80, 60, 50, 40, 30, 10.

05 21 52 54	LMP-LM	SHUTDOWN.
05 21 52 55	CDR-LM	Okay. We've had a shutdown on the - -
05 21 52 59	CC	Roger; trim the PGNS, all axes.
05 21 53 01	LMP-LM	And those residuals are good.
05 21 53 02	CDR-LM	... reset. *** button push KEY RELEASE.
05 21 53 09	LMP-LM	Hit PRO.
05 21 53 10	CDR-LM	Okay. ***
05 21 53 11	LMP-LM	Here's your residual - -
05 21 53 12	CDR-LM	8.
05 21 53 13	LMP-LM	- - minus 0.8.
05 21 53 15	CDR-LM	Okay.
05 21 53 20	LMP-LM	*** when we shut down. Go with that, Al. That looks good.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 21 53 31 CDR-LM Okay, minus 0.1, minus 0.4, plus 0.5.

05 21 53 38 CC Houston. We copy.

05 21 53 41 LMP-LM ***those.

05 21 53 42 CDR-LM ***extend. ***kay.

05 21 53 47 LMP-LM Better say them again, Al. Minus 0.1, minus 1.4, and hold.

05 21 54 15 LMP-LM Okay. Pressing on with the checklist.

05 21 54 26 CDR-LM Okay. We can go IC ***T.

05 21 54 34 CC Antares, Houston. There will be a tweak burn. It'll come up shortly.

05 21 54 44 LMP-LM Roger.

05 21 54 57 CC Antares, this is Houston. Tweak T_{ig} 142:36:51.
DELTA-V: X, minus 2.0; Y, plus 5.0; Z, minus 8.0; and this is it the nominal yaw 30 attitude. Read back. Over.

05 21 55 32 CC Antares, Houston. Did you copy the tweak burn? Over.

05 21 55 40 CDR-LM That's affirmative, Houston. We're setting up for it now.

05 21 55 43 LMP-LM Roger. 142:36:51, and minus 2.0, plus 5.0, minus 8.0.

05 21 55 50 CC Roger, Ed.

05 21 55 57 LMP-LM 36:51, Al. Getting AGS set up for you. Which axis are you going to do first? Biggest one is Z, minus - Z, minus 8.

05 21 56 18 CC X, Z, Y, Ed. X, Z, Y. Over.

05 21 56 23 LMP-LM Do X, Z, Y. Al, they want X, Z, Y.

05 21 56 32	LMP-LM	51, 20 seconds. That's minus 2. That is 2.0. Okay. Give it. Good. Z is minus 8. Z, minus 8 up and - Z. 1, 2, 4, 5 - 5, and 6, 7 - 1 foot more - that's 79; that looks good. 471 out of plane is plus 5 right. 3 and one-half, 4 and one-half; that's great. Right there. Hold it.
05 21 57 54	CDR-LM	Hey, Houston, Tweak's complete.
05 21 57 57	CC	Roger; out.
05 21 57 58	LMP-LM	It's good old P47. Okay. 8.
05 21 58 11	CC	Antares, Houston. You're GO for the APS TPI. APS TPI. Over.
05 21 58 19	LMP-LM	Roger. Thank you.
05 21 59 23	CC	Antares, Houston. How do you read?
05 21 59 29	CDR-LM	Loud and clear, Bruce. I'll lock up for you - ...
05 21 59 33	CC	Roger. Reading you the same.
05 21 59 56	LMP-LM	We're locked up on the steerable.
05 22 00 00	CC	Loud and clear, Ed.
05 22 01 11	CC	Antares, Houston. No state vector updates are required. Over.
05 22 01 19	LMP-LM	Roger. Thank you.
05 22 01 20	CC	And Stu reports he's having problems locking on in VHF.
05 22 01 29	LMP-LM	Okay.
05 22 03 43	CC	Antares, this is Houston. We believe that the command module VHF ranging lock problem may be due to the conversation on the loop. Your conversation even over the intercom within the LM is enough to break it up and inhibit lock; so maybe you can get Stu to give you a mark when he's ready to throw the RANGING RESET switch, and then remain silent for about 20 seconds, both spacecraft. Over.

05 22 04 09	LMP-LM	Roger. We understand. Give us a call, Stu, when you need it.
05 22 07 39	CC	Antares, this is Houston. We've been informed that all systems are looking good. In particular, BATs 5 and 6 are normal, and you're in good shape trajectory-wise going around the corner. We've got 6 and one-half minutes to LOS and we anticipate having a gound TPI solution for you prior to LOS. Over.
05 22 08 11	LMP-LM	Houston, Antares. I lost my S-BAND ANTENNA breaker again.
05 22 08 29	CC	Antares, this is Houston.
05 22 08 36	CDR-LM	Go ahead, Houston.
05 22 08 39	CC	Antares, Houston. Request AFT OMNI and LO BIT RATE.
05 22 08 46	CDR-LM	Okay.
05 22 08 49	LMP-LM	And you have it.
05 22 08 51	CC	And it looks like your present attitude is blocking the steerable antenna from pointing at the Earth.
05 22 09 03	LMP-LM	Maybe so, but it's also popped a circuit breaker.
05 22 09 07	CC	Roger. If it runs into the stop, I believe it will.
05 22 09 13	LMP-LM	It didn't. It popped just before it went to the stop.
05 22 09 16	CC	Roger. Out.
05 22 13 05	CC	Antares, Houston. Comm check; over.
05 22 13 11	CDR-LM	Loud and clear, Houston. How me?
05 22 13 13	CC	Roger. Out.
05 22 13 40	CC	Apollo 14, this is Houston. LM TPI ground solution, DELTA-V: X, plus 63 feet per second; Y, plus 1; Z, plus 67. I say again, LM TPI DELTA-V: X, plus 63.0; Y, plus 1.0; Z, plus 67.0. Antares, Over.

05 22 14 10 LMP-LM Roger. Copy plus 63, plus 1, plus 67, thank you.

05 22 14 17 CC Roger. Out. Ten seconds to LOS. Go get them. See you on the other side, Ed.

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM

05 21 54 54 CC Kitty Hawk, Houston. Are you copying the LM VHF?

05 21 55 20 CMP That's affirmative, Ron. I am reading them loud and clear.

05 21 55 22 CC Okay. Mighty fine. And, Kitty Hawk; Houston. There will be a tweak burn.

05 21 55 37 CMP Understand. There will be a tweak.

05 21 55 39 CC Affirmative.

05 21 58 36 CC Okay, Kitty Hawk; Houston. You're GO for a direct rendezvous.

05 22 00 19 CC Kitty Hawk, Houston; we're still checking your vector. You're not ...

05 22 00 27 CMP Okay, I was just going to start on that when I got a GO on it. My VHF won't stay locked on, Ron. It'll just flash me a RANGE and then drop right back off again. Anybody got any good ideas?

05 22 00 43 CC Okay, let me check the - You say your VHF won't stay locked on. It locks on and then comes right back out again. Is that correct?

05 22 00 53 CMP That's affirmative. It just flashes me a RANGE and then drops right back to zero.

05 22 00 59 CC Okay.

05 22 01 54 CC Kitty Hawk, Houston. LM update - or LM state vector update is not required. You're GO the way it is. And any better luck on the VHF?

05 22 02 09 CMP Okay. No, it's still the same.

05 22 02 25 CC Kitty Hawk, Houston. I just can't read you.

05 22 02 54	CC	Kitty Hawk, Houston. Transmitting kind of in the blind here, because I can't read you; but go ahead and try to take the VHF monitor, and see if you get a tracking light or not.
05 22 03 07	CMP	That's affirmative. I do.
05 22 03 31	CC	And, Kitty Hawk; you want to be sure and make sure that the Antares remains quiet on the VHF there while we're trying to lock up on the thing.
05 22 05 20	CC	Kitty Hawk, Houston. It looks like the VHF may have - may have locked up after your NOUN 49 value you had on it.
05 22 05 34	CMP	Yes. It's going okay.
05 22 05 40	CC	Okay.
05 22 10 07	CC	Kitty Hawk, Houston. Your vehicle's in good shape. You've got about 5 minutes to LOS here. And, Stu, you're accepting all the optics monitor in good shape. You probably better go ahead and accept the VHF monitor, also.
05 22 11 21	CC	Kitty Hawk, Houston.
05 22 11 27	CMP	Go ahead, Houston.
05 22 11 30	CC	Okay. Stu, it looks like we're getting some bad VHF spots in there. Just reinitialize the W-matrix and go sextant only - sextant only. So, mark it.
05 22 11 44	CMP	Okay. You say reinitialize? I've already accepted one.
05 22 12 05	CC	Kitty Hawk, don't worry about the W-matrix on the ground. Just press on. Accept sextant marks only.
05 22 12 16	CMP	It's too late. I've already initialized it.
05 22 12 29	CC	Kitty Hawk, Houston. Request OMNI Bravo.
05 22 13 41	CC	Apollo 14, this is Houston. LM PPI ground solution. DELTA-V: X, plus 63 feet per second; Y, plus 1; Z, plus 67. I say again. LM PPI, DELTA-V: X, plus 63.0; Y, plus 1.0; Z, plus 67.0. Antares, over.

05 22 14 10	CC	Kitty Hawk, Houston. Looks like the best ground solution we have down there for the LM is about as written. It's plus 63.0, plus 1.0, and plus 67.0.
05 22 14 46	CC	Kitty Hawk, Houston. About 30 seconds; you're looking good. We'll see you on the other side.
05 22 39 --		BEGIN LUNAR REV 32

SEPARATE, SIMULTANEOUS COMMUNICATIONS LINK IN USE BETWEEN CC AND CM SECURED; TRANSCRIPT OF COMMUNICATIONS BETWEEN CC AND LM RESUMED

05 23 01 47	CC	Apollo 14, this is Houston. Over.
05 23 02 10	CC	Antares, this is Houston. How do you read? Over.
05 23 02 15	LMP-LM	We read you loud and clear, Houston.
05 23 02 17	CC	Roger, Antares. How'd it go?
05 23 02 22	CDR-LM	Well, things just about as nominal as they could be. We had good TPI and midcourses of around 1.9 and 1.1 feet per second, DELTA-V ... Give you the exact numbers if you want them, but everything's just about nominal.
05 23 02 42	CC	We'd like the numbers for TPI.
05 23 02 43	LMP-LM	You're locked up on the steerable, Houston.
05 23 02 47	CC	Say again, Ed.
05 23 02 49	CDR-LM	Okay. Ed will give - Ed will give them to you.
05 23 02 55	LMP-LM	Okay. The numbers for TPI: NOUN 81, plus 62.1, plus 0.1, plus 63.1; burned on time; and nulled PGNS to 00 plus 0.1.
05 23 03 11	CC	Roger. And say again about the steerable.
05 23 03 25	CC	Kitty Hawk, Houston. Are you reading us now?
05 23 03 29	CMP	I'm reading you loud and clear.
05 23 03 31	CC	Roger, Stu. Could we have your TPI solution, please?

05 23 03 38	CMP	Stand by 1.
05 23 04 11	CMP	Houston, Kitty Hawk.
05 23 04 13	CC	Go ahead, Kitty Hawk.
05 23 04 20	CMP	Okay. On the VHF - I mean a sextant only solution, I had a minus 67.4, plus 0.5, minus 69.2. I did get the ranging to work when our comm got better after TPI. And everything's worked out good.
05 23 04 41	CC	Understand; you did get the VHF ranging going after TPI?
05 23 04 47	CMP	That's affirmative.
05 23 04 51	CC	Sounds good.
05 23 05 39	CMP	Well, Bruce. I was going to send you some TV. I had it on STANDBY and I went to TRANSMIT and I could see the surface pretty good and all of a sudden it quit.
05 23 06 02	CC	Stand by on that, Stu. We can probably get it working again.
05 23 06 06	CMP	How are you configured down there? Okay.
05 23 06 18	CC	Stu, this is Houston. I think that's a ground-commanded configuration problem. And as soon as we're through dumping the backside tape, we'll give it back to you.
05 23 06 32	CMP	Okay. What are you doing way down there, oh Fearless One?
05 23 08 19	CMP	... I show you at 1.52 or something like that.
05 23 08 54	CC	Kitty Hawk, Houston. We'd like you to load the nominal LM weight and the DAP please, 5700.
05 23 09 06	CMP	Okay.
05 23 09 20	CMP	I got a spot - -
05 23 09 49	LMP-LM	The line of sight through the COAS looks real good.

05 23 10 17	CC	Okay Stu, we're getting a great TV signal now.
05 23 10 23	CMP	Okay. I'll try a little zoom. I don't know if you can pick him up yet or not.
05 23 10 33	CC	Okay, can you tell us roughly where he is in the monitor and grid coordinates?
04 23 11 04	CMP	He's right on the top of B and C. On the line in between them it looks like, Bruce.
05 23 11 12	CC	Roger. Is that B-2 and -3?
05 23 11 18	CMP	Well, let me see. I can't see that far over to the monitor. Let me take another look.
05 23 11 23	CC	Oh, don't worry about it.
05 23 11 24	CMP	I'll look out the window here first.
05 23 11 37	CC	Okay. We've got it now.
05 23 11 52	CC	Roger, Stu. We've got him at the left-hand edge of our picture about one-third of the way down from the top. Growing bigger every second.
05 23 12 04	CMP	Okay. Roger.
05 23 14 02	CMP	Looking mighty pretty. No sweat.
05 23 14 36	CMP	Okay, I believe I'll just have a few pictures of you here.
05 23 15 20	CMP	You've lost a little weight since the last time I saw you.
05 23 16 04	CMP	Okay.
05 23 16 57	CDR-LM	Houston, Antares is stationkeeping at about 100 feet. Closing in a little more for the pictures of the service module and command module.
05 23 17 04	CMP	Roger, Al. We've got you on television, and it's looking beautiful.
05 23 17 19	CMP	Okay, anytime you're ready Al, you -

05 23 17 24	CDR-LM	Okay, we've got you Stu. Go ahead and turn it around, we'll photograph you.
05 23 17 27	CC	Say, Stu - -
05 23 17 28	CMP	Okay. I'm going to turn the TV off here.
05 23 17 29	CC	- - Stu, looking at the ascent stage of the LM, it looks like there's something hanging loose from the bottom of it. A piece of wire or insulation or anything. Any comment on that?
05 23 17 43	CMP	Yes, I saw that. I was going to wait until we got in a little closer. Probably part of the separation plane, I'm sure.
05 23 17 49	CC	Yes, we - we concur on that.
05 23 17 50	CMP	Let me turn the TV out here before I blast it into the Sun on this pitcharound, Bruce.
05 23 17 54	CC	Roger.
05 23 18 05	CC	And, Stu, we'd like to confirm that you got the LM weight of 5700 pounds loaded in the DAP prior to the docking.
05 23 18 15	CMP	Okay.
05 23 18 19	CDR-LM	Okay, I see a smooth loop there.
05 23 18 21	CMP	That's no problem, Bruce. Because I dock and I'll go FREE, and then I'll get all that squared away, but I'll load it in.
05 23 18 30	CC	Roger. Out.
05 23 18 31	CMP	Okay. Stand by 1 here. Okay, I shall do a loop, leader.
05 23 18 41	CDR-LM	Okay, make it smooth.
05 23 18 46	CMP	And around we go.
05 23 18 48	CDR-LM	Show us a little style. Oh, you look good.
05 23 18 57	CMP	There I was at 240,000 coming over the top.

05 23 19 03	LMP-LM	That's our home away from home.
05 23 19 16	CC	Would you believe 360,000?
05 23 19 23	LMP-LM	Yes.
05 23 19 33	CDR-LM	Okay, Houston. Kitty Hawk is doing an extremely smooth loop. We're sitting at 70 feet watching him go around. He looks very clean. Engine ... looks very clean - - ...
05 23 21 56	CDR-LM	Oh, you look clean. Nice and clean, Stu.
05 23 22 09	LMP-LM	Want to come in a little closer? It'll save you some gas.
05 23 22 24	CC	Ed, this is Houston. When you get a chance, on panel 16, would you check the ASA - AEA circuit breakers. We've lost data from the AEA only. Over.
05 23 22 40	LMP-LM	They're both in.
05 23 22 41	CC	Thank you.
05 23 22 44	CDR-LM	That close enough?
05 23 22 48	CMP	Yes, that ought to do it.
05 23 23 24	CMP	Okay, I've got the stationkeeping. Houston, what that is trailing is a little bit of that foil on the bottom part of that tank area, there.
05 23 23 42	CC	Thank you, Stu.
05 23 23 43	CMP	Looks like during separation, the foil - that insulation got - got ripped. The other side is down tight. And the side you're looking at there is ripped out pretty badly.
05 23 23 58	CC	Roger. Thank you, Stu. And we got a real good TV picture.
05 23 25 15	CMP	Okay.
05 23 25 ?	CC	Antares, this is Houston. Request LO BIT RATE, AFT OMNI. Over.

05 23 25 45	CMP	You want LO BIT RATE, AFT OMNI? Let's see, I wouldn't come in much closer than that, Al. Aren't you going to do your roll? Okay. Yes.
05 23 26 06	CDR-LM	Okay, I'm starting my roll.
05 23 26 15	LMP-LM	Houston, Antares. How do you read?

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

05 23 22 01	CMP	Okay, why don't you just stop it there. I need to translate down and right, here. Okay.
05 23 22 08	CC	And, Kitty Hawk, we show you - -
05 23 22 10	LMP-LM	Houston, Antares. Over.
05 23 22 15	CC	- - P47 for the docking. Go ahead, Antares.
05 23 22 20	CMP	Roger.
05 23 22 21	LMP-LM	Roger. You're on the OMNIs and be advised I seem to have lost AGSs, although I have no warning.
05 23 22 27	CC	Roger, Ed. We copy.
05 23 22 30	CMP	Okay, Houston. I have a - Houston, I have the LOGIC ON and would like a GO for PYRO ARM.
05 23 22 46	CC	Kitty Hawk, Houston. You're GO for PYRO ARM.
05 23 22 53	CMP	Okay. They're coming on.
05 23 28 13	CC	Antares, this is Houston. We'd like to get the steerable up. PITCH, 170; YAW, plus 55; HIGH BIT RATE and request that you and Kitty Hawk do not make contact until we establish good telemetry. Over.
05 23 28 33	LMP-LM	Roger; Ed. Steerable up. Say again ... just a second.
05 23 28 37	CC	Okay. PITCH, 170; YAW, plus 55, Ed. Over.
05 23 29 00	CMP	Say again.
05 23 29 04	LMP-LM	Houston, we're locked up. How do you read?
05 23 29 06	CC	Roger. Loud and clear, Ed, and we got HIGH BIT RATE.
05 23 29 12	LMP-LM	Okay.
05 23 29 38	CC	Apollo 14, this is Houston. You're GO for the docking.

05 23 29 46 LMP-LM Roger. We got you.

05 23 29 52 CMP Yes. How about that?

05 23 31 53 CMP Say again.

05 23 32 33 CMP Okay, we capture.

05 23 32 39 CC Beautiful. Normal docking.

05 23 32 54 CMP Okay. And we got hard dock.

05 23 32 56 CC Beautiful. There's a big sigh of relief being breathed around here.

05 23 33 07 CDR All over the world, there is.

05 23 33 08 CMP You ought to try it from up here.

05 23 33 11 CC This world and out of this world, too.

05 23 33 28 CMP Let me - let me clean up over here and I'll be -

05 23 33 42 CC Antares, Houston. When you have a moment, go to POO and DATA for us, and we've got an uplink for you. Good.

05 23 33 58 CDR Okay. You have it, Houston.

05 23 34 01 CC Thank you.

05 23 34 07 LMP Houston, are you going to give me the LM - command module weight?

05 23 34 15 CC Ed, this is Houston. Understand you want the command module weight now?

05 23 34 24 LMP Whatever you have; I'm out, ready to copy.

05 23 34 26 CC Okay. CSM is 34727 and the LM is 5103. Over.

05 23 34 44 LMP Understand. 5103, 34727.

05 23 34 49 CC That's correct, Ed.

05 23 35 04 CC And, Kitty Hawk; Houston. When you get through with what you're doing there, Stu, I do have SEP

pad for you and a - an updated DAP load, but there's no rush on either one.

05 23 35 17 CMP Okay. I'll take the DAP load now. That's what I'm working on.

05 23 35 20 CC Roger. CSM is 34727.

05 23 35 36 CMP Okay. 34727, thank you.

05 23 35 38 CC LM, 5103.

05 23 35 50 CMP Okay, and 05103.

05 23 35 54 CC Roger. Out.

05 23 36 02 CC Antares, Houston. I have a LM impact P30 pad for you when you're free.

05 23 36 13 LMP Roger. Give me 5 seconds.

05 23 36 34 CMP Well, I guess we'd better get to cracking, troops. I've got to put your 160 pounds of rocks some place.

05 23 36 40 CDR Yes. Can't do it until we get the tunnel open.

05 23 36 44 CMP Roger. I'll be working on that in just a second here. I'll start equalizing.

05 23 37 30 CMP Okay, Antares. I'm going to be off the - off the air for about 3 minutes here.

05 23 37 40 LMP Okay, Stu.

05 23 37 56 LMP All right, Bruce, GO on your P30 pad.

05 23 38 01 CC Say again, Ed.

05 23 38 06 LMP I'm ready to copy P30 pad.

05 23 38 08 CC Okay. P30 purpose, good-bye LM. T_{ig} 147:54:18.90; NOUN 81, minus 0182.0, plus 0039.0, plus all balls; H_A and H_P are NA; DELTA-V_R 0186.1; 1:15; 012, 176; minus 0181.9, plus 0039.0, minus 0006.0. Read back. Over.

05 23 39 06 LMP — I've got your impact P30 pad. 147:54:18.90; minus 0182.0, plus 0039.0, plus all zeros; H_A, H_P, NA; 0186.1; 1:15; 012, 176; minus 0181.9, plus 0039.0, minus 0006.0. End of pad.

05 23 39 42 CC — Roger. And you've already got the LM weight.

05 23 39 49 LMP — That's firm.

05 23 39 52 CC — Okay, Ed. If you would, we'd like a few words from you on the subject of the AGS. We've lost the AGS downlink telemetry and sort of at a loss as to what its current status is. Could you spare a little time for that?

05 23 40 11 LMP — Roger. It performed beautifully up until the time you asked me to check circuit breakers. I looked, and the circuit breakers are okay. I tried to look at it from a backup breaking gate about that time, and found I could not access it. Furthermore, the ball, the AGS ball, is still at 150 degrees pitch, zero yaw, zero roll and - has been for some time. And I had no warnings. All the circuit breakers were in, but I cannot access it to give a self test.

05 23 40 49 CC — When was the last time you tried to access it, Ed?

05 23 40 57 CC — Successfully?

05 23 40 59 LMP — Well, just now at - oh - about - oh, shortly before we hit the breaking gate.

05 23 41 08 CC — Roger.

05 23 41 24 CC — Ed, this is Houston. We'd like you to - on panel 16, cycle the ASA and AE circuit breaker - AEA circuit breaker, if you would, please?

05 23 41 45 LMP — Okay. They're cycled. In further answer to that last question, Bruce. It was some - somewhere around AOS, but I don't remember exactly when.

05 23 41 55 CC — Roger, Ed. That's close enough.

05 23 41 58	LMP	Good enough. I abandoned the AGS and started setting up the cameras for the docking about that point.
05 23 42 05	CC	Okay, Ed. And, if you didn't see any change, we'd like you to take the AGS operate switch - the AGS STATUS switch and cycle it from OPERATE to STANDBY and back to OPERATE, and if that doesn't do any good, on panel 11, we'd like to close the Commander's AEA circuit breaker. Over.
05 23 42 34	LMP	Okay. That hasn't been any good. We'll try the other one.
05 23 42 41	CMP	Okay. I'm back now.
05 23 43 01	LMP	That doesn't seem to help either, Bruce.
05 23 43 05	CC	Okay. Which one was that?
05 23 43 11	LMP	Any of them. I - I put in the Commander's circuit breaker and still has not gotten anywhere with it.
05 23 43 16	CC	Okay. Let's skip the AGS and leave it in its present situation and I've got a few items I'd like to read off for return - over and above the nominal return items.
05 23 43 47	CC	Ed, this is Houston. I'd like to read you up some extra return items, if you've got a piece of paper around.
05 23 43 58	LMP	Okay, I'm ready to copy.
05 23 43 59	CC	Okay, item number 1, the 100-foot tether. Over.
05 23 44 11	LMP	Okay, we got that one.
05 23 44 13	CC	Number 2, the LEC waste/tether combination. Over.
05 23 44 24	LMP	Okay.
05 23 44 26	CC	Number 3, 30-foot tiedown webbing. Over.
05 23 44 43	LMP	Okay.
05 23 44 46	CC	Item number 4 - -

05 23 44 47 CMP Okay, I'm cracking the hatch now.

05 23 44 48 CC - - We would like to bring back the Commander's Hasselblad and recommend that that go in the ISA. If you want to bring back the LMP Hasselblad, also, that could go in B-1, but we need the Commander's Hasselblad. Over.

05 23 45 06 LMP (Laughter) We thought about bringing them both back, but since you said not to, we left one on the surface. But you'll have the CDR's.

05 23 45 14 CC Roger, we copy. Item number 5, we want both of the LMP's EVA gloves. Over.

05 23 45 26 LMP Okay, they're aboard.

05 23 45 30 CC And, of course, we're going to bring back the docking probe. Now, on stowage: the first three items, the tethers and the webbing, can go in the temporary stowage bags in the command module. The Hasselblad in the ISA, which is normal, and your gloves can go in the PGA bag, and the probe up underneath the right-hand couch in the temporary stowage location.

05 23 45 59 LMP Okay, we've already stowed most of this stuff, Bruce. The tether - the 100-foot tether is already in the ISA; the LEC waste tethers can go in the TSB and so can the 30-foot tiedown webbing. The Commander's Hasselblad we can put in the ISA; the EVA gloves are already in the ISA.

05 23 46 26 CC Okay, stand by, please.

05 23 47 25 CC Ed, this is Houston. Over.

05 23 47 31 LMP Go ahead.

05 23 47 33 CC We'd like to get the - the tethers, especially the 100-foot tether, out of the ISA, because you're going to be bagging the ISA in a - a contamination bag, and we plan on using the 100-foot tether, the LEC waste tether, and the 30 feet of tiedown for securing the docking probe for reentry; so we'd like - if you can do it without impact, we'd like you to get that stuff out before you put the ISA in the contamination bag. All the other stowage is okay. Over.

05 23 48 05 LMP Okay, we'll see what we can do.

05 23 48 07 CC Roger.

05 23 48 36 CC Kitty Hawk, Houston. Are you back on the line? Over.

05 23 48 52 CMP That's affirmative.

05 23 48 43 CC Okay. I don't want to interrupt, but whenever you're free, I've got your SEP pad.

05 23 48 55 CMP Okay, why don't I take it now? I'm waiting for a hatch check here.

05 23 49 01 CC Okay, let me know when you're ready.

05 23 49 06 CMP Well, let her rip.

05 23 49 08 CC Okay. CSM SEP, RCS, T_{ig}, 146:30:00.0; NOUN 81, minus 0001.0; Y and Z are all zips; roll, 301, 355, 348; the rest of the pad is NA; remarks, LM-jettison time, 146:25:00; and the roll, pitch, and yaw for LM jettison are the same as for SEP. Over.

05 23 50 04 CMP Okay. SEP pad, 146:30:00.00; DELTA-V_X, minus 1.0, all zips, all zips; 301, 355, 348; jettison, 146:25:00.00; 301, 355, and 348.

05 23 50 32 CC Roger.

05 23 50 44 LMP Okay, Bruce. I'm ready to copy any pads you have for me.

05 23 50 50 CC Ed, this is Houston. I believe we're up to date already on you.

05 23 50 59 LMP Okay. I misunderstood. I thought you had a call for me a minute ago.

05 23 51 36 CC Kitty Hawk, Houston. We'd like to get POO and ACCEPT, if that's convenient with you, and confirm all the ROTATIONAL HAND CONTROL POWER DIRECT switches, OFF, please.

05 23 51 55 CMP Okay. You've got POO and ACCEPT and DIRECT, OFF.

05 23 51 59	CC	Roger. Out.
05 23 52 15	LMP	Stu, are the pressures equal in the tunnel yet?
05 23 52 19	CMP	That's affirmative. I'm about to drop the hatch.
05 23 52 53	CMP	And, Ed, did you verify, or Al, the FORWARD DUMP VALVE to AUTO?
05 23 52 59	LMP	That's verify, Stu.
05 23 53 00	CMP	Okay.
05 23 53 11	CMP	How dusty was it down there?
05 23 53 15	LMP	We don't have a lot of dust in here, but our suits are sure filthy.
05 23 53 19	CMP	Okay.
05 23 56 39	CC	Kitty Hawk, Houston. Computer is yours.
05 23 56 46	CMP	Okay.
05 23 57 57	CC	Kitty Hawk, Houston. Were you calling?
05 23 58 05	CMP	That's negative, Bruce.
05 23 58 07	CC	Roger. Out.
06 00 01 47	CC	Apollo 14, this is Houston; 12 minutes to LOS.
06 00 01 56	LMP	Okay, Bruce.
06 00 09 51	CC	Apollo 14, this is Houston.
06 00 09 58	CMP	Go ahead, Houston.
06 00 10 00	CC	Apollo 14, Houston. With 3 minutes and 45 seconds to LOS, both vehicles are GO on all systems. We'll see you on the other side. Over.
06 00 10 14	CMP	Okay.
06 00 37 --		BEGIN LUNAR REV 33
06 01 01 44	CC	Apollo 14. Apollo 14, this is Houston. How do you read?

06 01 02 16 CC Apollo 14. Apollo 14, this is Houston. Over.

06 01 02 34 CC Apollo 14. Apollo 14, this is Houston. Over.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 01 05 51	CC	Apollo 14, this is Houston. How do you read? Over.
06 01 06 12	CMP	Houston, 14. Read you loud and clear.
06 01 06 16	CC	Roger, 14. I'm reading you down in the mud, here; but I can understand what you're saying. How are you progressing on the closeout?
06 01 06 29	CMP	You're coming in 5 square here; so, if you've got anything to say, we might can pick it up. And we're pressing along nicely.
06 01 06 37	CC	Roger. For your information, although I don't want to make this a formal flight-plan update at this time, after TEI, there will be no lunar topo, that is, no Hycon-camera photos. Do plan on taking the - Hasselblad shots, and the visual assessment of targets 1 and 2. But right after your DAP load at 150 hours plus 32 minutes, you can plan on initiating PTC and then initiating sleep. Over.
06 01 07 14	CDR	I don't believe that will be a hard one to fill.
06 01 07 17	CC	I didn't figure you'd fight us on it.
06 01 10 22	LMP	Houston, 14.
06 01 10 25	CC	Apollo 14, this is Houston. Go ahead.
06 01 10 32	LMP	Okay, Bruce. What are we going to do about this closeout of the LM? Just ignore the AGS, huh? And stay with the PGNS? And everything else the same?
06 01 10 41	CC	Stand by, Ed.
06 01 11 35	CC	Antares, Ed; this is Houston. On the configuration, you may just leave the AGS in its current configuration. No need to target it or even fool around with it. And we'll be talking to you as you progress through the closeout. This does not constitute a GO for closeout. Over.

06 01 12 01	LMP	Roger; Roger. Understand.
06 01 13 53	CC	Antares, this is Houston. Over.
06 01 14 01	LMP	Go ahead, Houston.
06 01 14 03	CC	Antares, this is Houston. We'd like you to go through the DAP-loading procedure at the top of page 15 in your LM Time Line Book. We don't show the 12021 loaded in the DAP. Over.
06 01 14 23	LMP	That's affirm, Houston. I haven't - I deliberately held off on that one.
06 01 14 29	CC	Roger. We're showing some RCS thruster firings that maybe aren't necessary.
06 01 14 39	LMP	Okay, loading it now.
06 01 20 06	LMP	Houston, 14.
06 01 20 10	CC	Apollo 14, this is Houston. Go ahead.
06 01 20 16	LMP	Roger, Bruce. I'm at the - ready for IVT to the command module.
06 01 20 24	CC	Okay. Stand by, and I'll try and get you a GO.
06 01 20 34	LMP	Oh, Bruce. The thing we're short on is getting the comm up here the way you want it. I don't - you haven't given me any steerable angles to set on.
06 01 20 49	CC	Okay, Ed; you can go ahead and configure the comm at this time. The nominal values in the flight plan. PITCH, minus 40; YAW, plus 49, are valid. Over.
06 01 21 05	LMP	Okay, I'll use those.
06 01 21 59	LMP	Houston, your steerable is beeped up, and on SLEW.
06 01 22 05	CC	Roger, Ed; the comm looks good to us and now we need RBTs 5 and 6 on both NORMAL and BACKUP FEED, over.
06 01 22 18	LMP	Okay. That's what I was waiting for. Here we go.

06 01 23 58	CC	Antares, this is Houston. You're GO for final closeout; good bye. Over.
06 01 24 06	LMP	Okay, so long; see you on the other side.
06 01 24 09	CC	Roger; out.
06 01 28 51	CMP	Houston, 14.
06 01 28 54	CC	14, this is Houston. Over.
06 01 29 01	CMP	Okay, I'm bringing on the LOGIC switches.
06 01 29 03	CC	Roger; stand by for PYRO ARM.
06 01 29 40	CMP	Okay, Bruce. LOGIC is ON.
06 01 29 44	CC	Roger, Stu; stand by.
06 01 30 07	CC	Apollo 14, this is Houston. You are GO for PYRO ARM, over.
06 01 30 15	CMP	Okay, thank you.
06 01 38 25	CMP	Houston, 14. I still have GO for jettison on time, 146 plus 25?
06 01 38 30	CC	Stand by, Stu.
06 01 38 50	CC	Apollo 14, this is Houston. You are GO for a LM jettison on time. The only thing we see is P47, when you get down to it in the time line just before JETT. Over.
06 01 39 05	CMP	Okay. I'll get my pyros - armed in a ...
06 01 39 10	CC	Say again about the pyros armed.
06 01 39 13	CMP	Oh, I was just saying I was only missing one thing. I said I got to get my pyros armed, too.
06 01 39 20	CC	Roger. We gave you a GO for - -
06 01 39 21	CMP	I'm on the last two things on the checklist.
06 01 39 24	CC	- - the pyro arm a while ago.

06 01 39 27	CC	Roger. We don't mean to be backseat driving.
06 01 39 30	CMP	That's all right.
06 01 42 39	LMP	Houston, 14.
06 01 42 48	LMP	Houston, 14.
06 01 42 49	CC	Apollo 14, this is Houston. Go ahead.
06 01 42 55	LMP	Roger. Can you verify you can get into the computer; or have you verified it?
06 01 42 59	CC	Roger. The computer in the LM? Over.
06 01 43 05	LMP	That's affirm.
06 01 43 08	CC	Roger, we have verified it.
06 01 43 12	LMP	Roger. Thank you.
06 01 45 05	CMP	Hey, it worked that time.
06 01 45 11	CC	Roger, 14.
06 01 45 16	LMP	And we bid sayonara to Antares.
06 01 45 20	CC	Roger, 14.
06 01 52 16	CMP	Okay, Houston, we're through with the LM SEP burn there, and we're maneuvering to the P52 ATT.
06 01 52 26	CC	Roger, we copy; through with the SEP burn and maneuvering.
06 02 04 54	CC	Apollo 14, this is Houston. We have approximately 10 minutes to LOS. After you arrive at your P52 attitude, we'll be ready to send you up a - a desired orientation uplink, and have you noticed any dust floating around?
06 02 05 21	CC	Apollo 14, Apollo 14; this is Houston.
06 02 05 23	CMP	Go ahead, Houston. Do you read 14?
06 02 05 27	CC	Roger, 14.

06 02 05 35	CC	14, this is Houston. Six minutes and 30 seconds to LOS. How do you read? Over.
06 02 05 46	CMP	You're completely unreadable, Houston. Everytime you talk, we drop the signal.
06 02 05 50	CC	Roger. Stu, you're coming in pretty well now. We'd like to have you acquire us on the HIGH GAIN.
06 02 06 03	CMP	Houston, if you're asking for POO and ACCEPT, you have it.
06 02 06 07	CC	Thank you. We also need the HIGH GAIN.
06 02 06 26	CC	Apollo 14, Houston. How do you read?
06 02 06 36	CMP	Houston, everytime you transmit, our signal strength goes down, just right in synchronization with your words.
06 02 06 48	CC	Roger. Out.
06 02 07 11	CMP	Houston, do you read 14?
06 02 07 27	CMP	Houston, if you're wanting POO and ACCEPT, you have it.
06 02 08 00	CMP	Houston, how do you read 14?
06 02 11 39	CC	Apollo 14, this is Houston. Uplink complete. It's your computer. At 147 plus 10 plus 00, we'd like you to maneuver to roll, 026; pitch, 091; yaw, 000, for communications. HIGH GAIN will be PITCH, minus 10; YAW, plus 183. I repeat roll, 026; pitch, 091; yaw, 000. HIGH GAIN: PITCH, minus 10; YAW, plus 183; and the time for that is 147 plus 10. The normal time for the LTC photo pad maneuver, LOS. Over.
06 02 12 29	CMP	Roger. Verify the roll, 026.
06 02 12 34	CC	Verified.
06 02 35 --		BEGIN LUNAR REV 34

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 02 58 48	CC	Apollo 14, Houston. Over.
06 02 58 52	CMP	Go ahead, Houston; 14.
06 02 58 56	CC	Roger. You're loud and clear, Stu.
06 02 59 03	CMP	Likewise, Gordon.
06 02 59 06	CC	Okay. I've got some pads here, the TEI-34 and 35 pads.
06 02 59 16	CMP	Well, we're mighty interested in the first one, anyway.
06 02 59 20	CC	Okay. Let me know when you're ready to write.
06 02 59 33	CMP	I have pen in hand, awaiting your message.
06 02 59 36	CC	Okay. TEI-34, SPS/G&N; 34720; minus 0.72, plus 0.08; 149:16:04.30; NOUN 81: plus 3013.3, plus 1667.4, minus 0340.3; attitude: 180, 000, 000; NOUN 44: H_A, N/A; H_P, plus 0019.0; 3460.6, 2:28, 3436.6; sextant star, 11, 124.9, 22.5; NOUN 61: minus 27.03, minus 171.51; 1160.4, 36252; GET for .05g, 216:23:33; GDC aline stars are Sirius and Rigel, 140, 020, 350; ullage, four jets, 12 seconds. Go ahead.
06 03 02 07	CMP	Okay, Gordon. TEI-34 pad, SPS/G&N; 34720; minus 0.72, plus 0.08; 149:16:04.30; plus 3013.3, plus 1667.4, minus 0340.3; 180, 000, 000; H_A N/A; plus 0019.0; 3460.6, 2:28, 3436.6; 11, 124.9, 22.5; NOUN 61: minus 27.03, minus 171.51; 1160.4, 36252; 216:23:33; Sirius and Rigel, 140, 020, 350; four jet, 12 seconds.
06 03 02 20	CC	Okay, Stu. Readback correct. I'm ready the TEI-35.
06 03 02 31	CMP	Go ahead.
06 03 03 33	CC	TEI-35, SPS/G&N; the weight is 34720; minus 0.72, plus 0.08; 151:16:02.94; plus 3097.7, plus 1633.1, minus 0468.2; 178, 358, 359; ullage, four jets, ele - correction, four jets, 12 seconds. Go ahead.

06 03 04 38 CMP Okay. TEI-35, SPS/G&N; 34720; minus 0.72, plus 0.08; 151:16:02.94; plus 3097.7, plus 1633.1, minus 0468.2; 178, 358, 359; four jets, 12 seconds.

06 03 05 07 CC Okay, Stu. The readback is correct. I have some more information for this upcoming photographs with the 500-millimeter of the 13 S-IVB impact crater. Over.

06 03 05 24 CMP Okay.

06 03 05 25 CC Okay. Give us POO and ACCEPT. We'll give you a state vector and target load while we're getting this.

06 03 05 37 CMP Do you have it?

06 03 05 39 CC Okay. Information on the photo pass. At 148:15, maneuver to roll, 026; pitch, 104; yaw, 000. We suggest you use magazine Papa, the same 500-millimeter COAS procedures as before. T-start is 148:23:03. For locating visually the target, we suggest you use the zero-phase landmark map 7 and 8. To refresh your memory, the impact crater is on the northeastern rim of Lansberg B located on a line from Lansberg B to Lansberg. So, these procedures - We want you to pitch at T-start plus 1 minute and ignore the ORDEAL. Do not use the ORDEAL numbers be - This is because of a misalinement due to the TEI REFSMMAT. The pitch should work out to be a pure pilot pitch. Over.

06 03 07 31 CMP Okay. At 148:15, maneuver to 026, 104, 000. Use magazine P, the same 500-millimeter procedures. T-START at 148:23:03. Northeast rim of Lansberg B. I know the general area. I don't know how good an area this type of photography covers, though.

06 03 08 06 CC I can - I think the field of view is probably noticed on your orbital maps there, if you want to look it up. I - I think I looked the one time. The 500-millimeter should just about catch all of Lansberg B, and - -

06 03 08 26 CMP Yes. I - I thought it - Of course, I sort of got the impression today, Gordon, that - that it might

have been narrower than that, but that's fine. I - I know the general area to photo.

06 03 08 49 CMP And I guess you want me to do that after 1 minute, pitch to 328, and quit, huh?

06 03 09 06 CC The answer to that is affirmative. I have an up - -

06 03 09 15 CMP And as soon as we finish that, we do the VERB 49. As soon as we finish that, then, we go right into a VERB 49 maneuver to the pad burn attitude, right?

06 03 09 25 CC That's affirmative, Stu. I also have a map update for REV 35.

06 03 09 28 CMP Go ahead.

06 03 09 33 CC Okay. It's your computer, now. We're through with the uplink. And LOS time is 148:50:34; 180 time: 149:15:29; AOS with TEI: 149:26:49; AOS without TEI: 149:36:45. Over.

06 03 10 23 CMP Okay. I think the only one there that - give me the - I don't need the 180; but I got with TEI; AOS will be 149:26:49; without, 149:36:45. And give me LOS, again.

06 03 10 38 CC Okay. LOS, 148:50:35. You copied the AOSs okay.

06 03 11 24 CC 14, Houston. For your information, there's about 3 minutes to the - 2 minutes and 50 seconds to the LM ignition.

06 03 11 33 CMP Okay.

06 03 11 50 CC Stu, this is Houston.

06 03 11 55 CMP Go ahead.

06 03 11 59 CC Stand by 1.

06 03 12 09 CC Okay, Stu. We took a look at your geometry when you're in this attitude prior to starting the COAS maneuver. It turns out that you're probably going to be able to see, through the optics, Antares hit the ground. If you wish and you have

the time, one of the LM crew there could select P24, and we've got the numbers to set into NOUN 89. And we'll give you a - an impact time. You may be able to see it hit.

06 03 12 47 CMP Okay. P24, NOUN 89. Ready to copy.

06 03 12 51 CC Okay. Right now, we may have an update on this with - after they track it, after the burn but right now, minus 03.527, minus 09.576, and a plus all balls. Over.

06 03 13 15 CMP Yes, I copy minus 03.527, minus 09.579, plus all zips.

06 03 13 23 CC Okay. That second register, last digit is 6, minus 09.576.

06 03 13 36 CMP Okay. Minus 09.576. And what's the time of impact?

06 03 13 41 CC Okay. Impact time will be 148:22:19. This is about a minute and 40 seconds prior to when you'll start pitching for the - the COAS maneuver. Over.

06 03 14 07 CMP Okay.

06 03 14 10 CC If it's handy and you wanted to try to photograph it through the sextant, we'd suggest using C-EX at a 24 frames per second, 1/60th-of-a-second shutter speed, and start it at 30 seconds prior to impact, and let it run through to 30 seconds after. Over.

06 03 14 37 CMP Okay.

06 03 14 39 CC And the LM is burning now.

06 03 14 45 CMP Okay.

06 03 20 50 CMP Houst - Houston, 14.

06 03 20 52 CC Go ahead.

06 03 20 57 CMP Okay. Those other procedures called for 250 and f/11. Isn't it going to be a little darker over at Lansberg, Gordon? Do we want to change those settings?

06 03 21 12 CC Stand by, Stu.

06 03 22 09 CC Apollo 14, Houston. We'd like you to use f/11, 1/250th, focus infinity. Over.

06 03 22 32 CMP Okay. f/11, 1/250th, and infinity.

06 03 22 36 CC That's affirmative.

06 03 26 28 CC Apollo 14, Houston.

06 03 26 33 CMP Go ahead, Houston.

06 03 26 35 CC Okay. That NOUN 89 and the time of impacts for the - for Antares are good, after looking at it after its burn. And if you're going to - Are you going to be using the DAC on the sextant? If so, we'll call a start and stop time to you.

06 03 26 57 CMP That's negative.

06 03 27 01 CC Okay. And just one other thing. We want to be sure that we see P30 and P40 before your AOS. There shouldn't be any problem with them. Before your LOS.

06 03 27 21 CMP Okay. We'll sure try.

06 03 30 10 CMP We'll just let you look at them early, Gordon.

06 03 30 13 CC Roger. We're looking.

06 03 30 31 CC P40 looks good to us.

06 03 30 37 CMP Okay.

06 03 32 36 CC Stu, this is Houston.

06 03 32 41 CMP Go ahead.

06 03 32 43 CC We've got about 9 and a half minutes until LM impact. And at the risk of insulting your intelligence, we just wanted to remind you to - that, if you do reselect P30 between now and the - and the burn, be sure to reload the NOUN 81s.

06 03 33 05 CMP Okay. We won't reselect P30.

06 03 33 08	CC	Roger.
06 03 37 43	CC	14, Houston.
06 03 37 51	CMP	Go ahead.
06 03 37 52	CC	We'd like to have the TAPE RECORDER switch FORWARD prior to starting your COAS maneuver.
06 03 38 03	CMP	Yes. We'll give you a FORWARD and HIGH BIT RATE.
06 03 38 06	CC	Okay. Four minutes to impact, now.
06 03 39 14	CC	Impact in 3 minutes.
06 03 39 42	CC	Stu, for your information, trunnion should be about 41 degrees at impact. So, it probably won't clear the limit until just before - just before impact.
06 03 40 44	CC	Apollo 14, Houston. I've got a change to the setting on the Hasselblad, a last minute change. Over.
06 03 40 55	CMP	Go ahead.
06 03 40 56	CC	Okay. They want it at f/8 and 1/125th of a second, f/8 and 1/125th. Over.
06 03 41 44	CC	14, Houston. Thirty seconds to impact.
06 03 42 59	CC	Stu, 1 minute to T-start on the 500-millimeter.
06 03 43 10	CMP	T-start now, I believe.
06 03 43 19	CC	You're right. My mistake.
06 03 43 30	CDR	Houston, 14. ...
06 03 43 41	CC	14, Houston. Say again, please.
06 03 43 50	CDR	We were unable to see the LM impact in the optics.
06 03 43 56	CC	Roger, Al. Unable.
06 03 49 01	CC	14, Houston. We'd like a frame count on the Hasselblad, for this last pass here. Over.

06 03 49 11	CMP	Okay, stand by 1.
06 03 49 28	CMP	Okay, we went from 131 to 169, Gordon.
06 03 49 33	CC	Roger. 131 to 169; and, for your information, both the ALSEP seismometers are ringing like mad.
06 03 50 22	CC	14, Houston. Give us OMNI Delta, please.
06 03 53 32	CC	Apollo 14, Houston.
60 03 53 37	LMP	Go ahead.
06 03 53 42	CC	14, Houston. We have about 16 and a half minutes to LOS. We'd like to see you in burn attitude and also get a look at P40 prior to losing you.
06 03 53 57	LMP	Okay, Gordon. ... that.
06 03 57 52	CC	Apollo 14, Houston.
06 03 57 57	LMP	Go ahead, Houston.
06 03 57 59	CC	Would you put the TAPE RECORDER switch to FORWARD; and then, we'll take care of commanding it for - for the upcoming LOS.
06 03 58 13	LMP	You have it.
06 03 58 17	CC	Roger.
06 04 01 41	CC	14, Houston. Nine minutes now to LOS. And we'd like to see you at burn attitude, if possible, before you go LOS.
06 04 01 52	LMP	Okeydoke.
06 04 05 49	CC	14, Houston. For your information, in about 5 seconds, you'll be 30 minutes from ignition. I'll give you a mark. Ready -
06 04 06 00	CC	MARK.
06 04 06 04	LMP	Okay, thank you.
06 04 06 40	CC	14, Houston. P40 looks okay to us.
06 04 06 49	LMP	Thank you.

06 04 08 30	CC	14, Houston. Two minutes to LOS.
06 04 08 37	LMP	Roger.
06 04 08 38	CMP	Roger, Gordon.
06 04 08 39	CC	14, Houston. One minute to LOS, and we'll see you on your way home.
06 04 08 40	CMP	Roger, Gordon.
06 04 35 --		BEGIN LUNAR REV 35

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 04 47 07	CC	Apollo 14, Houston. How do you read?
06 04 47 44	CC	Apollo 14, Houston. How do you - -
06 04 47 45	CDR	Hello, Houston; Apollo 14.
06 04 47 47	CC	Roger, Al. You're loud and clear.
06 04 47 49	CDR	Reading you loud and clear, Houston. Okay, Gordo. We had a good burn. Good burn. We're on the way home. Burn time was 1 second long: 2 plus 29; residuals before trimming, plus 0.6, plus 0.8, minus 0.1; residuals after trimming, plus 0.2, plus 0.8, minus 0.1; DELTA-V_C, minus 21.1; fuel, 25; oxygen, 24; unbalanced decreased 40. Very smooth burn.
06 04 48 24	CC	Roger, Al. That's good news.
06 04 48 29	CDR	You bet. We're making like tourists with the cameras right now.
06 04 48 36	CC	Roger.
06 04 51 52	CC	Apollo 14, Houston. We have some flight-plan changes for you. The first of them, though, is not effective until about an hour from now; so, anytime anyone has some free time, I'll read them up.
06 04 52 11	CMP	Okay, Gordon. We'll catch them in a little bit, if you want. We're enjoying the view.
06 04 52 15	CC	Roger, Stu.
06 05 03 39	CDR	Okay, Houston. 14 is standing by for the flight-plan update.
06 05 03 43	CC	Okay, Al. Let's see, open the page to 150:30.
06 05 03 57	CDR	Okay.
06 05 03 59	CC	We'd like you to do everything as shown on up to the VERB 48 there at 150:35, or so. And then, we've got another procedure to - for one last-ditch

try with the Hycon. The theory behind this is that in a static attitude with the FMC turned off, even though the shutter is malfunctioning, they think they can get an image on the film and then compensate for any exposure - off-nominal exposure to the film by development afterwards. The procedure is not too lengthy, but find some blank paper to write it on there.

06 05 04 59 CDR Gordo, are you really serious about dragging up the Hycon, now? We're just getting ready to go to sleep here, as soon as finish these handheld pictures.

06 05 05 09 CC Okay. If - -

06 05 05 11 CMP Hey, Gordon, a little - Hey, Gordon.

06 05 05 14 CC Go ahead.

06 05 05 16 CMP A little clarification on that. See, we hadn't planned on it. We've got it all stowed and everything all over it, since we hadn't planned on - on using it. It's pretty tough to get to, now.

06 05 05 28 CC Okay. I was instructed to mention it to you. If you had any feelings about it, well, just forget the whole thing; and that's what we'll do - just scrub it. So, after you change the DAP load there, we'd like you to do the procedures, as shown an hour later there at 151:30; go into PTC and presleep; and you're clear to hit the sack after that.

06 05 05 58 CDR Okay. 151:30, PTC, presleep, and rest period.

06 05 06 03 CC Right. I don't mean to say you have to wait until 151:30 to do it. The procedures, as shown at that time, you can do those as soon as you're ready.

06 05 06 14 CDR Oh, okay. Thanks. We'll probably do them a little sooner than that, then.

06 05 06 22 CC If you'll give us POO and ACCEPT, we'll give you a PTC REFSMMATT.

06 05 06 35 CMP Okay, you got it, Gordon: POO and ACCEPT.

06 05 06 37 CC Okeydoke.

06 05 07 21	CC	14, Houston. At your convenience, we'd like the NOUN 93 figures on that last P52, prior to TEI.
06 05 07 37	CDR	Stand by 1.
06 05 08 33	CC	14, Houston. Uplink's complete. Your computer.
06 05 08 43	CMP	Okay; we got it.
06 05 09 25	CDR	Okay, Houston, on the last 52: NOUN 71, 24, 31; NOUN 05, all zeros; NOUN 93 is plus .018, minus .091, plus .050; GET torque, 146:58:25.
06 05 09 51	CC	Okay, Al, we copy that.
06 05 22 41	CC	Apollo 14, Houston.
06 05 22 48	CMP	Go ahead, Houston.
06 05 22 51	CC	We notice that you are maneuvering to the attitude listed after that P52 option 1, which might not work for P52.
06 05 23 08	CMP	Okay, thank you.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 05 50 13	CC	Apollo 14, Houston.
06 05 50 42	CC	Apollo 14, Houston.
06 05 53 34	CC	Apollo 14, Houston.
06 05 55 25	CC	Apollo 14, Houston.
06 05 55 37	CC	14, Houston. If you read, you might cage your BMAGs, go to RATE 2.
06 05 58 48	CC	14, Houston. If anybody reads, you're dragging your BMAGs.
06 06 09 59	CC	Apollo 14, Houston.
06 06 16 00	CC	Apollo 14, Houston.
06 06 28 01	CC	Apollo 14, Houston.
06 06 35 31	CMP	Hello, Houston; 14.
06 06 35 34	CC	Roger. You're still there, huh?
06 06 35 41	CMP	Well, don't know if you been trying to call or not. We've been hustling around on this storage, here.
06 06 35 49	CC	Roger.
06 06 35 51	CMP	And, do our rates look good enough for spinup?
06 06 36 02	CC	Stand by 1, Stu. Stu, if you'll give us POO and ACCEPT, we'll get a state vector before we spin up, there.
06 06 36 20	CMP	That sounds good.
06 06 36 24	CC	Also, I guess we're going to have one for you to write down by hand.
06 06 36 33	CMP	Okay.
06 06 36 35	CC	I don't have it yet. For your information, we got a - we got a monster midcourse 5 coming up at TEI plus 17 of 1 foot per second.

06 06 36 56 CMP Hey, that's good. TEI plus 17, huh?

06 06 37 00 CC Roger.

06 06 37 03 CMP You all sure do good work.

06 06 37 07 MCC So do you guys. We thought you'd all gone to sleep on us up there.

06 06 37 14 CMP Well, we were working on that, but we didn't have any place to sleep. We're unindated [sic]. So, we've been scurrying around trying to get things in some sort of order.

06 06 37 26 MCC Roger. Well, we want to power down your tired bodies, here, as soon as you can arrange it. We have nothing at all programed for about the next 12 hours. You guys have been doing an outstanding job here in the last couple of days, and we appreciate it.

06 06 37 44 CMP Okay, Deke, I'll pass that on. I'm the only one on the loop right now.

06 06 37 48 MCC Roger.

06 06 38 49 CC Stu, it's your computer. I'll have that pad in a minute or two.

06 06 38 56 CMP Okay. Thank you.

06 06 39 41 CC Stu, on the sleep, we won't wake you until - until an hour or so after the scheduled wake up time unless you're up sooner. Over.

06 06 39 57 CMP All right. Thank you.

06 06 40 05 CC And I got the state vector for you.

06 06 40 10 CMP Okay, stand by 1.

06 06 40 27 CMP Okay, Gordon, ready to copy.

06 06 40 29 CC Okay, it is a state vector 71. GET of 151:15:00; index 21, and address 2 is 01501, 00002, 03742; line five there is 11325, 76267, 44423; line 10, 77055, 42764, 13266, 10307, 70560; line 15 is 54223, 73757, 44252, 06426; line 21, 32440. Over.

06 06 43 32 CMP Okay, reading state vector VERB 71; 151:15:00; index 21, 01501, 00002, 03742; 11325, 76267, 44423; 77055, 42764, 13266, 10307, 70560; 54223, 73757, 44252, 06426; 32440.

06 06 44 22 CC Roger; your readback's correct.

06 06 45 10 CC Stu, this is Houston. Computer is yours. The yaw jet's just about to fire; and so, we'll wait a little bit here, on the PTC spinup. Just want to be sure you have all your - your urine dump complete before - before you do it.

06 06 45 32 CMP Okay. Yes, why don't you hold off on that for a little bit and we'll - We're not quite ready to spin it up.

06 06 45 41 CC Okay.

06 06 47 17 MCC Hey, Stu; this is Houston. Is your clean happy home still clean? We haven't heard much comment about any microlunar samples floating around.

06 06 47 31 CMP Yes. It's amazingly clean, Deke. Almost no dust at all. The suits were a little dirty but vacuumed off, and we got almost zero in the command module.

06 06 47 50 MCC Outstanding.

06 07 13 26 MCC Apollo 14, Houston.

06 07 13 31 CMP Go ahead, Houston.

06 07 13 33 MCC Yes, Stu. You guys aren't worrying about stowing the probe at the present time, are you?

06 07 13 42 CMP No. No, Deke. We're just getting a little chow and getting - getting squared away - sort of relaxing and looking at the full Moon coming - going away from us and so forth. No, we're in good shape.

06 07 13 55 MCC Okay. Fine. Well, we got a nice exotic procedure to read up to you some time in the next couple of days on final stowage on that thing. And we didn't want you worrying about it.

06 07 14 06	CMP	No, we're - We put it in a resting place up in the tunnel. We figured that'd be pretty good until we got back.
06 07 14 14	CC	Okay.
06 07 14 17	CMP	And ready to reenter.
06 07 14 19	CC	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 07 39 00	CMP	Houston, 14.
06 07 39 04	CC	14, Houston. Go ahead, Stu.
06 07 39 08	CMP	Okay, Gordon. We're ready to spin up any time the rates look good to you, and I have some onboard read-outs.
06 07 39 18	CC	Okay. Well, they're taking a check on it. They want to look at it a minute or 2. Go ahead with the read-outs.
06 07 39 27	CMP	Okay. Yes, they might have some rates, now; I just - maybe want to wait a little bit, but - Okay: BAT C, 37.0; pyro A, 37.2; pyro B, 37.2; RCS, 60, 58, 60, 60.
06 07 39 49	CC	Okay. We got all that.
06 07 40 00	CC	And, we'd like to remind you that - to be sure when we get the PTC going, to start - to go the - get the comm configured as shown in the checklist.
06 07 40 06	CMP	We'll do that. And far as crew status, we're all okay; no medication. And, you ready for an E-MOD dump?
06 07 40 18	CC	Not yet; we're getting configured.
06 07 40 23	CMP	Okay.
06 07 41 07	CC	We're ready for VERB 74.
06 07 41 14	CMP	Okay. Coming at you.
06 07 41 48	CMP	Houston, 14.
06 07 41 49	CC	Go ahead.
06 07 41 53	CMP	Okay, Gordon. Just to make sure we're all together, you want to use the OMNI mode for comm?
06 07 44 00	CC	Affirmative.
06 07 44 04	CMP	Okay.

06 07 45 00 CC Stu, would you be sure that that WASTE MANAGEMENT OVERBOARD DRAIN is closed tight. We want to be sure that this one takes, so that we don't have to interrupt your sleep. And, if it is, then you're GO for spinup.

06 07 45 19 CMP Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 18 42 12	CC	Apollo 14, this is Houston. Reveille, Reveille; heave out and trace up.
06 18 42 26	LMP	Good morning, Bruce. How are you this morning?
06 18 42 28	CC	Sweepers, man your brooms; clean sweepdown fore and aft.
06 18 42 35	LMP	Yes, all the sweepers are still asleep around here.
06 18 42 40	CC	Okay, Ed. How are you all this morning?
06 18 42 45	LMP	Really great, Bruce; really great. How are things there?
06 18 42 49	CC	Beautiful; everybody's relaxed down here and anticipating your arrival on schedule.
06 18 42 57	LMP	Very good.
06 18 42 59	CMP	Good morning, Bruce.
06 18 43 02	CC	Who's that? Stu?
06 18 43 05	LMP	Yes, he's waking up over there.
06 18 43 06	CMP	Yes, man.
06 18 43 08	CC	Hey, Ed, if you feel like configuring the HIGH GAIN ANTENNA for us, we'd like to set up in a REACQ mode but not select HIGH GAIN, yet. Over.
06 18 43 22	LMP	Okay.
06 18 43 24	CC	Okay, first off, we need the - -
06 18 43 26	LMP	My angles - -
06 18 43 29	CC	Roger. We need a PITCH of minus 40 and a YAW of plus 90, that's PITCH, minus 40; YAW, plus 90, set in on the dials; WIDE BEAM, MANUAL TRACK - make it WIDE BEAM and REACQ, but do not select the HIGH GAIN ANTENNA until we call you.
06 18 43 53	LMP	Okay, Houston. Out.

06 18 43 57 CC Roger. And I guess we needed to have the HIGH GAIN in MANUAL long enough for the antenna to go to those angles, then to REACQ.

06 18 44 13 LMP It's there.

06 18 44 14 CC Beautiful.

06 18 44 33 CC 14, Houston. When you all feel like discussing things, we've got oh - about five or six items here, including a consumables update and a short update to the procedures on one of the inflight DEMOs, and some discussion on midcourses in general. Nothing very pressing; in fact, nothing pressing at all. We would like to get the P23 scheduled at 164 hours, started within about half an hour of the nominal time. Over.

06 18 45 15 CMP Yes, Bruce. I'd like to go ahead and maybe start that one about now and then, P23, go ahead get going on it.

06 18 46 06 CC Apollo 14, this is Houston. We'd like you to select the HIGH GAIN ANTENNA at this time. And, Stu, we see that you've got a P52 to run prior to getting to the P23. We suggest you go ahead and go through that and start the P23, more or less, at the nominal time.

06 18 46 32 CMP Okay.

06 18 46 35 LMP Adjust HIGH GAIN.

06 18 50 28 CC 14, this is Houston. Did you call?

06 18 50 34 LMP Yes, that's affirm. I went to REACQs, Bruce. The antennas started driving around in a wild circle. I'm back on the OMNIs now.

06 18 50 45 CC Okay. We copy, Ed. Stand by.

06 18 52 04 CC Apollo 14, this is Houston. We'd like to remain on OMNIs. You may stow the HIGH GAIN ANTENNA, MANUAL and WIDE, at PITCH, minus 52; YAW, 270. Over.

06 18 52 21 LMP Roger. MANUAL and WIDE; minus 52 and 270.

06 18 52 27 CC Roger.

06 18 53 10 LMP ...

06 18 59 31 CDR Houston, Apollo 14 standing by for the consumables update.

06 18 59 37 CC Apollo 14, this is Houston. The consumables update for 162 hours follows: RCS total 48.8; quads in order, 48.9, 48.1, 49.6, 48.6; hydrogen, 45.7, 45.0; oxygen, 73.0, 70.2, 21.6. Over.

06 19 00 24 CDR Houston - -

06 19 00 27 CC Say it again, 14.

06 19 00 34 CDR Okay. A readback of 162 hours - -

06 19 00 49 CC 14, this is Houston. We're changing antennas. Stand by, please.

06 19 06 26 CC Apollo 14, this is Houston. How do you read now? Over.

06 19 06 32 LMP Loud and clear; go ahead.

06 19 06 34 CC Roger, Ed. I didn't get your readback on that consumables update. We switched OMNI antennas about that time. Were you happy with what you copied?

06 19 06 45 LMP That's affirm. Here, I'll read it back to you. The only ones in doubt is the O_2 tank 3 and, first decimal place. Okay, GET 162:00; RCS 48.8, order of 48.9, 48.1, 49.6, 48.6; H_2, 45.7, 45.0; O_2 73.0, 70.2, 21.

06 19 07 16 CC Roger. 21.6 on O_2 tank 3; and whenever it's convenient with you all, we would like to get that postsleep status report and acknowledgment on the postwakeup stuff on 162.

06 19 07 41 LMP Roger. I'll have it for you in a minute.

06 19 07 43 CC Roger. No rush.

06 19 08 25 CC 14, Houston. We are copying your torquing angles.

06 19 08 31	CMP	Okay, Bruce, and I'm torquing at 163:48:37.
06 19 08 44	CC	Roger, Stu. And you can go on with the P23 whenever it suits your convenience.
06 19 08 52	CMP	Okay.
06 19 11 26	LMP	Houston, 14.
06 19 11 28	CC	Go ahead, 14.
06 19 11 33	LMP	Okay, we verify that ...
06 19 11 37	CC	You're cutting out, Ed.
06 19 11 42	LMP	All of the items on the postsleep checklist have been completed. Al had 7 hours sleep, Stu 6, Ed 7. And, unfortunately, the PRD is not available at the moment, and we will have to forget about the ...
06 19 11 58	CC	Roger. We copy.
06 19 12 10	LMP	Yes, and we've had no medication. We are all in excellent ... So, just tell the surgeon to sit back in his chair and have a cup of coffee; we're fine.
06 19 12 22	CC	Okay, I'll see if the recovery coffee or the procedures coffee - network coffee pot is working here, and we'll get him a cup of coffee.
06 19 12 34	LMP	Have one for me, too.
06 19 12 36	CC	I just did, Ed.
06 19 15 45	CC	Apollo 14, this is Houston. On arrival in the optics-calibration attitude, we'd like to get the HIGH GAIN ANTENNA in WIDE BEAM width, MANUAL and with the flight-plan angles. Over.
06 19 16 00	CMP	Okay. We can handle that, Bruce.
06 19 16 04	CC	Roger, Stu. And could you also verify that you're still on the SECONDARY, SERVO ELECTRONICS, POWER for the HIGH GAIN?

06 19 16 14 CMP That's verified.

06 19 16 17 CC Okay.

06 19 22 53 LMP Houston, switching to the HIGH GAIN.

06 19 23 07 CC Roger, 14; we're receiving you loud and clear, now.

06 19 23 36 CC And, Ed; this is Houston. If you have got the flight plan handy, I've got a change to the heat flow and convection procedures, as called out in the back of the flight plan for you.

06 19 23 49 LMP Stand by. I don't have it handy, ... Houston, just a moment. But - -

06 19 23 54 CC Okay, well, let's get that later. Let him use it.

06 19 25 09 CC Apollo 14, this is Houston. Just for your information, RCS status shows about 131 feet per second DELTA-V remaining, and SPS is about 510 feet per second. Over.

06 19 25 31 LMP Okay, Bruce. Thank you.

06 19 25 36 CC And, looking ahead at the midcourse situation here, we'll have a decision for you shortly on whether we want to burn midcourse 5 or not. Right now, its magnitude looks like something on the order of a half to three-quarters of a foot per second. With no midcourses at all coming back, your gamma is minus 6.97 degrees. If we start making midcourses, 5 they say, would be about a half to three-quarters of 6's on the order of three-quarters of a foot per second, and 7 looks like about 2.7 or something on that order reading out. We'll keep you posted. We owe you some detail procedures on probe stowage, which will be up later on today. And, when Stu gets through with the P23, we'd like to clarify the status of his biomed harness. We didn't get any data from him up until about 160 hours this morning; and then, it came in loud and clear.

06 19 26 52 LMP Okay. I think we can clarify that for you.

06 19 26 54 CMP I can verify the biomed harness is okay, Bruce.

06 19 26 58 CC Okay. Was it switched on all the time, or did you get up and switch it on about 160?

06 19 27 08 CMP You've got it right.

06 19 27 15 CC Roger. Out.

06 19 27 49 CC And, 14; this is Houston. I've got some questions on the subject of the AGS again for ED, when he's free; and we've also got some news items if you're interested in hearing the news.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 19 37 07	CC	Apollo 14; this is Houston, Stu. Over.
06 19 37 15	CMP	Go ahead, Bruce.
06 19 37 16	CC	Yes, Stu. If you could leave your NOUN 49 up there in the DSKY just a little bit longer, we could copy. We got the first one okay. We missed the last one here.
06 19 37 25	CMP	Okay. The first one was 21.2, and the second one was 1.9.
06 19 37 29	CC	Okay, thank you.
06 19 37 39	CMP	And, Bruce? I want to verify that the state vector I'm working on now is the - is the TEI state vector. Is that affirmative?
06 19 37 57	CC	That's affirmative, Stu. And we'd like to get MEDIUM BEAM WIDTH on the HIGH GAIN.
06 19 38 13	LMP	Got it, Bruce.
06 19 38 16	CC	Thank you, Ed.
06 19 39 33	CC	Okay. We got that one, Stu. Just about 5 or 10 seconds is enough.
06 19 39 43	CMP	Okay.
06 19 50 13	CC	And, Stu, this is Houston. We're readying a checkpoint down here and, consequently, have no data for a minute or two. We'll call you when we're back in business; otherwise, we'd like you to keep the NOUN 49 for this next star, Antares, showing until we call you. Over.
06 19 50 36	CMP	Okay. I can just write them down for you.
06 19 50 56	CC	Say, Stu, you'd better hold off on actually making the mark. We want to get the shaft and trunnion angles off of the displays also.
06 19 51 07	CMP	Okay. I'll just stand by 1; no problem.

06 19 51 11	CC	Okay. And we're back in business, Stu. You can press on.
06 19 51 16	CMP	Well, that was good timing.
06 19 53 02	CC	Ed, this is Houston. If you have a minute, we'd like to get the HIGH GAIN ANTENNA pointing angles tweaked up for maximum signal strength. We're showing about a PITCH of minus 60 and a YAW of 0 as being appropriate. Over.
06 19 53 26	CC	You got it, Stu?
06 19 56 29	CC	Got it, Stu?
06 19 58 08	CC	We got it, Stu.
06 20 05 37	CC	We got it, Stu.
06 20 08 21	CC	We've got it, Stu.
06 20 10 06	CC	We've got that one also, Stu.
06 20 17 44	CC	Okay, we got it.
06 20 19 48	CC	Okay, we got it.
06 20 30 41	CC	Apollo 14, this is Houston. We copied the last NOUN 49 value there. And, for Stu's information, based on the sightings taken on the first three stars, we're showing that the program and the marks are all working out in excellent fashion within 1 sigma of the expected values. From the trench comes the information that your state vector compared with their estimate without any midcourse corrections, which show you arriving at entry interface 4 minutes earlier than the MSFN vector, at the present time. Over.
06 20 31 22	CMP	Okay, we'll see what - if we can work on that 4 minutes.
06 20 31 25	CC	Roger.
06 20 31 26	CMP	And we're going to be playing around here with the program a little bit.

06 20 31 30 CC Okay. And, when you're through with that and prior to starting your maneuver to the thermal attitude, we'd like to go through a normal acquisition procedure on the HIGH GAIN ANTENNA, hopefully winding up in AUTO and NARROW BEAM WIDTH to verify its tracking capabilities during the maneuver. Over.

06 20 31 54 LMP Okay, Bruce. Say again when you want to do this.

06 20 31 58 CC Roger. When Stu's through with his P23 and prior to starting the maneuver to thermal attitude that you've got called out - oh, at about 164:55, VERB 49, maneuver to thermal attitude. Over.

06 20 32 14 LMP Okay. Will do.

06 20 38 31 CC 14, Houston. If you want to sit there in POO and ACCEPT for a minute, we've got the target load and state vector update for you.

06 20 38 44 CMP Okay. We're POO and ACCEPT. I guess we're going to do midcourse 5, huh.

06 20 38 50 CC Roger. Sorry about that. Yes, we will burn midcourse 5 as scheduled. And I've got the midcourse 5 pad for you whenever you're ready to copy.

06 20 39 03 CMP Okay. Stand by 1.

06 20 39 52 LMP Houston, Apollo 14. Ready to copy it.

06 20 39 55 CC Roger, Ed. Midcourse correction number 5; RCS/G&N; 24561; pitch and yaw trim, N/A. T_{ig}, 166:14:58.54; NOUN 81, plus 0000.7, minus all balls, minus all balls; roll, 092, 330, 009; H_A is N/A, plus 0018.9; 0000.7, 0:03, 0000.7; sextant star 33, 256.3, 13.5; boresight star is N/A; minus 27.03, minus 172.62; 1158.8, 36251; 216:28:03; GDC aline, Sirius and Rigel; 230, 170, 002; plus-X, two jet, Bravo and Delta. HIGH GAIN angles in this attitude: PITCH, minus 90; YAW, plus 206. Read back over.

06 20 41 57 LMP Give again the jets to use, please, sir.

06 20 42 01 CC Jets Bravo and Delta, B and D. Over.

06 20 42 08 LMP Okay. Okay, midcourse 5; RCS/G&N; 24561; N/A, N/A; at 166:14:58.54; plus 0000.7, minus all zips, minus all zips; 092, 330, 009; N/A, plus 0018.9, 0000.7, 0:03, 0000.7; 33, 256.3, 13.5; N/A; minus 27.03, minus 172.62, 1158.8, 36251; 216:28:03; Sirius and Rigel; 230, 170, 002; plus-X, two jet, B and D. HIGH GAIN ANTENNA angles: PITCH, minus 90; YAW, 206.

06 20 43 34 CC Roger. Readback is correct. And were you aware that you're now coming back on Wednesday instead of Tuesday?

06 20 43 45 CDR No, we haven't considered that fact. But I guess we'll make it up between the splashdown and Houston, right.

06 20 43 50 CC (Laughter) Roger, Roger you. After the TEI burn, it looks like you're about 3 or 4 miles west of the jog in the international dateline, as it comes down through your splashdown area.

06 20 44 10 LMP Okay.

06 20 44 34 CC 14, Houston. The computer is yours. You can maneuver to the midcourse correction 5 attitude without going through the thermal attitude; that won't be required. And we would like to go through the normal REACQ procedure on the HIGH GAIN ANTENNA, prior to starting the maneuver, and see if it tracks. Over.

06 20 45 00 LMP Okay. Will do.

06 20 45 03 CC And, for Stu, we've got two minor corrections to the procedures for the heat-flow experiment, as found in the back of the flight plan.

06 20 45 16 CMP I don't believe it. Stand by 1.

06 20 45 45 CMP Okay, I have the procedures out, Bruce.

06 20 45 47 CC Okay. On the heat-flow and convec - convection demonstration, under step 2 was zone low, power on. It currently reads 15 minutes. Turns out that all that's required here is 10 minutes. Over.

06 20 46 09 CMP That's easy. Okay, under step 2, zone low, power on, 10 minutes.

06 20 46 15 CC Roger. And down there under step 4, zone high, power on, it's now 10 minutes, and you can reduce that to 5 minutes.

06 20 46 29 CMP Okay, 5 minutes under step 4.

06 20 46 32 CC Roger. And there's no problem involved in these. It just appears that the color changes in the crystals will saturate at about this time, so rather than using up more power, we can just shut it off at that point. Over.

06 20 46 50 LMP Bruce, we lost you there for a minute. Let me read you right and understand exactly what you want me to do, ... go ahead and lock on and REACQ and medium or ...

06 20 47 05 CC Negative, Ed. We want you to go through a normal manual acquisition procedure, winding up in AUTO and NARROW, over.

06 20 47 17 LMP Okay. But I'm already on the HIGH GAIN right now so I ...

06 20 47 23 CC Okay. Then we're showing you minus 109 dB, so we must have lost you on the HIGH GAIN there, or you pointed off when you started the maneuver.

06 20 47 38 LMP ...

06 20 48 11 CC Okay, Ed. What we want you to do is to go to AUTO and WIDE BEAM WIDTH, and acquire us on the antenna; and then progressively narrow it down from WIDE to MEDIUM to NARROW. Over.

06 20 48 25 LMP Okay. Thank you. You have it.

06 20 48 34 CC Beautiful. I guess this is a semantics problem here, Ed. The INCOs have been using the terminology of standard acquisition to imply pointing the antenna towards the Earth manually, then going to AUTO and WIDE, getting it to lock up, and then on down into NARROW BEAM to complete the acquisition. Over.

06 20 49 07 LMP Roger. That's what I understand as a normal acquisition, but I thought I heard the word REACQ a couple of times implying a position of the antenna, and I was confused on that one.

06 20 49 20 CC Negative. That wasn't our intent.

06 20 49 25 LMP Okay, Houston.

06 20 49 34 CC And, Stu, this is Houston. We'd like to remind you not to select P37 prior to the midcourse burn now that we've loaded the data for your burn from the ground. Over.

06 20 49 52 CMP Okay.

06 20 50 03 CC 14, Houston. You reported to us earlier that the weight of the ISA as determined on the lunar surface prior to lift-off was 50 pounds. If, in your opinion, this weight has changed to greater than 55 pounds as a result of the LM return to CSM stowage, then we'll have to make provisions for tying it down. We'd like to get your feel for what the current weight on the ISA is. Over.

06 20 50 46 LMP Roger, Bruce. We'll tell you it weighs exactly 54.9.

06 20 50 52 CC Okay, Ed. We copy 54.9 for the ISA.

06 20 51 47 LMP Houston, 14.

06 20 51 49 CC Go ahead, 14.

06 20 51 53 LMP A clarification on the ISA, remember now, there are a few program things that are listed in the flight plan that went into it after it was weighed. Are you taking that into account?

06 20 52 08 CC Roger. We got the weight at 50 pounds from the lunar surface and can add in, if you like, down here those things. We were just interested in getting your feel for what had all been put in. And, if so, what the - what the weight increase would be.

06 20 52 30 LMP Okay, Bruce. This - The things that are in the flight plan to go into the ISA were added in as programed. And any additional items are almost negligible in weight and certain - certainly did not violate your 5-pound criterion.

06 20 52 47 CC Okay. Thank you, Ed.

06 20 53 08 CC And if you're interested, we've got the morning's news items here.

06 20 53 26 CC Or, alternatively, I've got some additional questions on the AGS for Ed.

06 20 53 35 LMP Let's take the news first, and then the questions.

06 20 53 38 CC Roger. Okay, 14. From Fra Mauro Base comes the word that ALSEP package number 4 continues to function normally during the reporting period, ending at 162 hours GET; the CPLEE heater was turned off; and a long period calibration of the PSE was performed. From West Fra Mauro comes the report that, when Antares augered in last night, the steerable antenna was still locked on, sending back high bit rate telemetry in fine tradition. "Anchorage, Alaska - -

06 20 54 27 LMP It had to do something to redeem itself.

06 20 54 32 CC - - "Anchorage, Alaska - An earthquake measuring between 6.5 and 6.7 on the Ritcher Scale occurred near Adak in the Aleution Islands Saturday, but no damage or injuries were reported. The seismographic station in Berkeley, California, recorded the quake at 150 plus 14 GET, and scientists said it occurred close to the Earth's surface. The Alaska State Patrol said the trembler [sic] was centered south of Adak but was not severe enough to call for large wave warnings." "Stockholm - An Italian and a Norwegian-born Swede plan to repeat the 1909 North Polar Expedition of American Explorer, Admiral Robert E. Perry, right down to fur garments and sleighs. Some of the Eskimo guides even claim to be descendents of Perry's original Eskimo crew." "Moberly, Missouri - -

06 20 55 33 LMP Lots of luck on that one.

06 20 55 35 CC - - "Moberly, Missouri - A radio station of Moberly has tried a number of times to place a telephone call to Alan Shepard on the Moon. One operator said, 'The Moon? Really? Do you have a number and area code?' Another took it in stride, said, 'All right.' The newsman asked how long it would take, and the operator replied she didn't know; and he was discouraged when, after asking if he

could wait, the operator replied 'Okay.' Many operators laughed, but one ended the fun with a rejoiner 'Sir, there are no connections for civilians to the Moon at this time. We are sorry.'" "George C. Scott and Ali McGraw have been honored - -

06 20 56 17 LMP And that was the call Al was waiting for, too.

06 20 56 25 CC - - "George C. Scott and Ali McGraw have been honored as best actor and actress in the Foreign Press Association's 28th Annual Golden Globe Presentations in Beverly Hills, California. Miss McGraw received her award for her part in 'Love Story.' Scott was selected for his part as General George Patton in 'Patton.'" "Houston - At the River Oaks Country Club, golf pro Jack Arden was quoted in this morning's paper as saying that, 'Al has got a pretty good swing and could be a real good player if he worked at it.'" Along that line in the other golf news, Arnold Palmer, Tom Shore, and Dewitt Weaver are all tied for first place in The Haiwaian Open with scores of 204. That was after a third round yesterday, and a final round is to be played today.

06 20 57 24 LMP The only way Al can keep his arm straight, though, is to wear the suit, and that gets cumbersome on the golf course.

06 20 57 32 CC Roger that. "The Houston Astros have passed the halfway point in signing on new players for the 1971 season. Signed contracts have come in from 23 of the 43 players who are scheduled to see spring training action. Regulars, such as pitchers Don Wilson and Tom Griffin, catcher John Edwards, and infielders Denis Menke and Bob Watson, and outfielder Norm Miller are already signed up. Also, the Astros have commitments from both their newest acquisitions from the Chicago Cubs, infielder Roger Metzger and catcher/first baseman Jack Hiatt." "New Mexico's Governor Bruce King and his predecessor David Cargo are in a dispute over who owns the Moon rocks presented to Cargo by President Nixon. Cargo took them when he left office December 31. King said he has asked the former Governor to return them back because, 'I

think they belong to the State.'" "Charlotte Amalie (St. Thomas), Virgin Islands - the U.S. Virgin Islands is planning a permanent ocean-floor laboratory in Great Lamasher Bay, St. John, to provide a low-cost method of charting the untracked jungles of the world's oceans. The habitat, a large tubular twin-chamber cylinder, will be modeled after the one used in the recent Tektite Program and be financed by the Virgin Islands Government and private industry. The Navy says its first rescue minisub has shown it can locate a submarine trapped under water, lock onto it, and bring its crew to safety. The rescue vessel proved itself in test at a depth of more than 150 feet off San Clemente Island. The 50-foot sub located a metal structure representing a submarine, locked a transfer hatch over it, and brought a man through. They've dubbed the vessel 'the green torpedo.'" On the basketball scene, UCLA put the skids on USC in the big west coast basketball game last night. In a come-from-behind victory, the Bruins edged the Trojans 64 to 60. The Houston Cougars had a real battle with Seattle University at the Hofheinz Pavilion last night. They squeezed out a 93 to 92 win. In the Southwest Conference action, the Rice Owls dumped the Texas Tech Raiders by 80 to 64. Rice, smarting from a three-game losing streak, stopped the Raiders' three-game winning streak. Tech is number - Tech is 4-2 for the season; Rice, 3 and 3. In automobile racing, A. J. Foyt showed his driving prowess by winning the pole position for the big Daytona 500 on February 14. Foyt wowed the crowd as he turned in a qualifying lap time over the 2-and-one-half-mile oval with a clocking of 182.7. Defending stock car champion Bobby Isaac was second with a speed of 180.5 per hour. Foyt, who has never won the Daytona 500, is the favorite now with Isaac to win the 200,000 dollar auto classic. Former U.S. Davis Cupper Arthur Ashe defeated Clark Graebner of New York in the semifinals of the Fidelity invitational tennis tournament in Richmond, Virginia. And that about wraps up the morning news. Over."

06 21 01 21 CDR That's a very good rundown, Bruce. Very good. Why don't you let us hold off on the answer on the ISA for a minute? We'll run back over our checkout list and review those items while you're probably

doing the same thing down there, and we'll get back together with you a little bit later in the day on a good wave.

06 21 01 42 CC — Roger. There's certainly no rush on it. We'd just like to know, at - prior to entry, so that we can determine whether it needs to be tied down or not, and if it affects the c.g. any.

06 21 01 54 CDR — Okay. We think the additional items are about 5 pounds; and let us go back over the checklist, and we'll give you a good answer later on.

06 21 02 00 CC — Roger. And when Ed feels in the mood for it, I've got a couple more questions for the AGS.

06 21 02 09 CDR — Fire away.

06 21 02 27 LMP — Go ahead, Bruce; I'm ready.

06 21 02 45 CC — Okay, Ed. When the trouble first showed up, was there anything showing or was there anything left showing in the DEDA? And was it possible for you to clear this display, if there was anything showing? Over.

06 21 03 04 LMP — That's negative. The first time I noticed that there was a problem was when you called my attention to it, that - I don't recall what - don't remember what the call was - but you asked about the - I guess the circuit breakers on the DEDA or on the AGS. That was the first time I ever realized that we had a problem. There was nothing showing on the DSKY. And, of course, I could not ENTER the DSKY or CLEAR it or anything else.

06 21 03 34 CC — Okay. I guess that about sums it up.

06 21 03 40 LMP — There is one comment. I noticed, just before leaving the LM, there appeared to be a very small crack across the address register on the DEDA. Now, how long it had been there, whether it was bumped after docking, or when it occurred, I have no idea. But there did appear to be a crack in the inner glass on the address register.

06 21 04 14 CC — Okay. Thank you.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 21 11 48	CC	14, this is Houston. On your waste water dump scheduled for 166 hours, we'd like you to dump to 25 percent onboard indication. Over.
06 21 12 03	LMP	Roger. Waste water dump to 25 percent onboard indication.
06 21 12 07	CC	Roger.
06 21 18 11	CC	Apollo 14, this is Houston. For systems record-keeping purposes, if you have time, we'd like you to run an EMS null bias check, and give us the results on it.
06 21 18 26	CDR	Houston, I think we have that number. Stand by.
06 21 18 29	LMP	Okay, minus 990 is the number.
06 21 18 32	CC	Roger. We copy minus 990.
06 21 24 03	CC	14, Houston. We'd like to get this waste-water dump out of the way before the midcourse burn. Over.
06 21 24 11	CDR	Roger. We'll start it right now.
06 21 29 07	CC	14, this is Houston. We show oxygen still flowing in the fuel cell purge.
06 21 29 21	LMP	It's OFF.
06 21 34 06	CC	14, this is Houston; 1 minute to the burn. We'd like you to terminate the water dump at this time, and go ahead and ENTER on your maneuver there.
06 21 34 15	LMP	Okay, we'll be there.
06 21 34 54	CC	Your slip T_{ig} is okay, 14.
06 21 35 00	CMP	We're going to just go ahead and burn it on time.
06 21 35 03	CC	Okay.
06 21 36 23	CMP	Okay, Houston; the burn is complete.

06 21 36 26	CC	Houston. Roger, out.
06 21 39 27	CMP	Houston, 14.
96 21 39 31	CC	Go ahead, 14.
06 21 39 35	CMP	Okay, Bruce. I started this maneuver at optics CAL; I don't know if we'll have the HIGH GAIN there or not. Do you want to do the uplinking here? I kind of hate to stop the maneuver. Is OMNI Charlie going to be all right for you for the uplink?
06 21 39 52	CC	That's affirmative, Houston - 14.
06 21 39 56	CMP	Okay, thank you.
06 21 42 10	CC	Apollo.
06 21 42 19	CDR	Go ahead, Houston.
06 21 42 24	CC	All right, 14; this is Houston. Could you give us the reading on the DELTA-V counter on the EMS at the end of your burn, again, for systems tracking? Over.
06 21 42 51	LMP	That was 0.3; plus 0.3.
06 21 42 53	CC	Roger. Plus 0.3. Thank you.
06 21 49 06	CC	Apollo 14, this is Houston. Request OMNI Charlie. Over.
06 21 52 56	CMP	Houston, 14.
06 21 52 57	CC	Go ahead, 14.
06 21 53 00	CMP	Okay, Bruce. Are you ready for the uplink?
06 21 53 02	CC	That's affirmative. We're ready to send you up what will become the CM - the CSM state vector after we ship it over, and then there will be about a 2-minute delay while we get the MSFN-computed CSM state vector that goes in the LM slot out to the side. Over.
06 21 53 22	CMP	Okay. We're POO and ACCEPT, and standing by at your convenience.
06 21 53 26	CC	Roger; out.

06 22 01 24	CC	14, this is Houston. We're through with the uplink. Computer's yours.
06 22 01 32	CMP	Okay.
06 22 10 07	CC	Apollo 14, this is Houston. Over.
06 22 10 13	LMP	Go ahead, Bruce.
06 22 10 15	CC	Say, Ed. We've got some modifications to the high-oxygen-flow tests procedures, here, if you'll advise us when you're ready to copy. Over.
06 22 10 29	LMP	Roger. Stand by.
06 22 11 20	CC	I understand you're ready to copy, Ed. Over.
06 22 11 29	LMP	Stand by.
06 22 11 46	LMP	Okay, Bruce. What page do you want worked on?
06 22 11 52	CC	Okay. If you look on page 3-245 of the flight plan, the one that starts at 168 hours.
06 22 12 02	LMP	Okay.
06 22 12 04	CC	Okay. There are three steps there, that are: circuit breaker O_2 ISOLATION/AUX BAT, close, which is panel 226; O_2 TANK 3 ISOLATION valve, CLOSED, momentary; and O_2 TANK 3 ISOLATION valve talk back barber pole. We'd like to move those three steps up to 167 hours. Over.
06 22 12 43	LMP	Okay. The three steps: circuit breaker O_2 ISOLATION/AUX BAT, closed; O_2 TANK 3 ISOL valve, CLOSED, momentary; and O_2 TANK 3 ISOL valve talk back barber pole. These are moved to 167 hours.
06 22 12 59	CC	Roger. And, also, at 167 hours: circuit breaker OXYGEN TANK 3, 50-WATT HEATERS, open, 226. Over.
06 22 13 24	LMP	Okay. Say it again, want you want done with that one.

06 22 13 28	CC	Okay. Also, at 167 hours, we want to open the circuit breaker for OXYGEN TANK NUMBER 3, 50-WATT HEATERS. That's CB O_2 TANK 3, 50-WATT HEATERS, open, on Panel 226. Over.
06 22 13 57	LMP	Okay. You want the TANK 3 - O_2 TANK 3, 50-WATT HEATERS, OPEN.
06 22 14 06	CC	That's affirmative. You may commence the O_2 high flow tests at your convenience, following Stu's completion of the P23. Over.
06 22 14 19	LMP	I understand.
06 22 14 21	CC	Item number 3. The new heater redline temperature is 350 degrees Fahrenheit - that's 350 degrees Fahrenheit, which corresponds to 3.6. I say again - 3.6 volts on the SYSTEMS TEST meter. Over.
06 22 15 05	LMP	Bruce, say again what the 350 degrees of redline is.
06 22 15 10	CC	Roger, that's the redline on the heater temperature. Over.
06 22 15 16	LMP	Okay.
06 22 15 18	CC	And that corresponds to 3.6 volts on the SYSTEMS TEST meter.
06 22 15 27	LMP	Thank you.
06 22 15 57	CC	And, Ed; for tank 3, that's position 1 Charlie on the SYSTEMS TEST meter.
06 22 16 06	LMP	Okay, thank you.
06 22 16 10	CC	Okay. Some general comments, the test should be terminated if communications is lost with MSFN. Over.
06 22 16 24	LMP	Understand. You mean - you mean other than just a dropout.
06 22 16 31	CC	That's affirmative. If we lose communication for any extended period of time.

06 22 16 42	LMP	Okay.
06 22 16 44	CC	And, for your information, the minimum cabin pressure that we are expecting is in the vicinity of 4.4 to 4.2 psia. However, if the cabin pressure falls below 4.0 psia, you should terminate the test. Over.
06 22 17 09	LMP	Okay. Understand you're expecting 4.2 to 4.4 cabin pressure; if it drops below 4.0, we're to terminate the test.
06 22 17 17	CC	Roger. And if you're unable to terminate more rapidly than is required to keep the cabin pressure above 3.7, then bring the surge tank and the REPRESS back on line to maintain cabin pressure. Over.
06 22 17 34	LMP	Okay.
06 22 17 50	CC	Okay, Ed; and, on the SYSTEMS TEST meter, make that position 1 Bravo, for monitoring tank 3, which is the one that you should be monitoring. Over.
06 22 18 04	LMP	Okay; 1 Bravo, tank 3.
06 22 18 10	CC	And, then, here's a fairly long one. If tank 3 heater temperature, or tank 1, exceeds 350 degrees Fahrenheit, place the heater switch to OFF. I'll go all the way through this once, first. When the pressure drops to 800 psi, place heater switch to ON. Monitor tank pressure and heater temperature. Place heater switch to OFF when pressure reaches 930 or heater temp reaches 350, whichever occurs first. Test will be terminated if heater temp reaches 350 prior to tank pressure reaching 850 in this mode of operation. And - I'll go right back and start again from the beginning on that one in a minute. Over.
06 22 19 04	LMP	Okay. Let's see if we can find a way to codify it so that it'll be a little easier to understand.
06 22 19 17	CC	Okay, condition number 1. If the heater temperature exceeds 350 degrees, put the heater switch to OFF. Over.

06 22 19 35	LMP	Okay. If the heater in tank 3 exceeds 350, heaters to OFF.
06 22 19 47	CC	Okay. Under the assumption, then, that you're up in a normal operating pressure range when this happens, when the pressure drops - -
06 22 19 56	LMP	Bruce, hold up a minute.
06 22 19 57	CC	Okay.
06 22 20 01	LMP	Hold up a minute. Let's let Stu complete this P23, and then we'll get back on this. I'm interfering with him by working on the flight plan right now.
06 22 20 09	CC	Okay; tell you what. Just carry out that stuff at 167 hours, and then, whenever you're ready to press on with this, give us a yell, and we'll go back through the rest of these notes. Over.
06 22 20 22	LMP	Okay.
06 22 20 53	CC	14, Ed; this is Houston. Since we've already given you the instructions to terminate the test if communications is lost, it might be more straight forward if we monitored the heater temps and pressures for you down here and advised you of the action required, if any off-nominal action is required. Over.
06 22 21 20	LMP	Okay; that'll be fine.
06 22 21 22	CC	Roger; then you've got - you got all of it up there now; and if for any reason you should have to terminate, why, the procedures are over there on page 3-248; they're the nominal termination procedures.
06 22 21 40	LMP	Okay, Bruce; will do.
06 22 21 42	CC	Roger, out.
06 22 31 47	CC	14, this is Houston. We'd like to initiate charging on battery Bravo. Over.
06 22 31 55	LMP	Okay, stand by.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

06 22 40 00	CC	Come on, now.
06 22 40 05	CDR	All right; go ahead, Houston.
06 22 40 09	CC	I was just remarking at Stu's NOUN 49 value there, plus one-tenth zero.
06 22 40 19	CDR	Well, you're watching the world's leading expert on P23.
06 22 40 24	CC	Well, I don't know. Jack Swigert wrote a paper on it.
06 22 40 30	CDR	We're aware of that, also. Comment still stands.
06 22 40 37	CMP	Yes, that has nothing to do with Al's comment, Bruce.
06 22 40 42	CC	Okay, I'll pass that along.
06 22 41 53	CDR	Bruce, you're also watching the world's leading expert on going from CMC AUTO to FREE and back.
06 22 42 01	CC	Roger. We copy that, Al.
06 22 45 04	CDR	Houston, 14. We are applying power to the dump, AUTO heater, at 167:25, and we'll be doing the test in about 30 minutes.
06 22 45 16	CC	Roger, Houston. Roger, out.
06 22 45 35	CC	14, this is Houston. We show that you're in HIGH GAIN ANTENNA coverage area at the present time. We'd like you to acquire on the HIGH GAIN; PITCH, minus 5; YAW, 250. Over.
06 22 45 51	CDR	Okay, we're shooting for that now. We're at PITCH, minus 5; YAW, 250.
06 22 45 59	CC	Roger. Out.
06 22 46 19	CDR	Okay, you should have it now, Houston.
06 22 46 26	CC	Roger, Al. We've got you loud and clear.
06 23 06 34	CC	Apollo 14, Houston.

06 23 06 40	CDR	Go ahead, Houston.
06 23 06 41	MCC	Roger, Al. I just wanted to say, that I get a chance to say hello on the network. You guys did a great job yesterday, and I think things are in beautiful shape coasting home.
06 23 06 58	CDR	Well, thank you, Thomas. Appreciate those kind words. We're coming along well up here, too, right now.
06 23 07 05	MCC	Yes. Stu's marks looking real good, and we had a great team effort on that landing; we'll tell you about it. In fact, I nearly lost all of my hair; would you believe that?
06 23 07 15	CDR	(Laughter) No, that would be pretty hard to believe, Tom.
06 23 07 22	MCC	Roger.
06 23 07 26	CDR	Now, we're pressing ahead with the flight-plan items here, and we're staying busy.
06 23 07 30	MCC	Roger.
06 23 08 10	LMP	Houston, Apollo 14.
06 23 08 13	CC	Go ahead, Ed.
06 23 08 18	LMP	Okay, back to our ISA weight problem.
06 23 08 28	CC	I didn't know we had a problem, but go ahead.
06 23 08 32	LMP	Okay, I was jumped on by both sources, here; it's not a problem; it was a question. The ISA contains the 50 pounds we measured on the surface, less the 100-foot tether, plus the 70-millimeter camera and magazine, plus a pair of EVA gloves, plus the return items on Deke's list.
06 23 09 12	CC	Okay, Ed. We've got that, and we'll work the arithmetic on the weights from down here and keep you advised. Over.
06 23 09 24	LMP	Thank you, sir.
06 23 09 26	CC	Roger. Out.

06 23 13 15	CMP	There you go, Bruce.
06 23 13 23	CC	Okay, Stu. We copied that one for posterity.
06 23 19 32	CMP	You got the last one, Bruce?
06 23 19 40	CC	Yes, we got that one, too, Stu; but you only get the first one framed and authenticated.
06 23 19 48	CMP	Okay.
06 23 19 52	CC	You still on Delta Sagittarii?
06 23 19 59	CMP	That's negative. That was the last mark on Antares.
06 23 20 02	CC	Roger.
06 23 28 36	LMP	Houston, Apollo 14.
06 23 28 39	CC	Go ahead, 14.
06 23 28 42	LMP	We're starting the O_2 test now. The heaters are going to AUTO. Opening up the flow valve.
06 23 28 52	LMP	Delay that. We're standing by to open up the flow valve. It's not open yet.
06 23 28 57	CC	Okay. Understand, heaters to AUTO; and you're standing by on the flow valve. Have you got the REPRESS package valve, OFF?
06 23 29 08	CDR	Yes. We're changing that now.
06 23 29 49	LMP	Okay, Houston. The plug is up; we're flowing at 168:09:50.
06 23 29 54	CC	Roger, 14.
06 23 30 07	LMP	The screen has been installed on the adapter.
06 23 30 10	CC	Roger, the screen.
06 23 35 27	CC	Apollo 14. Stu, this is Houston. Over.
06 23 35 34	CMP	Go ahead, Houston.

06 23 35 35	CC	Okay. We continue to get praise of your ability on the P23s. Based on your navigation, your idea of your gamma angle at entry interface is minus 6.1 degrees. The MSFN solution corrected for the midcourse 5 burn, but without any postmidcourse tracking is 6.6 degrees. Over.
06 23 36 06	CMP	Okay. Yes, I noticed - I was comparing a VERB 83 there, Bruce; and I showed 625 miles, or thereabouts, prior to those last two sightings; and then, it was down to - I don't know 100 and some - after that. I think the sightings on the Moon is what really help bring it in. There were a couple of large updates there, I think, that really helped it.
06 23 36 36	CC	Okay. That sounds like you're doing good work.
06 23 36 43	CMP	Thank you.
06 23 37 04	CC	14, this is Houston. On telemetry, we're showing a cabin pressure of 4.7 right now and wonder what you've got?
06 23 37 19	LMP	That's about 4.8, what we're showing, Bruce.
06 23 37 23	CC	Roger. Out.
06 23 49 30	CC	Okay, 14; Houston. Now, we're showing the surge tank at 750 on our telemetry, now.
06 23 49 39	CDR	As a matter of fact, we were just going to call you on that. We have a bias on our gage, that's good, we'll stay with - we're going to start the test at 168:30 - 168:29 - I'm sorry, 168:30:00, surge tank valve going OFF.
06 23 49 57	CC	This is Houston. Roger. Out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 00 22 34 CC 14, this is Houston. We'd like you to zero the optics, please.

07 00 22 46 CDR Okay; stand by. Okay, you've got it.

07 00 23 01 CC Roger; thank you.

07 00 58 40 CC Apollo 14, this is Houston. Over.

07 00 58 47 CDR Go ahead, Houston.

07 00 58 49 CC 14, this is Houston. We're showing an O_2 manifold pressure of 8 pounds per square inch absolute, and we'd like to terminate the O_2 high-flow test at this time. Further procedures found in your flight plan opposite 171 hours 00 minutes GET, deleting the 10-minute step in there - deleting the 10-minute restriction in there. Over.

07 00 59 16 CDR Okay. At 171 hours, we ... through termination procedures; got you.

07 00 59 22 CC Roger.

07 01 04 03 CC 14, this is Houston. We show the surge tank on line and the manifold pressure back up in the normal operating range, and we'd appreciate it if you'd advise us when you have the orifice closed off. Over.

07 01 04 19 LMP Roger. It's closed off, now.

07 01 04 22 CC Roger. Thank you.

07 01 04 25 LMP Bruce, what was the reason for terminating the test? I didn't quite understand it.

07 01 04 31 CC Okay. The pressure in the O_2 manifold, which normally is regulated 85 to 110, got down to 9 psia; and the pressure in your water tanks was falling off from below its regulated range because of the pressure in the manifold. And we just thought it best to terminate the test at this time and

reexamine the data that we've got on the plumbing leading down to it, and we'll be back to you with some info on it later. Over.

07 01 05 06 LMP Okay, we understand. Thank you.

07 01 06 41 LMP Houston, 14.

07 01 06 44 CC Go ahead, 14.

07 01 06 49 LMP Do you want us to stay in this attitude, or shall we go on to the thermal attitude?

07 01 06 56 CC 14, this is Houston. Remain in the present attitude until 171 plus 30, and then maneuver to the thermal attitude. Over.

07 01 07 07 LMP Okay, and what about the isolating of the tank? Do you want to go ahead with those three steps, or do you want to hold off on those?

07 01 07 39 CC Stand by on that, Ed. We'll have the answer for you in a minute.

07 01 07 59 CC 14, this is Houston. Affirmative. Press on with the tank 3 isolation valve opening. Over.

07 01 08 08 LMP Roger.

07 01 31 37 CC Apollo 14, this is Houston. Over.

07 01 31 42 LMP Go ahead. Houston.

07 01 31 44 CC 14, this is Houston. Back when you all were running that P37 about an hour ago, we took your state vector and ran it through our computer here; and we got excellent agreement between the two solutions. We both showed a 0.9-foot per second midcourse, and the entry interface times were within 1 second of each other. The reduction here shows that the measurement plane error in the star sighting's themselves was less than 3-arc minutes. So, it's really looking beautiful.

07 01 32 20 LMP Three-arc minutes, huh?

07 01 32 22 CC Right.

07 01 32 23	LMP	Well, that's very good, Bruce. Thank you.
07 01 32 26	CC	And, with respect to the O_2 high-flow test, the feeling down here is that low pressure in the manifold was probably connected with some panel 251 activity, giving a higher flow rate. And if Stu's around, we'd like to discuss for a minute his plans on the demonstrations. Over.
07 01 32 49	LMP	Okay. He's here. Just a minute; we'll put him on.
07 01 35 28	CMP	Houston, 14.
07 01 35 31	CC	Okay, Stu. We wanted to just get a status report on the DEMOs, if you've been doing any work on them on the way home, here, and see what your plans were for the TV show this evening.
07 01 35 48	CMP	Okay. Why don't you give us about an hour on that; I'm just in and out. We've been running some of the metal composites, but that - that's nothing to do with TV; all we're going to do there is just show the experiment and talk a little about it. And when you called, I was putting up the heat-flow experiment. We're going to take a look at that one and the liquid transfer and get a hand on it. So, I'll have some word in about an hour.
07 01 36 18	CC	Okay. We're standing by for the TV at the regular time; and if you could tell us which ones of the metal casting that you've already run, why it might be of interest to people down here. We caught number 4 on the way out.
07 01 36 35	CMP	Yes. We've run 4, 5, 6; and 7 will be the next one.
07 01 36 40	CC	Roger.
07 01 39 36	CDR	Houston, Apollo 14.
07 01 39 42	CC	14, this is Houston. Go ahead. Over.
07 01 39 48	CDR	Just to clarify a point. We're still planning on starting the TV show at 172:30. Is that correct?

07 01 39 54 CC That's affirmative.

07 01 39 58 CDR Okay. Thank you.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 02 01 40	CC	14, this is Houston. Over.
07 02 01 46	CDR	Go ahead, Houston.
07 02 01 48	CC	Okay. We'd like to confirm that you did, in fact, turn the heaters and oxygen tank number 1 off for the continuation of our O_2 low-flow test here.
07 02 02 10	CDR	We're working on a 50-pound instrument error on that. I think we're reading about 865 right now. How do you look?
07 02 02 21	CC	Okay. We're reading a little higher down here. Got about 889 showing on the TM.
07 02 02 30	CDR	Okay. That's fine. We'll turn it off now.
07 02 02 33	CC	Okay; Roger. And for Ed, the folks in Kingston Court wanted me to say hi.
07 02 02 49	CDR	Understand you want Ed on the line.
07 02 02 51	CC	No, just pass that on to him, and you might remind Stu to listen to his music.
07 02 03 00	CDR	Yes. We - we're listening to the music.
07 02 03 04	CC	Okay.
07 02 04 04	LMP	Houston, 14. This is Ed. Did you call me?
07 02 04 08	CC	Ed, this is Houston. Go ahead. Over.
07 02 04 13	LMP	Roger. Did you call me?
07 02 04 15	CC	I just wanted to say that the folks in Kingston Court said to say "Hello." They'll - -
07 02 04 21	LMP	Thanks, Bruce. Appreciate that.
07 02 04 24	CC	They'll be watching during the TV demonstration here.
07 02 04 30	LMP	Very good. We're - getting the camera out right now, as a matter of fact.

07 02 04 36	CC	Okay.
07 02 32 47	CC	Apollo 14, Houston. Over.
07 02 32 53	LMP/CDR	Go ahead, Houston.
07 02 32 55	CC	Ed, if you have a couple of minutes, we have a short test we'd like to run on the HIGH GAIN ANTENNA to answer the questions - some questions that the antenna people have and try to tie down a couple of questions that are still in their mind about it.
07 02 33 15	LMP	Okay.
07 02 33 17	CC	Okay. What we'd like you to do is set the dials to PITCH of plus 25 and YAW, plus 265, and then go to MANUAL and WIDE and then switch to the PRIMARY HIGH GAIN SERVO ELECTRONICS and try to make a normal reacquisition on the PRIMARY ELECTRONICS and hopefully, if it's working, we'll wind up - once you acquire backup in AUTO and NARROW. If you have any problems and it won't work properly, just go back to SECONDARY ELECTRONICS and back essentially in the mode you are in now. They want a - one final check on whether PRIMARY ELECTRONICS had indeed failed or not. Over.
07 02 34 16	LMP	Okay.
07 02 34 40	LMP	Houston, 14.
07 02 34 42	CC	Go ahead.
07 02 34 46	LMP	Okay. It seems to have popped right up very nicely this time.
07 02 34 51	CC	That's in PRIMARY, right?
07 02 34 54	LMP	That's firm.
07 02 34 56	CC	Okay. We'd like to just stay in PRIMARY then, please.
07 02 35 01	LMP	Okay.

07 02 35 18	CC	Okay, Ed. That's really all they had to ask you to do. If you have any sort of failure in AUTO TRACK and PRIMARY, then go back to SECONDARY. Over.
07 02 35 36	LMP	Wilco.
07 02 57 36	MCC	Apollo 14, Houston.
07 02 57 40	CDR	Go ahead, Houston.
07 02 57 41	MCC	Yes, how's your health up there today?
07 02 57 48	CDR	Oh, we're just fine, Deke. Everybody's in great shape. We had a little sleep last night. Everybody's a little bit tired after 2 full days, but we're fine now. And we're making preparations to run the TV show here. We're playing with the experiments a little bit ahead of time to get organized. And we're just going along fine.
07 02 58 08	MCC	Outstanding. You guys did a beautiful job and you sound great.
07 02 58 13	MCC	We've got one - -
07 02 58 14	CDR	Okay, thank you very much, Deke.
07 02 58 17	MCC	- - we've got one quick question here. Wanted to know how you feel at this point about doing that Q and A with the press tomorrow?
07 02 58 29	CDR	Sounds good to us. No problems at all with that.
07 02 58 32	MCC	Okay, real fine. Well we're looking - -
07 02 58 34	CDR	I think we ought to work out a time - I think we ought to try to work out a time somewhere in the time line when it's convenient for everybody; the people on the ground and for us also.
07 02 58 45	MCC	Okay, well Flight thinks about 195:30 looks like a good time from all respects down here.
07 02 58 53	CDR	About 195:30?
07 02 58 55	MCC	Roger.

07 02 58 56	CDR	Stand by.
07 02 59 45	CDR	Looks pretty good to us Deke. That's good spot in the time line from our point of view, also.
07 02 59 51	MCC	Okay, real fine. And they'd like to have TV with that. That gives us good coverage out of Goldstone for that.
07 03 00 00	CDR	Okay, we'll plan on that, then.
07 03 00 04	MCC	Okay, great, Al.
07 03 00 08	CDR	You sound pretty good yourself. How's your sleep level these days?
07 03 00 13	MCC	Well, I gained on you last night. I picked up about 12 hours.
07 03 00 19	CDR	Ho ho ho.
07 03 00 23	MCC	Talked to your bride today and saw her yesterday. Everybody's doing great familywise.
07 03 00 29	CDR	That's good. Thank you, sir.
07 03 00 31	MCC	You bet.
07 03 11 24	CC	Apollo 14, Houston. Over.
07 03 11 28	CDR	Go ahead.
07 03 11 30	CC	We'd like to have you go to the thermal attitude as shown at 171:20 in the flight plan. Over.
07 03 11 41	CDR	Wilco.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 03 29 54 LMP Houston, 14.

07 03 29 59 CC Go ahead, Ed.

07 03 30 03 LMP The flight plan showing a NARROW DEAD BAND. Is a WIDE-band DEAD BAND good enough right now?

07 03 30 08 CC Stand by.

07 03 30 30 CC A WIDE DEAD BAND will be good.

07 03 30 35 LMP Roger, thank you.

07 03 30 36 CDR Okay, Stu ... now.

07 03 38 35 CC Apollo 14, Houston. We're ready for you to terminate the charge on battery B.

07 03 38 45 CMP Okay, terminating B at this time.

07 03 38 48 CC Roger.

07 03 51 09 LMP Houston; Apollo 14.

07 03 51 11 CC Apollo 14, Houston. We're getting a very nice picture of Apollo 14 patch. Over.

07 03 51 19 LMP Very good. How are you this afternoon, Gordon?

07 03 51 23 CC Fine. Gold Team's at your service and standing by for your show.

07 03 51 29 LMP Okay. We'd like to welcome you to an afternoon with Apollo 14 - a Sunday afternoon, by the way, with Apollo 14. And we're going to present some experiments for you. And our narrator for this afternoon will be Stu Roosa; and, I guess, he's about ready to go. Stu.

07 03 51 55 CMP Okay, Houston. What we'll try to do this afternoon is show you four of the experiments that we're carrying on board; and even though we'd like to think that maybe they're a major breakthrough - Essentially what these are, are experiments to check out not only the theory involved in the zero-g environment but also the technical problems

that we may face in designing bigger and better experiments for Skylab. And three of these experiments deal primarily with convection or, in our case, lack of convection, we hope, during the zero-g. And now, for the purists out - of you in the audience that say we should be calling it zero g, we'll concede to that and go ahead and call it zero g anyway, just for clarification; and everybody knows what we are talking about. But, really, what we're talking about is a free-fall situation, or the lack of weight. So, of course, on Earth under a one-g field, when you heat something, air, so forth, why, we say air rises; and this is due the influence of gravity on the - on the air that becomes less dense; and the cold air comes underneath; and you have your convection patterns, which everyone is familiar with. Well, under our situation, we probably have a lack of, or we do have a lack of these convection patterns; and we're going to use this to show some experiments and, hopefully, how in later missions that we can manufacture products and, perhaps, medicines and so forth. And the first one of these is the heat flow - it's a heat-flow experiment that we've got mounted over here, if Ed will put the camera on it. And what we have here are various cells; and, maybe, Al can point them out there on the radial zone. And inside each one of these zones, as - as outlined here, is a heat-sensitive material. And it will change colors as it's heated. And they'll not all change at the same time due to the substance that the sensor is made out of; however, these two are exactly the same. And, now, under a g-field, if you had - had these two the same and you heated them, well, of course, the hot air would rise. And let's say that you had this sitting on the table, the one above it you would see a - a marked difference in the heating pattern. Here, under our weightless condition, the pattern should be the same. In other words, in these two cells, the heating should go out evenly on both sides. Now, you will see a difference on - on these two because of the sensor being of different material. So, if Al will throw on the switch - and we'll see some response from this. It'll take about a minute. And, while we're waiting for that, we have essentially the same thing in a different form, across the top. And we can only heat one at a time; so,

we'll heat up this radial zone, first - I think you'll have a better chance of seeing this. And maybe, we'll throw - heat this up and throw it on - put the TV camera on them later. And while - while that's heating up, I'd like to show you another one that - that we've got. Okay.

07 03 56 05 LMP Houston. Color check on the picture - How's it coming through to you now?

07 03 56 11 CC We're getting a pretty good picture, Ed. But we're not noticing any difference in the crystals in the - circular heat-flow crystals, there - -

07 03 56 24 LMP They aren't going to show up on it, yet - so you wouldn't.

07 30 56 28 CMP Over here, we've got a - another experiment. Well, let's take another one of the convection types. Let's take the metal castings there, Al. Okay, Al has now got the - another experiment which we call metal composites. So, we have 18 different samples. These samples are metal. And really, what this experiment is, is to get some data - Okay. How's that picture, now, Gordon? Can you see the metal composite experiment?

07 03 57 05 CC Yes. Now, I have settled, and we're seeing it very well.

07 03 57 07 CMP Okay. What we have are 18 of these small canisters, each one containing a different metal and/or a mixture. And the purpose of this experiment is to get some data on casting under our weightless or zero-g conditions. And here again, when you cast metals, you heat them; and when they cool, you have convection currents in them. Hopefully, here in our laboratory, we can heat these and cool them - They will have even cooling. And also, another part of this experiment is, some of the metals are mixed with fibers and/or various other particles. And the theory here, to increase the strength of the casting with these fibers. Now, on Earth, under a one-g field, this gets to be a rather difficult process because, during the cooling, the fibers settle out; and you don't get a homogeneous mix and a cooling; so, you don't have equal strength.

So, what we do is, we heat these up and then we run through various processes. Some of them we shake; some of them we don't shake; and then, we cool them. We put them on a little heat sink, here. And we'll let it set and cool for a certain period of time; and then, we'll change it, put in another casting, and press ahead. There's really not much else to show on - on TV with - with this one. It's - it takes quite a bit of time, by the time we run through all the castings; but we just park it up in the tunnel out of the way. And when our kitchen timer goes off, why, we'll either cool it or put in a new casting and press ahead. And I see the - getting some action on the convection experiment over here, on the radial experiment; and we'd be real curious, Gordon, if you can pick this up, if we've got enough light.

07 03 59 17 CC — Yes, Stu. We can see a difference, particularly on the - as we're looking at it - upper left quadrant of the radial - window there.

07 03 59 36 CMP — Okay. Now, as I said before, this quadrangle will heat faster; so, you'll see more of - a faster color change. Now, these two will also heat, and these are the two that really show our zero-g condition, because these two will - and, - are heating out - extended the radial distance out - at the same rate. So, we're not getting any help, on either one of them, from the convection currents. And the fourth one is just now starting to pick up.

07 04 00 13 CC — Roger - -

07 04 00 14 CMP — And we'll drop off from that one and just let it extend out a little bit; we'll talk about another experiment we have that also deals with convection.

07 04 00 27 CC — Roger, Stu. The - That's very apparent that the upper-right and lower-left quadrants are heating equally. That's a very good picture.

07 04 00 37 CMP — Okay. And we - we did run this experiment on the ground before flight, and it was - It was very marked difference. It's quite impressive how it working - -

07 04 00 53 CC Roger.

07 04 00 57 CDR You do understand that the - this quadrant down here is a higher temperature crystal. That's the reason that - that it's not going out as fast as the one in the upper-left quadrant. It has nothing to do with the - the gravitational effect at all - it's a higher temperature crystal down here.

07 04 01 14 CC Roger, Al.

07 04 01 38 CMP Okay. Now, Gordon, our intrepid LMP is - is holding another experiment. And how's that picture look? Can you get anything of Ed and the blue box here?

07 04 01 58 CC We're not getting it, yet. It looks like you're still getting the camera settled down, I'm seeing Ed's face - Now - now we're seeing it - That's right in the center, now. I think, maybe, if you stop the lens down, the - the little window is overexposed with respect to the rest of the scene; so, we've been getting not much more than just a bright light. That's looking real good, now. I think that's a good setting, right there.

07 04 02 30 LMP Okay, Gordon. And what we have here is an elect - electrophoresis experiment. And we're not - we're not going to run this one on the TV camera. It's a one-shot operation. But on the left side here, we're got three channels going across this beauty; and over on the left, in a chamber, we have three different compounds containing organic molecules. And what we're going to do is apply a voltage to each one of these chambers, and then, open up the partition between the chamber where the organic molecules are, and our channel going across. And the theory here being that as you charge the - the molecules, they will move out across this channel. Now, some molecules will take a better charge than the other ones, and they will move faster. Well, under a gravity field - here again, you have the convection currents; and it tends to mix up the molecules; the heavier molecules settle out to the bottom of the channel. They don't make it all the way across, and so forth. All the problems involved with the convection again. So here, hopefully, the

only variable will be the different type of molecule. And we hope these molecules will then separate themselves in bunches - based on the assumption that all molecules of the same kind, you know - you know are all - been doing their physical conditioning and will run as the same rate. So, anyway, the molecules will move across and, hopefully, will separate them into bands. Now, we've got three different types of - of molecules here; and one, the simplest one, it's just some red and blue dye. And this phenomena will take place under a gravity field, and this happens on the Earth. And we work up in numbers up to - to quite heavy molecules, and these are the ones that we cannot do on Earth. And we're trying to see if it's possible to - to do them here under zero-g; and there are quite a few ramifications to this, if it really comes off. And one of the most obvious is in the field of medicine, in making pure vaccines, and so forth. Now, we don't expect this - this experiment to solve the problems. We're trying to get a hack - see if the theory is correct and, also, to work out some of the engineering details, such as, when you heat - apply this voltage, you form a few gas bubbles around it, and so, we have to have a little pump that circulates the fluid at a very low rate. And we're wanting to see if this works and if it disrupts the travel of the molecules. So, this - this we hope is the first step toward bigger and better experiments and, eventually, a truly manufacturing process.

07 04 05 53 CDR Ed, if you want to move on down closer to that light for a few minutes, we'll put you on the camera and, maybe, your family can see what you've got hanging all over your face.

07 04 06 04 CMP We couldn't talk Ed into shaving this morning.

07 04 06 07 LMP Or yesterday morning, either.

07 04 06 12 CC You might open up the lens slightly, if you're going to a less brightly lit object.

07 04 06 22 CMP Are you - are you trying to say Ed's not very bright, Gordon? (Laughter)

07 04 06 27 CC I guess I won't comment on the interpretation there.

07 04 06 33 CMP Okay (Laughter).

07 04 06 34 LMP I'm being conspired against.

07 04 07 24 LMP Since I'm being conspired against, I'll take the camera back.

07 04 07 36 CMP Okay. We'll come back down off the one that does not deal with - with the convection principle, and that's the transfer of liquid. If I can get out of the way here, and what - is that showing up, Gordon?

07 04 07 55 CC That's pretty good - -

07 04 07 56 LMP All you can see - -

07 04 07 57 CC - - for centering, Stu.

07 04 07 58 LMP - - is one great eyeball.

07 04 08 00 CC Can we - -

07 04 08 02 LMP Okay. We're watching it.

07 04 08 04 CC That's looking pretty good. You might move the camera down slightly, now. It's in the lower part of the screen. Okay. It's centered; well - it was. Also, you might try a peak on the camera; it might improve the exposure. That was one suggestion from the background man there.

07 04 08 27 CMP Okay.

07 04 08 34 LMP You have peak. How's it now? Peak and f/8.

07 04 08 40 CC I think that'll work. You might open it slightly, Ed. Open the f-stop slightly; and, I think, we'll have it.

07 04 09 00 CMP Okay. What we've got, Gordon, is, of course, two tanks here; and these have no baffles whatsoever. And we tried to transfer the liquid from one, into the other one, and then back again; and we ended up in about the condition that - that you see here,

not being able to do much with it. And I've got me a handy-dandy pump, which I'm going to mount on here. And this experiment is, of course, slanted toward the large space station refueling operations, transfer of fluids on a space station - Any time you have a rather large complex structure up here, why, you're going to have to be doing this type operation. And it's a first look at what type of baffles and - we need, and you'll see this on the other side. What I'd like to show you is a - the difficulty you have when you're trying to do them without any - without the aid of any baffles.

07 04 10 05 CC Stu, we see a couple of large bubbles in each tank. Will you point out just which part there is liquid and which part is the air space? Over.

07 04 10 17 CMP Okay. The white portion you see is the bubble, and you should be able to see a green fluid around the bubble. Can you see the green?

07 04 10 28 CC That's affirmative. We can see where you're - what the parts that you're pointing out there. The colors on our monitor here are not coming in true, but that shouldn't hurt the point of the experiment. Go ahead.

07 04 10 45 CMP Okay. We'll now take - yes - okay. And we'll - Al's now working this pump, and - okay. We can't even get the bubbles - to change too much, here.

07 04 11 12 CMP Okay, and about all we - okay if you'll watch that. About all you can succeed in doing when you pump with the pump is making the large bubble in the center, and the fluid has a tendency to cling around to the outside edge due to the surface tension. Now, this surface tension is quite important, and that is what will make the baffles work, as you see on the other side. But right now, the only surface for the fluid to cling to is right around the edge of the tank; and sure enough, that's where it goes, with the bubble in the center. And makes it very difficult, if not impossible, to work with.

07 04 11 51 CC Okay, that's very apparent from the picture we're seeing now.

07 04 11 58 CMP Okay, okay. And a little bit of the hardware here, we have a valve up here at the top that connects - connects the two tanks through two - through a tube, here. Now, Ed, if you can get it down. And we've got a valve on each - on the top of each tank here, in which the pump will either pump into this tank or suck from that tank into this tank. The tubing here goes from these valves through a little hand-operated pump. So, that's the engineering behind it; and, of course, as you can see, the liquid just clings to the periphery of the - of the tank due to the surface tension. We'll now switch the tank and show you the operation, using the baffle.

07 04 12 51 LMP And while you're switching, I'll put the camera on Al; and let the world look at him. He did shave this morning. It didn't help a bit.

07 04 13 02 CC Roger. We can see that none of you look the worse for - worse for wear on the preceding 3 days' activities.

07 04 13 17 CDR No, we feel great up here. Great shape.

07 04 14 02 CC Stu, a reminder; if you still have the heat on the radial experiment, you might turn it off. It - it might be overheating by this time.

07 04 14 11 CDR Well, you might swing on over. There's another part of the experiment, that we're not sure you'll be able to see, that we turned on instead. I don't know whether Ed can get it on the camera or not. I'll push the top in.

07 04 14 32 CMP Okay, now, up here, we have the ... we were heating - heating, extending out radially from a point here. Okay, up on the top, we're heating - Stand by 1; here, we'll get the camera rigged up. Okay, we've now switched to the zone cells, as they're called; and here again, we have the different crystals.

07 04 15 03 CC Ed, can you refocus there? As you moved in tight, we lost the focus and lost most of the detail of that part of the experiment.

07 04 15 21 LMP How's that, Gordon?

07 04 15 28 CC — Okay, that's better. I think that range is good. Just hold everything as it is.

07 04 15 30 LMP — Okay. Okay, Gordon. Now this is essentially the same principle only a different-type heating arrangement. Here, we're heating with a band in the center, and we have the crystal in longitudinal strips running out from the center. And you prob - I don't know if you can pick up the color difference or not on these - on these bands as they move out.

07 04 15 55 CC — We can see - -

07 04 15 56 CMP — I might add -

07 04 15 57 CC — - - a little bit of difference there. It's not readily apparent; but, as you point it out, I believe we can see those zones moving out.

07 04 16 08 CMP — Okay, and that's it basically. Now when we actually do the experiment for data, we have a 16-millimeter camera that sits out 1 foot; and we turn in on, and it takes a picture, and you go through a sequence here. So it's - it's a detailed experiment, in which we have the procedures and we run through those. And just - what we're doing here is just showing you the gross features of the experiment and - and its typical operation. Not trying to show you exactly how we gather the data or anything like that. And we're turning off the heat-convection experiment, now.

07 04 16 51 CC — Roger.

07 04 16 56 CMP — Okay, how are we focused on the tanks now, Gordon? Stand by.

07 04 17 06 CC — Okay, Stu. That looks really good. Just center it up slightly, and we can see the liquid and the baffles very clearly. Over.

07 04 17 18 CMP — Okay, just to point out that we've got two different-type baffles, I think you probably see the baffle, on this side, and over on this side there are two baffles running up, and with a little different feed-in arrangement - I meant bottom on

the - on the baffle. Okay, now, I'll steady up the camera, and Al will supply some power on the pumps, and you'll see the liquid now moving out. And due to the surface tension on the baffles, it clings to the baffles and comes out and fills up the tank in an orderly fashion instead of going up the side walls and leaving that large bubble right in the center.

07 04 18 14 CC That's a beautiful demonstration - -

07 04 18 15 CMP I know ...

07 04 18 18 CC It's very clear from here.

07 04 18 20 CMP Okay, good. Okay, we've got just about all we're going to get out of the tank. Now, Al will back it up, and we'll show you how the other set of baffles work. And you'll note the baffles not only aid on the fluid coming into the tank but also it makes for nice orderly discharge on the other tank. Now you can see it coming into this tank, with here again surface tension on the side walls and the two baffles, and proceeding to fill the tank.

07 04 19 18 CC That's very clear, Stu. You might run it back once more.

07 04 19 27 CMP Okay, we'll give it to you again.

07 04 19 46 CMP And I don't know if you can see it or not, Gordon; but when a bubble does come into the tank, it's broken up by the - by the baffles and tends to hang in pretty well. There, we just saw one burst there, if you happened to notice that.

07 04 20 02 CC Hey, we can see that very clearly.

07 04 20 08 LMP Why don't you run it fast and show the slosh, if you can get it that fast.

07 04 20 19 CMP Okay, we're going to increase the rate of flow on this one.

07 04 20 22 CC Okay.

07 04 20 37 CMP Okay, now with the faster flow rate, you don't quite have time for the bubbles to dissipate, using the - using the baffles, and we did pick up a few more bubbles. And, Gordon, you really - you really - to appreciate this, you have to try the other side. I'm afraid that one didn't show up too well, because all we had were the two bubbles in the center; but we can prove to you that the pump was working, because it works on this side. But it - it was just impossible to transfer any fluid after we opened the valve the first time, and got fluid out of one tank into the other one.

07 04 21 17 CC I think that's clear, Stu, now that we see how well this side works. We can see that the - without the baffles, it's a pretty hopeless situation.

07 04 21 27 CMP Roger.

07 04 22 02 CMP Okay, Gordon. That's probably about enough of liquid transfer. And I think we pretty well covered the - the four experiments unless you've got some questions, that I didn't make clear, or that has come up during the presentation.

07 04 22 26 CC One quick question. Did you have - Have you tried the - on the heat-flow convection experiment - the flow pattern part - part of it where you expected to see Benard cells, did that work out?

07 04 22 47 CMP Yes. We tried that, Gordon, and it didn't work out too good. Maybe while we've got the TV here, we'll - we'll talk about that one and maybe you can give - get some help, and we'd like to try running it again. We ran everything except the Benard cells. And, Ed, could you put the camera back over on the convection experiment, Ed?

07 04 23 18 LMP ...

07 04 23 19 CDR What has been happening here, in this particular experiment, we have a Krytox fluid that's supposed to come out at three different locations along the base of this cup. Can you see that cup from - from there, Gordo?

07 04 23 38 CC Yes. We're getting a very good view of it.

07 04 23 40 CDR This is the outline of the cup right here. It has three very small holes down at the base of the cup, at its periphery, and Krytox fluid flows in when we work a little hand pump here. And it's supposed to spread evenly over the bottom of this cup, which it does under one g. The cup is a heating element, and we - we're - we're - we were going to study the rate of growth of the - size of growth of Benard cells in the Krytox fluid. Unfortunately, we're not sure whether we have air in the fluid, too much air in the fluid, or not; but attempting to get the fluid to flow off the base of the cup through surface tension, we find that we don't have any luck, and rather it comes up along the walls of the cup adjacent to all three of the holes. And if you have any experts down there, we might just talk about that a minute.

07 04 24 46 CC Have you tried - -

07 04 24 47 CMP Gordon, it ... - -

07 04 24 48 CC - - to use an object to move - to try force the fluid to spread on over the surface by opening the lid on it and then trying to force it to spread out evenly.

07 04 25 02 CMP You mean physically spreading the Krytox around, Gordon?

07 04 25 08 CC That's - that's right. That's the question. We wondered if you tried that yet?

07 04 25 13 CMP No. We - we didn't. You know, our instructions there said if it didn't adhere to the - to the surface, we were to close up the lid and go home. We tried it three times; and to amplify there, it comes out of the hole, comes up the wall, and then spreads between the holes right on around the wall and just keeps packing up. We - we're most anxious to try it again; and we'll - we'll turn her on, and try spreading it across there.

07 04 25 45 CC Okay, Stu. We don't - -

07 04 25 48 CMP It, it ... - -

07 04 25 49 CC - - intend to ask you to try all this on TV, but our only suggestion would be to maybe open it up and try to spread it across with your finger or with a tissue or something like that. But that seems to be the only idea to be offered.

07 04 26 07 CMP Okay. Well, if you've got the time, we'll - we'll turn on the Krytox here and - watch - let you watch it come out.

07 04 26 15 CC Okay. We're - be glad to watch.

07 04 26 35 CDR What I'm doing here is opening a flow valve, between the tank and Krytox and the liquid plate. And over here we have a pump, which is actuated when I turn it in a clockwise direction.

07 04 27 02 CDR Perhaps you can already see that we have fluid coming out, right here. It's staying right in this crevice, moving up the side walls. Can you see that on the camera?

07 04 27 14 CC Yes, sir. We can see that very clearly.

07 04 27 20 CDR See, it's doing it almost the same all the way around it. This one is spreading a little further down the line, doesn't have quite as much fluid yet. But these two are spreading the same way. They're going up the walls as much as they are coming out on the floor. Now we'll get a finger in here and see what happens.

07 04 28 07 CDR I believe we may be able to get enough there to show you the formation of these Benard cells.

07 04 28 13 CC Okay.

07 04 28 46 CDR We have a thin layer here, now. Let's turn on some heat and we'll see what happens.

07 04 28 50 CC Okay.

07 04 29 23 CC Ed, a comment for the camera man there - we noticed a real improvement in the picture just about a minute or 2 ago. Which - If you did anything different there, remember what you did for future use.

07 04 29 42 LMP We just put it back on average from the peak we had it on a little while ago.

07 04 29 48 CC Roger.

07 04 30 03 CMP Yes. We should see some action here probably in a couple of minutes, Gordon, when these - when these form. I think you saw them down at the Cape; didn't you, Gordon?

07 04 30 13 CC No. I didn't see those personally.

07 04 30 17 CMP Okay. They're pretty impressive, and it breaks into the Benard cell here.

07 04 30 46 CDR I think we're having the formation of some small cells; but, of course, the film we've put out here, so far, is fairly thin. It's difficult to get the vertical - vertical circular pattern set up.

07 04 30 59 CC Roger.

07 04 32 17 CC Stu, the experts here would like to pass along the fact that it should take longer to get the cell formation with a thin layer of fluid than with a thick wet - than with a thick layer.

07 04 32 37 CDR Yes; well, we have a peculiar pattern in this - in this fluid, which you probably can't see; but the fluid, which I put in the center, stayed there, but there's a very thin layer here indicating that it's gone out radially again. And, as you can see, we have some pretty good-size fillets that stay right on the outside of the - of the cup. Very much the same principle as the surface tension that you saw in the experiment of the tank without the baffles.

07 04 33 09 CC Roger, Al.

07 04 33 22 CDR Well, the cells are forming. You can see very small cells. But you probably can't pick them up with the camera, because the cells are only approximately a 16th of an inch in diameter, right now. I think - yes - if you hold on just a minute, we're going to see some pretty spectacular formations. They're starting to form right now and get a little bit larger.

07 04 33 47	CC	Okay.
07 04 33 52	LMP	Gordon, are you able to see the detail of the cells?
07 04 33 58	CC	Not really now, Ed. It's - we see some texture there in the - in the fluid, but it's hard to say that they're really cells from here.
07 04 34 12	LMP	I think you'll be able to see them distinctly in a minute. They're starting to get larger and more active.
07 04 34 42	CC	Okay, now I - Now we're seeing the cells pretty well. They're becoming much more apparent now.
07 04 34 54	LMP	Improved common techniques again.
07 04 35 29	CC	Al, do you recall how many total turns you've put on the knob that pumps the Krytox out? They are curious just what total quantity is in the cup at this time.
07 04 35 42	CDR	Well, we have about two turns full right now.
07 04 35 46	CC	Roger.
07 04 36 26	CDR	Well, we do have some tiny cells here, and we'll play with this one some more and photograph it. In the meantime, you all might be thinking about that.
07 04 36 32	CC	Roger, Al.
07 04 36 36	CDR	Well, we can definitely see these - the formation of the same type of cells, although they're smaller than we had down there. Perhaps with more fluid in there, we could get larger cells.
07 04 36 46	CC	Roger.
07 04 36 47	CMP	And, Gordon, after the TV here, we'll put the camera back up, and take a picture of what we've got here, just while it's there.
07 04 36 56	CC	Roger, Stu.

07 04 37 08 CMP Okay, I guess that's about all of it from our zero-g lab of Apollo 14. I think - we're real pleased with the experiments, and I want to compliment all of the PI's and the work that they did. They - they came out extremely well; they went just as advertised on the procedures, gave us no trouble, and it's been - they've been real enjoyable to work with. And, hopefully, this is the beginning of bigger and better things in the way of manufacturing processes and so forth, in space. And I believe Al has got some words here.

07 04 37 58 CDR I just wanted to say a couple of words before we signed off tonight. What we've been talking about among the three of us, as we been setting up these experiments, is the contribution this could make, immediately and directly, into American lives and to the lives of people around the world. For example, if, specifically, these manufacturing processes of metals turned out to be better in the space environment; or the vaccines, which are proposed to be developed in weightless condition, can be used effectively and immediately. And, certainly, this type of an operation in Skylabs of the future can become immediately beneficial to the peoples of the United States and the peoples of the World. As a matter of fact, one of the things we're talking about, in that connection, was the tremendous achievements of the space program, so far, that have contributed particularly in the field of communication. For example, right now, I'm sure this broadcast is going directly overseas to millions of people who are seeing it in their homes through satellite. And I think many people have said that this improvement in communication through the space satellite will certainly go a long way in solving the problems of the World - problems of understanding between peoples of different nations and different countries. We are reminded, however, as we look at that shimmering crescent tonight, which is the Earth, on our way back, that there still is fighting going on. The three of us all have acquaintances, friends, and even relatives in Viet Nam. We are reminded that some of the people - some of the men who have gone to Viet Nam - have not returned, that are still being held there, listed as missing in action or as prisoners of war. And it is our wish,

tonight, that we can, in some way, contribute, through our efforts to the space program, to promote a better understanding of peace throughout the World and help to rectify these situations which still exist. And with that thought, for Ed and Stu and myself, I will say good night to you from Apollo 14.

07 04 40 21 CC — Roger, Apollo 14. Thank you very much for the very interesting and - thank you very much for the whole show. We've enjoyed every minute. Good night.

07 04 40 41 MCC — "Inspiring" was the word that Gordon was looking for.

07 04 40 47 CDR — Okay, thank you.

07 04 49 01 CC — Apollo 14, Houston.

07 04 49 06 LMP — Go ahead.

07 04 49 08 CC — The only suggestion we can make on that problem of the Benard cell flow pattern experiment there - is that that rubber surface around the edge of the cup is supposed to be treated so that the fluid won't adhere to it. Obviously, it's not working. The - the only suggestion that might work would be to take a tissue and wipe that off real well and try to clean it as well as possible; and then, try to put as thick a layer as possible of Krytox into the cup with your finger, if necessary, and the thicker the better, evidently, for results - more visible results. And a question for all the experiments. We'd like a status on just where you stand as far as taking data, if - on each of the four. If you could give that to us, the support people would like to know. Also, if you intend to work on it tomorrow, they'll be here to answer any questions, or whether you're going to finish it all up tonight. Over.

07 04 50 21 CDR — I - I don't think we'll be able to get it all completed by tonight, Gordo. However, if you give us a call when they're leaving, then we'll be able to tell you what the completion factor is.

07 04 50 46 CC Okay. Actually, they'll stand by as long as you wish. So, if you give us just a status right now, I think that's what they want. Have you taken any data on the - -

07 04 50 53 CDR Okay, well, as far as - -

07 04 50 54 CC - - on the electrophoresis yet, for instance?

07 04 50 58 CDR Well, let's start with the metal composites, as far as that's concerned. We have no problems with that, and, well, we have completed, I think, three or four of those, and we will press right on with those all the way in. As far as the heat flow is concerned, we have completed with the zone and the radial flows, and we'll try one more time on the Krytox. We, I think, only did the film of the fluid transfer. We have no questions on that; so, no further support on that will be required. And we have not made an attempt on the electrophoresis, yet. We're using that for demonstration, for television only. That's the only one that we would really need any support on at all.

07 04 52 48 CC Okay, fine. I think that answers their question.

07 04 52 50 CDR We should be getting into the electrophoresis after we finish this next P23.

07 04 52 59 CC Okay, thank you, Al.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 04 56 20	CMP	Houston, 14.
07 04 56 22	CC	Go ahead.
07 04 56 26	CMP	Gordon, is anybody concerned about a little longer delay in going into PTC? I was looking ahead at these three constraint stars. We could cut those out if - I'm not suggesting it, but if we're concerned about the thermal aspect.
07 04 56 45	CC	Stand by. We'll check on that.
07 04 57 10	CC	Stu, I guess we - we don't see, immediately anyway, any - any particular rush to get into PTC. So, go ahead and complete the P23, as shown; and, if we come up with something, we'll call you later. That - that - something that requires us to get - get into the PTC sooner; I don't think there's going to be anything, though. Over.
07 04 57 32	CMP	Okay, I just wanted to check with you. We've been out awhile.
07 05 08 28	CC	Apollo 14. Apollo 14, Houston. Over.
07 05 08 35	LMP	Go ahead, Houston.
07 05 08 37	CC	Okay, tank 3 heater is getting up above the limit. It's 335 and climbing. We'd like to have you turn tank 3 OFF; 1 and 2 to AUTO. That's the O_2 heater.
07 05 08 49	LMP	Tank number 3 coming OFF; 1 and 2 to AUTO.
07 05 08 55	CC	Thank you.
07 05 08 56	LMP	You got it.
07 05 17 12	CC	Stu, this is Houston. We think we - that you loaded 35, Rasalhague, when you meant to load 33, Antares, there. Over.
07 05 17 31	CMP	Roger, Gordon. I copy that. Okay. You're so right. I'm seeing double here.
07 05 17 46	CC	Big Brother is watching.

07 05 17 52 CMP Good call.

07 05 54 40 CC Stu, this is Houston.

07 05 54 44 LMP Go ahead.

07 05 54 46 CC For Stu, we noticed - at least it looked like it to us here - that he took six marks on star number 5, rather than three on 5 and then three on 6. Probably have to do 6 over. Over.

07 05 55 05 CMP Say that again, Gordon?

07 05 55 08 CC Well, the backroom guys that were watching said that you did six marks on number 5, rather than three on 5 and three on 6. Is that the way it seemed to you?

07 05 55 21 CMP Okay, I'll do 6.

07 05 55 40 CDR He knew 6 was going to be a difficult star, so he was practicing extra on 5.

07 05 55 46 CC Roger.

07 05 55 47 CMP Hey, Gordon. The tough one is that number 3. I don't know - I don't know why - that's a tough star.

07 05 55 56 CC Yes, we get it.

07 05 56 40 CC Al, this is Houston.

07 05 56 45 CDR Go ahead, Houston.

07 05 56 47 CC For EECOM, we noticed one - on the last heater cycle on O_2 tank 3, that the temperature went up pretty fast. We'd just like to verify that the 50-WATT HEATER breaker is out. That's on panel 226. The - that's on tank 3.

07 05 57 09 CDR Stand by.

07 05 57 14 CDR You want - O_2 tank 3.

07 05 57 17 CC Roger. We'd like to know where it was when you look at it. We think it was out; we'd like to verify that, and we'd like you to leave it out, if it is out.

07 05 57 41 CDR The breaker was in. It's now out. We're taking a look at our flight plan to see where that was supposed to happen.

07 05 57 51 CC Okay, Al. I think it was a real-time readout. It

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 06 42 12 CC Apollo 14, Houston. Over.

07 06 42 16 CDR Go ahead.

07 06 42 18 CC Al, we have a fairly lengthy procedure for stowing the probe for entry. We thought it might be a good idea to try to summarize it quickly to you now so that you can think about it somewhat. We're picking out a time tomorrow to accomplish this. We think that it should be no problem to finish it in about an hour, and it looks like maybe the crew exercise period scheduled at 190 hours might be a good time. So what we'd like to do is get Stu on the horn and summarize the whole procedure. Just quickly so you can think about it, and then when it comes - when you get ready to do it, rather than - probably it would be a long time - take as long to write down all these directions as it would to do the stowage, so we could just, real-time, read the steps to you one at a time as you accomplish it. And it might be easier than trying to copy it all down. Over.

07 06 43 30 CDR Okay, it sounds fine. As a matter of fact, we were discussing that a few minutes ago. If you'll hold on just a second, we'll put Stu on the air.

07 06 43 39 CC Okay.

07 06 52 00 CMP Houston, 14.

07 06 52 04 CC Roger; this is Houston.

07 06 52 07 CMP Roger; I think we're all on the air.

07 06 52 09 CC Okay, Stu. I'm not intending for you to either write this all down, or to under - to remember it all. We'd just like to give it to you once through quickly so you can think about it, and we'll do it in detail tomorrow when we get around to doing it for real. The first thing is the stowage for the decontamination bags that ordinarily go on A-10 and A-13. We're going to modify that to stow the one that has 30 pounds in it, and put that one on A-13, using the existing tiedown rings. But the one that has 20 pounds, rather than putting it on A-10, we

want to put it on A-8. And use the D-rings on A-8 in essentially the same manner - the normal manner of strapping it down. On top of that one, we want to take the CMP suit and helmet and put it in a sleeping bag, and then use the LM webbing and lash it down on top of the 20-pound decontamination bag on A-8. And this should all tie down there to allow a minimum 4-inch clearance to the couch for couch stroking. Are you with me so far?

07 06 53 48 CMP Yes, that's fine.

07 06 53 51 CC Okay. Now for the probe stowage. We start by going through A-10. And remove anything you think you might need later. We can't identify anything in there that will be needed later, but you want to take a check, because once we get the probe lashed down on top of that - it will be pretty tough to get back in there. Then go to A-5 and remove the headrest pads and put them on the couches. Take the heel clips and ropes, there should be five ropes in there, and stow them temporarily. From the right-hand side of A-5, take the cushion and all the equipment that's in that cushion and put it in foodbox B-1. And from A-6, take the two LiOH cans from A-6 and put them in the left-hand side of A-5. So take the TV equipment that's in A-6, wrap the TV monitor in a constant wear garment, and put all the TV equipment into B-1, also. Okay. Now take the ropes - take one of the ropes that you removed from A-5 and double it, and then tie it to footpad on A-6 - the footpad that's in the corner. It'd be the plus-Y, plus-Z footpad on A-6. And take three other ropes and tie one end of each of those three ropes - we won't double those ropes - tie one end of each of those three to the same point, that being the other footpad near the wall on A-6. It'd be the plus-Y, minus-Z footpad. Okay. Now we go to the probe and take two flight data file books and tape them to the base end of the probe, the end with the capture latch release handle. The probe now will be placed with one of the pitch arms - those are the large arms that - that normally contact the face of the drogue - one of those pitch arms down toward the aft bulkhead between A-6 and A-10. The apex of the probe pointing in the minus-Y direction and the base end of the probe

with the flight data file books taped on them to touching the right-hand equipment bay. Is that clear - more or less the position that it - it'll be stowed in? Over.

07 06 56 54 CMP Yes, it's real clear, Gordon. You're doing a great job.

07 06 56 58 CC Okay. Then the - there'll be six points that the probe will be resting on. I won't go into all of those, but we'll identify those as we go. And determine where, with a pencil or something, mark where these points are, and then remove the probe from that location. And on three of those positions we'll have to shim them up. One of the - one of these contact points will be shimmed with a sleeping bag, on top of which we'll put one of the rendezvous window shades and, on top of that, a flight data file book. One of the other shim points - one of the other contact points will be shimmed with a flight data book, and the third point will probably take a couple of flight data books to fill up the gap. Once we get the shims in place, we'll put the probe back down and check that all six contact points are indeed making contact. And then we go through a fairly - well about five steps of rope tieing. I won't go into the details, but we've got it all figured out where each rope coming from the A-6 footpads goes to on the probe and then back down to various other places, essentially lashing the whole thing down between points on A-6 and A-10. And as a final step, using tools that we've got for you from the toolkit, tools that we have identified, we'll take apart one of the support arms, we'll remove the bolt that holds that support arm to the shock strut, and then tie the loose support arm to the probe with the last rope to keep it from flopping around. This takes that support arm out of the couch stroke envelope. And that'll do it. How's that, clear as mud?

07 06 59 12 CMP No. That's - that's pretty clear, Gordon. When we got to that part about all the rope tieing, you know, I thought I sure am glad I'm flying with two sailors, you know. Shoot, they can handle that, no sweat.

07 06 59 25 CDR That's what you call abundantly clear. It sounds like you've put a lot of effort in to that one.

07 06 59 29 LMP I was just wondering how many new hires it took to figure all that out in 2 days.

07 06 59 34 CC There has been a few manhours spent on it. What I intend to do is go over tomorrow and do it all myself in the mockup. And then I'll probably spell Bruce sometime - if we end up at that same time in the shift tomorrow that we suggested around 195 hours - I'll be back here spelling him anyway, and I can go through the gory details with you as you do it, if that sounds good to you.

07 07 00 04 CMP That's - that's great, Gordon. We sure appreciate all the effort you're going to here, and it sounds like you've got it well in hand. That was pretty clear - real clear the first time through, and with you giving us the details, it shouldn't be any sweat. In fact, I bet we could hack it right now.

07 07 00 23 CC Okay. Very good.

07 07 00 41 CC 14, Houston.

07 07 00 45 CDR Go ahead.

07 07 00 47 CC Would you verify that you did change the lithium hydroxide canisters called for at 174 hours?

07 07 00 56 CMP Naturally.

07 07 00 57 CDR Absolutely.

07 07 00 58 CC Okay.

07 07 03 10 CC Apollo 14, Houston.

07 07 03 14 LMP Go ahead.

07 07 03 16 CC If you're all finished with your overboard dumps up there, your rates look good for starting the spinup. And we would like you to configure the HIGH GAIN in the coast to sleep mode as shown in the Systems Checklist. We'd like you to use option 1 under that, which is with the HIGH GAIN

operation as shown there rather than OMNI operation. We want to watch the HIGH GAIN awhile; and then, before you go to sleep, we'll probably go back to OMNI. Over.

07 07 03 51 LMP Okay, Gordon. Fine. I'll bring it up that way.

07 07 03 56 CDR Okay. We'll spin up with B-2/D-2.

07 07 04 00 CC Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 08 05 26	CC	Apollo 14, Houston.
07 08 05 32	LMP	Go ahead.
07 08 05 34	CC	We're ready for you to go to the sleep configuration on the comm, if - any time you are. We'd like you to secure the HIGH GAIN in PITCH, minus 52, and YAW, 270, and MANUAL on WIDE, and then the other switches as shown in the checklist. Over.
07 08 06 01	LMP	Okeydoke. We'll do that. Thank you.
07 08 06 04	CC	Roger.
07 08 06 13		(Music - Tijuana Brass, "The Work Song")
07 08 06 42	CC	Sounds like you're having a party up there.
07 08 06 51	LMP	Say again, Fredo.
07 08 06 53	CMP	Yes, we got a little music going up here.
07 08 07 03	LMP	That's the only ingredients we have for a party, though.
07 08 07 07	CC	Roger.
07 08 16 42	CC	Apollo 14, Houston. EECOM has informed us that unless we get these onboard read-outs before you go to sleep, we're going to have to return to Earth as soon as possible. Over.
07 08 17 04	LMP	Well, if we thought it would help, we'd just be quiet.
07 08 20 46	LMP	Houston, Apollo 14.
07 08 20 59	LMP	Houston, Apollo 14.
07 08 21 00	CC	Go ahead, 14.
07 08 21 06	LMP	Okay, Gordon. The onboard read-out follows: BAT C, 37 volts; pyro BAT A, 37.3; PYRO BAT B, 37.3; RCS A, 58; B, 55; C, 57; D, 60; and stand by for the rest of it.

07 08 22 09	LMP	And, Houston, 14. We have no medication to report. The crew is doing fine.
07 08 22 16	CC	Okay, Ed. Thank you.
07 08 31 33	CC	Apollo 14, Houston. Over.
07 08 31 40	LMP	Go ahead, Houston.
07 08 31 42	CC	We're at a good angle now for a E-MOD dump, if you'd like to give it to us.
07 08 31 50	LMP	Okay.
07 08 31 53	CC	And that about completes all the things that we had to pass up before you go to sleep. We want to finish the rest of the presleep checklist and wish you a good night.
07 08 32 09	LMP	Okay, here it comes. Good night to you.
07 08 32 28	LMP	Did you get my last, Gordon?
07 08 32 30	CC	Negative. Say again, Ed.
07 08 32 33	LMP	Okay, the E-MOD dump's on the way, and good night to you.
07 08 32 41	CC	You planning to raise the cabin pressure now, or wait awhile?
07 08 32 49	LMP	Oh, we'll wait awhile; we're not quite ready to go to sleep yet.
07 08 32 54	CC	Okay, Ed.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 17 22 57	CC	Hello, 14; Houston.
07 17 26 09	CC	Good morning, Apollo 14; Houston.
07 17 26 32	LMP	Houston, Apollo 14. Good morning, Fredo.
07 17 26 37	CC	Good morning, Edgar. It's pretty chilly down here. How's it up there?
07 17 26 49	LMP	Oh, very comfortable; 71 degrees in the cabin. What do you mean by chilly? Is it freezing?
07 17 26 57	CC	Well, let's see; this little report I've got here says it's supposed to get down to around 28 degrees.
07 17 27 09	LMP	Man, have you moved Houston to the North Pole already?
07 17 27 14	CC	Yes. There's also a pretty good breeze blowing which doesn't help.
07 17 27 22	LMP	Got the old chill factor down a little bit, huh?
07 17 27 25	CC	Yes.
07 17 27 29	LMP	Well, hold on a minute. Let's see if I can wake the rest of these guys up.
07 17 27 33	CC	Okay.
07 17 28 16	LMP	Now there's some grumbling going over - on over here about getting up, Fred, but I think they'll be around in a minute.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 17 28 22	CC	Okay. I had suggested that maybe we let you keep your banker's hours, but Flight brought up the point that tomorrow morning you can't afford to sleep in late, so - if you're going to get the job done and get back in - so, we'll try to get you back on the schedule today.
07 17 28 42	LMP	Okay. Fair enough.
07 17 28 55	LMP	And I'll get some of these chores done; I'll be back with you in a few minutes, Fredo.
07 17 29 00	CC	Okay, Ed.
07 17 39 28	CC	14, Houston.
07 17 39 33	LMP	Go ahead.
07 17 39 35	CC	Ed, I wonder if we can get you to put O_2 tank 3 HEATER to AUTO; tanks 1 and 2 to OFF.
07 17 39 52	LMP	Okay. O_2 tank 3 HEATER, AUTO; 1 and 2 to OFF.
07 17 39 57	CC	Roger.
07 17 40 28	CC	And, 14; Houston. I've got a few items that there's no big rush on. When you get free, just give me a call.
07 17 40 40	LMP	Okay, Fredo. I'm switching to HIGH GAIN as per flight plan unless you say otherwise.
07 17 40 48	CC	Stand by. Okay, Ed. Why don't you hold off on that a little bit? One of the - these things that we're in no big hurry on is to play with the comm a little more on the - checking PRIMARY and SECONDARY, et cetera. But we'll do that in a little while.
07 17 41 11	LMP	Okay. And shall I start battery charge A now?
07 17 41 20	CC	Roger. You can commence battery charge A.
07 17 46 09	CC	14, Houston.

07 17 46 25	LMP	Go ahead.
07 17 46 31	CC	14, Houston. I wonder if you could verify, Ed, that the TANK 3 50-WATT HEATER breaker on 226 is open.
07 17 46 44	LMP	Fredo - Fredo, you're breaking up. Wait until we get the antenna in a better position.
07 17 46 49	CC	Okay.
07 17 51 09	CC	How do you read now, Ed?
07 17 51 16	LMP	Loud and clear, Fredo.
07 17 51 19	CC	Okay. Since we had that tank 3 back in the line, we just wanted to verify that the TANK 3 50-WATT HEATER breaker on 226 is still open.
07 17 51 41	LMP	That's verified; it's still open.
07 17 51 43	CC	Very good.
07 17 51 47	LMP	It's still a mystery as to how it got closed yesterday.
07 17 51 53	CC	You've just got nimble toes, maybe.
07 17 52 04	LMP	I guess that's quite possible.
07 17 53 23	CC	And we have the NOUN 93s.
07 17 57 40	LMP	Houston, 14.
07 17 57 44	CC	Go ahead, 14.
07 17 57 48	LMP	Fredo, let me give you our postsleep report.
07 17 57 53	CC	Okay.
07 17 57 56	LMP	Okay, we each had 4 hours' sleep; PRD for Al is 16059; PRD for Ed, 07057; and Stu didn't have one; it's broken.
07 17 58 14	CC	Okay. We copy.
07 18 19 30	LMP	Houston, 14.

07 18 19 33	CC	Go ahead, 14.
07 18 19 37	LMP	I've been giving you these confounded medical reports every day; how's your pulse this morning?
07 18 19 45	CC	It's pretty slow about right now, Ed.
07 18 19 50	LMP	Okay. But you're alive and well and no medication, huh?
07 18 19 56	CC	Yes. I'm on a different flight plan than you are. I'm just fixing to get to my sleep period.
07 18 20 04	LMP	I see. Okay.
07 18 34 56	CC	14, Houston.
07 18 35 01	LMP	Go ahead, Fredo.
07 18 35 03	CC	Okay. I wonder if you could set your two HIGH GAIN knobs to PITCH, minus 40; and YAW, 90.
07 18 35 22	LMP	Minus 40 and 90. You have it.
07 18 35 24	CC	Okay.
07 18 35 44	CC	And, Ed, I wonder if we can get - get you to put the switch to NARROW and REACQ.
07 18 35 59	LMP	NARROW and REACQ. You have it.
07 18 36 02	CC	Roger.
07 18 36 21	CC	Okay. And Ed, we'll - we're just going to sit here a little while; and then, we'll look at it - make sure it doesn't drift off - before we proceed any further.
07 18 36 33	LMP	Okay.
07 18 40 02	LMP	Houston, Apollo 14.
07 18 40 05	CC	Go ahead, 14.
07 18 40 08	LMP	Fredo, I'm ready to copy the comsumables update.

07 18 40 11	CC	Okay. It's GET of 186 hours; your RCS total, 40 - stand by 1.
07 18 41 00	CC	Okay, Ed. RCS total, 46.2; quad A, 47.0; B, 43.7; C, 47.1; and Delta, 46.9; H_2 tanks: 1, 38.1; 2, 36.9; O_2 tank 1, 67.0; and number 2, 68.6; and number 3 is 15.2.
07 18 41 43	LMP	Okay. Readback: At GET 186:00; RCS total, 46.2; quads: 47.0, 43.7, 47.1, 46.9; hydrogen: 38.1, 36.9; oxygen: 67.0, 68.6, 15.2.
07 18 42 06	CC	Okay. Good readback.
07 18 42 42	CC	14, Houston.
07 18 42 45	LMP	Go ahead, Fredo.
07 18 42 47	CC	Okay, looks like that HIGH GAIN has drifted. Would you select MANUAL, and when it's back to your pre-set knob settings there, go back to REACQ for us; and then select HIGH GAIN; and we'll command it then.
07 18 45 07	LMP	Okay.
07 18 45 24	LMP	Okay. You got it.
07 18 45 26	CC	Okay, Ed.
07 18 58 14	CMP	Houston, 14.
07 18 58 24	CC	14, this is Houston. Over.
07 18 58 29	CMP	Good morning, Bruce. The EMS entry check passed okay.
07 18 58 33	CC	Oh, very good, Stu.
07 19 00 32	CC	14, this is Houston. Over.
07 19 00 36	CMP	Go ahead, Houston.

07 19 00 38	CC	If you could give us a status report on the progress of the inflight demos, especially any that you consider that you've completed, we can release some of the supporting personnel. Over.
07 19 00 52	CMP	Okay. I guess we need to talk about that. We completed the heat-flow and convection experiment all the way; never did really get too many good results on our Benard cells, but we got some. We finished - essentially, we're finished with all the inflight experiments, with the exception of the metal composites, and we're pressing along through those. And I guess we - we don't require any more support.
07 19 01 30	CC	Okay. Thank you, 14.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 19 12 51	CC	Apollo 14, this is Houston. Over.
07 19 12 56	CMP	Go ahead, Houston; 14.
07 19 12 59	CC	14, our current feeling is that midcourse correction number 6 will probably not be required. However, we'll give you a definite decision on that later on, after we get a little bit more tracking. And we have a procedure for further investigation into the light-flash phenomena, which we'd like to get your feelings on. If we don't burn midcourse 6, we're looking at scheduling a period of something on the order of an hour, starting at about 193:45 or 193:50, for this light-flash investigation, and we're wondering how that fits into your onboard schedule. Over.
07 19 13 50	CMP	Stand by 1.
07 19 14 21	CMP	Okay, Bruce. Is - If we do skip midcourse 6, why that'll be all right. We'll - we'll take that time for the light flash.
07 19 14 29	CC	Roger, Stu. Out.
07 19 44 30	CC	Apollo 14, this is Houston. Over.
07 19 44 35	CMP	Go ahead.
07 19 44 36	CC	14, when you pass out of the region of OMNI Delta coverage, we will ground-command you over to the high gain antenna. At this point, however, you will be in a region where reflections from the spacecraft make acquisition marginal. And, if we - if the antenna is not automatically acquired by the time that you get to the calibration attitude, we would like you to take over and commence a normal acquisition at the optics CAL attitude for us. Over.
07 19 45 14	CMP	Okay. We'll do that.
07 19 45 19	CC	Roger. Out.
07 19 45 49	CMP	Houston, 14.

07 19 45 52	CC	Go ahead, 14.
07 19 45 54	CMP	Hey, Bruce. Do you want us to go OMNI Delta now? You know we're on HIGH GAIN now.
07 19 46 01	CC	14, this is Houston - -
07 19 46 02	CMP	...
07 19 46 03	CC	- - We're controlling your antenna configuration from the ground here. Just leave the configuration on board as is. Over.
07 19 46 11	CMP	Okay.
07 19 48 43	CC	14, Houston. We seem to have acquired a good signal strength. How do you read? Over.
07 19 48 51	CMP	Loud and clear, Houston; 14.
07 19 48 53	CC	Roger. Out.
07 19 54 11	CC	Apollo 14, this is Houston.
07 19 54 17	CDR	Go ahead, Houston.
07 19 54 20	CC	14, for Stu, we're receiving a - I guess you could call it a carrier from his biomed, but we're getting neither the EKG nor the respiration trace. And we wonder if the harness connectors to the signal conditions are properly mated up. Over.
07 19 54 42	CMP	Just stand by, Bruce. I'll check that.
07 19 54 47	CC	Roger. Out.
07 19 56 30	CC	Okay. Thank you, Stu.
07 19 56 38	CDR	Houston, 14. How does the rest of the crew look on biomeds?
07 19 56 40	CC	14, this is Houston. Al, you look 4 0 on the biomed. We're not receiving Ed's right now. It looks like he's either turned off or totally disconnected. Over.
07 19 57 11	CDR	Well, he's not on the air right now, but I was wondering how he looked the last time I saw him yesterday. ...

07 19 57 19	CC	Yes. The surgeon's telling me you - -
07 19 57 20	CDR	...
07 19 57 22	CC	Surgeon's telling me you all look in great shape, and he wasn't concerned about anything. He just wanted to find out what the problem was there, because he was getting something that indicated the signal conditioners and - all that were hooked up - and the TM was turned on, but we weren't getting a signal through on top of the carrier there. Over.
07 19 57 43	CDR	Okay. Well, Ed and I had had some ... sensor problems earlier, and I just wondered how we were looking now. Thank you.
07 19 57 51	CC	Roger. Out.
07 20 07 24	CDR	Houston, 14. How's the downlink look to you now?
07 20 07 30	CC	In what respect, Al? Biomed? Over.
07 20 07 36	CDR	Negative. TM.
07 20 07 38	CC	Oh, it's looking beautiful to us.
07 20 07 42	CDR	Okay, we're proceeding. We didn't want you to miss the world's expert on 23 ... here.
07 20 07 48	CC	Oh, we won't. And I - you can tell Stu I made a hard copy of his 00 NOUN 49 yesterday. We'll present it to him, framed, with suitable ceremony.
07 20 08 00	CDR	Very good. You missed some others while you were gone somewhere else.
07 20 08 05	CC	No, I was here when he made the second one, too, but you don't get a framed certificate for each one.
07 20 08 11	CDR	Oh, okay.
07 20 11 35	CC	Okay. We copy that one, Stu.
07 20 11 48	CC	Over.

07 20 11 51	CMP	Roger. Apparently you haven't really taken a look at what 49 should be after long periods of testing. I think we kind of expect that sort of thing, particularly on the first mark.
07 20 12 07	CC	Roger. Out.
07 20 13 42	CC	14, Houston. The analysis of your first mark there is that that's within about one and a half sigma, and is, indeed, what we expect on the first mark after a period of time such as this. Over.
07 20 13 57	CDR	Roger. Out.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 20 47 37	CC	14, this is Houston.
07 20 47 41	CMP	Go ahead.
07 20 47 42	CC	Roger. On our telemetry, it looks like you accepted an update this last time on star 4; and our recommendation is that the updates from the first three stars be used for navigation updating, and the last ones - 4, 5, and 6 - just for your own benefit in testing out the P23 techniques, but not for updating the state vector. Over.
07 20 48 09	CMP	Okay. Sorry about that, Bruce.
07 20 48 12	CC	Also, 14; we've noticed the cabin pressure go up slightly here, over some period of time, and we're wondering if you changed the cabin configuration any. You're up to about 5.7 on our telemetry. Over.
07 20 48 41	CDR	Houston, we've been testing out a couple of the oxygen masks for a while this morning. That may have done it. We'll keep an eye on it.
07 20 48 51	CC	Roger. It's certainly no problem; you just had the EECOMs a little confused here.
07 20 48 59	CDR	Well, perhaps the problem was here.
07 21 20 43	CC	Apollo 14, this is Houston. We show that you're damped out sufficiently to start the spinup at this time. Over.
07 21 20 57	LMP	Okay, Houston. We will do that very thing. Thank you.
07 21 21 15	CDR	Houston, 14.
07 21 21 17	CC	Go ahead.
07 21 21 22	CDR	Got a little something for you. (Music from "Camelot")
07 21 21 31	CDR	Oh, I got in on the tail end of that one.

07 21 21 35	CC	I appreciate you thinking about me, Al.
07 21 25 08	CC	Apollo 14, this is Houston. We'd like to terminate battery Alfa charging at this time. Over.
07 21 25 17	CDR	Okay. (Music from "Camelot")
07 21 29 09		(Music from "Camelot")
07 21 38 18	CC	14, this is Houston. Over.
07 21 38 22	CDR	Go ahead, Houston.
07 21 38 23	CC	14, we're still working on these docking probe procedures. And we'll give you a call later on today when we've got them finalized. Over.
07 21 38 36	CDR	Okeydoke, Bruce. That will be fine.
07 21 38 38	CC	And, for our information, can you tell us whether the contingency lunar sample decontamination bag is available in the command module or whether you jettisoned that with the LM? Over.
07 21 38 57	CDR	Bruce, I'm not sure we can answer that without some looking around. It may be here, or we may have used it. Just a minute.
07 21 39 03	CC	Okay; well, we don't need an answer immediately. We're considering using this bag, if it's available, to go over the head of the docking probe, in order to protect it from any salt spray after splashdown. Over.
07 21 39 18	CDR	Okay, we'll try and get an answer for you.
07 21 39 20	CC	Thank you.
07 21 40 06	CC	14, this is Houston. On our last request, that won't be required. We've got two other bag candidates that we've identified, and we can use one of them. Over.
07 21 40 20	LMP	That'll be fine, if they didn't go to the same place as the contingency sample bag.

07 21 40 24	CC	No; what we're talking about is one of the temporary stowage bags with the - the purse assembly up at the top cut off - or the bag in which the hoses for the liquid transfer demo are stowed. Over.
07 21 40 43	LMP	Okay. We've got another little - got another alternative for you. I can see our shaving kit - razor bag sitting here, or the exerciser bag should be about the same size and work very well.
07 21 41 00	LMP	I'm getting some headshakes down here, Ed, that says those bags won't fit over the head of the probe.
07 21 41 11	LMP	Neither of them? Doesn't matter to us. We'll put anything over it you like.
07 21 41 20	CC	Okay, we can go and try those out on the mockup. We had not tried to fit those two bags that you mentioned. We do believe that - we know that the temporary stowage bag or the liquid transfer demo hose bags will fit. We'll get back to you - -
07 21 41 39	LMP	Okay, fine. Either one of those will be great.
07 21 41 41	CC	All right; we'll get back to you later on with the finalized procedure. Thank you.
07 21 41 46	LMP	Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

07 22 21 45 CC Apollo 14, this is Houston. Over.

07 22 21 50 LMP Houston, 14. Go ahead.

07 22 21 53 CC In looking at your flight-plan activities for this afternoon, since we are still holding on the final probe stowage procedures, we're wondering how you'd feel about doing some of the light-flash stuff during the next hour here. Over.

07 22 22 22 CDR I thought we originally discussed that as a replacement for the midcourse.

07 22 22 27 CC We did. However, we're now looking at the possibility of getting the probe tied down, roughly in this time period, instead. And one of the items that we're going to use, - or planning to use in tying down the probe is a rendezvous window shade, and it would be hard to get good dark adaptation inside after using the window shade as a shim. Over.

07 22 23 02 CDR It would also be hard to sleep this evening after using the rendezvous window shade as a shim.

07 22 23 32 CC Roger, 14. But looking ahead in the time line for the activities coming up tomorrow - that is, after your sleep period this evening, it looks like you're going to be relatively busy, and we'd like to allocate about an hour, or maybe even a little more, to - to getting the probe configured and properly tied down in its position. And, I guess, if - We've been looking for a good place to fit that in, and we don't see an obvious slot in tomorrow's flight plan, although we could take another look at rearranging things somewhat. Over.

07 22 24 18 CDR Oh, I completely agree. I think we ought to get the probe stowed today and forget about it. Hold on just a minute; we'll look at the flight plan.

07 22 24 25 CC There's a possibility we could rig some sort of a temporary window shade that might not give you complete blackness, but it could be - say, taped in place and would make it dark enough inside for sleeping. Over.

07 22 24 45 CDR — Well, perhaps - possibly, you could put the window shade in place under the probe, get the ... on it, and remove it tonight, and then slip it back in tomorrow as the last step, and put it down with ...

07 22 25 04 CC — As I say, Al, we haven't got the final procedure bought off on yet; but, looking at the interim one here, the present location of it would be underneath a book from the flight data file and on top of a sleeping bag down on the aft heat shield, with the probe strapped down pretty tightly against it, using the window cover to spread out the force from one of the pitch arms, so that it doesn't concentrate excessively on the aft heatshield - so that if you get it tied down very securely, it may be difficult to get that window shil [sic] - window shade in and out after tying it down. Over.

07 22 25 52 CDR — Okay. Well, how's about looking at something else in place of the window shade, because we'd like to get a good night's sleep tonight, if we can.

07 22 26 00 CC — Okay. We'll look at it.

07 22 29 22 CC — Apollo 14, this is Houston. Over.

07 22 29 27 LMP — Go ahead.

07 22 29 29 CC — Okay; back to our original question. Under the assumption that we are not yet ready to stow the probe, would you all be agreeable to trying some of this light-flash observation, at the present time or after you finish eating? Over.

07 22 29 59 CDR — Okay. We'll go ahead and do it now, if you'd like.

07 22 30 04 CC — Okay.

07 22 30 26 CDR — Houston. Do we want to use the - DSE, the voice loop, or how do you want us to record this info?

07 22 30 35 CC — I think we might as well use the voice loop. You can just send it down under the assumption that we're on good comm here.

07 22 30 48 CDR — Okay.

07 22 30 50 CC — Okay. The objectives stated for this period of observations are, first off, to confirm that it is not necessary to be dark-adapted to see the flashes; secondly, to collect the real-time data on the times of occurrence of different types of flash; and, lastly, to determine if there's any other sensory effect associated with this phenomenon. Over.

07 22 31 16 CDR — Okay.

07 22 31 20 CC — You're requested to - you're requested to become thoroughly light-adapted, that is, by looking at a flashlight. Then relax, start the dark-adaptation procedure, and report and describe flashes as they occur.

07 22 32 08 CC — 14, Houston. How do you read now?

07 22 32 13 CDR — Okay, Bruce. We lost you right after you started talking about the procedure.

07 22 32 18 CC — Okay. You should configure the cabin so that you can, indeed, start the dark-adaptation procedure. And in starting the procedure, you are asked to become thoroughly light-adapted, as by looking at a flashlight or floodlight. Then relax, start the dark adaptation, and report and describe flashes as they occur. Marking the time of the occurrence of the flash takes priority over detailed description. One of you should continue observations, dark-adapted, as long as possible. The others should - expose themselves to light again after about 25 minutes, and we'll give you a cue on that. And repeat the experiment for another 10 minutes - as many cycles as you feel you have time for, in order to increase our probability of getting flash observations during the early portion of the dark-adaptation transients. We'd also like to hear from you commentary on any other unusual physical sensations, such as tingling or apparent sounds of unusual character - like ringing in the ears, and so forth. Over.

07 22 33 31 CDR — How did all that get into it?

07 22 33 36 CC — Well, it's what our investigator has decided he's interested in. Over.

07 22 33 43 CDR I mean, these things aren't timebombs going off in your head, you know.

07 22 33 46 CC Okay.

07 22 33 51 CDR Just being facetious, Bruce. We'll cooperate.

07 22 33 54 CC Okay (laughter). And along those lines, he's looking for the following data on the flashes: the type of flash, i.e., star streak, nova, et cetera; brightness; the location in your visual field; color, if any; and whether it's possible to distinguish or not which eye the flash seems to occur in. Over.

07 22 34 22 CDR Okay. We understand.

07 22 34 24 CC And let us know when you start dark-adapting each time, and we'll time it for you. Over.

07 22 34 31 CDR Okay. We have the - window shades in now.

07 22 34 42 CC And, just for reference, we're playing back the video tapes of your last evening's - inflight demonstration TV show for about the fifth time down here. I think you're going to be a best seller.

07 22 34 57 CDR Oh, really. Glad to hear it.

07 22 37 04 CDR Okay, Houston, let's review what we intend to do here just a second. Okay, we have all three on now, and we're going to - we have the window shades in; the cabin lights are currently on. At T_0, all three of us shine a flashlight in our eyes, turn out all the lights, and that's the start of the sequence. Stu and I'll recycle about once every 10 minutes, and Ed keeps going as long as he can stay awake. Is that correct?

07 22 37 44 CC 14, Houston. That's correct, except that on the first batch we'd like to keep you all in the dark-adaptation procedure for about 25 minutes and then have two of you start recycling at 10-minute intervals. Over.

07 22 38 05 CDR Understand you want all three for 25 minutes.

07 22 38 06	CC	That's affirmative.
07 22 38 09	CDR	And then all three recycling.
07 22 38 19	CC	Negative. One crewman, whom you can determine amongst you, should, when he starts the dark-adaptation procedure, continue in the dark-adapted condition until the termination of the experiment. The other two of you should do this light-adaptation again after 25 minutes and then recycle on a 10-minute basis. Over.
07 22 38 47	CDR	Okay. Well, it looks to me like we'll probably have time for one 25-minute cycle. And that's probably about it. We have a P52 coming up here at 192:10.
07 22 39 04	CC	Roger. We see that in the flight plan.
07 22 39 10	CDR	Okay. All right, all three of us will go for 25 minutes and Ed'll continue on; and we'll discuss how the other two will go from there.
07 22 39 17	CC	Roger.
07 22 39 20	CDR	Give me long enough to get the flashlights ready. We'll give you a mark here in about 40 seconds.
07 22 39 50	CDR	Okay, T_0 will be 191:20:00. Here we go.
07 22 39 55	CC	Roger. Out. Minus 1 second and counting - -
07 22 39 58	CDR	Okay -
07 22 39 59	CDR	MARK.
07 22 40 15	CDR	Okay. It's all dark.
07 22 56 00	CC	14, this is Houston. Nothing heard for 16 minutes. Over.
07 22 56 07	CDR	That's correct.
07 22 56 21	LMP	Not only correct, but unusual, Bruce.
07 22 56 26	CC	Run that one by again - -
07 22 56 27	LMP	It's almost unbelievable, Bruce.

07 22 56 33	CC	Run that one by again, please, Ed.
07 22 56 39	LMP	I say it's unusual; I think most of us see them long before now.
07 22 56 57	CDR	Well, if we don't see anything by 20 minutes, I suggest we terminate - and try to give you some more qualitative information during tonight's sleep period.
07 22 57 11	LMP	Okay.
07 22 57 12	LMP	MARK. A faint star - left eye at - 10 o'clock.
07 22 57 23	CC	Roger. Faint star, left eye, at 10 o'clock.
07 22 57 43	CDR	Okay.
07 22 57 44	CDR	MARK. Vertical trace, right eye.
07 22 57 48	CC	Roger, Al.
07 22 57 50	CDR	Nine o'clock. Nine o'clock.
07 22 58 26	LMP	High and left to lower right.
07 22 58 31	CC	Roger, Ed. You have a color on any of these?
07 22 58 35	LMP	Say again.
07 22 58 36	CC	Do you have a color on these?
07 22 58 42	LMP	These have both been white so far.
07 22 58 44	CC	Roger.
07 22 58 54	CDR	Houston. We all have a consensus that we've never seen anything that's colored.
07 22 59 01	CC	Roger. Out.
07 22 59 36	LMP	MARK. It is a cloud at 12 o'clock, high, left eye.
07 22 59 40	CC	Roger, Ed.
07 22 59 44	CDR	MARK. Right eye, 8 o'clock, low, single flash.
07 22 59 52	CC	Roger, Al.

07 22 59 57	CC	How's the redheaded cosmic ray detector doing?
07 23 00 02	LMP	He's asleep, I think.
07 23 00 03	CMP	Not - must not be my time for stars.
07 23 00 09	LMP	He's down in the LEB. He's shielded by the nav base.
07 23 01 09	LMP	MARK. 10 o'clock - about level; it was a - a double star.
07 23 01 20	CC	Roger, Ed.
07 23 01 23	LMP	And it was the left eye; and, believe it or not, it had kind of a bluish tint to it.
07 23 01 29	CC	Roger, Ed.
07 23 01 32	LMP	Yes. It was - it looked more like a blue diamond. You know, very white, but with a blue cast.
07 23 01 41	CC	Roger, Ed.
07 23 02 30	CDR	MARK. Left eye, single flash, 9 o'clock.
07 23 02 33	CC	Roger, Al.
07 23 03 01	LMP	MARK. Streak, left eye, 12 o'clock, low; and it was going from the bottom toward the top.
07 23 03 30	CC	Apollo 14, this is Houston. Twenty-three minutes and 34 seconds into the test. And at 25 minutes, we would like Ed, and Ed only, to shine the flashlight in his eyes long enough to ruin his dark adaptation, and then start the dark-adaptation procedure again. We'd like to be sure that you don't shine the flashlight in anybody else's eyes.
07 23 03 58	LMP	Well, they'll just have to close their eyes then, I guess.
07 23 04 03	CC	Okay. I'll give you a hack at 25 minutes.
07 23 04 14	LMP	Only been seeing on my left eye. Should I just dark-adapt that one?

07 23 04 24	CDR	MARK. Low at 6 o'clock, and it was a double flash, left eye.
07 23 04 33	CC	Roger. All right, Ed. Let's not - let's not go halfway. Let's do the whole job. You can - light up both your eyeballs. And - we're 24 minutes 50 seconds and counting.
07 23 04 53	LMP	Okay.
07 23 04 55	CC	Okay.
07 23 04 57	CC	MARK. Twenty-five minutes, and let us know when you turn the light back out.
07 23 05 17	LMP	Okay. The light's out.
07 23 05 21	CC	Roger, Ed.
07 23 05 32	LMP	I don't think I'll see anything for days after that one.
07 23 06 09	LMP	MARK. Right eye at - It'd be 3 o'clock, low, and it was a streak; went from right to left.
07 23 06 21	CC	Roger, Ed. That was about 51 seconds when you called mark.
07 23 06 26	CDR	MARK. Left eye - Yes, I had a mark right in the middle of that conversation. Left eye, 12 o'clock high, single flash.
07 23 06 43	CC	Roger, Al.
07 23 08 10	LMP	MARK. Cloud, 12 o'clock, high, both eyes.
07 23 08 15	CC	Roger, Ed.
07 23 08 31	LMP	...
07 23 08 34	CDR	MARK. Left eye, streaked from 6 o'clock to the center, going up.
07 23 08 39	CC	Roger, Al.
07 23 09 05	LMP	MARK. Streaked, left eye.
07 23 09 08	CC	Roger.

07 23 09 10	LMP	Going left to lower right.
07 23 09 28	CMP	MARK. Right eye, 4 o'clock - pretty much on the periphery; it was a flash.
07 23 09 37	CC	Roger.
07 23 09 41	LMP	MARK. Right eye, nova, right in the middle.
07 23 11 30	CDR	MARK. Right eye, 11 o'clock, on the periphery, faint flash.
07 23 11 35	CC	Roger, Al.
07 23 11 36	CMP	MARK. Right eye - Mark, right eye, about 5 o'clock, halfway up, flash.
07 23 11 42	LMP	Simultaneous with Stu, in the left eye - cloud at 6 o'clock.
07 23 11 49	CMP	MARK. Right eye, 3 o'clock with a flash on the periphery.
07 23 11 53	CC	Roger, Stu. Roger, Ed. Roger, Stu.
07 23 12 19	LMP	MARK. Flash, right eye, 2 o'clock, high.
07 23 12 42	CMP	MARK. Seven o'clock, flash on the periphery.
07 23 12 50	CDR	Simultaneous with Stu, Al had a - a lighting behind cloud, low, right eye.
07 23 13 13	LMP	MARK. Nova, right eye at 3 ...
07 23 14 31	CDR	MARK. Right eye, 4 o'clock, in the periphery, a faint nova.
07 23 14 36	CC	Roger, Al.
07 23 14 50	LMP	MARK. Flash, right eye, ...
07 23 14 56	CC	Say again the last part of that, Ed. We - -
07 23 14 58	CMP	MARK.
07 23 14 59	CC	- - You blurred it out.
07 23 15 02	LMP	Two o'clock, level.

07 23 15 07	CMP	During that one, I had a cloud at 11 o'clock.
07 23 15 20	CDR	MARK. Left eye, 9 o'clock, down at the bottom.
07 23 15 25	CC	Roger, Al.
07 23 15 58	CC	Ed, this is Houston. We'd like you to repeat the exposure of your li - eyeballs to light cycle and then start readapting again. We want Stu and Al to continue in the dark-adapted condition. Over.
07 23 16 14	LMP	Okay.
07 23 16 17	CDR	How much longer do you project this to run, Bruce?
07 23 16 27	CC	Say again, Al.
07 23 16 31	CDR	MARK. Right eye. I wonder if that was Ed's flashlight. How much longer you think you're going to be running this test?
07 23 16 41	CC	A total of about 10 minutes more. And then we'll come out, and Stu can start the P52 and we'll be back in business.
07 23 16 51	CDR	Okay. Sounds good.
07 23 16 52	CC	Roger. Currently, I've got 191 plus 57, or 13 minutes, until the block in the flight plan for starting the P52. So I think we're still in good shape.
07 23 17 06	LMP	Okay.
07 23 17 07	LMP	MARK, Bruce. I'm starting my adaptation again.
07 23 17 10	CC	Roger, Ed.
07 23 17 56	CMP	MARK. Right eye, streak; it's at the center going out, 3 o'clock.
07 23 18 01	CC	Roger, Stu.
07 23 18 05	LMP	MARK. Nova, right eye, at 3 o'clock.
07 23 18 10	CC	Roger, Ed.
07 23 18 19	CMP	MARK. Flash, at 5 o'clock, about half way out.

07 23 18 24	CC	Roger, Stu.
07 23 18 56	LMP	MARK. Left eye, 12 o'clock, high, a flash.
07 23 19 00	LMP	MARK. Nova, right eye, low - 12 o'clock, low.
07 23 19 05	CC	Okay. We got those, Ed.
07 23 19 22	CDR	For your documentation on spacecraft orientation, Al is in the - left couch looking up; Ed is in the right couch looking up; and Stu's in the LEB facing Mecca.
07 23 19 37	CC	Understand. Stu is in the LEB facing the nav base?
07 23 19 46	CDR	To each his own.
07 23 19 51	CMP	No. I'm - I'm floating in LEB, Bruce. But it's - I'm looking toward plus-X.
07 23 19 58	CC	Roger. We couldn't find Mecca on the stowage list there.
07 23 20 35	LMP	MARK. Flash, right eye, at 12 o'clock, level.
07 23 20 40	CC	Roger, Ed.
07 23 21 22	LMP	MARK. Streak, right eye, from upper right to the center.
07 23 21 26	CC	Roger, Ed.
07 23 21 50	CDR	MARK. Right eye, 8 o'clock, flash.
07 23 21 58	CC	Roger, Al.
07 23 22 19	LMP	MARK. Flash, right eye, 3 o'clock.
07 23 22 25	CC	Roger, Ed. And - 14, this is Houston. We have a - a query here, wondering how long, in terms of angular measurement, those streaks are? Over. I should say, apparent angular measurement.
07 23 22 46	LMP	Mine are abo - mine have been about half an eyeball diameter from - -
07 23 22 53	CDR	MARK. Double shot in the right eye, at 10 o'clock and 7 o'clock.

07 23 23 01	CC	Roger, Ed. Roger, Al.
07 23 23 11	CDR	MARK. Double shot in the right eye, 10 o'clock and center.
07 23 23 14	CMP	Flash at the same time, right eye, at 2 o'clock.
07 23 23 20	CC	Roger.
07 23 23 46	CMP	MARK. Streak, right on the periphery, at 3 o'clock, left eye, going vertical, bottom to top.
07 23 23 57	CC	Roger, Stu.
07 23 23 59	LMP	MARK. Flash, ... left eye, 2 o'clock.
07 23 24 15	LMP	MARK. Bright flash, right eye, at about 1 o'clock, high.
07 23 24 21	CC	Roger, Ed.
07 23 24 43	CMP	MARK. Flash, at 4 o'clock, about halfway out, right eye.
07 23 24 52	CC	Roger, Stu.
07 23 25 04	CDR	MARK. Dim flash, right eye, center.
07 23 25 08	CC	Roger, Al.
07 23 26 22	CMP	MARK. Flash, 2 o'clock, on the periphery, right eye.
07 23 26 30	CC	Roger.
07 23 27 18	CC	Apollo 14, this is Houston. We're going to terminate the light-flash investigation at this time. We would like to convey our appreciation to all three of you for cooperating in the investigation. The investigators are very happy with the data that you have given them, and I think they will be able to get something significant out of it. Over.
07 23 27 41	CMP	MARK. Flash, at 1 o'clock, on the periphery.
07 23 27 46	CC	Roger, 14. We can terminate the experiment and proceed with the P52, Stu.

07 23 27 53 CMP Okay. And, Bruce, I'd just like to make a comment. I don't know whether it's my position down in LEB or why, but even with those up in the couches, that's not near as many flashes as I've seen at other times.

07 23 28 08 LMP Yes. And I was going to remark, Bruce, that most of the times when I've observed them have been after sleep. Generally, I guess I fall asleep so fast when we turn in that there's not time to observe them. But they always seem very bright, much brighter than right now - than they were this pass. I don't know whether more numerous - perhaps more numerous - but always brighter than they were today.

07 23 28 36 CC Roger. We copy that, Ed. Thank you.

07 23 28 41 LMP Did you get Stu? He concurs on that, he said.

07 23 28 43 CMP Yes. I said on the intercom that I agree to that, also, Bruce. Like last night - I was laying there and there were just, you know, big bright ones all over the place. And these, seemed like, were a little subdued compared to that.

07 23 29 03 CC Roger.

07 23 29 06 CDR Well, let's see, that should put us at about 104 percent completion of the flight-plan items.

07 23 29 16 CC I'll run that one by the FAO, and see what he's got to say.

07 23 30 31 CC 14, a brief update on things. We have canceled midcourse correction number 6 at this time. Based on our tracking, the preliminary estimates are that midcourse 7 will not be required. However, we won't be able to make that decision with certainty until tomorrow. Based on MSFN tracking, your gamma at entry interface is minus 6.35 degrees. Based on your onboard navigated state vector, it's minus 6.68. So we're showing very good agreement there.

07 23 31 17 CMP Say the MSFN angle again, Bruce.

07 23 31 20	CC	Roger, Stu. The MSFN angle is minus 6.35. The angle derived from your onboard navigated state vector is minus 6.68. Over.
07 23 31 33	CMP	Okay. These should come together as the marks continue, shouldn't they?
07 23 31 41	CC	That's our expectation, Stu.
07 23 33 57	CC	Okay, Stu, we've got them. And they look good.
07 23 34 03	CMP	Okay.
07 23 34 20	CMP	Okay, Bruce, and we'll torque at 192:14:25.
07 23 34 26	CC	Roger, Stu. Run that time by again, please.
07 23 34 34	CMP	192:14:25.
07 23 34 37	CC	Roger.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 00 44 40	CC	Apollo 14, this is Houston.
08 00 44 44	MS	Go ahead.
08 00 44 49	CC	Stand by.
08 00 44 55	LMP	Say again, Bruce.
08 00 45 30	CMP	Hey, Bruce - -
08 00 45 31	LMP	14. Did you call?
08 00 45 35	CC	Roger, 14. This is Houston. We would like you to go to an attitude for thermal control, not PTC, and maintain that attitude until beginning of the TV coverage for the press conference; and that attitude is roll, 262; pitch, 090; yaw, 000. Over.
08 00 46 06	LMP	Roger. 262, 090, 000.
08 00 46 10	CC	Roger.
08 00 46 13	LMP	And we'll do it.
08 00 56 53	CC	14, this is Houston. Request you terminate the waste water dump now in progress. Over.
08 00 59 07	CC	Apollo 14 - -
08 00 59 08	LMP	...
08 00 59 09	CC	- - This is Houston. Over.
08 00 59 14	LMP	Yes, Bruce; we've turned it off now.
08 00 59 16	CC	Roger.
08 01 00 38	CC	14, this is Houston. When you can give us POO and ACCEPT, we have a state vector and a clock update for you. Over. - Or uplink.
08 01 00 50	CMP	Okay, Bruce; you've got it.
08 01 00 52	CC	Roger, Stu. You're very weak.

08 01 00 59 CMP Well, how now? Maybe it works better if I talk into the mike. We're POO and ACCEPT.

08 01 01 04 CC That comes through a lot better.

08 01 01 17 CC And, for your information, Stu, based on your last set of P23s, your navigated state vector has a gamma at entry interface of minus 6.74; MSFN solution of minus 6.35 remains unchanged. Over.

08 01 01 39 CMP Well, didn't sound like it helped us much.

08 01 01 45 CC Well, you might be right; who knows?

08 01 01 52 LMP Say, Bruce. Observe the HIGH GAIN starting to oscillate. What would you like to do with it?

08 01 02 02 CC Yes; they tell me you're on OMNI Delta right now. We'll get you something to do with the HIGH GAIN.

08 01 02 10 LMP If we're on OMNI Delta, it's news to me.

08 01 02 20 CC Stand by, please.

08 01 03 07 CC 14, this is Houston. We've uplink commanded you to OMNI Delta. We'd like you to park the HIGH GAIN ANTENNA at PITCH, minus 52; YAW, 270. Over.

08 01 03 22 LMP Wilco.

08 01 03 24 CC And I have a brief flight-plan update for you, when you're ready to copy.

08 01 03 33 LMP Go ahead.

08 01 03 38 CC Okay. Do not go into PTC until a GET of 198 plus 45. Over.

08 01 04 04 LMP Okay. Do not go to PTC until 198 plus 45. Understand.

08 01 04 08 CC Okay. At 194 plus 50, a VERB 49 maneuver to the TV attitude, which is roll, 325, 090, 000. In that attitude, HIGH GAIN ANTENNA, PITCH, plus 32; YAW, 270. Over.

08 01 04 47 LMP Okay. At - 194 plus 50: VERB 49 to TV attitude; pitch is 325, 090, 000, with HIGH GAIN - angles of 32 and 270.

08 01 05 04	CC	Roger. And - TV pass is scheduled from 195 plus 07 through 195 plus 37. Over.
08 01 05 39	LMP	Understand; TV, 195:07 to 195:37.
08 01 05 46	CC	Readback correct. That completes the flight-plan update, and the computer's yours. Over.
08 01 05 55	CMP	Okay, Bruce. The computer's mine, and how about me going to WIDE DEAD BAND here - while we're setting here and until after the TV show.
08 01 06 10	CC	Roger, Stu. We concur. And I'll have a - -
08 01 06 15	CMP	Okay.
08 01 06 17	CC	- - an entry pad here for you shortly. And then we'll be ready to start in on the great probe stowage exercise.
08 01 06 27	CMP	All right.
08 01 10 12	CC	Apollo 14, this is Houston. I have an entry pad and a CSM state vector pad for you. Over.
08 01 10 21	LMP	Okay. Stand by.
08 01 11 07	LMP	We're ready to copy the entry pad, Bruce.
08 01 11 10	CC	Roger, Ed. Mid-Pacific entry pad: roll, 000, 154, 000; 216:10:47, 267; minus 27.02, minus 172.64; max g 06.1; 36170, 6.35; 1135.0, 36251; RRT 216:27:47; 00:29; NOUN 69 is NA; D_0, 4.00, 02:10; 00:18, 03:36, 08:03; sextant star 30, 354.3, 30.7; boresite star, good ol' Nu Hydra, up 21.1, left 2.8; up lift vector. Comment 1: use nonexit EMS pattern; 2: Moon check attitude, Moon at left of window; roll, 000; pitch, 182; yaw, 000; number 3: moonset GET, 216 plus 25 plus 15; number 4: RET of 90,000 feet, 6 plus 25; main deploy, 8 plus 51; landing, 13 plus 48; number 5: constant g entry is roll right - right; 6: GDC aline, Sirius and Rigel, 322, 325, 018; number 7: the attitude at .05g and the GDC aline angles, assume a P52 nominal alinement, option 2, using the RRT time of 216 plus 27 plus 47. Read back. Over.

08 01 15 43 LMP Okay, Bruce. Think the only thing I missed was the - the boresite star angles. I have a up 21.1, and a left - something.

08 01 16 54 CC Okay, left 2.8. Over.

08 01 17 01 LMP Okay, MEDPAC 000, 154, 000; 216:10:47, 267; minus 27.02, minus 172.64; 061; 36170, 6.35; 1135.0, 36251; 216:27:47; 00:29; NA D_0 is 4.00, 02:10; 00:18, 03:36, 08:03; 30, 354.3, 30.7; Nu Hydra, up 21.1, left 2.8, lift vector, up. And use nonexit EMS pattern; Moon check attitude is roll, 000; pitch, 182; yaw, 000; Moon will be to the left window; the moonset is at 216:25:15; the RET of 90 K is 6 plus 25. The mains is 8 plus 51, and landing is 13 plus 48; for the constant g reentry, it's roll right; GDC aline stars are Sirius and Rigel at angles of 332, 325, 018; and the moonset and Moon check times, I believe you said, are for a P52, using option 3 - option 2, and RRT time of 216:27:47.

08 01 18 22 CC 14, this is Houston. Your readback is correct. The attitudes that I was referencing you were the .05g attitude and the DC aline angles. Your statements regarding moonset and all that, however, are also correct. Over.

08 01 18 42 LMP Okay.

08 01 18 44 CC And for Stuart, I've got a CSM state vector pad, if you're ready to copy.

08 01 18 55 CC Stand by, please.

08 01 21 29 CC 14, this is Houston. I'm ready with the P27 state vector pad, now.

08 01 21 36 CMP Okay. Standing by to copy.

08 01 21 39 CC Okay. It's a verb 71, the index is 21. And here we go on line 02, 01501, 00001, 74563, 62354, 10577, 10424; line 10, 03452, 14667, 00467, 37210, 73721; line 15, 60164, 75626, 44713, 10452, 21000. Read back. Over.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 01 22 57	CMP	Okay, Bruce. Before I start, give me a time on this.
08 01 23 08	CC	Roger, Stu. It's GET of 200 hours even; that's 200 plus 00 plus 00. Over.
08 01 23 19	CMP	Okay. State vector, VERB 71. 2 - 200 hours on the money; index 21, 01501. How do you read, Bruce?
08 01 23 37	CC	Okay. I was reading you before, and I have my volume all the way turned up here. Now, I really read you, Stu.
08 01 23 45	CMP	Oh, okay. I just realized that my mike had - wasn't right. I'll start on 02: 01501, 00001, 74563; 62354, 10577, 10424; 03452, 14667, 00467; 37210, 73721; 60164, 75626, 44713; 10452, 21000.
08 01 24 29	CC	Roger, 14. Readback is correct.
08 01 24 34	CMP	Okay. Thank you, Bruce.
08 01 25 45	CC	14, this is Houston. We're ready to go on the probe stowage at the present time. However, it was our intent to give you about a half an hour of free time prior to commencing the TV pass for the press conference to let you get configured in whatever mode you want up there. So, we've got a couple of breakpoints in this procedure; and, if you concur, we could start into this and give it about 30-minutes' worth and then knock it off for the TV show. Over.
08 01 26 21	LMP	Roger. Reading you.
08 01 26 23	CDR	Yes. About all we have to do to configure for the TV show is to get the camera set up. And, actually, Stu and I will be stowing the probe, and Ed could be setting up the camera, so we can work simultaneously.
08 01 26 35	CC	Roger.

08 01 27 47	CC	14, this is Houston. As a preliminary to the probe stowage proper, we'd like to review a few stowage items for entry with you. Over.
08 01 28 02	CMP	Okay, go ahead.
08 01 28 03	CC	Okay, you might get up a little closer - -
08 01 28 05	CDR	... do all this - Can do all this in real time, now. We don't have to write anything down. Is that right?
08 01 28 13	CC	That's correct. The first few steps will be probably informational rather than anything else; and then, we'll get into the real-time stuff.
08 01 28 43	CC	14, Houston.
08 01 28 47	CMP	Go ahead.
08 01 28 49	CC	It's our understanding that you have two decontamination bags at the present time, one weighing about 20 pounds and one weighing about 30 pounds. The 30-pound decontamination bag and contents should be stowed on top of locker Alfa-13 for entry, using the existing tiedown rings. Over.
08 01 29 16	CMP	Stand by 1, a minute, Bruce.
08 01 29 18	CC	Roger.
08 01 29 40	CDR	Give us about 5 minutes, Bruce, and we'll have the A-10 in shape for you here. Stand by.
08 01 29 46	CC	Okay, now. Before you do too much with the A-10 situation, it's our understanding that you currently have a 20-pound bag on top of A-10; and we're going to ask you to move that over to the top of A-8 for entry. And, of course, once you lash this down on top of A-8, which is not necessary to do right now, you're locking your inflight demo, the composite casting, into place there; and you want to be sure and get as far through that as it is your intention to do prior to lashing down A-8. Over.

08 01 30 24 CDR Okay. We understand that.

08 01 32 15 CMP Okay, Bruce. Now, let's go back to the bag that you want on A-13. Make sure I've got that one.

08 01 32 21 CC Okay, Stu. We want the 30-pound decontamination bag on top of A-13 for entry. It is not necessary to lash this down at the present time unless you so desire. Over.

08 01 32 40 CMP Okay. We'll put the 30-pounder on top of A-13, and we'll lash it down at our convenience.

08 01 32 47 CC Roger.

08 01 32 48 CMP And I guess we're ready to press when you are, Bruce.

08 01 32 51 CC Okay, Stu. Then, we're going to have the 20-pound decontamination bag on top of A-8 for entry; and again, it's not necessary to lash this down yet. Over.

08 01 34 08 CMP Okay. Twenty pounder on A-8.

08 01 34 11 CC Next, it's intended to stow the IV pressure garment assembly, that is, yours, with its helmet in a sleeping bag on top of the 28 - on top of the 20-pound bag on A-8. Use LM webbing and the D-rings on the container for tiedowns. Once again, this can be delayed. Over.

08 01 34 54 CMP Okay. And we'll put my suit, with helmet, gloves in a sleeping bag and tie them on top of the 20-pounder on A-8.

08 01 35 04 CC Roger. Then, after that's all through, you need to verify a minimal 4-inch clearance to the couch. Over.

08 01 35 12 CMP Okay. Four-inch clearance to the couch.

08 01 35 15 CC Okay. Now then, we need you in real time here to go through locker Alfa-10 and remove anything that may be needed later on in the flight - prior to entry, such as 70-millimeter magazines, Reseau camera, or whatever you feel you'll require. Over.

08 01 35 41	CMP	Okay. Stand by 1.
08 01 35 49	CC	And, Stu, one item that we'd like you to remove from A-10 at this time is the bag that contains the hoses for the liquid-transfer demonstration. Over. And that's - that's just the bag because we're going to place the bag over the probe head later on and tape it in place; so, you'd want to leave the hoses in A-10.
08 01 36 17	CMP	Okay. That clarifies that.
08 01 40 55	CMP	Okay, Bruce. A-10 is secured to our satisfaction.
08 01 41 01	CC	Roger, Stu. And now, in locker Alfa-5, we'd like you to remove the headrest pads and install them on the couches. Over.
08 01 41 12	CMP	Okay, in work.
08 01 41 15	CC	Also, the heel clips and five ropes, while you're down there temporarily.
08 01 41 23	CMP	Okay.
08 01 42 58	CMP	Okay, Bruce. That's accomplished.
08 01 43 02	CC	Okay. You've got the heel clips and the ropes and the headrest pads out and installed on the couch. Okay.
08 01 43 11	CMP	21 Nancy.
08 01 43 12	CC	Roger. And we want everything else removed from the right-hand side of A-5, that is, the cushion and added equipment that's in there and stow that in Bravo-1, the main food locker there. Over.
08 01 43 29	CMP	In work.
08 01 45 45	CMP	Okay, Bruce. A-5 is all clean.
08 01 45 52	CC	Roger, Stu. Now, we'd like you to remove the two lithium hydroxide canisters from Alfa-6 and place them in the left-hand side of Alfa-5. Over.
08 01 46 05	CMP	In work.

08 01 46 09 CC And while you're over there in Alfa-6, you might as well get all the rest of the stuff, the TV equipment, out of it.

08 01 46 19 CMP Okay.

08 01 47 31 CMP Houston, 14.

08 01 47 33 CC Go ahead, 14.

08 01 47 36 CMP Okay. Now, you want the cushion out of the right side of A-6. Is that affirmative? Or just the TV gear?

08 01 47 59 CC Okay, Stu. It's not required that you take the cushion out of the right-hand side of - or out of A-6. We do want the TV gear out. Ultimately, we're going to stow the TV equipment from Alfa-6 in the Bravo-1 food locker with the monitor wrapped in a constant wear garment; but since we're coming up on the press conference, you want to keep it out for operation at the present time. Over.

08 01 48 26 CMP Okay. So, we now have A-6 completely empty, except for the cushion in the right side.

08 01 48 32 CC That's affirmative. And Alfa-5 ought to have two lithium hydroxide canisters in the left-hand side of it, and the right-hand side of it ought to be completely empty. Over.

08 01 48 44 CMP Okay. We are in that configuration.

08 01 48 48 CC Roger. Now, we need somebody that is qualified to tie knots.

08 01 48 56 CMP Okay. As I said before, we've got two sailors.

08 01 49 01 CC Okay. We want you to double one of the sleep-restraint ropes and to tie it to the plus-Y, plus-Z footpad on the aft bulkhead belonging to locker Alfa-6. As a preliminary, you should remove the urine bag from under Alfa-6 to allow you to get under there with one hand. You can put a hand underneath and a hand around the side toward panel 250, and this is the plus-Y, plus-Z-ward footpad of Alfa-6, and it's the one that's closest to panel 250 down there in the corner. Over.

08 01 49 46 CMP Okay. So we should take the bag completely out from underneath, right?

08 01 49 50 CC Roger. You can restow that back in there after you get the rope tied on, but it makes access a lot easier if it's out for this step.

08 01 50 01 CMP Okay.

08 01 50 04 CC And you want to - to tie the knot, using as little of the line as is convenient, probably a bowline or something like that to - the thing going to come up and tie around part of the probe.

08 01 50 21 CMP In work.

08 01 50 22 CC Roger.

08 01 50 56 CDR Okay. Do you want this thing outside the footpad or inside the footpad?

08 01 51 04 CC Okay. We would like it trending through the space between the Alfa-6 locker and the waste management panel, so I guess it - that would probably be outside.

08 01 53 31 CDR On the loose end of this line, do you want a bight or do you want just the bitter ends?

08 01 53 37 CC On the loose end of it, Al, which is really a double end as I assume you're tying it on, there is no particular requirement. You're just going to tie the - the doubled-up piece of line around a part of the probe later on. Over.

08 01 53 57 CMP Okay.

08 01 54 33 CMP Okay, Bruce. That step is completed.

08 01 54 37 CC Roger, Stu. Then, we want you to take the three ropes that you've removed from A-5 there and tie one end of all three, either collectively or one at a time, to the A-6 aft bulkhead footpad; that's in the plus-Y, minus-Z direction. That's the one on the box there that's farther - It's closer to the side hatch than the one you just tied the one doubled-up rope around. Over.

08 01 55 15	CMP	Okay. You want three ropes, the ends tied around that one. That's four.
08 01 55 21	CC	That's correct. You're going to come off of there with effectively a triple strand of line, the full length. Over.
08 01 56 54	CMP	Okay, Bruce. We've got three more snakes on the loose. So you can - -
08 01 57 00	CC	Okay. Now that you've got the additional snakes tied to Alfa-6, you can put the urine bag back underneath it, unless you anticipate needing this assembly prior to entry.
08 01 57 14	CMP	Okay. We'll put it back underneath it.
08 01 57 16	CC	Roger.
08 01 57 43	CMP	Okay. Let's press.
08 01 57 48	CC	Okay, Stu. All right, now, we'd like to move over to the probe and ensure that the probe - umbilical power connectors are connected to the shorting plugs and that the probe is fully folded. Over.
08 01 58 06	CMP	Okay. I'll verify that.
08 01 58 11	CC	Is that an in work or an accomplished?
08 01 58 15	CMP	Well, I verified those - those steps, but we're going to have to stand by right now, here. We're going to have to get the probe down out of the tunnel.
08 01 58 23	CC	Okay.
08 01 59 46	CMP	Okay. We have the probe.
08 01 59 50	CC	Okay. Ask ole 21 Nancy there if he'll verify that the probe connectors are connected to the shorting plugs and that the probe is fully folded.
08 02 00 01	CMP	Well, the umbilicals are connected to the shorting plugs, and I don't know if there's something in there that's fully folded; you know, the probe's folded up as you bring it out of the - out of the tunnel.

08 02 00 20 CC Okay, and Stu - -

08 02 00 21 CMP I haven't done anything other than just - just a normal probe removal.

08 02 00 25 CC Yes, you might check to make sure that the old Teflon block there on the side is against the ratchet housing in - on the arm there that engages in the tunnel.

08 02 00 43 CMP Okay.

08 02 01 50 CMP Bruce, are you waiting on us?

08 02 01 55 CC Affirmative.

08 02 01 58 CMP Okay. We're - we're ready to go. The probe's folded.

08 02 02 01 CC Okay. We'd like you to take two of the nominal 8-and-a-half-by-11-size Flight Data File Books and tape them to the base or the capture latch release handle under the probe. We've got tape in R-6, and it's your option as to which pubs you use; probably, the CSM Rescue Book and the CMP Solo Book or the Lunar Landmark Maps would be good candidates.

08 02 02 30 CMP Okay.

08 02 02 50 CC And, just by way of information, when we get this stowed, these pubs are going to come to rest against the right-hand equipment bay panel, down there to the - to the right of 251.

08 02 03 08 CMP Okay.

08 02 03 25 CDR Okay. We have the CSM Lunar Landmark Map Book, which is about five-eighths of an inch thick. Is that satisfactory?

08 02 03 33 CC Roger. That should be satisfactory by itself.

08 02 04 31 CMP Okay, Bruce. We have a book in hand and ready to go.

08 02 04 35 CC — Okay. You want to place that across the base end of the - the probe assembly there, across the capture latch release handle; and this is going to be the padding that distributes the load a little bit from the base end of the probe assembly onto the paneling down there in the right-hand equipment bay, hatchwise from panel 252; so, you just want to tape it across the base there, so that it'll be sure and stay in position. Over.

08 02 05 07 CMP — Okay.

08 02 07 47 CMP — Okay, Bruce. The book is taped to the base of the probe.

08 02 07 52 CC — Roger, Stu. And what we'd like you to do next is to place a bag over the probe head, and the latest information shows that that liquid transfer demo hose bag probably will not fit; and, therefore, you can stow that either in Bravo-1 or - or back in Alfa-10; your option. And we're recommending that you take an unused temporary stowage bag, that is, one that's not currently in use, and cut the mechanism off the top of the temporary stowage bag, place that over the probe head, and tape it in place. Over.

08 02 08 49 CC — What we're trying to do here is protect the mechanism in the probe head against possible salt water or salt spray splashing in during the recovery. Over.

08 02 09 02 CDR — Okay. We're just looking around; the temporary stowage bags are all filled at the moment. Hold on.

08 02 09 19 CC — And, 14; Houston. Since you don't have anything else to do right now, why, we'd like you to press on to the TV attitude, 325, 090, and 000, and acquire on the HIGH GAIN when we get there. Over.

08 02 09 35 CDR — Okay. 325, 090, 0 - 090.

08 02 09 41 CC — 325, 090, and 000.

08 02 09 47 CDR — Okay. We're on the way.

08 02 11 27 CMP — Houston, 14.

08 02 11 28 CC Go ahead, 14.

08 02 11 32 CMP Okay. Bruce. We've got this bag that the - hatch - the hatch - window bracket for the camera, you know, they used on the zero phase, and we had as a stand by - 70-millimeter-camera hatch window adapter bag, and it's big enough to go over the - the probe head. We just sweat it a little bit.

08 02 12 01 CC Beautiful, Stu. If you can get that over and tape her down so that you have a water - salt water spray protection on the probe head, that's all we need. Over.

08 02 12 12 CMP Okay. We'll do that.

08 02 15 50 CC 14, this Houston. How are you reading me, now? Over.

08 02 22 37 CC Apollo 14, Apollo 14; this is Houston. How do you read? Over.

08 02 23 12 CC Apollo 14, Apollo 14; this is Houston. How do you read? Over.

08 02 25 29 CC Apollo 14, Apollo 14; this is Houston. How do you read? Over.

08 02 26 27 CC Apollo 14, Apollo 14; this is Houston. Request OMNI Charlie. Request OMNI Charlie in the blind. Over.

08 02 26 44 CC Apollo 14, this is Houston. Request OMNI Charlie, OMNI Charlie in the blind. Over.

08 02 27 28 CC Apollo 14, Apollo 14; this is Houston. Requesting OMNI Charlie in the blind. Over.

08 02 28 12 CC Apollo 14, Apollo 14; this is Houston. How do you read? Over.

08 02 28 19 CDR We read you loud and clear, Houston.

08 02 28 21 CC Roger, 14. We'd like to stow the probe temporarily in some convenient location and prepare for the press conference. I'll turn it over to Gordon, here.

08 02 28 34 CDR I took your downlink down, Bruce. You should be getting us.

08 02 28 36 CC Roger. We've got a beautiful picture here.

08 02 28 41 CDR We're ready to go any time.

08 02 28 48 CC Okay, Al. The questions that you'll be asked at this news conference have been submitted by newsmen here at the Manned Spacecraft Center who have been covering the flight.

08 02 28 58 CDR Gordo?

08 02 29 00 CC Go ahead, Al.

08 02 29 02 CDR Could you - could you hold on just a minute? We'll get in position to answer the questions.

08 02 29 06 CC All right, fine. Just let us - when - let us know when you're ready.

08 02 29 41 CC And, for your information, we're getting a very good picture - -

08 02 29 43 CDR Are you getting a picture, now?

08 02 29 45 CC That's affirmative. Good picture. All three of you in there. The questions that you'll be asked at this news conference have been submitted here at the Manned Spacecraft Center by newsmen who have been covering the flight. Some of the questions they raised have been answered in your communications with Mission Control, but the public-at-large has not necessarily heard them. The questions are being read to you exactly as submitted by the newsmen and in an order specified by them. First of all, for Al and Ed. Cone Crater was your major objective on your second moonwalk. You almost made the rim. How close do you think you got, and do you believe you collected enough rocks and samples to accomplish the purpose of your mission?

08 02 30 34 CDR I think so. Let me take the first part of it, with respect to how close we got. I think we were within perhaps 100 yards or less of the rim and certainly in a boulder field that was right there associated with the boulders in the rim.

08 02 30 55 LMP — I agree with Al. I agree with Al. I think we were in 100 to 150 yards, and I think the majority of the type rocks that - ... find at the rim were in the boulder field that we were working; and although it was a disappointment, just as a matter of challenge, not to get up there, I think we accomplished the scientific objectives that we went for.

08 02 31 24 CC — It is hard for us to get a feel for what it was like in the large boulder field. Was it a forest of big rocks higher than you? Could you see any distance? Over.

08 02 31 38 CDR — Well, the - the rocks that we were in - ranging in different sizes. They ranged up to 10 or 12 feet in height above us; so, at times, we were behind rocks that were taller than we were. As far as the mobility's concerned, Ed, do you want talk about that?

08 02 31 57 LMP — Yes. We didn't have a great deal of trouble moving around the rocks. We didn't even have trouble moving the MET around the rocks, except we did have to dodge them and, of course, had to be a bit more careful with the MET that - walking without it. Our major problem, however, was the undulating sur - terrain where you simply couldn't see more than 100 to 150 yards away from you and see landmarks. Consequently, you were never quite sure what landmark would appear when you topped the next ridge, and we were very surprised when we topped the ridge - approached the ridge which we thought to be the rim of Cone Crater to find there was another one beyond it, and that was the beginning of the real problem.

08 02 32 48 CC — The next question is: tell us about your problems of fatigue, orientation, and visibility; and apply them, if you will, to the longer 7-hour moonwalks planned for Apollo 15.

08 02 33 06 CDR — Well, I guess we didn't realize that we had problems of fatigue and visibility. As far as we were concerned, our only problem was the amount of time allotted for the excursion. We - I don't exactly know what our heart rates were. Obviously, they

were higher than the normal sitting rate, but we still were not operating at maximum capacity of our backpacks for cooling, nor were we operating for extended periods of time at high heart rate. To us, it was just a matter of working against the clock. I think that we had the capability to go longer from the standpoint of fatigue. I don't believe that we were disoriented or lost at any - any time at all, either.

08 02 33 51 LMP — Yes, I agree with Al. If my previous answer misled you, it was only a matter of context, because, given a few minutes to look around, we figured out where we were, but trying to do it rapidly made it difficult; and, as Al says, time was our major factor. Given another 30 or 40 minutes, I think we could have reached the top of Cone Crater, covered all of our objectives, and - get back in good fashion.

08 02 34 22 CDR — Well, let me add one thing here. I think if we had wanted to reach the top of the crater, and did nothing else, that we could have done that within the time period allotted. But I think that this method in which we reverted to, that of collecting rocks from a point not quite near the top of the crater, provided a lot more geologically, and gave us a better cross section of the rocks in the area, and, therefore, a better chance of getting rocks ejected from Imbrium than had we gone to the crater and back and not collected as many rocks.

08 02 35 00 CC — The next question is for Stu Roosa. Stu, what did you see of the lunar module from orbit?

08 02 35 10 CMP — Okay. The first pass that I made on the landmark tracking, I picked the LM up with no problem. It just showed up as a - as a white - a white spot, obviously something foreign to the lunar surface, reflecting light, but the ringer was the long shadow put out. The first day that I tracked it, why, the Sun angle was still pretty low; and you could see the shadow coming out; and the shadow and the - and the reflection cinched it as the LM. Now, you couldn't see a shape of the LM, as such, but - was no doubt the LM was there. And on the next day, as I was doing landmark tracking, it was

not on - in the schedule to track the LM again; however, I had a landmark just prior to the Fra Mauro region and one after it. And I was in forma - the right attitude for landmark tracking; so, I looked for the LM again - found it this time without any trouble. The shadow had diminished to - to almost nothing, or it was very small; but, here again, then, I could see the glint coming off the ALSEP. At this time, the ALSEP had been deployed; so, I could see the glint coming off it. And I checked with Ron Evans later on the - and told him what I thought it was, and he agreed that that was the ALSEP location.

08 02 36 39 CC The next question is also for you, Stu. A top priority for you is taking detailed pictures of the Descartes Crater as a possible landing site for a later mission. Since your big camera was broken, do you think you got enough high-resolution photos?

08 02 36 58 CMP Well, I guess - well, I'd say yes. We made three passes and - with the 500-millimeter, using what we call the COAS maneuver, or you - you pitch and keep the camera on the Descartes landing site, and this way you get a real good stereo. And, I guess, we'll have to develop the pictures and see - see how they are. But I'd - I'd say the answer to that's probably yes, but I - I really can't answer it completely at this time.

08 02 37 33 CC With your docking problem, and battery problem, abort switch problem, and a problem with the landing radar, how concerned were you about not making a successful landing or a safe return?

08 02 37 49 LMP This is Ed. I never doubted it for a minute. We were going to make it.

08 02 37 55 CDR Well, I guess we're always concerned about the operation of the equipment. That's what we're up here for is to - to assure that it operates - to the best of our ability, as well as it's designed to function all the time. We're always concerned about that, and we still are. We still have a little bit of this voyage left to go, and we're still concerned about a safe return. I think that

anyone that's involved in this kind of a business of research flying has to be concerned until the flight is totally over.

08 02 38 36 LMP — I - I'd like to make one other comment, too, about - the question about the - Stu's pictures of Descartes. The photographic technique which he used is essentially the same as Apollo 12 used, which took the pictures of the area in which it landed. We feel that was successful.

08 02 38 57 CC — The next question. Other crews had trouble with dust. How did dust affect you on landing, on the surface, and on the way back?

08 02 39 08 CDR — Well, let me take the landing part, and I'll give Ed the surface part, and let Stu handle the way-back part. As far as the landing was concerned, there was - there was less dust than I figured; and I think that was generally borne out as we progressed through our EVA; but the dust started forming, I think, approximately 100 feet above the surface, maybe 150. It was a thin layer, as we've seen before but less dense than what I expected. And it did not interfere with my vision or capability to land at all. Now, do you want to talk about how it was on the surface?

08 02 39 48 LMP — I think it was substantially as previous crews have reported it, as far as working on the surface is concerned. It's a nuisance. The material is soft. It clings very readily to equipment, to your suits, and it's - it's a nuisance. But surprisingly, we didn't find that we had too much of it on the LM with us in the evening - rather the first night, nor did we feel we carried too much of it back in with us after the second EVA, except for the fact that it was - had impreg - impregnated the top of the suits and was on most other pieces of cloth. However, it came off of the metal very readily, and that didn't cause any problem. I think it was more of a nuisance than anything else.

08 02 40 37 CMP — Okay. As far as - after the docking and on the way back, the dust problem's really been nonexistent. They - Of course, Al and Ed took their suits off in the - in the LM; and then, we have a vacuum

cleaner in the command module and which I passed over; and they vacuumed the suits. And I passed over several bags in which they put all of the equipment that they brought from the lunar surface into these bags. They have zippers on them and so forth that are to keep the fine dust in. So, I took each one of their suits and put it in a special suit bag that we have in here and another bag that they came back across; and by holding a little positive pressure in the command module, we - we've had very - very little dust, and absolutely no - no problem at all.

08 02 41 30 CC — Now we'd like to - -

08 02 41 31 CDR — I think you might - I might just add that we certainly have benefited - from the - from the lessons of earlier flights in this respect. I think the problem, particularly on Apollo 12, showed us how to handle the dust problem, and I think that we have most of the answers now solved.

08 02 41 50 CC — Now, we'd like you tell us about the rocks you're bringing back. How big are they? What is their texture, color, and did they crumble? And compare them with the rocks on Apollos 11 and 12.

08 02 42 12 CDR — Well, I tell you, we've been so busy, we really haven't looked at the rocks. Stu's going to see if he can't find one for us now. But while he's digging, to comment on that particular question; of course, we don't have the equipment here to analyze these rocks from the standpoint of mineral content and how they compare with the various mineral percentages with those that have been brought back, but with respect to size - We didn't have a dust problem until just now (laughter). With respect to size, I think the largest we brought back is about a foot in its diameter, and the large rocks we've brought back were not crumbly. Some of the rock specimens, the smaller hand samples which we collected, were, in fact, crumbly; but the large rocks we brought back, I think we have four or five relatively large rocks. And these are - are not of the crumbling type. I think we just - because of the dusty (laughter) problem which now has been created. I think we'll have to hold on showing you a rock until we get back.

08 02 43 27 CC Okay.

08 02 43 28 CMP I don't - I don't want to get a rock out.

08 02 43 31 CC The next question is for Al Shepard. Was the terrain in the landing area different from what you expected? And describe your reaction to landing on a slope.

08 02 43 45 CDR No. With respect to the general terrain, it was exactly as we had expected. As a matter of fact, as soon as the vehicle pitched over in the final stages of the landing approach, I was immediately able to recognize where we were and could control the spacecraft accordingly. We were essentially right on target, and we landed essentially right on target. I had originally planned to land a little bit to the south of the designated spot, perhaps within a couple hundred yards, because I thought it was smoother there. It turned out that there really was no smooth place within the general area of the landing site. As far as the slope was concerned, there was something like a 7-degree slope, and it didn't give us any problem at all. The LM landed very softly, gently. No tendency for it to topple over, and it stayed there steady as a rock for the duration of the stay.

08 02 44 45 CC This next question is for each of you. As space pilots, what is your dominant professional impression of the flight?

08 02 45 07 CMP Well, I guess any - any comment like that - the answer that I'd give - would be that to me it's gone - it's been very gratifying. I think it's been a challenge, and I think each one of us has certainly had the chance to use his abilities as a - as a research pilot and scientist. And I - I think it's gone real well up to this point. And before we elaborate too much on - on a postmission conference, I'd rather wait until after the entry.

08 02 45 51 LMP I think Stu's put it very well. The small things we've had to encounter that were unexpected have been handled very well by the entire team. I think everyone on the team functioned very well, certainly from our point of view. And all the major objectives

that we went after were accomplished - a certain - at least, well backed up whether we accomplished them per se or not. In my opinion, the mission was, to this point, quite a success. And I expect the reentry to be quite a success.

08 02 46 30 CDR — I would only add to those comments that - that we're basically sensible people, that we're involved in a program of developing and promoting technology. Apollo 12 is only one - one step in the space technology. I feel that Apollo 12 - Apollo 14, I should say - has been a - a resounding success; and I don't really think that we've been able to assess, at this stage, what the contributions will be; but I can intuitively tell from what we've done, what we've seen on the surface, that we're bringing back a wealth of information photographically and geologically, that we've left stations and other stations on the Moon sending back information for scientific purposes. And I think that, generally speaking, it was a smashing success.

08 02 47 25 CC — Again, for each of you. What event in the flight touched you most emotionally?

08 02 47 37 CDR — Well, I think the big emotion for me is yet to come, and that's getting both feet on the carrier.

08 02 47 45 CMP — Okay. I'd say up to - There - there's been a lot of rather tremendous sights on the mission so far, and entry will be another one; but I guess, the - the first look at the Moon after you - after you burn LOI and in the darkness and you come around, pitch to an attitude where you can see - see the Moon and it's there below you at about 60 miles, but it looks like about 200 feet. And your first impression of the body is a rather tremendous thing.

08 02 48 27 LMP — I think Stu's choice is my number 2, and my number-1 impact is when we pitched over and there was Cone Crater right out the window. It was very impressive.

08 02 48 42 CC — You have not talked to your wives and families since you left Cape Kennedy. Is there anything that you would like to say to them now? We will make sure they hear about it.

08 02 48 55 CDR — Well, thank you. I'm sure you all have done a wonderful job of keeping them posted, particularly with the communications link and everything; and I guess, perhaps, they're probably as well informed of the flight as we are ourselves; but, in case they don't know, we're all very well, very happy, and say hello; and we'll look forward to seeing them in a few days. Ed?

08 02 49 19 LMP — I have nothing to add to that at all.

08 02 49 23 CMP — No, No. We'll be in touch.

08 02 49 29 CC — The next question is for Al. Would you give us your personal feelings about the differences between the rides on Freedom 7, a decade ago, and Apollo 14?

08 02 49 46 CDR — One big step. It's very difficult to - Of course, as the question implies, discuss the technical differences between the - the two flights. And from the standpoint of personal differences, I think that for those days, that the Mercury-Redstone flight was just as much of an individual challenge as has been Apollo 14. I think, of course, the machinery are different, but the - the men with whom we worked, the individuals that helped us along, are pretty much the same; and, therefore, the emotions are pretty much the same. Both were a great thrill for me; there's no question about that.

08 02 50 39 CC — The final question is also for Al. You became the first lunar golfer with your little six iron. How many golf balls did you hit, how far did they go, and did you make the green?

08 02 50 56 CDR — Well, you saw the whole action on television. I missed the first one. The second one went, perhaps, a couple of hundred yards; and the third one, perhaps, about 400 yards, which was not bad for a six iron.

08 02 51 14 LMP — Let me add, there wasn't any green in sight.

08 02 51 17 CDR — There were no green rocks; there where no green rocks.

02 08 51 23	CC	Thank you very much. We've certainly enjoyed every minute of - of your commentary, and this concludes the list of questions that we have for you. Thank you, again.
08 02 51 33	CDR	Thank you, and we'll look forward to seeing you shortly.
08 02 51 39	LMP	That sounds good.
08 02 52 48	CC	Apollo 14, Houston.
08 02 52 51	CDR	Go ahead.
08 02 52 53	CC	This attitude will be a good one to hold through the P52. Over.
08 02 53 02	CDR	Okay. Is it also a good attitude for probe stowage?
08 02 53 07	CC	It's also a good attitude for probe stowage.
08 02 53 22	CDR	How was the quality of the picture on that last television transmission, Houston?
08 02 53 28	CC	It was a very good picture; in fact, our estimate is that it was as good as it's been at any time during the flight.
08 02 53 40	CDR	Okay.
08 02 55 30	CC	Apollo 14, Houston. Whenever you are ready, we'll press on with the probe stowage; and at this time, you can go ahead and take the - the TV monitor, the monitor cables, power cable, cable bracket, and stow all that in the Bravo-1, wrapping the monitor in a CWG. Over.
05 02 55 53	CMP	Okay, in work.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 03 02 14	CMP	Okay, Houston. We're - we have the monitor and the cable on bracket B-1, and we're just touching up the cover for the probe head right now. Be back with you shortly.
08 03 02 28	CC	Roger. We're standing by.
08 03 04 21	CDR	Okay, Houston. I think we have the probe head pretty well protected with that Beta bag we discussed and we're ready to press on.
08 03 04 28	CC	14, this is Houston. The next step is an initial fitting of the probe into its stowage location. We'd like you to place the probe between the A-6 and A-10 lockers with a pitch arm down towards the aft bulkhead between A-6 and A-10 and the apex - that is, the probe head towards A-12. The base end of the probe with the Flight Data File Book on it should be touching the right-hand equipment bay panel. The probe should be oriented so that the yellow support arm touches the top or plus-X side of the A-6 locker. And it should be resting on five points, which I'll read off to you after you get it in position. Over.
08 03 06 03	CMP	Hey, Bruce.
08 03 06 04	CC	Go ahead, Stu. You're very weak though - -
08 03 06 06	CMP	Hey, Bruce. You said the hatch - What - what's the orientation of the hatch installation strut?
08 03 06 13	CC	Okay, the yellow one is on the top side, or the plus-X side of the A-6 locker and then there's a pitch arm pointed down toward the aft bulkhead between A-6 and A-10. Over.
08 03 07 08	CDR	Okay, tell us how it should look now.
08 03 07 11	CC	Okay. It should be resting on five points. The probe head should be on the A-10 locker, or somewhere above it.
08 03 07 27	CDR	Okay.

08 03 07 29 CC — There should be a support arm touching the plus-Y side of the A-10 locker.

08 03 07 48 CDR — Okay.

08 03 07 49 CC — The yellow support arm should be touching the top, or plus-X side of A-6.

08 03 07 58 CDR — Okay.

08 03 08 00 CC — The base of the probe, with the Flight Data File Lunar Landmark Book, should be firmly up against the right-hand equipment bay wall. Over.

08 03 08 12 CDR — Okay.

08 03 08 13 CC — And there should be a shock strut touching the plus-Y edge of the A-10 locker. Over.

08 03 08 31 CMP — Okay. Bruce, it doesn't look like we can have the installation strut touching A-6, and the shock strut touching the top of A-10 at the same time.

08 03 08 44 CC — Okay, in the next step, we're going to shim at five locations, and one of the places where we're going to shim is underneath the yellow support arm on top of A-6; so if it's very close to the top, that'll be satisfactory.

08 03 10 04 CDR — Okay, I think we see your point. This means that you do - actually do not have a shock strut touching the - the aft bulkhead.

08 03 10 13 CC — That's affirmative. The shock strut is not touching aft bulkhead.

08 03 10 19 CDR — Or at least the cable run, which is on top of the aft bulkhead at this point.

08 03 10 26 CC — Roger. It - I think it's the pitch arm you're referring to, and that's correct. It is not coming into contact with the aft bulkhead yet. Over.

08 03 10 39 CDR — Okay.

08 03 10 54 CC — Al, what we should have - -

08 03 10 56 CDR Okay. We're with you.

08 03 10 57 CC - - We should have the shock strut which is attached to the support arm for installation of the probe assembly in the hatch resting on the plus-Y edge of the A-10 locker. Over.

08 03 12 03 CMP Okay, Bruce. The way we've got this probe now, it's making contact with the probe head on A-10 and it's up against the - the side bulkhead. And then this support strut that goes down to the support arm is - on - is on - is touching A-10. And those are the only three points right now that we have any contact. Now, it - Does that sound like we're in the right spot?

08 03 12 34 CC Roger; it does. What you're calling the support arm is what we've been calling the shock strut. Over.

08 03 12 43 CMP Okay. To make sure we have our semantics right, we've got support arms and pitch beams. Is that right?

08 03 12 59 CC Roger. We've got support arms and pitch arms - or pitch beams and the support arms are connected to the little shock struts. Over.

08 03 13 12 CMP Okay. So I think we're now in - in the position you're describing, and we have a space between the yellow installation strut and A-6, and a space between the pitch arm and the top of A-10.

08 03 13 30 CDR And a space between the pitch arm - -

08 03 13 31 CC Roger.

08 03 13 33 CDR - - we're running the other ...

08 03 13 36 CC Okay, now then. We want you to locate, on the command module, the following locations where we intend to place shims. First is on the aft bulkhead, underneath the pitch arm that is thrusting down towards the aft bulkhead, but is not in contact with it. At this location, we intend to put in - a bumper. It will not be a solid shim, but it will serve to spread out any force should the pitch arm come into contact with the aft bulkhead.

Over. We'll put one - one Flight Data File Book that you do not require for entry down there and, when we refer to Flight Data File Books here, you can of course, use LM books as well as command module books. It's your preference. Over.

08 03 14 31 CDR Okay.

08 03 14 33 CC Okay. The next location is on the right hand, or plus-Y side of A-10, where the support arm comes close to touching on the side of the A-10 locker or where it may actually touch, depending on the precise location that you've got there. We'd like a thin Flight Data File Book in that place.

08 03 14 58 CDR Yes, we've got it figured - It'll be about 2 inches of padding there, but we see the point you're talking about.

08 03 15 07 CC We're talking about the face of the A-10 locker that's over toward the right-hand equipment bay paneling. Are you talking about the same place?

08 03 15 16 CDR Right. Plus-Y side.

08 03 15 18 CC Roger.

08 03 15 38 CC Okay, it sounds like you've got the right location there. Another place is where the probe head touches A-10 and where the pitch arm comes over A-10. We'd like to shim up on both those locations.

08 03 15 58 CDR Okay. Then we've got one, two, three, four, five locations.

08 03 16 04 CC Okay. And the fifth location, of course, is where the yellow support arm passes over the top of A-6. In all of those locations, except the first one - that is the aft bulkhead underneath the pitch arm - we'd like to shim with unused publications, such that the probe is firmly in contact with the underlying structure. And you may recall earlier this afternoon that I referred to use of the sleeping bag and window shade cover on the aft bulkhead - we've modified that stowage and deleted the requirement for the window shade; so, you can use them for a good night's sleep. Over.

08 03 16 42	CDR	Very good. We understand.
08 03 16 45	CC	Okay, at this juncture - if you have the contents of the shims in mind and the locations in place, go ahead and remove the probe and tape the shims in place with the tape you have from R-6. Over.
08 03 17 08	CC	And, as you go along, we'd be interested in knowing which books go in which location. Over.
08 03 17 21	CDR	Okay (laughter). Would you also like to know which page they're opened?
08 03 17 27	CC	(Laughter) Negative. That doesn't matter. And you can delete our request for books.
08 03 17 37	CDR	Okay. Thank you.
08 03 18 51	CMP	Houston, 14.
08 03 18 53	CC	Go ahead, 14.
08 03 18 56	CMP	Okay, Bruce. I just want to make sure that we've got it clarified. Tell me again what - you mean when you say the probe is fully folded.
08 03 19 11	CC	Stand by a minute, Stu. We're coming up on a site handover. I'll give you a call as soon as we reacquire. Over.
08 03 19 18	CMP	Okay.
08 03 20 15	CC	14, Houston.
08 03 20 26	CC	14, this is Houston. Over.
08 03 20 30	CMP	Go ahead.
08 03 20 31	CC	Okay, Stu. If you'll look at the yellow installation arm. About halfway down its length - If the probe is fully collapsed, then this arm should be bearing against a Teflon block that's part of the ratchet handle housing there. Over.
08 03 20 54	CMP	Okay. The Teflon block is not bearing against - that. It's against the ratchet pawl - it's I believe - is what it's going to come in contact with. So how do I get it there?

08 03 21 08	CC	Okay, you've got about - probably one or two clicks left on the - the ratchet - should be able to extend it there by the normal procedures. I'll give you a talkthrough, if you like.
08 03 21 20	CMP	Okay, stand by 1.
08 03 23 25	MCC	Hey, Stu; aren't you glad you got a couple knot-tying swabbies on board for this job?
08 03 23 32	CMP	Yes. How about that.
08 03 27 33	CC	14, this is Houston. How are you coming? Over.
08 03 27 39	CDR	Well, we're getting books now, and we have the probe fully folded, and we're in the shimming process.
08 03 27 48	CC	Roger.
08 03 33 16	CC	Apollo 14, this is Houston. Stand by for a mark on 100,000 miles from the Earth. Over.
08 03 33 26	CDR	Okay.
08 03 33 27	CC	Stand by.
08 03 33 29	CC	MARK; 100,000 miles.
08 03 33 33	CDR	Beautiful, beautiful. Getting closer all the time.
08 03 36 11	CDR	Okay. We're all ship and ready for the next step, Houston.
08 03 36 16	CC	Okay. The next step is to put the probe back in place and verify that it contacts the shims as required and the other hard points. Over.
08 03 36 28	CDR	Okay. We verify that.
08 03 36 30	CC	Okay. Using the double rope from the A-6 anchor, tie that to the apex of the pitch arm which points in the plus-X direction, making the rope as tight as possible.
08 03 38 12	CDR	Okay. That's complete.

08 03 38 15 CC — Okay, with the three-rope combination from the other footpad on A-6, we want you to tie that also to the apex of the plus-X pitch arm, cinching it up tightly and try not to use too much line in this knot because it's going to go on from there down to the tiedown point on the side of A-10 - directly beneath it. Over.

08 03 38 45 CC — But don't tie it to A-10 - -

08 03 38 47 CDR — Okay. I think - just a loop through the fitting up against that - the apex of that pitch arm should do it, huh?

08 03 38 54 CC — Okay, a loop with maybe a half hitch in it or something like that.

08 03 39 03 CDR — All righty.

08 03 39 05 CC — And if Ed or Stu could get out tools Foxtrot, Whiskey, and one, we'll be ready for the next step, when you're ready.

08 03 39 46 CMP — Okay, Bruce. Now we're running that rope across through the hook on the outboard side of A-8. Is that - or is - is it the one on A-10?

08 03 39 58 CC — No. It's going to be going to A-10, but before you tie it down there, we'd like to disassemble one of the support arms shock strut assemblies at one point. Over.

08 03 40 10 CMP — Okay. Well, we're standing by to tie down as soon as we get the toolkit out.

08 03 40 15 CC — Roger.

08 03 40 45 LMP — Houston, what tools do you think we need, now?

08 03 40 48 CC — Foxtrot, the crescent wrench; Whiskey, the ratchet driver; and one, which is a socket. Over.

08 03 41 03 CC — Now, what we're planning on doing is - on the support arm that points in the - diagonally in the plus-X, minus-Z direction - we want you to remove the bolt at the joint between the support arm and the shock strut with F, W, and one - and then you're going to put the bolt back in the hole of

the support arm - We're reinstalling that finger tight, on that. Over.

08 03 41 32 CMP Okay. Well, that's in work.

08 03 41 35 CC And, of course, the reason for doing this is to get it out of the couch stroke envelope.

08 03 41 42 CMP Roger.

08 03 43 39 CDR Did you say you want the bolt and the nut back in the shock strut?

08 03 43 43 CC That's affirmative.

08 03 43 46 CDR Okay.

08 03 43 57 CC Al, this is Houston. Make that in the support arm part. Over.

08 03 44 06 CDR Okay.

08 03 44 25 CDR Okay, that is done.

08 03 44 28 CC Okay. Now using some of the LM webbing - we'd like you to tie the support arm and shock strut against the body of the probe to keep it from flapping. Over.

08 03 44 42 CDR Okay.

08 03 47 23 CC Apollo 14, this is Houston. We'd like to get OXYGEN tank 3 HEATERs to OFF now. 1 and 2, AUTO. Over.

08 03 47 33 CDR 3, OFF; 1 and 2, AUTO. Okay.

08 03 47 36 CC Roger. That's 1 and 2, AUTO. Over.

08 03 48 26 CC 14, Houston. Confirm OXYGEN tank 3 HEATERs, OFF. Over.

08 03 48 35 CDR Okay. We've got OXYGEN tank HEATER number 3, OFF. O-F-F. We have oxygen tank HEATERs number 1 and number 2, AUTO. A-U-T-O.

08 03 48 50 CC (Laughter) Roger, 14.

08 03 50 10 LMP — Okay, Houston. That step is complete now. The - the webbing has been used to tie down the support arm.

08 03 50 20 CC — Roger. Understand you've got the support arm and the shock strut tied down against the probe and the - the bolts back in the hole - the support arm, and are ready to press on with the lashing down. Over.

08 03 50 32 LMP — Roger. I suppose the next step is to tighten up the line going down to the A-10 island.

08 03 50 38 CC — Okay. That - triple-rope combination that came from A-6 and was looped or tied around the apex of the plus-X pointing pitch arm - then goes down to the plux-Z, plus-Y D-ring on the A-10 locker - tied there, and then up to the apex of the pitch arm which points in the minus-Z direction and from there it's going to go down to the minus-Z, plus-Y D-ring on A-10. We can take that a step at a time if you like.

08 03 51 23 LMP — Okay. This is the first rope you're talking about now, that comes up to the apex of the pitch arm and then goes down through the tiedown and A-10.

08 03 51 33 CC — Right.

08 03 51 34 LMP — And then where?

08 03 51 35 CC — And then it comes up to the apex of the pitch arm which points in the minus-Z direction and then back down to the other tie ring on the side of A-10. You're going to wind up with a - a rope that would look sort of M-shaped when viewed from the side. Over.

08 03 57 28 CDR — Okay. Rope number 1 is tied in M as in Minneapolis, Minnesota.

08 03 57 36 CC — Roger, Al. And that rope number 1 is the triple-rope combination. Is that correct?

08 03 57 45 CDR — That's the first of the - of the tripartite agreements.

08 03 57 49 CC — Say again, please?

08 03 57 51	CDR	That's the first party of the tripartite agreements.
08 03 57 56	CC	Okay. Then the other two parties have to follow suit, also. Over.
08 03 58 03	CDR	Okay. All three follows same path, huh?
08 03 58 05	CC	That's affirmative.
08 04 00 54	CC	14, this is Houston. If one of you is free - we'd like to start the VERB 49 maneuver to the optics calibration attitude, now. Over.
08 04 01 03	LMP	Okay, Houston. We'll get it going.
08 04 05 11	CDR	Okay, Houston. That's been completed. We have a triple pass now as described - in the shape of an M.
08 04 05 18	CC	Okay. Now, taking the fifth and last rope, we'd like you to double it, and tie one end of it to the minus-Z, plus-Y footpad of the A-5 locker. You'll then loop it around the probe head and tie it to the minus-Y, plus-Z D-ring on A-10. Over.
08 04 05 40	CDR	Okay.
08 04 06 07	CDR	Do you want this double or singled?
08 04 06 09	CC	It'll be a double strand. You can just double the rope up, and you can tie the bight of it around the minus-Z, plus-Y foot pad of A-5 and go on with the double strand from there.
08 04 06 22	CDR	Okay. Very good.
08 04 11 41	CDR	Okay, Houston. That step's complete.
08 04 11 46	CC	Okay, 14. That brings us to the end of the famous Apollo 14 probe stowage for reentry procedure. Who did the least work on stowing this? We'd like a quality control inspection, please. Over.
08 04 12 02	CDR	Everybody did 33 and one-third percent. You'll have to call 21 Nancy - in on this.

08 04 12 08 CC Roger. 21 Nancy. And the only outstanding items from this afternoon's efforts then are the final tying down of the 30-pound decontamination bag with contents on top of A-13, the 20-pound bag on top of A-8 and the CMP's PGA, with helmet on top of the 20-pound bag and then verifying 4 inches of clearance under the couch. We'll check with you on that tomorrow.

08 04 12 40 CDR Okay. We've got that.

08 04 12 43 CC Okay. That takes care of tying it down and I'm going to hand over to Gordon here and you can press on with the optics calibration and the - I guess you've got to get the P - the optics calibration and flight plan as normal. Over.

08 04 12 58 CDR Okay. Thank you very much. We're - That's a good stowage procedure. It's tight as can be here. We ought not to have any problems at all.

08 04 13 13 CC And you're in a suitable attitude to run the P52, also, which you probably ought to do prior to starting in the P23. Over.

08 04 13 23 CMP Roger.

08 04 17 50 CC Al, this is Houston. Over.

08 04 17 55 CDR Go ahead.

08 04 17 57 CC Al, if you have time - it'll take about a couple of minutes here, but I have a fairly lengthy question here regarding the circuit breaker configuration yesterday during the DTO. Is this a good time to do it?

08 04 18 17 CDR Okay. I'm not sure we can remember - but give us the question and we'll take a whack at it.

08 04 18 24 CC Okay. At the start of the high flow portion of the DTO, Bruce was on and he read up to you to pull the O_2 TANK's 3 50-WATT circuit breaker - HEATER circuit breaker. And you Rogered and we checked the transcript - but this call was made about an hour prior to actually starting the high flow - and then later when - after I came on -

during the low flow part of the DTO - I called - you went on a TANK 3 HEATER cycle - the heater TEMP hit the upper limit and we asked for the heater switch OFF. We asked you to check and you confirmed that the TANK 3 50-WATT breaker was in and that you must have missed it earlier. Now, the problem is - that the engineers who are analyzing the data from the - whole DTO are not sure where the circuit breaker was during the entire period of the DTO, and it really doesn't matter whether the circuit breaker was in or out, as long as we know where it was during the test. Can you tell us the history of the position of the breaker during the high flow portion? Was it ever pulled prior to my call on the temperature going out of limits - and if so - when was it pulled, and then when did it get put back in? Over.

08 04 19 44 LMP — Okay. This is Ed. I probably have the story better than anybody, and I'm not sure I have it. It was pulled when it was called to be pulled and Al and I both remember that - and it was noticed that it was back in - shortly before you called us and asked about it. I was over - Oh, when I did the O_2 - when I closed the O_2 ISOL AUX BATTERY switch - I saw at that time that the 50 1 HEATER was in and I vaguely remembered it should be out and yet it was in and that's when it was noticed. When it went in - I don't know, but it was definitely pulled on call and I was surprised to find it back in when I reconfigured after the test - and you called us shortly after that.

08 04 20 41 CC — Okay, Ed. If you'd stand by a minute, I'll see if they have any further questions to - to clarify.

08 04 21 32 CC — Ed, if we really have no further specific questions - just - unless you could maybe make a best guess as to whether that breaker was in or out during the high flow portion of the DTO.

08 04 21 48 LMP — Well, it - We started the high flow portion shortly after the time it was pulled, did we not?

08 04 21 56 CC I think - I checked on that, and they say it was about an hour, actually, of time gap in there.

08 04 22 08 LMP All right. Just a minute. We're talking here.

08 04 22 36 LMP Let us - take a look at the flight plan here and see if I can refresh my memory a little bit.

08 04 22 42 CC Okay, Ed. Don't expend an excessive amount of time on it, but if you think you can remember anything more about it, we'd appreciate it.

08 04 28 21 LMP Houston, Apollo 14.

08 04 28 25 CC Go ahead, Ed.

08 04 28 27 LMP Okay, Gordon. In reviewing the - all the events that seemed to have taken place as per flight plan about that time, it was opened as the first item at 167 hours - I believe. We had to boost up the three items ... of the page. And, as far as I can tell no one was in that particular area - or had any work in that area - to tell when we terminated the test an hour or so later. And my best guess is that it was probably closed inadvertently by myself or by one of the other two guys - probably by myself - about the time that we were setting the circuit breakers for the end of the test. I noticed it at that point, but I don't actually know when it was closed.

08 04 29 27 CC Okay, Ed. I think that's - that's good for our purposes. Thank you.

08 04 29 37 LMP Okay.

08 04 30 07 LMP Houston, 14.

08 04 30 09 CC Go ahead, Ed.

08 04 30 12 LMP Now, that we're talking about it - it is suppose to be open now, is it not?

08 04 30 16 CC That's affirmative. And your previous estimate of - of the time line there on the circuit breaker

tags up real well with the data. The - the engineers are pretty sure that that's exactly what happened.

08 04 39 35 IMP Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 04 30 40	CC	If you have your flight plan still in hand, I got a short update for page 270.
08 04 30 46	CDR	Stand by.
08 04 31 09	CDR	Okay. Go ahead.
08 04 31 11	CC	Okay. On the sixth or seventh line down from the top where it gives the dark-side photo attitude of 122, 270, and 0, change 122 to 125. And the high gain angles that follow are still okay. Over.
08 04 31 28	CDR	Okay. 125 and minus 59 and ... 90.
08 04 31 33	CC	That's affirmative. And then when the rates - when you damp the rates there, as per PTC procedure, we'll give you a GO when the rates are good for taking the photos.
08 04 31 47	CDR	Okay.
08 04 31 48	CC	That's it. Thank you.
08 04 34 03	CDR	Houston, 14.
08 04 34 08	CC	14, Houston. Go ahead.
08 04 34 11	CDR	Because of our bug with the - with the probe, it appears as though what we're going to do on this 23 is to skip the constraint stars, just mark on the first three, and then go directly from that into the Earth-darkside attitude. I still expect we may be 10 or 15 minutes late on that. Does that pose any problem to you all, if we do that way?
08 04 34 38	CC	Stand by 1, Al.
08 04 34 46	CC	That sounds like a good plan to us, Al. And there is no real-time criticality on the earthside dim-line photography. Over.
08 04 34 59	CDR	Okay. Good enough. We'll do it that way, then.
08 04 35 03	CC	Roger.
08 04 40 22	CC	Apollo 14, Houston.

08 04 40 26	CDR	Go ahead.
08 04 40 27	CC	Ah - -
08 04 40 28	CDR	Go ahead.
08 04 40 29	CC	The analyst for the P23 would like to see you shoot star number 4 also, just the one star of the three constraint stars. They're using that as a trend star, and this permits them to tie the data between the other P23s into this one a little better. There's no problem being late with the dark-side photography. Over.
08 04 41 04	CDR	Okay. Sounds good.
08 05 03 42	CC	Apollo 14, Houston.
08 05 03 49	LMP	Go ahead, Houston.
08 05 03 51	CC	Ed, if you'd pass this along to Stu. We noticed earlier today that he incorporated into the state vector the sightings on the constraint stars on earlier batches. We'd like to ask that he not incorporate his fourth star tonight into the state vector. Over.
08 05 04 09	LMP	Okay.
08 05 17 59	CMP	Houston, 14.
08 05 18 03	CC	Okay, Stu. Go ahead.
08 05 18 07	CMP	Okay, Gordon. These backup alinements over here at 198. As far as I know, there's no DTO or anything else associated with those; they were just put in - Because I wanted to try those. Why don't you talk it over there and consider about deleting those?
08 05 18 28	CC	Okay. I'll check on that.
08 05 18 58	CC	Stu, this is Houston. It's strictly your choice. Over.
08 05 19 03	CMP	Okay. I think I'll delete those this evening. It'll put us just about back on time for the - for the rest period.

08 05 19 14 CC Roger.

08 05 23 25 CC Apollo 14, Houston. I have a short update to the dim-light information.

08 05 23 33 CDR Roger. Stand by 1.

08 05 36 18 CC Apollo 14, Houston. The update that I have affects the info to be loaded in the P22 there. Over.

08 05 36 28 CMP Okay, Gordon. Go ahead.

08 05 36 30 CC Okay. Just under the landmark coordinates, change the longitude over 2 from minus 17.5 to minus 25.000. Over.

08 05 36 51 CMP Okay. Longitude over 2 to a minus 25.000.

08 05 36 55 CC That's affirmative.

08 05 38 19 CC Stu, this is Houston. G&C reports your rates look good to take those photos when you get to them.

08 05 38 28 CMP Okay.

08 05 42 11 CC Stu, Houston. A reminder to disable all the jets.

08 05 42 19 CMP Roger, Gordon. You know, I was looking at this attitude. You know, we're right over - With a big trunnion - it looks like there's a lot of glare. I suppose the sextant will be all right. It shoots by it, but I was wondering why the attitude was such where we had this large trunnion?

08 05 42 44 CC Stand by. I'll have to get an answer on that one.

08 05 42 49 CMP I mean, I'll go ahead and shoot it, but it's so far over that I can't really see any of the Earth crescent through the telescope.

08 05 42 58 CC Roger.

08 05 43 01 CC Stu, in answer to your question - Stand by 1.

08 05 43 26 CC Stu, in answer to your question, the attitude is designed to afford the maximum shading from the Sun on the optics as possible. And we'd like

you - wonder if you have looked through the sextant to verify that it - that they are boresighted on the Earth's - Earth dark side. Over.

08 05 43 46 CMP — Well, yes. It is. We still got that same scattered light problem, which we discussed on the way out. But - it's - it's off the terminator, sure enough, so if everybody's agreeable, we'll shoot it here.

08 05 44 11 CC — That's affirmative. They concur. They expected some scattered light and they'd like to go ahead and take the pictures as shown in the flight plan.

08 05 44 20 CMP — Okay.

08 05 53 01 CDR — Houston, 14. We've completed darkside photography now. We're going to start PTC.

08 05 53 07 CC — Roger, Al. And one item on - for the Surgeon here. He noticed, after the probe stowage exercise, your EKG data and Ed's ZPN data degraded to - useless actually; and we'd like you to check your external leads, and Ed to check his ZPN leads, and also where Ed's leads go into the transmitter box.

08 05 53 38 CDR — Okay.

08 05 53 40 CMP — Okay, Gordo.

08 05 57 25 CDR — How does the CDR look now, Houston?

08 05 57 31 CC — Al, yours looks good now.

08 05 57 37 CDR — Okay, one of my leads has a stripped thread so, it may or may not hold. Just keep me advised, and I'll tighten up from time to time.

08 05 57 49 CC — Okay, thank you.

08 05 57 56 CMP — Houston, 14.

08 05 57 58 CC — Go ahead.

08 05 58 00 CMP — Hey, Gordon, I don't want to make a big point out of it, but I just - broaden the education on this P23 here. I've been noticing, you know, except

for when we shot the Moon and we dropped that difference between the vectors down to about 30 miles, it's been running rather consistently 50 to 55 to 60. Do the P23 specialists or that - Is that the way they think it - it should be working?

08 05 58 29 CC Stand by. We'll get you an answer.

08 05 58 46 CC Stu, the answer to the question is yes. That's the way they think it ought to work.

08 05 58 54 CMP Okay; very good.

08 06 03 34 CMP Houston, 14.

08 06 03 36 CC Go ahead.

08 06 03 38 CMP Okay, would you like to copy the command module RCS TEMPs?

08 06 03 46 CC Roger; go ahead.

08 06 03 50 CMP Okay, systems test meter reading 5-C, 4.6; 5-Dog, 4.6; 6-Alfa, 4.4; 6-Bravo, 4.6; 6-Charlie, 4.5; 6-Dog, 4.5.

08 06 04 16 CC Okay, Stu, we got all of those.

08 06 04 20 CMP Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 06 11 44	CC	Apollo 14, Houston.
08 06 11 48	CDR	Go ahead.
08 06 11 49	CC	We're in a good attitude. We're also configured to take the presleep E-MOD at any time.
08 06 12 00	CDR	Okay, we'll spin up here shortly, and we'll give you a 74 right now.
08 06 12 05	CC	Roger.
08 06 12 11	CDR	You've got it.
08 06 12 45	CC	14, Houston.
08 06 12 49	CDR	Go ahead.
08 06 12 57	CC	The attitude I was referring to is for getting the dump. I think that - We'd just like to remind you to be sure to complete most of your dumps before spinning up. There's no hurry to go into PTC if you want to just sit in that attitude; there's no thermal problems. Over.
08 06 13 17	CDR	Oh, okay; I misunderstood you, Gordo.
08 07 23 30	MCC	Apollo 14, Houston.
08 07 23 38	CMP	Go ahead, Houston.
08 07 23 40	MCC	14, this is Gold Flight. Before you guys sign off for tonight, on behalf of all the guys on the Gold Team that have worked during this mission, we want to tip our hat to you for a super job; and we're looking forward to you getting back here to the ranch; and we'll talk about it over a cool one.
08 07 24 04	CMP	We - we thank you, Jerry. Al's not on the loop right now. We'll pass that on to him. But we sure appreciate the support. You all really do good work.
08 07 24 15	MCC	Well, thank you very much. We enjoyed it.

08 07 24 18 LMP Jerry, your guys really did a super job on PDI day. That was wonderful.

08 07 24 24 MCC Yes. We'll have to get together with the LM guys. Of course, they've already secured in their operations. But I agree with you. They and all their support people really hung in there and got up the answers that we needed.

08 07 24 39 LMP They sure did. It was a great show.

08 07 24 43 CMP Hey, hang loose for a minute, Jerry; Al's getting on a headset here.

08 07 25 10 CDR Jerry.

08 07 25 11 MCC Go ahead.

08 07 25 14 CDR Sorry, you caught me right in the middle of a drink of cof - cocoa.

08 07 25 19 MCC Sorry about that.

08 07 25 21 CDR You all - you all about to leave right now, huh?

08 07 25 23 CC Well, we'll be on for a few more hours. But we - This is our last shift; and then, Orange Team's going to pick it up; and then, you'll have Maroon for entry.

08 07 25 36 CDR Well, we'll be talking to you directly in a few days, but I sure do want to thank you for that superb job you did for us, especially down there around those low altitudes. Everything went real fine, and we appreciate your persistence that I know you had in getting that job done right. It's a hell of a thrill for us to work with you, Jer.

08 07 25 56 MCC Yes. We had a real ball at it, Al. We'll be looking forward to getting that cool one when you get back here.

08 07 26 01 CDR Sounds good, Jerry. Give my thanks to all the troups.

08 07 26 06 MCC Okay. Wilco.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 07 51 50	CMP	Houston, 14.
08 07 51 53	CC	Go ahead, 14.
08 07 52 12	CC	14, Houston. Go ahead.
08 07 52 18	CMP	Houston, do you read? 14.
08 07 52 20	CC	Roger. You're loud and clear now, Stu.
08 07 52 23	CMP	Okay. Do our rates still look good enough for spinup?
08 07 52 29	CC	That's affirmative. Rates are GO.
08 07 52 36	CMP	Oops. I just heard a - I just felt a thruster fire. Maybe we'll just set here for a minute, and you take a look at it.
08 07 52 43	CC	That was a roll jet, so that, shouldn't hurt anything.
08 07 52 48	CMP	Okay.
08 07 52 52	CC	And on the comm, you can go straight to OMNI mode. In the checklist there, select OMNI Bravo and mark the HIGH GAIN at minus 52, PITCH; and plus 270, YAW. Over.
08 07 53 14	LMP	Okay, Gordon. We'll do it.
08 07 53 17	CC	A couple of other items before we bid you good-night. The - your - Ed, your ZPN has showed no change so far, if you've had any chance to look at it. And we'd like to suggest one - -
08 07 53 31	LMP	What?
08 07 53 32	CC	Your ZPN data.
08 07 53 38	LMP	Okay. ...
08 07 53 43	CC	The - the other procedure we'd like to suggest - upon awakening in the morning - that will improve your L over D slightly. We'd like to ask you to

close the POTABLE TANK INLET valve, and that'll divert the water you use after you wake up to the waste tank and let the potable tank decrease, which will give us a hair better L over D; and, I guess, every little bit helps. Over.

08 07 54 15 LMP Okay. We understand.

08 07 54 17 CC Okay. That's to be done in the morning, not now.

08 07 54 23 LMP Roger. Understand.

08 07 54 25 CC And, of course, it will - -

08 07 54 27 CMP What - have you heard yet - have you heard an L over D figure being kicked around, Gordon?

08 07 54 34 CC Let me get one for you, Stu.

08 07 54 45 CC If - if you'd turn that tank valve off just before you start using water for breakfast, you should end up with an L over D of just shy of 0.28. Over.

08 07 55 01 CMP Okay. Copy 0.28, if we do the water bit.

08 07 55 06 CC Okay. And I think the only thing remaining is the onboard read-out. Standing by any time.

08 07 55 33 CMP Okay, Gordon. BAT C is 37.0; ... 7.3; 37.3. Get the RCS in a second - 58 for quad Delta; 57, quad Charlie; 55, quad Baker; and 59, quad Able.

08 07 56 06 CC Roger, Stu. We copy all those.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

REST PERIOD - NO COMMUNICATIONS

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 15 21 14	CC	Hello, 14; Houston.
08 15 21 43	LMP	Houston, Apollo 14. Good morning, Fredo.
08 15 21 47	CC	Good morning, Ed. Down the home stretch. I show you're about 55 grand out, now. I got a few things here for you, if you got a flight plan handy.
08 15 22 03	LMP	Okay. Let me get some lights on first, Fred.
08 15 22 07	CC	Okay.
08 15 23 25	LMP	Okay, Fredo; go ahead with your updates.
08 15 23 30	CC	Okay, first we got a consumables update; GET of 208 hours; 44.0; quad A, 44.9; B, 41.0; C, 45.7; and D, 44.4; H_2 tank 1, 30.7; and 2, 29.2; O_2 tank 1, 63.3; 2, 65.0; 3 is 10.9; and why don't you go ahead with that readback - if you want, Ed - first.
08 15 24 30	LMP	Okay. 208.00; 44, RCS total; quads, 44.9, 41.0, 45.7, 44.4; hydrogen, ...7, 29.2; oxygen, ..., ..., 10.9.
08 15 24 55	CC	Okay. Stand by 1.
08 15 25 18	CC	Okay, 14; how do you read now? We had to get the VOGAs off the line.
08 15 25 24	LMP	Okay. Loud and clear, Fredo.
08 15 25 26	CC	Yes, you're good now. Right to the left of the consumables update block, there's a VERB 29 maneuver to the optics CAL attitude at about 208:30; and your HIGH GAIN angles there should - should be PITCH, minus 73; and the YAW number there should be 102.
08 15 26 01	LMP	Okay. That's corrected. Thank you. 102.
08 15 26 05	CC	Okay - and let's see - we'd like the potty tank inlet valve to close, so we can get a little more water into the waste tank.

08 15 26 23	LMP	Okay, I'll do that right now.
08 15 28 11	CC	And, 14; Houston. You still there?
08 15 28 16	LMP	That's affirm, and the potty tank's closed off.
08 15 28 20	CC	Okay, Ed. Let's see. They'd like here the read-outs that you have there for the onboard PITCH and YAW S-band meters. And also the dials.
08 15 28 44	LMP	Okay - at this moment, you mean?
08 15 28 47	CC	That's affirm, Ed.
08 15 28 53	LMP	Yes. It looks like at this moment, they're setting at - plus 60 and 360. And the thumbwheels are sitting at minus 52 and 270.
08 15 29 15	CC	Okay, copied, Ed.
08 15 30 13	CC	And, 14; Houston.
08 15 30 22	LMP	Go ahead, Fred.
08 15 30 23	CC	Okay, we've got that number 3 tank down low enough now; so, hereafter - just in case you're wondering - we'll keep tanks - O_2 TANKs 1 and 2 in AUTO, and we'll leave TANK number 3, OFF, O-F-F.
08 15 30 42	LMP	Okay. That's my current configuration, and I understand it will stay that way.
08 15 30 47	CC	Roger, Ed. And we've got the torque angles okay.
08 15 30 56	LMP	Okay.
08 15 31 01	CC	And let's see, 14; one other note here they missed - says they missed getting a presleep medication report - and from that I assume you didn't have any medication. Is that correct?
08 15 31 15	LMP	That's a good assumption.
08 15 31 17	CC	Okay.
08 15 31 27	CC	Okay, 14. I've got one other thing which concerns verifying where you've got some stowage, and it's

not too time-critical - so, if you want to - go ahead and get cleaned up first and just give me a call when you want to talk about that.

08 15 31 44 LMP Okay.

08 15 31 50 LMP Got anything that's outstanding we owe you right now, Fredo - like checklist - -

08 15 31 56 CC No, I think we've got everything taken care of except finding out for sure where you got all the bags.

08 15 32 00 LMP Okay. Well, right now, we don't have them all - we don't have them all stowed, but we know exactly where we're going to put them, and we'll be starting that before long.

08 15 32 15 CC Okay.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 15 34 38	LMP	Houston, 14. Fredo, did you get the NOUN 93s pertaining to ...?
08 15 34 44	CC	That's affirm, 14. We got those.
08 15 34 48	LMP	Okay, the time we're using is 208:11:05.
08 15 34 51	CC	Roger; 208:11:05.
08 15 39 31	LMP	Houston, 14.
08 15 39 35	CC	Go ahead, 14.
08 15 39 38	LMP	Okay. Postsleep report. On sleep, Al and Stu had 4 hours each; I had 6. On the PRD, Al is 16062; Ed, 07060.
08 15 40 01	CC	Okay. Copied sleep report - or postsleep report; 4, 4, and 6 hours, with you getting the 6, and I copied the other numbers - dosimeters.
08 15 40 17	LMP	Roger. And I was the one on the headset, too.
08 15 40 42	CC	Hey, are you reading, Ed?
08 15 40 48	LMP	Go ahead.
08 15 40 51	CC	Hey, you can tell Stu I watched the press conference, and I hope he didn't let all the lunar fines out there.
08 15 41 01	LMP	He did a pretty good job of letting part of them.
08 15 41 05	CC	Yes, I could see that.
08 15 41 06	CMP	..., Fred?
08 15 41 10	LMP	We've got it all cleaned up now, though.
08 15 41 14	CC	Okay.
08 15 41 15	CMP	We don't have any dust in here, Fred. You can see that.
08 15 47 54	CC	And, 14; Houston. We'd like the high gain cranked up when you get at it there.

08 15 48 03	LMP	Okay, Fredo. Stand by 1.
08 15 48 33	CMP	And you got her, Fredo.
08 15 48 36	CC	Okay. Thank you.
08 16 27 06	CC	Not bad, Stu.
08 16 27 10	CMP	Well, I'm not sure whether it's good or bad, Fred. I think we probably need some update. That doesn't help me much.
08 16 27 27	CC	Well, Dave here says you're looking pretty close.
08 16 27 46	CC	Or maybe it's like the old saying, even the blind squirrel finds a nut, now and then.
08 16 27 55	CMP	Hey, you're just all heart this morning, Fredo.
08 16 28 05	CC	Didn't want you overconfident.
08 16 28 26	CC	And, Stu, Dave wonders if you want to proceed from here, maybe, and look at the DELTA-Vs and P37, and he'll compare with you.
08 16 28 39	CMP	Okay. We might try that, depending on the time here; still a little stowage I want to get on.
08 16 28 47	CC	Okay.
08 16 46 53	CC	14, Houston.
08 16 46 56	CDR	Go ahead.
08 16 46 58	CC	Hey, just thought Stu would be interested. After his last sets of marks there, we have his gamma, now, down to within about 0.05 degrees; and altitude, against ours, about - within 4/10ths of a mile.
08 16 47 18	CDR	I knew he would get a little bit better with his marks.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 17 07 24 LMP Houston, 14.

08 17 07 28 CC Go ahead, 14.

08 17 07 32 LMP Fredo, we're starting into getting these bags stowed in here. You said you had a storage update for us - ... we have.

08 17 07 42 CC I'm not sure it's an update, Ed. You may have already gotten the word, but there was a conflict in a note that RETRO had on one of them. And it indicated maybe you had put it in a different spot. And - -

08 17 08 00 LMP ... I don't know which one you're referring to, but go ahead and let's hear it.

08 17 08 08 CC Okay. I'll just read - there's only three items - three items; and one says that the 30-pound bag will be put on A-13, the 20-pound bag on A-8, and Stu's suit with the helmet and a sleeping bag will be on top of the - also on top of A-8.

08 17 08 39 LMP Okay. Stand by just a minute.

08 17 08 50 LMP Fredo, we were putting the 20-pounder on A-8 with the suit on top of it. Is that the way you want it now?

08 17 08 57 CC That's correct.

08 17 09 00 LMP Okay. That's the way we're going.

08 17 09 02 CC Very good.

08 17 20 09 CC 14, Houston.

08 17 20 12 LMP Go ahead, Houston.

08 17 20 15 CC Okay, Ed. Would you verify the H_2 FANS, OFF?

08 17 20 21 LMP Stand by, Fredo.

08 17 20 40 LMP Okay, they're OFF now.

08 17 20 42 CC Roger, Ed.

08 17 24 22	CC	14, Houston.
08 17 24 25	LMP	Go ahead, Fredo.
08 17 24 27	CC	Okay. You all can crank the carrousel up there anytime. And before you do, we'd like you to check the S-BAND PITCH knob at minus 40, YAW at 90, REACQ, and we'd like MEDIUM BEAM width now.
08 17 24 53	LMP	Okay. You want minus 40, 90, REACQ, and we're ready to spin up.
08 17 24 58	CC	Okay. And that was MEDIUM BEAM width, Ed.
08 17 25 02	LMP	Roger. MEDIUM BEAM width.
08 17 54 00	CC	14, Houston.
08 17 54 05	LMP	Go ahead, Houston.
08 17 54 07	CC	Okay. We won't be needing MCC-7.
08 17 54 13	LMP	Roger. Said no MC-7 - MCC-7. Thank you, Fredo.
08 17 54 17	CC	...
08 18 05 23	LMP	Houston, Apollo 14.
08 18 05 27	CC	Go ahead, 14.
08 18 05 31	LMP	Let me give you command module RCS injector valve TEMPs.
08 18 05 37	CC	Okay. Go ahead, Ed.
08 18 05 39	LMP	Okay. SYSTEMS TEST meter: 5 Charlie, 4.4; 5 Delta, 5.1; 6 Alfa, 4.5; Bravo, 4.4; Coco, 4.4; and Delta, 4.5.
08 18 05 58	CC	Okay. We've got them in.
08 18 32 08	LMP	Houston, Apollo 14.
08 18 32 11	CC	Go ahead, 14. Over.
08 18 32 15	LMP	Hello, Bruce. Say, I thought I'd try to make the surgeon happy for the last 4 or 5 hours in the flight. Have him check my biomed now, please.

08 18 32 22	CC	Roger, Ed. Understand you'd like a biomed-harness integrity and telemetry check. Over.
08 18 32 29	LMP	That's affirmative.
08 18 32 31	CC	Okay. We'll get them going on it.
08 18 35 31	CC	Apollo 14, this is Houston. The surgeon reports that they have good data on all crewmen, with the exception of Ed's respiration rate. The ZPN sensors are still not getting through on telemetry; however, don't worry about it at this time. They're happy with what they've got; and, medically, you're GO for entry. Over.
08 18 35 56	LMP	Okay. Well, I just replaced one sensor that had come loose. I thought maybe that was the one causing the problem.
08 18 36 03	CC	Okay. Right now, we're not getting your respiration rate. Which one did you - which one did you replace, Ed?
08 18 36 14	LMP	Actually, I replaced the top outer, not on the sternum, the one to the right.
08 18 36 23	CC	Okay. Understand the upper one on the right side of your chest, not on the sternum. Over.
08 18 36 29	LMP	That's affirm. And, on the respiration here, let's see if I can press them and get them coming in. Yes, tell them to watch it now.
08 18 36 41	CC	Okay. They're watching. All right.
08 18 37 46	CC	And, 14, this is Houston. When you select OMNI Charlie, would you give us a call, so that we can send you a COMMAND RESET? Over.
08 18 37 57	LMP	Okay. I was just getting ready to do that when you called. It's going in now.
08 18 38 00	CC	Roger. Thank you.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 18 41 18	CC	14, Ed; this is Houston. Over.
08 18 41 22	LMP	Go ahead, Houston.
08 18 41 23	CC	We have seen no change in your impedance pneumograph. We suspect that it may be a problem in the signal conditioner. And the Surgeons thank you for your efforts in attempting to restore the axillary leads, but suggest that you just leave it as is for entry and not bother with it any further. Over.
08 18 41 45	LMP	Okay, I was pulling and tugging, and I'm convinced the sensor and harness is okay, Bruce. So, I agree with you; it must be somewhere down stream.
08 18 41 54	CC	Roger; the feeling is that it's probably in the signal conditioner.
08 18 42 58	LMP	Okay, tell them not to worry. I'll hold my breath; and then, they'll know what the rate is.
08 18 43 04	CC	Say, that sounds like a pretty good plan. Give us a mark when you start holding; and then, we'll time from there.
08 18 43 12	LMP	Okay.
08 18 43 14	CC	Either that, or the Surgeons say that if - if you give us a mark when you start holding your breath, we'll give you a mark when the EKG goes flat. Over.
08 18 43 24	LMP	That's a fair enough exchange.
08 18 44 36	CC	14, Houston. The information that you sent us down on the systems test meter leads us to cancel the command module RCS preheat, as you probably surmised by now. We just wanted to make sure we were both on the same frequency. Over.
08 18 44 51	LMP	Okay, we concur. Thank you, Bruce.
08 18 56 55	CC	Apollo 14, Stu. This is Houston.
08 18 56 59	CMP	Go ahead.

08 18 57 00 CC — Roger. In looking at your NOUN 49 values, we're scratching our heads on the magnitude of the DELTA-R and the DELTA-V updates. Would you verify that - the first star, you were, in fact, using the far horizon; and on this one, you are using the near horizon. Over.

08 18 57 19 CMP — That's affirmative. I worried about that, too - at the size of them, Bruce. And I verify this one for sure on the near horizon; and you know, I'm 99 percent certain on - on the other one. I really didn't - I reshot and got that same large update, and thought it was pretty good, but I didn't see them taper down like they should have. I'm mystified, also.

08 18 57 45 CC — Okay. Well, we're not meaning to - to try and backseat drive. We're trying to figure it out for you, also; and we wanted to confirm that before we went too much further. Over.

08 18 57 55 CMP — Okay.

08 19 03 14 CC — Apollo 14, this is Houston. I have your reentry pad whenever you're ready to copy. Over.

08 19 03 40 LMP — Okay, Houston. Ready to copy.

08 19 03 43 CC — Roger. And would you confirm that star 23 was loaded in P23 this time? It looked like 22 as it went by us.

08 19 03 53 CMP — Roger; it was 22, Bruce. I went back on and checked that first star again, and I'm afraid that is the trouble - I shot the wrong horizon on the star 22.

08 19 04 26 CMP — And, Bruce, would you suggest that I shoot that over again? See if we can take that error out?

08 19 04 47 CC — Stu, this is Houston. Go ahead and shoot star 22 over again, and we'll have some more detailed word for you on the sequence after that in a minute.

08 19 04 57 CMP — Okay.

08 19 05 10 CC — And after reshooting star 22, Stu, you can press on to star 23; and there's no need to redo 64. Over.

08 19 05 19 CMP Okay.

08 19 05 24 CC And, Ed, if you're ready, I've got the entry pad.

08 19 05 29 LMP Okay. Let's copy.

08 19 05 31 CC Roger. Entry: mid-Pacific area; roll at .05g: 000, 154, 000; 216:10:47; 267; minus 27.02, minus 172.65; MAX g, 06.2; 36170, 6.39; 1140.2, 36251; RRT, 216:27:47; 00:29; NOUN 69 is NA; D_0, 4.00, 02:09; 00:18, 03:33, 08:07; sextant star, 30, 354.3, 30.7; boresight star, Nu Hydra, up 21.1, left 2.8, up lift vector. Comments: Use 1, nonexit EMS pattern; 2, Moon check, Moon in left of window: roll 000, 182, 000; 3, Moonset GET, 216 plus 25 plus 15. RET of 90,000 feet, 6 plus 29. Main deploy, 8 plus 54. Landing, 13 plus 52. Constant-g entry is roll right. GDC aline, 322, 325, 018. And for your information, the MSFN values of gamma at entry interface are minus 6.39, comparing with the navigated value prior to this last set of P23s of minus 6.42. The MSFN vacuum perigee, 20.6. Your onboard vacuum perigee, 20.1. And back under GDC aline, it's Sirius and Rigel for the stars. Read back. Over.

08 19 09 14 LMP Okay, Bruce, we have a MIDPAC landing at zero - Roll, pitch, and yaw: 000, 154, 000; 216:10:47; 267; minus 27.02, minus 172.65; MAX g is 06.2; 36170, 6.39; 1140.2, 36251; 216:27:47; 00:29; D_0 is 4.00, 02:09; 00:18, 03:33, 08:07; sextant star, 30, 354.3, 30.7; Nu Hydra, up 21.1, left 2.8, lift vector, up. Use nonexit EMS pattern.

08 19 10 30 LMP Okay, for the Moon-check attitude, it's in the left of the window; and we should be at roll 000, 182, 000; and Moonset is at 216:25:15. RRT of 90 K is 06:29; mains are 08:54; landing's at 13:52. For constant-g, roll right. GDC aline stars are Sirius and Rigel, with angles of 322, 325, 018. The MSFN entry gamma is minus 6.39. Onboard gamma, 6.42. H_p is 20.6 and 20.1.

08 19 11 20 CC Roger, 14. Readback correct. Out.

08 19 16 24 CC Apollo 14, this is Houston. Over.

08 19 16 29	CMP	Go ahead, Houston.
08 19 16 31	CC	After you have finished with this P23, Stu, we will uplink to you a new MSFN state vector for the CSM and load it into the LM state vector slot and leave it there until time to uplink you our final MSFN state vector, which will come about - come after your last set of P23s. And for your information, in the event that we should have communications problems, the CSM state vector that we read up to you in the pad yesterday would be acceptable for conducting an entry. Over.
08 19 17 17	CMP	Okay.
08 19 30 46	CC	...
08 19 31 45	CC	14, this is Houston.
08 19 31 48	LMP	Go ahead.
08 19 31 50	CC	After Stu finishes his marks on this last star, we'd like him to stand by for a possible rerun of star 22, in the present attitude and configuration; we also have to do a ground-tracking-station handover here, and we'll do that after he finishes marking on this star and advise you. Over.
08 19 32 15	LMP	Understand.
08 19 39 13	CC	14, this is Houston. If you'll give us POO and ACCEPT, we'd like to uplink to you a new CSM state vector for the LM slot. The - the desired orientation and entry LAT and LONG. Over.
08 19 39 28	LMP	You've got it.
08 19 39 29	CC	Okay.
08 19 46 53	CC	14, this is Houston. We have finished with the uplink. The computer's yours. Our recommendation on the P23 sightings is that you return to star 22 and take additional marks until you are satisfied with the magnitude of the DELTA-R, DELTA-V updates, or until we start running shy on time. It looks now like we can slip the initial P52 you have scheduled at 212 hours down to about 213 hours, since we have canceled midcourse 7. Over.

08 19 47 29	CMP	Okay, Bruce. Just keep shooting star 22, only.
08 19 47 33	CC	That's affirmative. The marks that you took that drove the state vector out were those derived from star 22, and I'm informed that the fastest way to bring your state vector back in would be to put in compensatory marks from the same general direction. Over.
08 19 47 52	CMP	Okay. We'll give it a go.
08 19 58 30	CC	14, this is Houston. We show your computed value of vacuum perigee coming down into agreement with the MSFN value at the rate of about 2 miles or so per mark on star 22. Over.
08 19 58 49	CMP	Yes, Bruce. The way I figure it, I've got about 16 marks to go.
08 19 58 53	CC	Well, we were going to say 10 marks to go, but we thought you'd figure we were being sarcastic.
08 19 59 01	CMP	No, I'm looking at VERB 83, and she's coming down about - well, it was 30 miles - down about 25 miles a mark.
08 19 59 17	CMP	You know, I could have already been through if I had a recycle on this program.
08 19 59 23	CC	Okay, I'll tell the MIN KEY boys about that.
08 20 13 57	CC	Apollo 14, this is Houston. Over.
08 20 14 01	CMP	Go ahead, Houston.
08 20 14 02	CC	Stu, we're showing your calculation of vacuum perigee coming down only about 1 mile per mark at the present time. We've got about 21 miles for the MSFN solutions and about 53 for yours. We suggest that you terminate the P23 marking routines at this time and press on for the flight plan. Over.
08 20 14 28	CMP	Okay. Sounds like a good winner.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 20 18 42	CC	14, Houston. We copy your torquing angles.
08 20 18 54	CMP	Okay, and torquing is 212:58:50.
08 20 19 14	MCC	I'd suggest you give them a call on it so you could [aside] - -
08 20 19 17	CMP	...
08 20 19 39	CC	14, this is Houston. Before torquing to the entry REFSMMAT, we recommend SCS - and check your LIMIT CYCLE switch, ON, please. Over.
08 20 19 50	CMP	Okay.
08 20 28 18	CC	Apollo 14, this is Houston.
08 20 28 49	CC	Apollo 14, this is Houston. Over.
08 20 28 52	CMP	Go ahead.
08 20 28 55	CC	Okay, 14. We hadn't planned on any sort of a complete or comprehensive newscast this morning - on your way in to entry, as we figured you'd probably get a pretty good briefing after splashdown. There is one item I'd like to read up to you, however, if you have a minute.
08 20 29 17	CDR	Okay, go ahead with that - and we'd also be interested in what the weather is in the recovery area when you finish.
08 20 29 23	CC	Okay, recovery area weather is about 1500 - or 2000 scattered, higher broken, winds from 100 degrees at 15 knots - the waves are - are two sets. You've got a batch of 2-foot waves with a 2-second period, and superimposed on them, you have some 4-foot waves with a 3-second period - and, in general, it looks pretty good. I can get some more details for you, if you're interested. Over.
08 20 29 53	CDR	Well, that's pretty good - unless it changes from that measurably, that sounds like it's not bad at all.

08 20 30 00 CC — Right. And we'll have an update for you on the weather as you get closer to interface. This one is dateline Los Angeles. "A powerful earthquake hit southern California at 8:01 central standard time today, causing two reported deaths, numerous injuries, and cracked buildings and highways. The jolting trembler was felt over at least 350 miles from Fresno to below the Mexican border. But damage was worse in Los Angeles and its heavily populated San Fernando Valley. The center of the shock was reported at 17 miles north of the valley in the rugged San Gabriel Mountains. Major damage is reported in the two closest towns of Newhall and Saugus, 35 miles northwest of downtown L.A. The magnitude of the shock was rated at between 6 and 6.5 on the Richter scale, which rates major quakes at 7 or more. It was the strongest quake in the Los Angeles area since the 1952 trembler at Tehachapi to the north, which had the magnitude of 7.2 and was strongly felt in L.A. It killed 13 persons. The San Francisco earthquake was 8.25." Over.

08 20 31 11 LMP — Well, looks like San Andreas is kicking up again.

08 21 07 10 CC — 14, this is Houston. Whenever it is convenient with you, we would like to press on with the logic sequence check and get that out of the way. And I understand that this 212 alarm is expected - as a consequence of the CMC self-check.

08 21 07 28 LMP — Roger. We'll give you a buzz when we're ready to move out.

08 21 07 33 CC — Roger.

08 21 09 47 LMP — Houston, on the logic sequences check, we're standing by for SECS LOGIC, on.

08 21 10 01 CC — Stand by, please, 14.

08 21 10 13 CC — 14, this is Houston. We show that the LOGIC power is on at the present time. Over.

08 21 10 24 CDR — That's affirmative - -

08 21 10 26 LMP — We're standing by - -

08 21 10 27 CDR — We're standing by at the present time.

08 21 10 28	LMP	Yes. We're standing by on the step SECS LOGIC, two on, up.
08 21 10 36	CC	Okay. That's what we show as already having been accomplished. What is the position of your SECS LOGIC switches? Over.
08 21 10 45	LMP	Okay. They are on, up. That was a cockpit error here. Okay, we're standing by for GO.
08 21 10 53	CC	Roger, Ed. Your system is in a good configuration. Do not arm the pyros at this time; however, you would be GO, if you had desired to. Over.
08 21 11 04	LMP	Roger.
08 21 43 34	LMP	Eight ...
08 21 43 39	CC	14, this is Houston. How do you read? Over.
08 21 43 42	LMP	Loud and clear, Houston.
08 21 43 44	CC	Roger; reading you the same.
08 21 58 24	CC	Torquing angles look good there, Stu.
08 21 58 28	CMP	Okay.
08 21 58 34	CDR	Okay, Houston. We'll be torquing at 214:38:45.
08 21 58 41	CC	Roger, Al.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 22 03 12	CC	Apollo 4 - Apollo 4 - Apollo 14, this is Houston. Over. Apollo 14, this is Houston. Over.
08 22 03 31	CDR	Go ahead, Houston.
08 22 03 33	CC	Roger, 14. We'd like to conduct the VHF SIMPLEX Alfa check at this time, if one of you can support it. Over.
08 22 03 52	LMP	This is Apollo 14, on VHF Alfa. How do you read?
08 22 03 56	CC	Okay, Ed. We're reading you loud with a - a little bit of garble. I understand you've turned off your S-BAND T/R, and you're coming at us VHF Alfa. Is that correct? Over.
08 22 04 06	LMP	... I was coming at you simo that time. And I'm coming out VHF Alfa.
08 22 04 12	CC	Roger. Standing by.
08 22 04 14	LMP	Houston, Apollo 14. How do you read VHF Alfa?
08 22 04 18	CC	Oh, loud and clear, VHF Alfa, Ed. How me?
08 22 04 22	LMP	You can cut it down a little bit, Bruce; it's readable.
08 22 04 40	CC	Okay. We're still over an hour - more likely, about an hour and 10 minutes out from the point we normally conduct the check, and chart is showing you about 17,000 miles out; so, I think it's a pretty good check. Over.
08 22 04 42	LMP	Very good.
08 22 11 28	CC	Apollo 14, this is Houston. Over.
08 22 11 31	LMP	Go ahead, Houston.
08 22 11 33	CC	If you're interested, I have an update on the weather for you. Over.
08 22 11 39	LMP	All right. Stand by. Okay, go ahead with your weather update.

08 22 11 44	CC	Roger. At your planned landing area, the general condition is good. You've got 2000 feet scattered, high broken, and 10-mile visibility. The wind is 120 degrees at 15. Wave height is 4 feet, with a southerly swell of 4 feet. The altimeter is 3006 or minus 128-foot pressure altitude. GMT computed for your landing is 21:05 on the ninth. Sunrise was at 17:15 in the night; sunset at 06:20:00 on the tenth. That's for your G&N target point; and over at the constant-g target point, there's really no significant change between the order at the two places. Your recovery forces standing by are the landing platform helicopter, New Orleans, which is 5 miles from the target point. Swim 1 and 2, SH-3 helicopters in the vicinity of the target point, and the ship Ponchatoula at the backup target point; it's an AO, oiler. Other support, you've got Photo 1 and Relay 1, and SH-3 helicopters in the vicinity of the target point that are providing photo and voice coverage, and Samoa Rescue 1 and 2, HC-130s that are about 45 minutes away. Over.
08 22 13 35	LMP	Okay, Houston. I believe I got all of that, and I hope to be in contact with the New Orleans then very soon.
08 22 13 44	CC	Roger.
08 22 17 26	CMP	And, Houston; 14. The EMS checks out real fine.
08 22 17 32	CC	Roger, Stu. Copy EMS entry check complete.
08 22 23 59	CC	14, this is Houston. If you could give us POO and ACCEPT, we have your final state vector uplink for you. Over.
08 22 24 11	CMP	Okay, Bruce. You've got it.
08 22 24 14	CC	Roger.
08 22 26 25	CC	14, Houston. We're through with the computer; the uplink's in, and you've got a MSFN state vector in both slots. Over.
08 22 26 32	CMP	Roger. Thank you, Bruce.
08 22 39 35	CC	Apollo 14, this is Houston. Over.

08 22 39 39	LMP	Go ahead, Houston.
08 22 39 41	CC	Okay, 14. I've got some changes to your entry pad. Over.
08 22 39 48	LMP	Okay. Go ahead, Houston.
08 22 39 52	CC	Okay. Under NOUN 60, gamma at 400,000 feet should be minus - should be 6.37 vice 6.39. I say again, 6.37. Over.
08 22 40 07	LMP	Understand; 6.37.
08 22 40 09	CC	EMS range-to-go should be 1138.1. Over.
08 22 40 18	LMP	EMS range-to-go, 1138.1.
08 22 40 22	CC	Okay. Time of V_{CIRC} is going to be 02:10. Over.
08 22 40 32	LMP	V_{CIRC}, 02:10.
08 22 40 35	CC	Time for ending blackout, 03:35. Over.
08 22 40 48	LMP	End of blackout at 03:35.
08 22 40 51	CC	Drogue, 08:05. Over.
08 22 40 58	LMP	08:05.
08 22 41 01	CC	90,000 feet, 6 plus 28; mains, 8 plus 53; and landing, 13 plus 51. That's knock 1 second off each of the last three. Over.
08 22 41 15	LMP	Understand; 1 second off the last three.
08 22 41 18	CC	Roger.
08 22 43 13	LMP	Houston, 14. We are planning on activating the RCS about minus 1 hour.
08 22 43 21	CC	Say again, 14.
08 22 43 25	LMP	We're planning on activating the command module RCS at about minus 1 hour.
08 22 43 30	CC	Roger. We copy.

08 22 46 26	CMP	Okay, Houston. The LOGIC is on, and we're standing by for a GO for PYRO ARM.
08 22 46 31	CC	Roger. We see the LOGIC on and stand by, please. Apollo 14, this is Houston. You are GO for PYRO ARM.
08 22 46 41	CMP	Roger, 14.
08 22 47 10	CMP	And we got both rings pressurized here.
08 22 47 14	CC	Roger, 14. Okay. Both rings look good from down here, 14.
08 22 47 27	CMP	Jolly good.
08 22 50 43	CC	Apollo 14, this is Houston. All your systems are looking good from down here, and you're in great shape for the entry. The - the carrier is 5 miles off the target point, so you can go ahead and land right at the target point. Over.
08 22 50 59	LMP	They're up-Sun, I hope, - so they'll get a good picture of us.
08 22 51 07	CDR	Thank you for your kind words. Everything looks good up here. We are pressing on.
08 22 53 34	LMP	Houston, stand by for a thruster test, ring 2.
08 22 53 37	CC	Roger. We're standing by, Ed.
08 22 54 36	CC	Okay. Ring 2 looked good to us.
08 22 54 41	LMP	Okay.
08 22 55 18	LMP	Okay, Houston. They're both good to us.
08 22 55 32	CC	14, this is Houston. We concur; both rings checked out good on the ground here, and we'd like to hold to the time line in the entry checklist as far as getting the batteries on, on the remainder of the events, go. Over.
08 22 55 45	LMP	Okay. Hold on the batteries, then.
08 22 55 48	CC	Roger.

08 23 19 51	CC	14, for your information, Samoa Rescue 1 and 2 are on station, and helicopters are in the air.
08 23 19 57	CDR	Sounds good, Bruce.

END OF TAPE

APOLLO 14 AIR-TO-GROUND VOICE TRANSCRIPTION

08 23 32 25	CDR	Houston, standing by for PYRO ARM.
08 23 32 30	CC	GO for PYRO ARM.
08 23 32 51	CDR	Okay. We've had separation, Houston.
08 23 32 54	CC	Roger.
08 23 40 38	CC	Apollo 14, this is Houston. Over.
08 23 41 15	CC	Apollo 14, Apollo 14; this is Houston. Say again; you're very weak. Over.
08 23 41 21	CDR	Okay, Houston; we have had good separation. We're back in plane, following the horizon down. Over.
08 23 41 28	CC	Roger; we copy you, now, loud and clear.
08 23 41 36	CC	And you're looking very good from down here, 14.
08 23 41 40	CDR	Okay. Everything's fine up here.
08 23 43 55	CC	14, this is Houston. We show you with 98.4 amp-hours left on the water, and that's 56 hours' endurance. Over.
08 23 44 04	CDR	Okay, 98.4 and 56. Thank you.
08 23 44 09	CC	Roger.
08 23 45 07	CMP	And moonset, Houston.
08 23 45 11	CC	Roger, Stu.
08 23 45 13	CMP	Yes, that was the real moonglow.
08 23 45 16	CC	Right about on time.
08 23 46 32	CC	Apollo 14, this is Houston through ARIA 2. How do you read? Over.
08 23 46 37	CMP	Loud and clear, Houston.
08 23 46 39	CC	Roger. Reading you the same, 14.
08 23 46 44	CMP	Okay, we're standing by for ARIA 2.

08 23 46 52 CC Roger. Out.

08 23 46 53 CDR And our thanks to the ARIA troops for the memento they sent before launch.

08 23 46 58 CC Okay, I'll pass it on to the rest of them. I'm sure some of them are monitoring the loop.

08 23 47 54 CC Okay, Apollo 14; it's about 8 seconds to beginning of blackout. We'll talk to you when you come out the other side. Over.

08 23 48 02 LMP Okay, Bruce.

08 23 48 03 CDR That sure sounds good.

08 23 48 12 MCC It's 2 seconds ...

08 23 51 24 CC Apollo 14, Apollo 14; this is Houston. How do you read? Over.

08 23 52 30 CC Apollo 14, Apollo 14; this is Houston through ARIA 3. How do you read? Over.

08 23 52 42 CDR 14; how do you read?

08 23 52 44 CC Okay, 14. You're coming in loud and a little bit of noise through ARIA 3. How'd it go?

08 23 52 51 CDR Pretty good. We're - *** ...

08 23 52 54 CMP Things are looking good, Bruce. CMS - CMC checking real well.

08 23 52 58 CC Good show, Stu. On television, looks like a beautiful day out there in the recovery area.

08 23 53 27 CC 14, Houston. Samoa Rescue 1 has S-band lock with you. Over.

08 23 53 33 CDR Thank you.

08 23 53 45 CDR We have 30 seconds ...

08 23 54 13 CC Okay, 6 plus 28, 14.

08 23 54 19 CDR Copy for ...

08 23 54 22	CC	Roger.
08 23 54 38	CDR	Houston; starting up.
08 23 54 51	LMP	Steam press pegged, 90 K.
08 23 55 00	CDR	Okay. In NOUN 57, I read 2704, 17269, 2704, 17269, ***
08 23 55 13	CC	Okay. We copy that, 14. You're looking real good.
08 23 55 18	CDR	And the altimeter's off the peg. Passing 50 K, Bruce.
08 23 55 23	CC	Roger. Passing 50.
08 23 56 09	CDR	Drogues are out.
08 23 56 11	CC	Okay, 14. We copy drogue deploy, and we'll turn you over to the recovery forces now. Have a happy landing.
08 23 56 19	CDR	Thank you, Bruce.
08 23 56 51	RELAY	New Orleans, Relay.
08 23 56 53	NEW	Relay; go.
08 23 56 54	RELAY	New Orleans, Relay. Visual, approximately 130; from the ship, approximately 5 miles; ... 92, relay on station overhead. ...
08 23 57 11	NEW	Roger. ...
08 23 57 17	R-1	Apollo 14, Apollo 14; this is Recovery, Recovery. Over.
08 23 57 32	P-1	And Photo acquisition.
08 23 57 36	CDR	Roger, Photo.
08 23 57 38	R-1	Apollo 14, Apollo 14; this is Recovery, Recovery. Over.
08 23 57 43	CDR	Roger. 14; we're reading you loud and clear.
08 23 57 53	CDR	Read you loud and clear, Recovery.

08 23 58 01	R-1	Apollo 14, Apollo 14; this is Recovery, Recovery, Recovery. ... visually. Reactivate recovery beacon. Out.
08 23 58 12	CDR	Roger.
08 23 58 26	NEW	Recovery, New Orleans requests ... voice report from Apollo 14. Over.
08 23 58 32	R-1	Right there. Wait 1. Apollo 14, Apollo 14; this is Recovery. Over.
08 23 58 41	AB	... Photo is about a mile short. All three chutes look good. Appear to be in good shape.
08 23 58 48	P-1	Photo. Roger.
08 23 58 53	R-1	Photo, this is Recovery. Do you have any ... transmission?
08 23 58 57	P-1	Negative, negative. Apollo 14, Apollo 14; Photo. Over.
08 23 59 04	LMP	PLSS off.
08 23 59 05	CDR	... switch in SECONDARY.
08 23 59 08	LMP	Roger. I'll remain ...
08 23 59 11	NEW	Apollo 14, New Orleans. Over.
08 23 59 19	R-1	Apollo 14, this is Recovery. Over.
08 23 59 33	R-1	Apollo 14, ***
09 00 00 14	CDR	Hous*** and we have completed dumping.
09 00 00 20	P-1	Photo; Roger.
09 00 00 21	CDR	And ... are at 148 radio at 4 and a half.
09 00 00 27	R-1	Roger. We hold you on radar.
09 00 00 28	CDR	Roger; Roger.
09 00 00 30	NEW	Apollo 14, Apollo 14; New Orleans. Over.
09 00 00 34	CDR	This is 14. Read you loud and clear.

09 00 00 36	R-1	Roger. Request crew status and position.
09 00 00 41	CDR	The crew is fine. We have completed the dump and the purge. We've run the checklist, and everybody's in good shape.
09 00 00 49	R-1	Roger. Request position.
09 00 01 04	R-1	Apollo 14, New Orleans requests computer read-out.
09 00 01 07	CDR	Okay; I give you 2701 and 17266; 2701, 17266.
09 00 01 14	R-1	We copy.

END OF TRANSCRIPTION