



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 14

LUNAR MODULE (LM)  
ONBOARD VOICE  
TRANSCRIPTION  
(U)

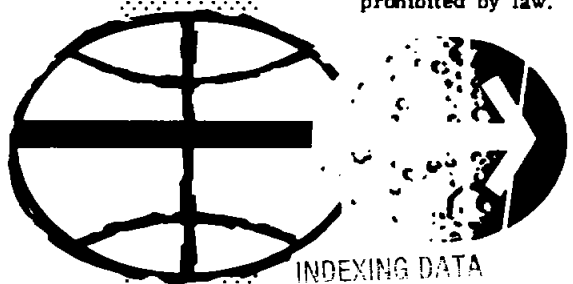
RECORDED ON THE  
LUNAR MODULE  
ONBOARD RECORDER  
DATA STORAGE EQUIPMENT  
ASSEMBLY (DSEA)

FEBRUARY 1971

GROUP 4  
Downgraded at 3-year  
intervals; declassified  
after 12 years

CLASSIFIED DOCUMENT - TITLE UNCLASSIFIED

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SECURITY CLASSIFICATION

The material contained herein has been transcribed into a working paper in order to facilitate review by interested MSC elements. This document, or portions thereof, may be declassified subject to the following guidelines:

Portions of this document will be classified CONFIDENTIAL, Group 4, to the extent that they: (1) define quantitative performance characteristics of the Apollo Spacecraft, (2) detail critical performance characteristics of Apollo crew systems and equipment, (3) provide technical details of significant launch vehicle malfunctions in actual flight or reveal actual launch trajectory data, (4) reveal medical data on flight crew members which can be considered privileged data, or (5) reveal other data which can be individually determined to require classification under the authority of the Apollo Program Security Classification Guide, SCG-11, Rev. 1, 1/1/66.

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## INTRODUCTION

This document is the transcription of the Apollo 14 flight crew communications recorded on the lunar module (LM) data storage equipment assembly (DSEA). After the multiplexed voice communications and mission elapsed time had been recorded on board the LM on a single track of the tape, the tape cassettes were transferred to the command module (CM) for the return to Earth. The cassettes were forwarded to NASA Manned Spacecraft Center, Houston, where mission elapsed time was converted to ground elapsed time for this document. Transcription of these tapes was managed by David M. Goldenbaum, Test Division, Apollo Spacecraft Program Office, to whom inquiries concerning this document should be referred.

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 34 14). 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 was updated to both the spacecraft and MCC computers but was not updated to the telemetry downlink pulse-code-modulated bitstream or other time-recording devices. This GET updating was performed only to correct significant changes in flight-plan time occurring as the result of midcourse corrections or spacecraft burn-time differences (trajectory dispersions).

Therefore, the Apollo elapsed time (the true mission-elapsed time) does not always agree with flight-plan and MCC times. Users of this transcript are cautioned to apply the appropriate time-update deltas for the updated periods.

In the text, a series of three dots (...) designates those portions of the communications that could not be transcribed because of garbling. One dash (-) indicates a speaker's pause or a self-interruption. Two dashes (- -) indicate an interruption by another speaker or a point at which a recording was abruptly terminated. A series of three asterisks (\*\*\*) indicates voice clipping caused by use of the voice-actuated (VOX) mode. Dashes in the time column indicate that the time could not be determined because of the use of the VOX mode.

The Apollo 14 mission was flown January 31 to February 9, 1971; lift-off occurred at 21:03:02 G.m.t. (04:03:02 p.m. e.s.t.) on January 31. The CM was designated Kitty Hawk and the LM was called Antares.

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Speakers in the transcript are identified as follows:

CDR	Commander	Alan B. (Al) Shepard, Jr.
CMP	Command module pilot	Stuart A. (Stu) Roosa
LMP	Lunar module pilot	Edgar D. (Ed) Mitchell
SC	Unidentifiable crewmember	
MS	Multiple speakers	
CC	Capsule communicator (CAP COMM)	

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## UNDOCKING PREPARATION TO POSTUNDOCKING

04 07 46 28 LMP - - ON, S-band.

04 07 46 36 CDR What the hell are we doing with that on there?

04 07 46 38 LMP What's that? Houston, I have you locked up on the steerable.

04 07 46 50 CC ...

04 07 46 57 CDR Okay, let me keep you on this, now.

04 07 46 59 CMP Okay.

04 07 47 03 CDR We might not get in there which-zillion times, but - -

04 07 47 09 LMP Ask him to hold off on it until you do.

04 07 47 13 CDR All right. Give me about 5 seconds, Stu. Need another 5 seconds.

04 07 47 17 CMP Okay. I'm showing 10. I'll make it 15.

04 07 47 21 CDR Okay. Good.

04 07 47 22 LMP Give me BIOMED, LEFT; PC\*\*\* HI.

04 07 47 28 CMP Okay. They're zero. Will you be ready to go at 5? Are you ready, Al?

04 07 47 34 CDR Okay. Ready.

04 07 47 35 LMP No.

04 07 47 36 CDR We're ready; go.

04 07 47 38 CMP Okay. Okay, you're moving out -

04 07 47 42 LMP We're clear - -

04 07 47 43 CDR No, we're not.

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04 07 47 44 CMP - - ... probe. We'll wait until ... damp here. Okay, we seem real steady. I'm going to back off from you.

04 07 47 57 CDR Okay.

04 07 47 58 CMP And we're free.

04 07 48 00 CDR Very good.

04 07 48 09 CDR Okay, we had a normal undocking, Houston. Okay.

04 07 48 17 LMP Okay. DEAD BAND, MIN; VERB 77; go to P00.

04 07 48 37 CDR Okay. We're in P00.

04 07 48 40 LMP Okay. Yaw left, 60; pitch up, 90.

04 07 48 43 CDR Okay, starting left yaw, Stu.

04 07 48 46 CMP Okay. Boy, you look mighty pretty out there.

04 07 48 54 CDR And starting the pitchup. Pitch up, 90.

04 07 49 04 LMP Yaw right, 60; yaw left, 60; pitch up, 90.

04 07 49 11 CC Antares, Houston. We've lost data on you, now. We'd like your - what you ended up with in NOUN 83.

04 07 49 21 LMP Roger. We ended up with - -

04 07 49 22 CDR Minus 0.1 - minus 0.1, 0.

04 07 49 25 LMP Plus 0.1, minus point - -

04 07 49 26 CDR Minus 0.1 - -

04 07 49 27 LMP Minus 0.1, plus 0.1, and 0.

04 07 49 29 CDR Shit. Try it again. Minus 0.1, minus 0.1, 0.

04 07 49 33 LMP Okay. Houston, you reading?

04 07 49 36 CC Go ahead.

04 07 49 37 LMP Minus 0.1, minus 0.1, and 0.

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04 07 49 44 CC Okay. Minus 0.1, minus 0.1, and 0.

04 07 50 03 LMP 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 17 LMP I'll give you LO bit rate, if you want it.

04 07 50 31 CC Okay, Antares. You can stay in HI.

04 07 50 35 LMP Roger.

04 07 50 47 CDR See them yet?

04 07 50 48 LMP Not yet.

04 07 50 55 CDR Ought to see them pretty soon.

04 07 51 00 CMP Okay, Al. You're around - you want me to verify your tracker light?

04 07 51 05 LMP Okay. There's your tracker.

04 07 51 07 CMP And it's loud and clear.

04 07 51 10 CDR Zero degrees and down.

04 07 51 12 LMP There he is. Okay, Stu, we have you; and I have the camera on; and you look mighty pretty out there.

04 07 51 29 CMP Okay, I've been taking a few shots of you, there.

04 07 51 34 CDR Okay, ...

04 07 51 40 LMP He's got it rate.

04 07 51 47 CDR Okay, where are we in the time line?

04 07 51 50 LMP Okay. We've got the VHF ANTENNA to FORWARD - Here, put it over here, so we can see it. We're in good shape.

04 07 52 06 CDR We'll be in good shape as soon as we can get these helmets and gloves off, here.

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04 07 52 12 LMP

Yes. Okay, we're right here. The TRACKING LIGHT's ON and OFF and verified; VHF ANTENNA is FORWARD. Turn the sequence camera off.

04 07 52 23 CDR

TAPE RECORDER, OFF.

04 07 52 24 LMP

TAPE RECORDER is OFF.

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PDI PREPARATION TO POSTTOUCHDOWN

04 11 43 38 CC -- noise, and drop the downlink - drop your  
downlink - -

04 11 43 43 CDR Okay. I'm ready for it.

04 11 43 44 CC - - ... so we can get it back in there.

04 11 43 46 LMP Okay.

04 11 43 50 CDR/LMP Okay.

04 11 43 51 LMP Let me - let me have the downlink.

04 11 43 52 CDR Okay. Here it comes.

04 11 44 00 LMP Okay.

04 11 44 01 CDR Is the tape - -

04 11 44 02 CC Antares, Houston. ...

04 11 44 03 CDR - - TAPE RECORDER, ON.

04 11 44 04 LMP Go ahead. It's ON. Let's go to VOX.

04 11 44 08 CDR AUDIO MODE, VOX.

04 11 44 09 CC ...

04 11 44 10 CDR Okay.

04 11 44 12 LMP Okay. I've got my downlink.

04 11 44 23 CDR Okay. Do your VERB 83 as soon as we complete here.

04 11 44 24 LMP Okay.

04 11 44 25 CDR Okay, how do you read in VOX, Houston?

04 11 44 27 LMP And how do you read Ed? ...

04 11 44 29 CDR Okay.

04 11 44 40 LMP Okay.

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04 11 44 41 CDR Okay, there's your VERB 83 coming up.

04 11 44 45 LMP Very good. That looks good; 317, looks good; 883, 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. \*\*\*96\*\*\*40 is the same.

04 11 45 26 CDR Right.

04 11 45 34 LMP Plus \*\*\*6963.

04 11 45 42 CDR 8254.

04 11 45 43 LMP 8254; plus 05428.

04 11 45 46 CDR Right.

04 11 45 47 LMP 05428.

04 11 45 49 CDR \*\*\*1; plus 00037.

04 11 45 55 LMP Plus 0037; 00037 ... - -

04 11 46 00 CDR Okay. \*\*\*2 minus - -

04 11 46 03 LMP \*\*\*2 minus -

04 11 46 05 CDR 00147.

04 11 46 08 LMP 00147; 62, minus 00147.

04 11 46 13 CDR Right. \*\*\*04.

04 11 46 16 LMP \*\*\*04.

04 11 46 17 CDR Minus 12345.

04 11 46 19 LMP Minus 12345. Okay. That's entered. Let me run back through them very quickly.

04 11 46 25 CDR Okay.

04 11 46 26 LMP \*\*\*31 read-out, 56963; that's good. \*\*\* read-out, 56963; that's good. \*\*\*254 read-out - Check me on these - plus 5 - 05428.

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[REDACTED]

04 11 46 42 CDR Go.

04 11 46 43 LMP 61 read-out, plus 00037.

04 11 46 50 CDR That looks good.

04 11 46 51 LMP 62 read-out, minus 00147.

04 11 46 54 CDR Okay.

04 11 46 55 LMP And 404 is a large negative number: 12345.

04 11 47 00 CDR Okay.

04 11 47 01 LMP Okay, let's press on.

04 11 47 09 CDR ... up on minus 10.

04 11 47 10 LMP Okay, we're a little ahead of time.

04 11 47 11 CDR Okay. I think, Houston, what we'll do just before we enter the final trim is to call you to get the \*\*\* set at that time. Do you concur?

04 11 47 40 CDR Okay, but we seem to be fairly successful at resetting by tapping; so, if it shows up prior to that time, then let us know.

04 11 47 50 LMP Let me read this: the limit set goes in. Ignition plus 26; MANUAL THROTTLE.

04 11 47 54 CDR ...

04 11 47 55 LMP And I'll put these other calls in just as quick as I can get them in.

04 11 48 10 CDR Yes, one right after the other. Okay, what's going on ...

04 11 48 11 CDR/LMP Go ahead.

04 11 48 13 LMP Okay, we'll get it - would have gotten it on our checklist, Fred. We're not quite there yet.

04 11 48 35 CDR Go ahead and change our DPS burn.

04 11 48 36 CC ...

[REDACTED]

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04 11 48 57 LMP Roger. 56978, CLEAR 231; plus 56978, ENTER.  
40\*\*\*5497\*\*\*, ENTER. Okay, Fred; they are in.

04 11 49 25 LMP AUTO COMMANDER, AUTO again.

04 11 49 40 CDR ... It went through ... down to ... pretty well  
... ABORT STAGE, RESET; DEAD BAND, MIN; ROT  
CONTROL, 3.

04 11 49 51 LMP Did you get your circuit breaker to gimbal ACT?

04 11 49 54 CDR Yes, they are all set.

04 11 49 56 LMP All right, let me check mine.

04 11 49 57 CDR I already checked yours.

04 11 49 58 LMP Okay.

04 11 50 04 CDR Okay. PGNS and PGNS AUTO and AGS AUTO. Our push-  
buttons are reset. A is in MIN.

04 11 50 31 LMP How far down are we on the DPS configuration card,  
now? Down to - -

04 11 50 35 CDR Here.

04 11 50 36 LMP Down to there. Okay.

04 11 50 39 CDR \*\*\* we're through with that card.

04 11 50 42 LMP Okay.

04 11 50 44 CDR Back on this one?

04 11 50 45 LMP Roger. We've got 10 minutes.

04 11 50 46 CC Standing by for the landing radar.

04 11 51 15 CDR I'm a little early here?

04 11 51 19 LMP Fred, if you're going to give me any words on the  
antenna operation, I'd appreciate them very soon.

04 11 51 36 LMP Okay. We're going with OMNIs. At 10 minutes,  
give me circuit breaker LANDING RADAR, closed;  
your ALTITUDE TRANSMITTER.

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04 11 51 47 CDR Okay. It's closed and the VELOCITY TRANSMITTER is reading 4.0, and the ALTITUDE TRANSMITTER is reading 4.0.

04 11 51 53 LMP Okay. Let's call P63.

04 11 51 56 CDR Let's do (humming).

04 11 52 22 LMP \*\*\* just about 1 second off. \*\*\* on. Timer's set. It's right on.

04 11 52 23 CDR Okay.

04 11 52 35 LMP Okay. We're looking for NOUN 63; go ahead.

04 11 52 48 CDR Okay, your DPS burn card is all complete.

04 11 53 28 LMP Go ahead, Fredo.

04 11 53 39 LMP Okay. If I hear it, I'll switch - -

04 11 53 41 CC ... call on it.

04 11 53 42 LMP Roger. If I hear it starting to break up, I'll switch it unless you'd rather I wait for the call. Okay.

04 11 53 58 CDR Okay, the FDAI \*\*\* 51.1 and about \*\*\*

04 11 54 17 CDR \*\*\* looks good. We'll zero the CDUs.

04 11 54 20 LMP Okay.

04 11 54 25 CDR \*\*\* zeros in.

04 11 54 26 LMP Roger. Standing by.

04 11 54 35 CDR \*\*\* zeros complete.

04 11 54 37 LMP Okay.

04 11 54 38 CDR 400 to plus 30000.

04 11 54 39 CDR It's entered.

04 11 54 41 CDR 410 to plus all zeros.

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04 11 54 48 LMP 410 to plus all zeros is entered.

04 11 54 50 CDR ... plus 10000.

04 11 54 52 LMP Plus 10000 is entered.

04 11 54 56 CDR ... We have needles?

04 11 54 57 LMP It went in and we have needles.

04 11 54 58 CDR You can read out 433 at your pleasure.

04 11 55 03 LMP Okay. 433, inertial velocity.

04 11 55 09 CDR Okay, we're sitting on final trim, waiting 4 minutes. \*\*\* VERB 21 NOUN 01, 1010 and 107 is your first call.

04 11 55 25 LMP Okay. \*\*\* got it there; I've got it here. Good enough.

04 11 55 45 CDR Okay. We're starting now with 96 on A and \*\*\*4 on B. \*\*\* good.

04 11 56 11 LMP Hey, Al, your RCS system looks \*\*\*

04 11 56 14 CDR ASCENT HELIUM 1 and 2 look good. B tank is still good, and the start tank is good.

04 11 56 24 LMP EPS system is good. ECS, all indications are normal.

04 11 56 29 CDR Okay.

04 11 56 31 LMP Ready.

04 11 56 35 CDR ... fortunate. A minute and 50 seconds away from final trim.

04 11 56 41 LMP Okay. \*\*\*

04 11 57 04 CDR Okay. We'll go into final trim 30 seconds early. It'll allow you to get that \*\*\* - get a final trim and then you can take it over.

04 11 57 22 LMP Okay. \*\*\*

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[REDACTED]

04 11 57 26 CDR Rather have me put it in?

04 11 57 27 LMP No. I've got it. I just wanted to adjust this lock - locking harness \*\*\* can still reach \*\*\*

04 11 57 37 LMP Oh?

04 11 57 40 CDR \*\*\* out of there.

04 11 57 41 LMP \*\*\* we're there, and we are.

04 11 57 48 CDR Ok\*\*\* you ready?

04 11 57 50 LMP I'm ready, ENTER.

04 11 57 53 CDR ENTER.

04 11 57 57 LMP Sure hope this thing comes up. And there it is.

04 11 58 09 CDR NOUN 62 VERB 21 NOUN 01, ENTER; 2010, ENTER; 207, ENTER.

04 11 58 12 LMP 2010, ENTER; 207, ENTER.

04 11 58 23 LMP Okay, Houston. It's in.

04 11 58 35 CDR And Antares is standing by for a PDI GO.

04 11 58 55 LMP Good show, Fredo. Thank you.

04 11 58 58 CDR Thank you; you troops did a nice job down there.

04 11 59 00 LMP That was beautiful.

04 11 59 09 CDR If your watch is reset, we'll flip the page.

04 11 59 13 LMP Okay. Let's go.

04 11 59 25 CDR Okay. All procedures are normal from here on in, except at 26, I actuate the manual throttle to full on my side.

04 11 59 32 LMP That's correct. I'll start reentering the - that's after you have throttled up.

04 11 59 37 CDR Okay.

[REDACTED]



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04 11 59 38 LMP Won't have guidance until after I give it to you - after the first \*\*\*kay. Have we covered everything on that last one?

04 11 59 53 CDR Yes, sir.

04 11 59 58 LMP At 10 feet per second, we \*\*\*

04 12 00 06 CDR You're breaking up to me. Would you run your SENSITIVITY up a little?

04 12 00 08 LMP Okay. SENS - VOX SENSITIVITY is full up.

04 12 00 11 CDR Okay.

04 12 00 23 CDR It's a beautiful day to land at Fra Mauro.

04 12 00 42 CDR \*\*\* MASTER ARM, ON, 30 seconds \*\*\* hit us again. Houston, the MASTER ARM is ON, and the A and B lights are on.

04 12 01 17 CDR \*\*\* quiet. Looks good.

04 12 01 26 LMP MARK, 1 minute.

04 12 01 29 CDR Okay. LANDING RADAR TEMPERATURE's coming up. Okay.

04 12 01 48 LMP We get the - the PRO?

04 12 01 49 CDR Yes.

04 12 01 50 LMP ... SENSITIVITY got bumped.

04 12 01 52 CDR Okay. Our DSKY's on time.

04 12 01 53 LMP ... lights.

04 12 01 56 LMP ARM to DESCENT.

04 12 01 58 CDR Average g is on. The descent engine is armed.

04 12 02 02 LMP And VELOCITY light?

04 12 02 03 CDR There's ALTITUDE and VELOCITY light. R<sub>3</sub> looks quiet.

04 12 02 11 LMP Okay, we're waiting for ullage - auto ullage.

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[REDACTED]

04 12 02 16 CDR R<sub>3</sub> looks good.

04 12 02 19 CDR/LMP Ullage -

04 12 02 20 CDR Auto ullage -

04 12 02 25 CDR PRO 4, 3, 2, 1, 0 -

04 12 02 27 LMP IGNITION.

04 12 02 28 CDR We have auto ignition.

04 12 02 30 LMP Okay, that - Good - good ignition.

04 12 02 33 CDR We have an auto ignition.

04 12 02 37 LMP Okay. ENGINE ARM OVERRIDE - ENGINE COMMAND OVERRIDE.

04 12 02 39 CDR Okay. And the MASTER ARM is OFF.

04 12 02 41 LMP All right. Standing by for 26.

04 12 02 43 CDR Okay. Let's take the throttle up at 26.

04 12 02 52 LMP \*\*\* up.

04 12 02 54 CDR Okay. We're at full throttle, Houston.

04 12 02 56 LMP The command is down. VERB 25 NOUN 7 \*\*\* 101.

04 12 03 07 CDR 1.7.

04 12 03 10 LMP \*\*\* ENTER; \*\*\* guidance. And you have commanded throttle.

04 12 03 17 CDR Okay. We have guidance.

04 12 03 21 LMP All right. I am disabling. VERB 25 NOUN 7 ENTER, 105 ENTER, 400 ENTER, ... ENTER. Okay, LANDING RADAR, ENABLE. VERB 21 NOUN 1 ENTER, 1010 ENTER, 77 ENTER. The landing radar is there. Al, you can reduce your throttle to minimum. You have - -

04 12 03 54 CDR Okay. Coming down.

04 12 03 55 LMP - - commanded thrust both ways. Houston, the procedure is complete.

[REDACTED]

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04 12 04 04 CDR And we're standing by for NOUN - and we're standing by for NOUN 69, as appropriate. Okay. I guess things are back to normal now, huh?

04 12 04 10 LMP Yes. Let's get off - -

04 12 04 28 CDR Plus - -

04 12 04 29 LMP 02 - no, 10 plus 02800.

04 12 04 40 CDR Okay, Houston, how does that look? You say it's in?

04 12 04 53 LMP Okay, give me a 2-minute-and-30-second hack, Al.

04 12 04 56 CDR ... mark.

04 12 04 58 LMP 2:30. And we're a little fast. About 10 feet per second. ... slow on H-dot, a little low. PGNS and AGS are within 2 foot per second. It looks good. It looks good.

04 12 05 17 CDR Okay, it's almost back on the track.

04 12 05 18 LMP Yes. Give it a 3-minute mark, again.

04 12 05 26 CDR All right.

04 12 05 28 CDR MARK; 3.

04 12 05 29 LMP MARK; 3. The -  $V_I$  is good.

04 12 05 34 CDR Okay; understand. GO at 3.

04 12 05 35 LMP H-dot is low. H is a little low. PGNS and AGS, \*\*\* foot-per-second difference.

04 12 05 44 CDR Okay. Still high on the AGS at the moment. Hey, do you want to get those ED BATs out of the way?

04 12 05 55 LMP No, I was going to wait and give them another 10 seconds here.

04 12 05 58 CDR \*\*\* the throttle convergence.

04 12 05 59 LMP Take a look at ED BATs.

04 12 06 09 CDR Okay, the throttle's converging. Looks nice.

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Day 5

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04 12 06 12 LMP Houston, my ED BATs are GO. All in the Green.  
\*\*\* that smooth ride.

04 12 06 23 CDR Yes, it's great. Guidance is good. Roger.

04 12 06 31 LMP \*\*\*  $V_I$  is good. H-dot still low. H is converg-  
ing. PGNS and AGS about 2 and a half foot apart.  
And at 32,000, we should be getting landing radar  
in very soon. Good. They're GO. And I will give  
an update at 12,000; there's little difference in  
them. Come on, radar; that's a lockon \*\*\* radar  
\*\*\* thousand \*\*\* have anything to get the radar in?

04 12 07 37 CDR Roger.

04 12 08 00 LMP 05:30. Still on profile. PGNS and AGS are about  
4 foot apart, now.

04 12 08 13 CDR Roger.

04 12 08 14 LMP Roger, Houston. We still have altitude and  
velocity lights.

04 12 08 22 CDR I'll bet they ... know that. Stand by for 6.

04 12 08 30 CDR MARK; 6.

04 12 08 31 LMP 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 40 CDR Okay.

04 12 08 47 LMP Cycle the LANDING RADAR breaker.

04 12 08 50 CDR Okay. It's cycled.

04 12 09 02 LMP Come on.

04 12 09 12 CDR Velocity light. VERB 57 ENTER. How does it  
look, Houston?

04 12 09 25 LMP \*\*\* to accept?

04 12 09 31 CDR Okay, PRO; ..., PRO. Great. Great. Whew, that  
was close.

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04 12 09 37 LMP Okay, I'll give you 07:30 mark, Al.

04 12 09 42 CC ... running.

04 12 09 43 CDR Okay, the throttledown was on time, essentially. And we're on DESCENT FUEL 2.

04 12 10 09 CDR Okay. Thank you. ... PGNS. You leave these - leave that up?

04 12 10 21 LMP 150; 13000. Roger. PGNS - AGS is updated. Okay, everything is looking good, Al. I'm starting the camera.

04 12 10 58 CDR \*\*\* seconds to go.

04 12 11 01 LMP How much?

04 12 11 03 CDR \*\*\* seconds to go.

04 12 11 11 LMP Okay, there's pitchover.

04 12 11 12 CDR 64; and we have pitchover, Houston.

04 12 11 13 LMP There's PRO. You have it?

04 12 11 15 CDR There's Cone Crater.

04 12 11 16 LMP Right on the money.

04 12 11 17 CDR And there it is!

04 12 11 18 CDR Right on the money!

04 12 11 19 LMP Hot damn! Right on the money!

04 12 11 20 CDR What's the LPD, babe?

04 12 11 21 LMP LPD, 41.

04 12 11 23 CDR Okay. Fat - fat as a goose.

04 12 11 27 LMP 41.

04 12 11 28 CDR Beautiful.

04 12 11 30 LMP Right out the window. Just like it should be.

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04 12 11 32 CDR Outstanding!

04 12 11 33 LMP Great!

04 12 11 35 CDR Okay, let's get in - back inside.

04 12 11 38 LMP Okay. Here we go.

04 12 11 39 CC ...

04 12 11 40 CDR Thank you, sir.

04 12 11 42 LMP 3000.

04 12 11 43 CDR Up next.

04 12 11 44 LMP You're out at 3000, Al. Seventy-five feet a second.

04 12 11 48 CDR Okay. That LPD is real good.

04 12 11 52 LMP Houston, I'm on AFT. \*\*\* 2000, 48 feet - -

04 12 11 57 CDR One click left.

04 12 11 59 LMP A little fast.

04 12 12 00 CDR One click left.

04 12 12 01 LMP 2000 feet a second. A little bit fast but not bad.

04 12 12 05 CDR Okay. Outstanding.

04 12 12 09 LMP Okay. 1500; too fast. Not bad. Coming in well. LPD's 40, Al. Going through a 1000 feet; 87 feet. Right on schedule. Right on schedule, now. Going by Cone Crater right outside to my right.

04 12 12 33 CDR Okay, the best spot is - oh, south of track about halfway between Triplet and Doublet. Go south of track.

04 12 12 41 LMP Okay.

04 12 12 42 CDR About 60 meters. That's where we're going.

04 12 12 43 LMP That looks good from here. Looks good from here. Okay, Al, you're through 550 feet.

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04 12 12 52 CDR Okay.

04 12 12 54 LMP Sixteen feet per second. 500 feet, 15 feet per second. It looks good. The fuel is good at 10 percent.

04 12 13 03 CDR Let's take it over and move up a little.

04 12 13 05 LMP Okay. Yes, I think so. You're through 340 feet.

04 12 13 08 CDR I'm ATT HOLD.

04 12 13 09 LMP Okay. I'd give - give it few clicks. You're through 200 feet - -

04 12 13 12 CDR Okay - - 5 feet per second. That looks good.

04 12 13 22 CDR ... level here.

04 12 13 24 LMP Nine percent fuel; looks great. Okay, looks like you're going right over the middle of Triplet. 170 feet, Al. Two feet per second down. Eight percent fuel. You're looking good.

04 12 13 41 CDR Okay.

04 12 13 42 LMP 170 feet and holding. About 1 foot per second down. Ought to pick - speed it up a little bit.

04 12 13 48 CDR Stand by to move forward.

04 12 13 50 LMP Okay. Seven percent fuel, and you're still at 170 feet indicated.

04 12 14 04 CDR Heading down.

04 12 14 06 LMP Okay, you can move on over. You're just barely crossing North Triplet, barely crossing North Triplet. Six percent fuel. Okay, 150 feet. There's DESCENT QUANTITY light.

04 12 14 10 CDR Okay.

04 12 14 25 LMP All right. And you can land over here. There's some dust, Al. 110 feet. Three feet per second down. You're looking great.

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04 12 14 28 CDR What percent?

04 12 14 29 LMP Six percent. There's good dust. On your own at - ...

04 12 14 39 CDR Starting down. Starting down.

04 12 14 41 LMP Okay. There's 90 feet; 12 feet per second; 5 feet per second down.

04 12 14 47 CDR Okay.

04 12 14 48 LMP ... down; looking great. Looking good.

04 12 14 50 CDR ...

04 12 14 53 LMP Okay. Fifty feet down; 50 feet.

04 12 14 56 CDR We're in good shape, troops.

04 12 14 57 LMP Three feet per second; 40 feet, 2 feet per second; 30.2 \*\*\* feet per second; looking great; 20 feet; 10; 2 feet per second.

04 12 15 09 LMP CONTACT, Al.

04 12 15 10 CDR \*\*\* stop. Great. Oh, AUTO, AUTO.

04 12 15 16 LMP We're on the surface.

04 12 15 17 CDR Okay. We made a good landing.

04 12 15 22 LMP 013, plus 10000. That was a beautiful one.

04 12 15 25 CDR Okay, we're slightly off. Kind of a slope, but other than that, we're in great shape; right on the landing site.

04 12 15 34 LMP Okay. Recycling the Parker valves. Okay. Closed, open, closed, open, open, open, open, open.

04 12 15 47 CDR ... HELIUM, REG 1, CLOSED. Talkback barber pole; and the OXIDIZER and FUEL VENTS are gray; MASTER ARM is ON; DES \*\*\* VENT, FIRE.

04 12 15 55 LMP Okay. MASTER ARM.

04 12 15 59 CDR ARM is OFF.

04 12 16 00 LMP Okay, [REDACTED]



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04 12 16 03 CDR And they are coming down.

04 12 16 04 LMP They're coming down.

04 12 16 05 CDR Okay.

04 12 16 06 LMP/CDR PROPELLANT TEMP/PRESS MONITOR ... ASCENT then DESCENT.

04 12 16 12 CDR Okay. ASCENT ... good; DESCENT 1 ... Okay, we're coming down on both.

04 12 16 20 LMP Okay. ASCENT HELIUM MONITOR cycle. ... monitor.

04 12 16 23 CDR Okay. ASCENT HELIUM 2; okay.

04 12 16 25 LMP Roger; thank you.

04 12 16 30 CDR ASCENT HELIUM 2 looks good. ASCENT HELIUM 1 looks good.

04 12 16 34 LMP Okay. Okay, O<sub>2</sub> QUANTITY MONITOR. I'll take a look at those - -

04 12 16 38 CDR Take a look at those babies.

04 12 16 41 LMP Okay, just like they did in orbit. ASCENT 2 is full. \*\*\* to DESCENT. All right. And the sequence camera is off.

04 12 17 07 LMP Okay, VHF A TRANSMITTER to VOICE. STAY for T<sub>1</sub>. So, I'll do a 414 - -

04 12 17 12 CDR Four, plus 20000.

04 12 17 13 LMP \*\*\* thousand and, oh, fourteen - 400 plus 4.

04 12 17 22 CDR 400 plus 40000.

04 12 17 28 LMP 014. Did I get that right? Houston, did I get a 414 plus 20000 in?

04 12 17 42 CDR Okay, 0.01.

04 12 17 44 LMP Okay.

04 12 17 49 CDR Okay, you're in NOUN 43s, Houston.

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04 12 17 58 LMP Yes, we are on a little slope, aren't we?

04 12 17 59 CDR Yes. That's the flattest place around here, though.

04 12 18 01 LMP What's that, about 8 degrees of roll we're in? An 8-degree slope.

04 12 18 11 LMP Let me copy those down. ..., Back on our book.

04 12 18 21 CDR \*\*\* reset.

04 12 18 24 LMP NOUN 40 - Hold it. No, you blew it up before I got a chance - -

04 12 18 27 CDR Minus 367.

04 12 18 29 LMP Pardon?

04 12 18 30 CDR Minus 367, minus 1751.

04 12 18 37 LMP 367. One, what?

04 12 18 41 CDR 1751.

04 12 18 43 LMP What was the altitude read-out? ...

04 12 18 46 CDR You want to give me the - everything from P12, please? ...

04 12 18 51 LMP Okay.  $T_2$ , 109.

04 12 19 00 CDR Plus 109.

04 12 19 03 LMP \*\*\*04.

04 12 19 04 CDR Plus 04.

04 12 19 07 LMP Plus 34.06.

04 12 19 10 CDR 34.06. I have 109:04:34.06.

04 12 19 15 LMP That looks good.

04 12 19 17 CDR Okay. How about how my NOUN 76?

04 12 19 25 LMP Okay, that's good. Let's go - go with the pad value, 55124.

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04 12 19 30 CDR Okay, VERB 25 ENTER, plus 55124; plus \*\*\* ENTER;  
\*\*\* ENTER.

04 12 19 44 LMP Okay.

04 12 19 46 CDR Okay.

04 12 19 47 LMP Oh, wait a minute. Now, 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 20 15 LMP Okay. Go as is. 411 plus 10000.

04 12 20 19 CDR ...

04 12 20 23 LMP \*\*\*11, plus 10000.

04 12 20 24 CDR Right.

04 12 20 25 CDR/LMP 410, plus zeros.

04 12 21 03 CDR DESCENT HELIUM - DESCENT OXIDIZER is about - -

04 12 21 13 LMP Roger, Roger. Thank you.

04 12 21 14 CDR Okay STAY for T<sub>2</sub>. TAPE RECORDER, OFF.

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## EVA-1 PLSS COMMUNICATIONS TO POST-EVA-1

04 16 27 23 CDR \*\*\* EVA.

04 16 27 24 LMP VHF ANTENNA, EVA.

04 16 27 26 CDR FUNCTION, ENABLE.

04 16 27 33 LMP Okay.

04 16 27 34 CDR FUNCTION, ENABLE.

04 16 27 36 LMP ENABLE.

04 16 27 37 CDR Okay. You collect - or connect to the PLSS comm ...  
AUDIO circuit breakers, here.

04 16 27 43 LMP Okay.

04 16 36 45 LMP Houston, this is Ed on Antares. How do you read?

04 16 36 58 CDR Okay. I can't - I can't hack this. My VHF  
switch is OFF.

04 16 37 02 LMP Pardon?

04 16 37 04 CDR My VHF switches are both OFF.

04 16 37 07 LMP What do you mean, your VHF switches are both OFF?

04 16 37 11 CDR They're both OFF ...

04 16 37 12 LMP You're coming through my side.

04 16 37 21 LMP Houston, this is Antares. How do you read?

04 16 37 49 LMP Houston, Antares. Over.

04 16 37 55 CDR VHF ANTENNA ... Okay.

04 16 38 09 LMP Houston, this is Antares. Over.

04 16 38 15 CDR Go ahead, VHF ...

04 16 38 17 CC Antares, this is Houston. Go ahead.

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04 16 38 19 LMP Okay, Bruce, I have you. We seem to have lost comm on the PLSSs. Let's get coordinated and try through it again. Over.

04 16 38 30 CC Roger.

04 16 38 31 LMP What do you suggest? We went through the check-list, 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 board. What is your present configuration?

04 16 38 48 LMP Well, I've come off of the PLSS comm and back on to the ship's comm. Al is still set up with his PLSS operating, and - -

04 16 39 00 CC ... reading?

04 16 39 03 LMP 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 13 CC Okay, I understand. You can talk to each other in A, B, and AR in the LM. 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.

04 16 39 31 CC And Al was still on the ship's comm.

04 16 39 33 LMP Okay. Let's see if that's correct.

04 16 39 41 CC Is Al in mode A at the present time?

04 16 39 43 LMP 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 12 LMP Okay. Sounds like it's your comm that's - The C - C transceiver that might be the problem. That's the one that sends it on out to Houston.

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[REDACTED]

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04 16 40 28 CDR

Yours went through A, huh?

04 16 40 31 LMP

Yes, we can talk to each other fine. And they're getting - well, wait though - They're - they're getting data from us, they said.

04 16 40 58 CC

Ed, this is Houston. We request that you return to the beginning of the PLSS comm check block, [REDACTED] on the EVA 1 card and

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04 16 42 37 LMP 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 49 LMP Okay. TV, closed. Okay. S-BAND T/R; ICS T/R.

04 16 42 55 CDR Wait a minute. I'll reverify it. Okay. S-BAND T/R.

04 16 43 02 LMP ICS T/R.

04 16 43 04 CDR ICS T/R.

04 16 43 05 LMP RELAY OFF.

04 16 43 06 CDR RELAY OFF.

04 16 43 07 LMP MODE, VOX.

04 16 43 09 CDR MODE, VOX.

04 16 43 10 LMP VOX SENS, max.

04 16 43 11 CC VOX SENS, max.

04 16 43 12 LMP VHF A, T/R.

04 16 43 14 CC VHF A, go ahead, T/R.

04 16 43 15 LMP VHF B, RECEIVE.

04 16 43 16 CC VHF B, RECEIVE.

04 16 43 18 LMP Okay. All right, Houston; we've verified the AUDIO - CDR's AUDIO panel.

04 16 43 27 CC Okay. LMP's AUDIO panel.

04 16 43 31 LMP T/R; RELAY ON. VOX - VOX SENS, max; T/R. Okay, Houston, how do you read, now? Houston, Ed; how do you read?

04 16 43 54 CC Ed, this is Houston. Over.

04 16 44 06 LMP Okay, Houston, reading you loud and clear. How me?

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[REDACTED]

04 16 44 17 LMP Houston, this is Antares; reading you loud and clear. How me?

04 16 44 24 CC Antares, Antares, this is Houston. Over.

04 16 44 35 LMP Okay, let me go back and reset the switches. Houston, this is Ed. How do you read, now?

04 16 45 09 LMP 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? \*\*\* Yes, but I don't - what he said when he - when the static came on the line. Before I went to RELAY. No, with RELAY ON, I was not reading him. I'm on ship's comm, so I shouldn't.

04 16 46 20 LMP Okay, Houston, how do you read now? Okay.

04 16 46 24 CC Go ahead.

04 16 46 27 LMP Okay. You wanted me to change the MODULATE switch to PM? Is that affirm?

04 16 46 41 LMP Okay. I'm at the point now of going back to the LMP's AUDIO panel. I will not transmit again until I get on PLSS comm. Over.

04 16 46 57 LMP 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 39 LMP Okay, Bruce. I think it has to do with the RELAY switch, as well. Let's ignore that and go on for the moment. ... of my keying.

04 16 48 25 LMP Houston, Antares.

04 16 48 36 LMP I think a lot of this noise is coming when I hit my - It seems simultaneous with my keying my umbilical.

04 16 48 56 LMP Okay, maybe it's only ... to us.

04 16 49 29 LMP I don't know what it is. They're trying to figure out what is wrong with our comm. They won't let me go on until they - this is ...

[REDACTED]



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04 16 49 59 LMP Okay, you're verifying your - your own configuration, is that affirm?

04 16 50 09 LMP Put your - put your antenna down before you break it off.

04 16 50 30 LMP ... looks great. Put it any place. \*\*\* Right now, we are only 20 minutes behind time.

04 16 51 39 LMP Go ahead.

04 16 52 04 LMP Okay. Stand by. Let me verify his configuration. Okay. You should be in AR. Okay, you're in AR. They are 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. 3, 2, 1.

04 16 52 31 LMP 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.

04 16 53 04 LMP Houston, Antares. Read you loud and clear. How me?

04 16 53 05 CC Antares, this is Houston. Do you read? Over.

04 16 53 14 LMP Houston, Antares. Loud and clear. How me?

04 16 53 16 CC Antares, this is Houston. Do you read? Over.

04 16 53 29 LMP 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 50 LMP 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 minor 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.

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04 16 54 45 LMP \*\*\* were you in VOX mode, for sure? That's a verify. He was in VOX mode, and I was reading his calls.

04 16 55 29 LMP \*\*\* It didn't look that big when we came over it.

04 16 56 16 LMP Go ahead, Bruce.

04 16 56 50 LMP Okay, we've got it. We'll reverse the LMP and the CDR's AUDIO panels.

04 16 57 03 LMP No, I'm still on LM comm.

04 16 57 19 LMP Bruce, don't you want to try communicating with Al, just with his RELAY ON, before I can - do anything else?

04 16 57 49 LMP Okay. Will do. Okay, Al. Set yours - T/R - T/R, RELAY ON. ..., RELAY ON.

04 16 57 59 CDR ON.

04 16 58 01 LMP MODE, VOX.

04 16 58 02 CDR MODE, VOX.

04 16 58 03 LMP VHF A, T/R; B, RECEIVE.

04 16 58 05 CDR VHF A, T/R; B, RECEIVE.

04 16 58 09 LMP Okay, and mine's going T/R, T/R, RELAY OFF; VOX - VOX in; A, T/R; B, RECEIVE. Okay. ... give them a call.

04 16 58 27 CDR Houston, this is Al. How do you read?

04 16 58 39 CDR Hcuston, this is Al. How do you read?

04 16 58 40 LMP They're reading you.

04 16 58 47 CDR They're reading me, but I'm not reading them?

04 16 58 57 LMP Houston, that's affirmative. Alfa and Bravo are OFF. I am reading you. Al does not seem to be. Give him another call.

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04 16 59 07 CDR Okay, Houston, this is Al. Testing, 1, 2, 3, 4, 5, 4, 3, 2, 1.

04 16 59 11 LMP \*\*\* with your VOLUME control?

04 16 59 22 LMP Okay, Bruce, give him a long count and let him - -

04 16 59 24 CC Al, this is Houston. Reading you loud and clear.

04 16 59 25 LMP - - give him a long count and let him try to adjust his volume and see if that's part of it.

04 16 59 35 CDR ... getting him now?

04 16 59 36 LMP Okay. Turn maximum, up. \*\*\* wheel.

04 16 59 51 CDR Both of them are turned to max volume, and I can't hear anything.

04 16 59 55 LMP Okay. Houston, he had full volume up and is not receiving you.

04 17 00 08 LMP Do you read me, Al? Or are you hearing me through here? Okay, he is not reading me. We're just talking in the cockpit.

04 17 00 25 CDR ... audio.

04 17 00 26 CDR ... read you.

04 17 00 27 LMP Go ahead.

04 17 00 34 LMP Comm in AR.

04 17 00 37 CDR I'm in AR.

04 17 00 38 LMP You're verified.

04 17 00 46 CDR OFF and back in AR.

04 17 01 05 LMP You've already cycled that wheel all the way, haven't you?

04 17 01 08 CDR Yes, it's all the way -

04 17 01 12 LMP Well, you cycled it all one way to the other?

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[REDACTED]

04 17 01 13 CDR Yes.

04 17 01 14 LMP Houston, we've already done that, and we still don't receive anything.

04 17 01 40 CDR Counterclockwise is thataway.

04 17 01 46 LMP As you look at it, counterclockwise? Right? As you'd look down on it, counterclockwise?

04 17 01 53 CDR Yes.

04 17 02 02 LMP Go ahead.

04 17 02 20 LMP Okay. Say again which one you want which.

04 17 02 34 LMP Okay. Al in Bravo. Me in Alfa. And we will try our comm check again.

04 17 02 47 LMP ... Houston, for that check. Observe - Do you still want the VHF A, VHF B, OFF, on the LMP panel?

04 17 03 12 LMP Understand that. You're in A, T/R and B, RECEIVE, right?

04 17 03 18 CDR Right.

04 17 03 19 LMP Okay. Let's - you go Bravo. I go Alfa.

04 17 03 24 CDR Okay. But ... not even on the PLSS.

04 17 03 26 LMP Pardon?

04 17 03 28 CDR \*\*\* not even \*\*\*

04 17 03 31 CDR I'm going to be in just a minute.

04 17 08 20 LMP \*\*\* trouble. I think that circuit breaker was out.

04 17 08 31 LMP Houston, this is Ed. How do you read?

04 17 08 37 CC Loud and clear, Ed.

04 17 08 40 LMP Check to make sure your AUDIO circuit breaker is in.

04 17 08 42 CDR Okay. It's in.

[REDACTED]

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04 17 08 47 CC Ed, this is Houston. Loud and clear.

04 17 08 49 LMP ...

04 17 09 00 LMP ... You go to B. I go to A.

04 17 09 03 CDR I'm B.

04 17 09 06 LMP Houston, this is Ed. How do you read?

04 17 09 07 CC Ed, this is Houston. Over.

04 17 09 11 LMP Houston, this is Ed. How do you read?

04 17 09 14 CC Ed, this is Houston. Loud and clear.

04 17 09 17 CDR This is Al. How do you read?

04 17 09 20 LMP Okay. Let's try once more.

04 17 09 23 CC Al, this is Houston. 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 29 LMP Let's go to AR, now.

04 17 09 30 CDR Let's go to AR. Reconfigure the panel \*\*\* Okay? Let's put your RELAY ON.

04 17 09 37 LMP No, no leave it - leave it right where it is. We were fine. Don't touch a thing.

04 17 09 40 CDR Okay.

04 17 09 41 LMP 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 49 LMP Roger. Loud and clear. Try Al.

04 17 09 52 CDR 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 00 CDR Loud and clear.

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[REDACTED]

04 17 10 02 LMP Okay. I think we got out - -

04 17 10 03 CC Hey, beautiful.

04 17 10 06 LMP 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 15 LMP 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 25 CDR Okay. Where are we in the great scheme of things?

04 17 10 33 LMP Okay.

04 17 10 34 CDR Right in through here.

04 17 10 36 LMP We've done all our comm checks.

04 17 10 41 CDR All right. Okay. We're - we're still in FM, are we not?

04 17 10 45 LMP Yes. We want to stay in FM.

04 17 10 47 CDR Okay.

04 17 10 49 LMP Circuit breakers in.

04 17 10 51 CDR Okay.

04 17 10 52 LMP Final systems prep.

04 17 10 54 CDR Okay. I'll read out for you. Panel 16, CABIN REPRESS, verified closed, circuit breakers.

04 17 11 01 LMP Okay. Go again.

04 17 11 03 CDR Verify CABIN REPRESS breaker is closed.

04 17 11 05 LMP Okay.

04 17 11 06 CDR SUIT FAN DELTA-P, open.

04 17 11 09 LMP SUIT FAN DELTA-P, open.

[REDACTED]

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04 17 11 10 CDR SUIT FAN 2, open.

04 17 11 12 LMP SUIT FAN 2, open.

04 17 11 13 CDR Okay, let's select SUIT FAN 2; I'll get it.

04 17 11 16 LMP Okay.

04 17 11 17 CDR And we got a MASTER ALARM. ...

04 17 11 22 LMP ...

04 17 11 23 CDR Is the WATER SEP COMP light on?

04 17 11 25 LMP It'll take a few minutes.

04 17 11 26 CDR Why don't you check and see if it's on?

04 17 11 33 LMP No, it's not on yet.

04 17 11 34 CDR Okay, it must be -

04 17 11 38 LMP Just take a little while for it to run down. Six or 7 minutes.

04 17 11 41 CDR Okay - Okay. SUIT GAS DIVERTER, PULL-EGRESS.

04 17 11 47 LMP Okay. PULL-EGRESS.

04 17 11 51 CDR CABIN GAS RETURN, EGRESS; CIRCUIT RELIEF, AUTO. Verify. I'll get them.

04 17 11 55 LMP Okay.

04 17 11 57 CDR RELIEF, AUTO.

04 17 12 00 LMP Stand by.

04 17 12 04 CDR CABIN GAS RETURN is EGRESS. Okay. Ready for the OPS hookup.

04 17 12 12 LMP Okay. OPS hookup.

04 17 12 16 CDR Go on, you first.

04 17 12 17 LMP Okay.

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04 17 12 20 CDR Unstow the O<sub>2</sub> actuator, if you'll bend over a little bit. ...

04 17 12 28 LMP No - Yes, it's on backup again. I'll put it down for you. Okay. ... get it to me?

04 17 12 34 CDR ... there we go.

04 17 12 35 LMP Uh-oh!

04 17 12 38 CDR Snapped up nice and clean on top.

04 17 12 47 CDR Okay, O<sub>2</sub> actuators unstowed and - Actuator to RCU.

04 17 13 16 CDR Okay. It is.

04 17 13 22 LMP Okay.

04 17 13 27 CDR Okay. SUIT ISOLATION, DISCONNECT. And disconnect the LM hoses.

04 17 13 33 LMP Okay, I'm hung up here on something.

04 17 13 39 CDR Okay.

04 17 13 40 LMP Let me get your antenna down before you break it. ... afraid of that.

04 17 13 55 CDR Okay, your LM hoses are off. And we'll let them hang down there.

04 17 14 02 LMP Okay.

04 17 14 03 CDR Okay. OPS O<sub>2</sub> hose to PGA.

04 17 14 12 LMP Okay.

04 17 14 23 LMP \*\*\* MASTER ALARM. Okay, that's the ECS system.

04 17 14 25 CDR Right.

04 17 14 27 LMP Okay. That's the O<sub>2</sub> ... H<sub>2</sub>O COMP light.

04 17 14 44 LMP Try it again. That bulky one.

04 17 14 50 CDR Okay, there it is. And you need the purge valve.

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**CONFIDENTIAL**

04 17 14 56 LMP Okay, purge valve.

04 17 14 58 CDR Okay, we've got the purge valve; it's closed, locked, and trimmed; and we're on low flow. Okay.

04 17 15 37 CDR Do you know where this thing ends up?

04 17 15 39 LMP Yes. ... back locked.

04 17 15 51 CDR Okay. Locked and LO ... PGA diverter valves to verter - valves to vertical. And repeat with thee.

04 17 16 08 LMP Okay. And, let's see, where was that? That's right there.

04 17 16 10 CDR Right there.

04 17 16 11 CC Ed, this is Houston.

04 17 16 14 LMP 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 your RELAY mode ON. Over.

04 17 16 26 LMP Your valve was loose. It came up - Stand by, Houston.

04 17 16 31 CDR Turn it on.

04 17 16 32 LMP Yes, but it - it hung up on the cover when it came up. It's still loose. Okay, that's - -

04 17 16 38 CDR Okay, the MASTER ALARM has been reset, Houston.

04 17 16 40 LMP Okay.

04 17 16 43 CC Okay, Al. Which AUDIO panel has the RELAY switch ON? Over.

04 17 16 49 CDR CDR's.

04 17 16 51 LMP Better stay that way because we've got a problem over - -

04 17 16 52 CC Roger. Out.

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04 17 16 53 LMP - - on that one. We do have two problems. The first one was right there - was that one; the second one was the other - was the cockpit error.

04 17 17 04 CDR Okay.

04 17 17 14 LMP Okay.

04 17 17 15 CDR Ready; let's connect these babies.

04 17 17 20 LMP Okay.

04 17 17 25 CDR (Yawn) Okay. Connect the OPS O<sub>2</sub> hose.

04 17 17 35 LMP Okay. OPS O<sub>2</sub>.

04 17 17 37 CDR PGA, blue to blue.

04 17 17 46 CDR And we have a purge valve.

04 17 17 47 LMP Okay.

04 17 17 48 CDR Lock, locked and verify LO. LO? Okay.

04 17 17 56 LMP Got LO. Okay. See where the apple is?

04 17 18 11 CDR Okay?

04 17 18 12 LMP Okay.

04 17 18 13 CDR ...

04 17 18 14 LMP Okay, get your DIVERTER valves vertical.

04 17 18 17 CDR They are.

04 17 18 18 LMP Okay. Great.

04 17 18 21 CDR ... champagne!

04 17 18 31 CDR (Laughter) Yes. All right.

04 17 18 35 LMP I think they put champagne instead of iodine in the LM water this time. Okay.

04 17 18 50 LMP Okay. Position the mikes. ... closed.

04 17 19 02 CDR Okay. Right down here. Both mikes are repositioned.

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04 17 19 04 LMP Okay. PLSS - -

04 17 19 06 CDR FAN, ON.

04 17 19 08 LMP ... get my helmet ... damn it.

04 17 19 24 CDR Okay?

04 17 19 26 LMP Okay. PLSS FAN, on. Right vent flag - right vent flag, cleared.

04 17 19 37 CDR Right vent flag is cleared. Tone is stopped.

04 17 19 39 LMP Okay, my tone is stopped. Okay. Don helmets.

04 17 19 44 CDR Okay.

04 17 20 21 CDR Okay. You're locked. And the LEVAs. Thank you. Is your drink bag positioned okay?

04 17 20 29 LMP I think I got a mouth full of microphone; I can't get a drink.

04 17 20 35 CDR You've got to put up with a few hardships.

04 17 20 39 LMP Right, I don't mind at all.

04 17 20 46 CDR Okay. I think that baby is about ready.

04 17 20 52 LMP Okay, let's snap it on.

04 17 20 59 CDR \*\*\* the drink port. Okay. I'll check my back.

04 17 21 20 CDR Houston, this is Al. Are you following us on the checklist now?

04 17 21 26 CC That's affirmative, Al.

04 17 21 27 CDR Okay.

04 17 21 37 CDR Okay, you're ready to go out and play in the snow.

04 17 21 42 LMP Yes, it looks like my snowsuit's ready.

04 17 21 46 CDR Okay.

04 17 21 49 LMP ... do the same for you.

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[REDACTED]

04 17 21 51 CDR Okay.

04 17 21 56 LMP You got your comm carrier cable like you want it?

04 17 22 00 CDR Yes.

04 17 22 24 CDR Okay, helmet's on.

04 17 22 26 LMP Okay.

04 17 22 29 CDR Bag's okay. Install LEVA (singing).

04 17 23 05 LMP Okay. Your LEVA's on.

04 17 23 06 CDR Get the back.

04 17 23 07 LMP I'll get the back, just a second.

04 17 23 11 CDR I'll get this tucked down, right there.

04 17 23 36 LMP Okay. Let me look back there, Al. I'm afraid to trust it without looking. Okay.

04 17 23 39 CDR Okay. The LEVAs are both on.

04 17 23 42 LMP Okay.

04 17 23 43 CDR The LCG is as required.

04 17 23 46 LMP There's somewhere we missed something. You didn't go back and do that twice.

04 17 23 54 CDR What? The OPS connect?

04 17 23 59 LMP Yes. We connected one, but we didn't recycle. Did we?

04 17 24 05 CDR Yes; yes, we did.

04 17 24 06 LMP You've still got some Irish pennants floating loose here.

04 17 24 10 CDR This isn't installed yet.

04 17 24 12 LMP It was installed a minute ago. Put it back on you.

[REDACTED]

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04 17 24 29 LMP Okay, it's locked now. Must not have had it locked before. Oh - No, we triggered it when we were getting your spacesuit on.

04 17 24 39 CDR Okay.

04 17 24 42 LMP Okay. Yes, that's good.

04 17 24 44 CDR Okay.

04 17 24 51 LMP Okay, we're ready to go LCG, COLD, to ...

04 17 24 55 CDR No, leave the LCG.

04 17 24 58 LMP Huh?

04 17 24 59 CDR I disconnected, so let's leave the LCG control as it is.

04 17 25 03 LMP Okay.

04 17 25 04 CDR And we can open up the LCG PUMP circuit breaker on your circuit breaker panel. And -

04 17 25 12 LMP Okay, the LCG PUMP is open.

04 17 25 14 CDR Okay. You can take off your LM water hose.

04 17 25 21 LMP And connect the PLSS water hose. And get the umbilical out the way, also.

04 17 25 42 CDR ... here to get this - Get this ...

04 17 26 02 CDR ... Lean forward a little bit, Ed. Okay. Hold it.

04 17 26 11 LMP Okay. Got it.

04 17 26 36 LMP Okay.

04 17 26 38 CDR Okay. Is your water hose in?

04 17 26 42 LMP Yes, they're all connected.

04 17 26 43 CDR Okay. Let me read while you verify. Helmet and visor, alined and adjusted.

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[REDACTED]

04 17 26 49 LMP Okay.

04 17 26 50 CDR Torso tiedown. Adjusted. Three oxygen connectors locked.

04 17 26 59 LMP Okay.

04 17 27 01 CDR Three oxygen connectors locked.

04 17 27 04 LMP Okay, two, three, and lock, locked.

04 17 27 08 CDR Okay. One purge valve, locked.

04 17 27 10 LMP Purge valve, locked.

04 17 27 11 CDR Check the water connector.

04 17 27 15 LMP Locked.

04 17 27 16 CDR Okay, and the comm connector.

04 17 27 20 LMP It's locked.

04 17 27 21 CDR Okay. Read for me.

04 17 27 22 LMP Okay. Helmet and visor.

04 17 27 26 CDR Okay, and the LEVA.

04 17 27 28 LMP And torso tiedown.

04 17 27 33 CDR See all your flags?

04 17 27 35 LMP Yes.

04 17 27 38 CDR Okay, that's locked. Okay.

04 17 27 41 LMP Okay, O<sub>2</sub> connectors.

04 17 27 42 CDR One there, red; one there, blue; locked. One there, blue, locked. Okay.

04 17 27 47 LMP Purge valve 1.

04 17 27 49 CDR Purge valve, on and locked.

04 17 27 50 LMP Water connector.

[REDACTED]

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04 17 27 52 CDR Water connector is on and locked.

04 17 27 54 LMP Comm connector.

04 17 27 56 CDR Comm connector is on and locked.

04 17 28 02 LMP Okay.

04 17 28 04 CDR Okay, verify EVA circuit breaker configuration.

04 17 28 09 LMP Okay, let's go circuit breakers.

04 17 28 26 CDR In ...

04 17 29 16 CDR Okay. Circuit breakers are configured here.

04 17 29 19 LMP Okay, I verify no fog on the right-hand window. You can tie the jettison bag.

04 17 29 22 CDR Okay.

04 17 30 08 LMP Yes. I wish we had more room to move around.

04 17 30 12 CDR Okay.

04 17 30 13 LMP Okay, we can don EV gloves.

04 17 32 53 LMP Okay. Verify your wrist locks and your glove straps. Oops, you're not on yet.

04 17 33 04 CDR Not quite.

04 17 33 10 LMP Strap.

04 17 33 12 CDR No, that's the armrest.

04 17 33 19 LMP We'll get it in a minute.

04 17 33 32 CDR Okay. My gloves are on and the straps are adjusted.

04 17 33 38 LMP Okay.

04 17 33 47 CDR Okay.

04 17 33 48 LMP Okay. Now, let's go PLSS DIVERTER to MINIMUM.

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04 17 33 58 CDR Okay. PLSS DIVERTER, up.

04 17 34 00 LMP Verify it's MINIMUM.

04 17 34 01 CDR MINIMUM.

04 17 34 02 LMP Turn you PUMP, ON - that's to the right.

04 17 34 05 CDR 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, O<sub>2</sub>, ON. PLSS, O<sub>2</sub>, ON. Okay, O<sub>2</sub> flag. ... Pressure gage is coming up.

04 17 34 30 CDR PRESS flag clear, 3.2.

04 17 34 43 CDR O<sub>2</sub> flag clear, 3.7. Okay, are you ready for the 1-minute check?

04 17 34 54 LMP I'm not reading you. Okay, try it.

04 17 34 59 CDR Okay, do you read me now?

04 17 35 00 LMP Yes. Okay (laughter). I was reading you.

04 17 35 05 CDR Yes. Okay. Okay, you ready to bring PLSS O<sub>2</sub>, OFF?

04 17 35 12 LMP Okay, where are we?

04 17 35 14 CDR We'll do it at 20. Coming OFF. Watch it - gage decay.

04 17 35 22 LMP Okay. My O<sub>2</sub> is OFF.

04 17 36 18 CDR Okay, Houston, we're 1 minute. Both suits are tight. PLSS O<sub>2</sub> 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 you watch - -

04 17 36 47 CDR Okay.

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04 17 36 48 CC - - at the second DEPRESS.

04 17 36 50 CDR Okay. Circuit breaker CABIN REPRESS, open.

04 17 36 54 LMP It's - open now.

04 17 36 59 CDR CABIN REPRESS valve, CLOSE.

04 17 37 08 LMP CLOSE now.

04 17 37 09 CDR Okay. And let's take the - -

04 17 37 20 LMP No, let's get the overhead. I think it would be easier, don't you?

04 17 37 23 CDR I can get the forward one.

04 17 37 26 LMP Okay.

04 17 37 27 CDR I'll go down and get that. Let me know when it's to 3.5.

04 17 37 37 LMP Okay. I think I'm going to be in your way.

04 17 37 44 CDR No, I'm all right.

04 17 37 45 LMP Got it?

04 17 37 46 LMP Okay. Drop her on down.

04 17 37 47 CDR Really. Really.

04 17 37 50 LMP Wait a minute. Get the latch out of the way.

04 17 37 53 CDR I - There we go. Here we come.

04 17 38 03 LMP Okay. Down through 4.5. Through 4.

04 17 38 10 CDR There's 3.5.

04 17 38 11 LMP No, not quite; bring her on down. There's 3.5 and holding.

04 17 38 21 LMP Okay.

04 17 38 24 CDR I've got 4.9.

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[REDACTED]

04 17 38 27 LMP 4.85 and holding.

04 17 38 29 CDR Okay.

04 17 38 30 LMP Okay. Cabin's at 3.5.

04 17 38 33 CDR Cabin suit circuit.

04 17 38 34 LMP Is at 4.5.

04 17 38 37 CDR Okay.

04 17 38 38 LMP PGA is 4 8 and coming on down. Houston, we are ready to start our watches.

04 17 38 45 CC Give us a mark.

04 17 38 51 CDR Okay; 3, 2, 1 -

04 17 38 54 CDR MARK it. We're off and running. Time zero.

04 17 38 58 LMP Okay. Over here - let's see, FORWARD DUMP valve, OPEN now.

04 17 39 03 CDR Okay. I'm going to dump. And there's the tone.

04 17 39 31 LMP Tone on; water flag, A.

04 17 39 33 CDR Water flag, A.

04 17 39 39 LMP Five pounds pressure. \*\*\* 0.6 pounds in the cabin, \*\*\* half a pound in the cabin. You might be able to get the door open partly.

04 17 40 04 CDR Yes.

04 17 40 06 LMP Better let her drop a little more. It's a pretty heavy pull there.

04 17 40 17 CC You got a lot of surface area on that hatch.

04 17 40 20 LMP Yes. Okay, there's a quarter of a pound. Still tight, huh? Let her drop. Rest a minute. Let her drop.

04 17 40 36 LMP Okay. It should be almost zero now.

[REDACTED]

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04 17 40 44 CC We're showing a 10th of a pound right now.

04 17 40 49 LMP There it comes. Okay. Final PREP. PLSS FEED -  
PLSS FEEDWATER.

04 17 41 03 CDR Would you hold it for me, please?

04 17 41 04 LMP Yes, I got it.

04 17 41 06 CDR Thank you.

04 17 41 07 LMP Okay -

04 17 41 08 CDR I can get it now.

04 17 41 10 LMP Straight - straighten up.

04 17 41 11 CDR ... There we go.

04 17 41 13 LMP Okay. PLSS FEEDWATER, OPEN.

04 17 41 27 LMP Okay. We're waiting for the water flag.

04 17 43 37 CDR \*\*\* don't have the PREAMPs or the ECS caution  
lights.

04 17 43 42 LMP No, they're on.

04 17 43 44 CDR Are they?

04 17 43 45 LMP Yes.

04 17 43 46 CDR Oh, I see. You've got them on DIM. Okay.

04 17 43 52 LMP Okay. ... be getting a water flag clear here in  
a minute.

04 17 44 03 LMP Okay, my PGA is getting down to about usable  
pressure of 4.3 now. What's yours now?

04 17 44 11 CDR Okay. Reading 4.2.

04 17 44 13 LMP We ought to be able to work in a minute. Okay.  
The present warning status is good. We have a  
WATER SEP light, PREAMPS, ECS.

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04 17 44 50 CC Ed, this is Houston. We're showing your feed-water pressure going up. You ought to be in business shortly.

04 17 44 55 LMP Roger. Water pressure - water flag just cleared. That's great.

04 17 45 06 CDR You know, it's amazing.

04 17 45 09 LMP How's yours, Al? Your water flag about to clear?

04 17 45 11 CDR Don't know, it's still up there. No. There, it's gone.

04 17 45 14 CC Al's pressure is rising now; it ought to clear momentarily.

04 17 45 18 CDR Okay, Al's water flag is clear.

04 17 45 19 LMP Okay. Now we know what it all means.

04 17 45 22 CC Beautiful.

04 17 45 31 CDR Oh, hum. Okay.

04 17 45 32 LMP Okay. LIGHTING, ANNUNCIATOR to DIM. Okay.

04 17 45 37 CDR DIM. Stop the DET.

04 17 45 40 LMP All right, DET is stopped.

04 17 45 43 CDR Okay.

04 17 45 44 LMP Forward hatch the rest of the way open.

04 17 45 47 CDR All righty.

04 17 45 50 LMP \*\*\* REG monitor. Okay. Forward hatch is open. Lower your visor.

04 17 46 01 LMP Let me get a - get a -

04 17 46 03 CDR Yes. Let me -

04 17 46 07 LMP That's fine. Can you get - reach everything now? Okay. Stay right there. I'm going to help you.

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04 17 46 26 CDR We're on the way now. About ready? Okay, very good.

04 17 46 30 LMP I'll get your antenna as you go out.

04 17 46 33 CDR All righty. Starting out the door.

04 17 46 50 LMP You're going to have to get your PLSS down a little; roll toward me.

04 17 46 55 CDF Okay, coming over.

04 17 46 56 LMP 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 07 CDR Okay.

04 17 47 08 LMP You'll have to get mine when I come out. Okay. You're clear. Go on out.

04 17 47 23 CDR Okay, clear of the hatch. Give me a jettison bag.

04 17 47 32 LMP Roger. Let me get over here on the other side, so I can get to it.

04 17 47 46 LMP Oops.

04 17 48 05 LMP I'm hung up on something, Al.

04 17 48 17 CDR Probably that -

04 17 48 19 LMP It's the door handle. I got it loose now.

04 17 48 21 CDR Okay, very good.

04 17 48 33 LMP Okay, jettison bag coming at you.

04 17 48 36 CDR Okay. Okay, I've got it now. Standing by for the LEC.

04 17 48 48 LMP Okay.

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[REDACTED]

04 17 49 41 CDR 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 09 CDR 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 49 CDR Starting down the ladder.

04 17 50 51 CC Roger, Al.

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. On the surface.

04 17 51 24 CDR 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 50 CDR I'm moving around, getting familiar - -

04 17 51 51 CC Roger, Al.

04 17 51 53 CDR - - 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 up 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 30 CDR 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 the boulders near the rim as - -

04 17 52 53 CC Antares, this is Houston. You are GO for two-man EVA. Over.

[REDACTED]

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04 17 52 59 LMP Roger, Hou - Houston. Thank you.

04 17 53 04 CDR And, continuing, we can see the boulders that are 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 along to the north. That's very apparent.

04 17 53 34 CDR I'm moving over to adjust the MESA.

04 17 53 40 CC Roger, Al.

04 17 54 02 LMP 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 12 CDR Okay, the MESA is adjusted. Going over to remove the MET blanket.

04 17 54 35 LMP Okay, Al. I'm starting out.

04 17 54 38 CDR Okay.

04 17 55 44 CC Okay, Ed. We can see you coming down the ladder, now.

04 17 55 52 LMP And it's very great to be coming down.

04 17 55 56 CC Roger. Bottom step.

04 17 56 06 LMP The last one is a long one.

04 17 56 17 LMP Ascent check. Very easy to do. A little push and just spring right up.

04 17 56 26 CC We got there with those lightweight units.

04 17 56 29 LMP 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 51 LMP He's releasing it now.

04 17 57 00 CDR Okay, Houston. The MET is finally clear of the MESA.

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[REDACTED]

04 17 57 04 LMP Al, I'm going to come over. How about getting my antenna out before I lose comm here in a minute?

04 17 57 09 CDR Okay.

04 17 57 10 LMP If I go around the corner or something.

04 17 57 12 CDR Okay. Just drop this baby over here.

04 17 57 14 LMP Okay.

04 17 57 33 LMP It's bright up-Sun, isn't it?

04 17 57 35 CDR 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 57 LMP Thank you.

04 17 57 59 CDR Okay, Houston, the MESA has been stowed on the plus-Y footpad.

04 17 58 06 CC Roger. Out.

04 17 58 11 CDR I'm going back to adjust the MESA.

04 17 58 23 LMP Mobility is - very great under this crushing one-sixth-g load, Houston.

04 17 58 36 CC Roger.

04 17 58 44 LMP 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 04 LMP I knew they would.

04 17 59 06 CDR We knew the troops on the ground would be glad to hear that.

04 17 59 18 CDR The MESA blanket is coming off here.

[REDACTED]



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04 17 59 19 CC Here comes the lens cap.

04 17 59 22 CDR You'll lose television for a moment.

04 17 59 25 CC Roger. MESA blanket.

04 17 59 39 CDR Okay. That's beautiful.

04 17 59 46 LMP Okay, senior.

04 17 59 59 LMP Let me give you a hand, and we'll get it done.

04 18 00 08 LMP Okay.

04 18 00 24 LMP Put this back on?

04 18 00 27 CDR Ed, \*\*\*

04 18 00 31 LMP Great.

04 18 00 36 CDR Okay, the lens cap is going on now, Houston, while we set up the tripod - move the TV to another location.

04 18 00 44 CC Antares, this is Houston. Request EMU status check here.

04 18 00 52 LMP Okay, Houston. LMP is 3.75 psi; reading - 85 percent; all flags GO. On - -

04 18 01 09 CC MIN cooling?

04 18 01 10 LMP MIN cooling.

04 18 01 15 CDR Okay, CDR here is 81 percent.

04 18 01 16 CC And, Al - -

04 18 01 17 CDR 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 37 LMP And, Houston, while Al's getting that television, I'll go ahead and get my contingency sample; get it out of the way.

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04 18 01 52 CC Roger, Ed.

04 18 02 44 LMP Houston, the contingency sample is being taken about 25 feet to the - in the 01:00 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 57 CDR Do you want to watch the cable as we go out, Ed?

04 18 03 59 LMP Okay.

04 18 04 09 CC Al, this is Houston. Would you verify the lens is still capped? Over.

04 18 04 18 CDR That's affirmative.

04 18 04 38 LMP Keep going.

04 18 04 40 CDR Okay. It's about 50 feet, I'd say.

04 18 04 44 LMP Why don't we get all the cable out while we're at it?

04 18 04 47 CDR Okay. Go ahead and pull it out, and I'll -

04 18 04 49 LMP Okay. Let me get this contingency sample folded up.

04 18 05 23 CDR Okay, Houston, the lens cap is off. We're aiming for the general area of MESA.

04 18 05 40 LMP Al, can you pull this - the rest of this cable out away from the MESA here?

04 18 05 44 CDR And we got about ... 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 10 CDR Okay. It's going from 22 to 44, and I'll zoom it in to 40. Stand by.

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04 18 06 23 CC Okay. Hold the zoom there, and the position looks good, also.

04 18 06 29 CDR Okay, how about the f-stop?

04 18 06 46 CDR 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 05 CDR Okay. It's right up against the stop.

04 18 07 15 CDR It's up 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 37 CDR 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 04 CDR Okay, this is the - the adjustment to f/22. There you go.

04 18 08 47 CC Al, this is Houston. Would you confirm that you're at f/22 now?

04 18 08 52 CDR Okay, I'm confirming that I'm in peak and that I'm at f/22.

04 18 09 24 CDR And, while we're waiting for the television adjustments, the 02:30 position, approximately 50 feet where the camera is, is slightly uphill. We see that the LM did, in fact, land on the - sort of a - a downslope. It appears to be in - almost a basin.

04 18 09 43 CC Al, this is Houston.

04 18 09 44 CDR 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.

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04 18 09 55 CDR Okay, this is the last adjustment. Going to f/44.  
And going - -

04 18 10 04 CC Roger. And back the zoom out to about 35.

04 18 10 05 CDR - - and going to average. And back the zoom out  
to 35. How does that look?

04 18 10 19 CC Beautiful.

04 18 10 22 CDR Okay, pressing on. S-band antenna - -

04 18 10 29 CC Roger; press.

04 18 10 30 CDR 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 stacks of generally under 2 inches or less.

04 18 11 03 LMP Roger. Houston, as you can see, the SRC table is  
deployed. BB is emptied, and I'm putting the 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 24 LMP That's affirmative. That's where it is.

04 18 11 30 CDR Houston, it looks as though we've landed in a  
fairly rough place.

04 18 11 34 LMP Yes; indeed it does. Evidenced by the fact that  
you dug your front landing gear into a hole.

04 18 12 05 LMP And, Houston, I have the SWC out and setting out  
to deploy it.

04 18 12 13 CC Roger, Ed.

04 18 12 20 LMP Am I still in your field of view, Houston?

04 18 12 24 CC Affirmative.

04 18 12 26 LMP Okay.

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04 18 12 40 CDR Okay, Al is bringing the S-band antenna around. Positioning.

04 18 12 46 CC Roger, Al; we're watching you.

04 18 13 39 LMP 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 14 45 LMP 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 08 CDR Okay, the legs are in the surface approximately 1 inch, I would say. Appear to be fairly equal all the way around - perhaps the leg to the left 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 49 CDR I didn't attempt to run any kind of an experiment - forcing the legs down. I just - just - -

04 18 16 54 CC Roger, I copy.

04 18 17 17 LMP And here comes the S-band antenna cable. Al, you're too far away.

04 18 17 24 CC Looks more like a kangaroo.

04 18 17 25 LMP It should have more cable than that. It's hung up.

04 18 17 41 CDR Okay. How are we in respect to the cable?

04 18 17 45 LMP I'm afraid you're too far away.

04 18 17 49 CDR Well, I wanted to get maximum length. I'm moving on in.

04 18 17 53 LMP That's better. Let's see. Yes, I want to do that, too.

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[REDACTED]

04 18 18 01 LMP This is all she - I've got, Al.

04 18 18 02 CDR Okay, we'll bring it in.

04 18 18 15 LMP Right over here. Right about in here anywhere will probably do it.

04 18 18 20 CDR We'll have to put it right here to get it level.

04 18 18 22 LMP Okay.

04 18 18 28 CDR ~ Okay. Can you reach that?

04 18 18 29 LMP Oh, yes.

04 18 18 31 CDR Okay. If you want to stand clear, we'll deploy the antenna.

04 18 18 36 LMP Let her rip.

04 18 18 43 CDR Okay, here we go.

04 18 18 51 LMP It's hung up at the top.

04 18 18 52 CDR ...

04 18 18 53 LMP Yes. If you'll tilt it over toward me without dropping it, I'll get it unhung for you.

04 18 18 59 CDR All righty. Ready for it?

04 18 19 07 LMP All right. Lower it on down.

04 18 19 08 CDR Okay.

04 18 19 11 LMP Keep coming. Okay, set her up.

04 18 19 15 CDR Okay. All kinds of freebies in today's simulators.

04 18 19 27 CC Roger. We got the boys in the backroom working overtime.

04 18 19 29 CDR Sure have.

04 18 19 43 LMP Okay.

[REDACTED]

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04 18 19 57 LMP Sure you got it?

04 18 20 02 CDR Appears to be.

04 18 20 04 LMP Okay.

04 18 20 32 LMP Okay. There is Earth, way up there.

04 18 20 38 CDR How does that look ... - -

04 18 20 40 LMP Looks like it's getting close. Let me get on the glass.

04 18 20 43 CDR Take that - turn it to the left a little more. Wait a minute, because that changes the whole deal.

04 18 20 58 LMP ... step over here.

04 18 21 02 CDR That's about it for azimuth.

04 18 21 05 LMP Okay. I don't see it, Al.

04 18 21 06 CDR Well, just put it back down again. Okay.

04 18 21 14 LMP Okay. I think my PLSS - my OPS is hitting it.

04 18 21 17 CDR All right, just a second. Let me back it off a minute and move this a little bit.

04 18 21 29 CDR Okay, that's about it for azimuth. I'll come down a little bit.

04 18 21 32 LMP Okay.

04 18 21 34 CDR Let me just check through which way we want to go.

04 18 21 44 CDR ...

04 18 21 45 LMP Okay.

04 18 21 47 CDR Okay, coming down a little bit.

04 18 21 48 LMP You're down.

04 18 21 54 CDR Hold it.

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[REDACTED]

04 18 21 55 LMP Back up just a bit. Right there. Okay, I have the Earth centered.

04 18 22 03 CDR Okay.

04 18 22 06 LMP Okay, Houston. Boresighted the - the Earth, dark side and all.

04 18 22 14 CC This is Houston. Roger.

04 18 22 15 CDR Okay. The S-band antenna has been erected and alined, and the cable has been attached - -

04 18 22 25 LMP And I'll go back in to switch. Okay.

04 18 22 28 CC Roger, Ed. And we'd like to get an EMU status report as you go by.

04 18 22 39 CDR Okay. The CDR's reading 3.75. Reading 76 on the O<sub>2</sub>. I have no flags; I'm still in MINIMUM flow; and I'm comfortable.

04 18 22 54 LMP Okay, and this is Ed. I'm reading 3.75, about 75 percent O<sub>2</sub>, no flags, 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 32 LMP Okay.

04 18 24 01 LMP Bruce. Is any appreciable dust flying off of 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 13 LMP Okay.

04 18 24 45 LMP And, Houston; I'm back in the LM without a great deal of problem.

04 18 24 50 CC Roger, Ed.

[REDACTED]



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04 18 24 51 LMP 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. Okay?

04 18 25 04 CC Ed, this is Houston. You're GO to switch to LUNAR STAY. Go ahead.

04 18 25 17 LMP And, Houston; this is Ed. How do you read?

04 18 25 22 CC Loud and clear, Ed.

04 18 25 25 LMP Okay, you're on the erectable antenna.

04 18 25 28 CC Roger. And how are you reading us?

04 18 25 31 LMF Loud and clear.

04 18 25 35 CC Beautiful.

04 18 25 39 LMP Okay, Alan; I'm ready for the ETB, most anytime.

04 18 25 43 CDR 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 02 CDR That's affirmative.

04 18 26 07 LMP It'd never do for us to leave that one behind, Bruce.

04 18 26 25 CDR Okay. Well, Bruce is loading up the ETB.

04 18 26 32 LMP Who?

04 18 26 34 CDR Oh, excuse me. While Ed is loading up the ETB - -

04 18 26 35 CC Don't I wish it - -

04 18 26 36 CDR While Ed is loading up the ETB, I'll 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 - 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

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[REDACTED]

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 pock-marked 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 09 CDR

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 - from Doublet, since 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're 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. Okay, it looks as though the LM 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're bent. The footpad, plus-Y, for example, has a drag pattern of approximately 1 foot.

04 18 30 44 CDR

Okay, Ed, how're you doing up there?

04 18 30 46 LMP

Okay, Al. I've got it loaded. I'm about ready to start down with it now.

04 18 30 50 CDR

Okay.

[REDACTED]

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04 18 30 51 LMP Just another minute. I have - the ISA came loose from its straps and is being a great major headache.

04 18 31 10 CC Ed, before you start transferring, you want to verify contents in the ETB?

04 18 31 15 LMP 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 Okay. Did you get the 16-millimeter camera with MAG attached?

04 18 31 45 LMP No. Thank you. Guess we kind of need that one.

04 18 31 54 CDR Yes, that's the one that's supposed to photograph you coming down the ladder.

04 18 31 59 LMP Uh-oh; all of the contingency - the disposal containers just fell out on the floor. Just a minute. Get the camera.

04 18 32 32 CDR Okay, Houston. With respect to the erosion pattern, directly under the engine bell, there is \*\*\* 3 feet to the southeast of the ... location of the bell. 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 28 CDR 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 53 LMP Okay, Al. I am ready to bring this down.

04 18 33 54 CDR Okay.

04 18 34 01 LMP Wait a minute. Got it.

04 18 34 07 CDR Okay.

04 18 34 08 LMP Okay. Let her come gently.

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[REDACTED]

04 18 34 11 CDR All righty.

04 18 34 27 LMP Okay.

04 18 34 29 CDR 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. There are the steps, and I'll take it down slowly.

04 18 34 56 LMP Do you have it in hand?

04 18 34 58 CDR 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 11 LMP And it's all yours.

04 18 35 12 CDR Very good. I've got it.

04 18 35 16 LMP All right. Coming out again.

04 18 35 18 CDR If you want to wait a minute, I'll take a picture of you.

04 18 35 21 LMP Okay.

04 18 35 22 CC Okay. We'll give Al a few seconds to get the camera - -

04 18 36 33 LMP Okay, about ready?

04 18 36 34 CDR No. Stand by 1.

04 18 37 00 CDR Okay, lens cover is coming off.

04 18 37 36 CDR Okay, come on down.

04 18 37 38 LMP Okay. Here I come.

04 18 37 52 CC Okay. Give me a mark, Al, when you start using film.

04 18 37 56 CDR I just started using film now.

04 18 38 01 CC Are you on 24?

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04 18 38 03 CDR 12.

04 18 38 07 CC Roger, 12.

04 18 38 10 LMP Okay. Let me close the hatch.

04 18 38 21 LMP But not too far.

04 18 38 40 LMP Tell me when I hit the bottom step.

04 18 38 42 CDR You're at the bottom step.

04 18 38 44 LMP I'm on it?

04 18 38 45 CDR Yes.

04 18 38 46 LMF Oh, okay. I want to miss the LR cubed. Okay?  
And I'm down.

04 18 38 57 CDR Okay. Camera's stopped, Houston.

04 18 39 00 CC Roger.

04 18 39 04 LMP Okay, up one flag.

04 18 39 08 CDR Okay, we're right on the time line. Right to the  
minute.

04 18 39 25 LMP 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 39 CDR It will be the best place, I guess.

04 18 39 41 LMP Okay, f/8.

04 18 40 14 LMP The camera was on 1/60th. I hope it - got bumped  
there.

04 18 40 18 CDR No, that's where it's supposed to be for you.

04 18 40 20 LMP Was it?

04 18 40 21 CDR Yes. 2.8, 1/60th.

04 18 40 24 LMP Okay.

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04 18 40 29 CDR You got it?

04 18 40 32 LMP Aim my camera out there at about the right spot.

04 18 40 35 CDR Okay. Let's see. Up there on the rise? Be okay?

04 18 40 52 LMP Let's see where you're pointed.

04 18 40 54 CDR Over there on the rise?

04 18 40 55 LMP Okay. Let me point a little bit further around that way.

04 18 40 58 CDR Out there in the sunlight, I think, with ...

04 18 41 02 LMP Okay.

04 18 41 18 CC Antares, Houston. The flag is going off the camera to the right.

04 18 41 32 CDR How about that? You back in, Houston?

04 18 41 39 CC Al, this is Houston. We still show you're off - Okay. You're coming back in now.

04 18 41 46 CDR Okay.

04 18 41 51 LMP Al, we're not going to - we're too far around. We're not going to be able to get it with a 16, Al.

04 18 42 00 CDR Well, we can put it down here close by, if you want.

04 18 42 05 LMP Just put it right out here in front - -

04 18 42 09 CC Al, this is Houston. I think it would look a lot - lot better if you could bring it over closer towards the TV.

04 18 42 15 LMP Put it right here in front of us, Al.

04 18 42 17 CDR Okay.

04 18 42 19 CC Maybe on this - on the TV camera side of the LM shadow.

04 18 42 29 CDR Roger.

[REDACTED]

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04 18 42 31 CC At 01:30, 20 feet.

04 18 42 33 CDR Just about right here.

04 18 42 35 CC There you go. ...

04 18 42 37 CDR Okay.

04 18 42 42 LMP Okay. Camera going here.

04 18 42 48 CC Give me a mark.

04 18 42 51 LMP MARK. It's running.

04 18 42 57 CC Roger. Out.

04 18 43 06 LMP How's this, Bruce? Look okay?

04 18 43 10 CC That's a good site.

04 18 43 26 CDR Good. Goes in very easily.

04 18 43 28 LMP It does, indeed.

04 18 43 33 CC You're going off camera to the right.

04 18 43 45 CC That's good.

04 18 43 53 CDR Okay. Take a picture this way, and then we'll swing it around so they can see it in the television.

04 18 43 59 LMP All right.

04 18 44 01 CDR Okay, let me straighten it around a little, if I can here.

04 18 44 02 CC Okay we can see it.

04 18 44 18 CDR Okay. There we go.

04 18 44 37 LMP I think I'm still too close to you, Al.

04 18 44 40 CDR Watch out for the LM leg.

04 18 44 43 LMP Yes.

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04 18 44 48 CDR 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 54 LMP Okay.

04 18 44 59 CC Okay, and which magazine are you using? \*\*\* Hasselblad?

04 18 45 00 CDR Indianapolis-Indiana.

04 18 45 02 LMP Got your feet in the TV cable, Al.

04 18 45 03 CC Roger. Indianapolis-Indiana; but that was my line.

04 18 45 05 LMP Al, watch your TV cable.

04 18 45 15 CDR Thank you.

04 18 45 16 LMP And the S-band cable both - Got them both. Back up. Try it again.

04 18 45 32 LMP Okay, you're clear.

04 18 45 33 CDR Okay. Okay. Ready?

04 18 45 44 LMP Ready.

04 18 45 48 CDR Okay. Got it.

04 18 45 54 LMP Houston. Give me a good orientation for the flag.

04 18 45 56 CC What's the final exposure number?

04 18 46 01 CDR 25, 25.

04 18 46 02 CC Okay, Ed. If you just turn us broadside - 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 13 LMP Okay.

04 18 46 14 CDR There you go. You got 25 on the MAG.

04 18 46 22 CC ... Al.

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04 18 46 24 CDR Okay, Houston.

04 18 46 25 CC That's good on the flag.

04 18 46 26 CDR Okay.

04 18 46 34 LMP Did you shut off 16?

04 18 46 35 CDR No.

04 18 46 36 LMP Okay. 16 is off, Bruce.

04 18 46 43 CC Stop.

04 18 46 47 LMP And there's a little bit left - -

04 18 46 49 CC You have about 3 minutes remaining on that magazine, Claremont-California.

04 18 46 54 LMP Roger. We won't change it. Okay, I'm going to press on out for the TV PAN, Houston.

04 18 47 06 CDR And, Ed - while Ed is doing that, Al is going to proceed with photographing the landing gear and general features about the LM.

04 18 47 18 CC Roger. Using Indianapolis-Indiana.

04 18 47 26 LMP Okay, Houston. I will on my - 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 43 LMP Roger.

04 18 47 57 LMP Okay. You're zoom of 25; focus going out toward infinity. And how's your picture, Houston?

04 18 48 15 LMP Houston, this is Ed. Al?

04 18 48 23 CDR Yes.

04 18 48 24 LMP Think we lost comm?

04 18 48 26 CC Go ahead, Ed.

04 18 48 29 LMP Okay, how's your picture now?

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04 18 48 34 CC Roger. It looks good.

04 18 48 35 LMP Okay. Can you see the horizon?

04 18 48 39 CC ... 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 - -

04 18 48 53 LMP Okay, that's just about where I wanted it.

04 18 48 54 CC - - with the small crater off to the left.

04 18 48 55 LMP Roger. The horizon that you see - far horizon, Bruce, is a ridge that seems to run around this bowl that we're sitting in - 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 - that score. The little rise you see in front of us is a rise that's shown on - 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 - south ... 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 steadies 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 09 LMP Okay. All right, I've moved around to the next sector now. And it's looking down over what we used to call Cloverleaf - although it's not obvious from here what the cloverleaf was. There is a fairly significant crater of - about 250 to 300 yards out. I'll try to come - bring it in for you.

04 18 50 41 LMP 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.

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04 18 50 50 LMP Okay. Let's zoom all the way.

04 18 50 51 CC Well centered.

04 18 50 53 LMP Okay. That crater is - -

04 18 50 54 CC Okay. Beautiful.

04 18 50 55 LMP - - 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 our next sector, although we'll shoot across it because you won't be able to see it.

04 18 51 10 CC Okay, bring her back in.

04 18 51 12 LMP Okay. Now, another sector to the right, facing almost down-Sun. And -

04 18 51 24 CC Roger. We got your shadow.

04 18 51 25 LMP Okay. It's a very low spot. The deepest part, I guess, of what we were calling Cloverleaf before, although I did not realize how deep that depression was, and I still don't quite get the - -

04 18 51 47 CC Okay, zoom out while you're talking.

04 18 51 50 LMP - - 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, rising up on the far side to above us.

04 18 52 12 CC Okay, you're aimed up a little high.

04 18 52 17 LMP 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 24 LMP 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

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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'm bringing them - bringing it on out for you. Doublet is on the second - second hill that you see. Pick it up out there, Bruce?

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 24 LMP Okay. We'll zoom back in and move on around; I think Al's about to finish up his task over there.

04 18 53 32 CDR Negative. I'm still working at 8 o'clock.

04 18 53 36 LMP Oh.

04 18 53 37 CDR Ed, I just wonder how come McCandless has the audacity to presume that we're wrong about Doublet Crater (laughter).

04 18 53 46 LMP 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 - 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 LMP Here we come.

04 18 54 18 CC Okay, now point the camera down a degree or 2.

04 18 54 24 LMP 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.

04 18 54 41 LMP Okay. And I might add - I mentioned a quadruplet chain of craters. Well, they're right here in front of me - -

04 18 54 51 CC Point it down a little.

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04 18 54 52 LMP Okay. The quadruplet chain of craters starts right here in front of me; well, it's halfway between the rock and myself and moves across here; now, there're quite a few - -

04 18 55 06 CC You're getting all sky.

04 18 55 07 LMP Let me zoom back in again.

04 18 55 15 CC Hold it.

04 18 55 23 LMP Okay. How's that now?

04 18 55 27 CC Good.

04 18 55 15 CC  
04 18 55 29 LMP Okay. There's the south quadruplet crater, and then there's the next one and the next one and the largest one. You can see - -  
Good.

04 18 55 43 CC We probably better go back to zoom 25 and press on with the panorama.  
then there's the next

04 18 55 50 LMP 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 Al was talking about - There's not a level portion out here - -  
north now. I'll swing back around and

04 18 56 12 CC Roger.

04 18 56 13 LMP - - that's more than a few square meters. And you can see at least three ridges between us and the horizon. I'll zoom in out here once more. Let you see it close - close-hand what's out there. Another pile of rocks or ridges.  
- - that's more than a few square

04 18 56 44 CC You're pointing at the sky.  
horizon. I'll zoom in out

04 18 56 49 LMP Okay. You need a gunsight on this thing.

04 18 56 52 CC That's better.

04 18 56 53 LMP That better?

04 18 56 56 CC Yes.

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[REDACTED]

04 18 56 57 LMP Okay.

04 18 56 58 CC The horizon is about one quarter of the way up.  
Beautiful.

04 18 57 03 CDR. Okay, Houston. Al is finished with the documenta-  
tion. Counter, 110.

04 18 57 28 CC Roger, Al. 110, 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 45 CDR 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. You're looking at sky again. \*\*\* her  
down. \*\*\* Ed, we're recording all this on video  
tape so that it only takes a relatively brief  
period of time looking at the - the scene that  
we can play it back, frame at a time, later on.  
\*\*\* 25?

04 18 58 56 CC Are you reading me?

04 18 58 59 CDR Ed, are you reading Houston? Doesn't look like  
Ed's reading anybody.

04 18 59 07 CC Ed.

04 18 59 08 CDR Oh, God.

04 18 59 10 CC Ed, this is Houston; we're not reading you.

04 18 59 14 LMP Okay, Bruce, now you are; I hit the transmit  
switch to OFF. The - -

04 18 59 21 CC Loud and clear.

04 18 59 23 LMP The horizon that you see in this view is the north  
flank leading up to Cone Crater. It's proba -  
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. I'm at my  
limit.

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04 18 59 39 CDR Okay, we're - -

04 18 59 40 CC Okay, you're looking at sky again.

04 18 59 41 LMP Okay. There you go.

04 18 59 47 CDR Okay, we're - -

04 18 59 48 CC Beautiful.

04 18 59 49 CDR - - at the time to deploy the MET, Ed, if you want to swing it on back around.

04 18 59 53 LMP Okay. Bruce, what was the zoom setting you wanted - right here for the - for the MET and the MESA?

04 19 00 02 CC Let's try 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.

04 19 00 11 LMP How's that?

04 19 00 12 CC PAN left about 2 degrees - 2 degrees. Okay, that looks - -

04 19 00 26 LMP Is that okay?

04 19 00 29 CC Crank it out about to 40 on the zoom.

04 19 00 37 LMP Okay.

04 19 00 41 CDR That's really - -

04 19 00 42 CC That's good.

04 19 00 43 LMP Okay. Here I come.

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 52 CDR 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 05 LMP Okay.

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[REDACTED]

04 19 01 06 CDR Okay.

04 19 01 09 MCC 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 02 CDR That's fine, Deke. Thank you very much. And we appreciate those kind words.

04 19 02 08 LMP 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 16 CDR Okay. You ready? Get the wheels first.

04 19 02 25 LMP Okay.

04 19 02 26 CDR Okay.

04 19 02 32 LMP Wheels out.

04 19 02 34 CDR Tires ... up.

04 19 02 35 LMP 160, gear down and locked.

04 19 02 38 CDR Both tires are inflated properly on the MET.

04 19 02 40 CC Yes.

04 19 02 46 LMP Wait a minute.

[REDACTED]



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04 19 03 03 CDR Okay.

04 19 03 05 CDR Okay. Put it there.

04 19 03 09 CDR Let's get that. ... set up here - there we go.

04 19 03 22 LMP Well, I see we've had visitors again.

04 19 03 26 LMP Yes.

04 19 03 29 CDR Hardly worth mentioning.

04 19 03 31 LMP Agree.

04 19 03 37 CDF Okay. Houston, as you can see, the MET is deployed properly.

04 19 03 45 CC Roger.

04 19 03 47 CDR Looks like it - looks like it's in good shape.

04 19 03 51 LMP Okay. I'll get a camera.

04 19 03 59 CDR Okay, if you want to - Okay, that's right here - I'll move around to put the TV camera on the scientific equipment bay.

04 19 03 10 LMP Okay.

04 19 04 11 CC Antares, Houston. We'd like to get an EMU status report at this point.

04 19 04 16 CDR Okay. CDR is 3.7 and reading 72; no flags. I'm on low flow and in good shape.

04 19 04 31 LMP And the LMP is 3.7 and reading 67 percent; low flow, low cooling, and feeling great.

04 19 04 48 CDR TV camera - -

04 19 04 49 CC Roger.

04 19 04 50 CDR - - TV camera is covered, and proceeding to the rear of the LM to observe the deployment of the ALSEP.

04 19 06 01 CDR Okay, Houston. The cover is coming off the lens now. How does that look to you?

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04 19 06 15 CC Roger, Al. Are you - are you all the way back at the 30-foot position there? ... 30.

04 19 06 20 CDR Well, it's about - it's about 30 right there, I'd say. A little hilly here.

04 19 06 32 CC Okay. Our picture is moving around a lot; you're going to have to set it down and let it stabilize before we can tell you anything about it.

04 19 06 41 CDR I'm trying to find a level spot, Bruce. We're in - -

04 19 06 43 CC Okay. What zoom are you on?

04 19 06 44 CDR 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?

04 19 07 04 CDR That's what I'm doing at the moment.

04 19 07 08 CC That's a pretty clumsy tripod, I realize.

04 19 07 15 CDR Okay. Do you know, I think it will stay now?

04 19 07 24 CDR Okay. How's that?

04 19 07 25 CC Okay. What zoom are you on? Back off the zoom some.

04 19 07 31 CDR Yes. I think we'll have to.

04 19 07 42 LMP Okay, Bruce, can you see the bay?

04 19 07 43 CC Wrong way.

04 19 07 44 LMP I'm ready to start opening.

04 19 07 46 CC Roger. I can see your hands very clearly. We seem to be close \*\*\* Hold that zoom, Al. Okay. Looks good.

04 19 07 58 CDR Okay.

04 19 08 01 CC Beautiful.

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04 19 08 05 LMP Okay, the door is - guard door is open. Let's see, K-bay [?] door is open. Pulled a little stiffer than I expected in one-sixth g.

04 19 08 15 CDR Okay.

04 19 08 23 CC Looking good though, Ed. And you all are within 9 minutes of the time line.

04 19 08 28 LMP Okay. We'll pick it up here in a little while. Okay. Ready with number 1.

04 19 08 34 CDR Hey. Number 1, coming out.

04 19 09 06 LMP Okay. Got her down.

04 19 09 10 CDR Okay. I'm going to move it over a little bit here.

04 19 09 14 LMP Okay. It's almost as heavy as you are.

04 19 09 30 CC Who's talking?

04 19 09 32 LMP ... move over. Man, it's rough to find a level spot to put anything. Okay. Number 2 is coming out.

04 19 09 40 CDR Okay, can you get that by yourself?

04 19 09 45 LMP Well, it's - I think so. Let me - make 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 out here.

04 19 11 04 LMP I'll have to bend a little bit. I just can't bend down to that.

04 19 11 08 CDR Okay.

04 19 12 09 LMP And the handtool carrier's clear.

04 19 12 12 CC Roger.

04 19 12 36 SC/CC \*\*\*

04 19 12 38 CDR Say again, Houston.

04 19 12 43 CC Nothing, Ed.

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04 19 14 10 LMP You know, I fully expect to see Stu and Ron come running around to pick up the pit pins and the thrown-away parts.

04 19 14 20 CDR See this - Okay. I think there's a pretty level place right there.

04 19 14 37 CDR Oops. Excuse me.

04 19 15 05 LMP Okay, I'm ready for the fuel cask.

04 19 15 07 CDR Okay.

04 19 15 10 CC Roger, Ed.

04 19 15 17 LMP The handtool carrier, as you can undoubtedly see, is on the MET. No problems.

04 19 16 02 CDR Okay. Temperature indicators on the mast show that there's been no heat.

04 19 16 12 CC Roger.

04 19 16 20 LMP And the cask is coming down.

04 19 16 25 CC ... Ed.

04 19 16 27 LMP And it's down far enough, I believe.

04 19 16 50 CDR Okay, stand by 1. Not the best place in the world to work. There we are.

04 19 16 59 LMP Okay, if we can get the lid off of it.

04 19 17 53 LMP Watch it. That's probably pretty hot. Okay, it's locked.

04 19 18 03 CDR Got it?

04 19 18 04 LMP Think so.

04 19 18 15 CDR ... down a little bit. Got a little more in right there. There you go.

04 19 18 25 LMP Okay, good. Houston, the lid is off the nuclear fuel cask. And I have none of them - -

04 19 18 35 CC Did you report TEMP levels?

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04 19 18 36 LMP - - No TEMP indicators that are black. You want to take that? Got me in midthrow there. Okay, it's open.

04 19 19 14 LMP Okay, the cask ready?

04 19 19 16 CDF Okay. All set.

04 19 19 31 LMF Okay.

04 19 19 49 CDR This slight slope is about as level as we can get from here.

04 19 19 52 LMP Okay.

04 19 19 57 CDR Okay, looks good. All right, a little more this way. There you go. Very good.

04 19 20 21 CDR The reading on that tube?

04 19 20 24 LMP Yes. I'll get it in a minute.

04 19 20 25 CDR Okay.

04 19 20 32 LMP And, Houston, all of the temperature indicators are still white.

04 19 20 39 CC Roger, Ed.

04 19 20 45 CDR Okay, the doors are closed.

04 19 21 32 LMP Okay.

04 19 21 34 CDR Okay, Houston. We're going to cover the television camera, load it back to its original location.

04 19 21 39 CC Roger, Al. For your information, you're approximately 7 minutes behind the time line at this point.

04 19 21 48 LMP Okay.

04 19 21 53 CDR Okay. Where do you think's a good spot for the ALSEP?

04 19 21 57 LMP Oh, boy. That's going to be tough, Al. I'd just head out toward Doublet out there and let's look.

04 19 21 59 CDR Which way?

04 19 22 00 LMP Right toward Doublet.

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[REDACTED]

04 19 22 10 CDR 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 02 LMP 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 06 CDR What's that?

04 19 23 08 LMP You ought to point it at us, and we'll pick it up on the way out.

04 19 23 11 CDR Well, we're supposed to - Okay, right now - you can put it here and watch the MET deployment, if you like.

04 19 23 29 LMP Okay.

04 19 23 32 CDR 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 54 CDR Houston, are you with us?

04 19 23 58 CC Roger. Let's go to 50.

04 19 24 03 CDR Okay, 50.

04 19 24 11 CC And come right about 3 degrees. Very good.

04 19 24 21 CDR Okay.

04 19 24 46 CDR Okay. Got the television camera there?

04 19 24 49 LMP Yes, it's down in the bottom.

04 19 24 51 CDR Okay.

04 19 25 16 LMP 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. I can't do that when they get - get a little more weight on there.

[REDACTED]

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04 19 25 30 CC Okay. We got that, Ed. Be sure you get the large scoop on there replaced.

04 19 25 43 LMP 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 08 CDR Right. And I've just started the TV bracket, and I'm open - getting ready to open SRC number 1. Okay. Black-and-white television - -

04 19 26 28 CC And, Al, have you gotten - Roger.

04 19 26 35 CDR Black-and-white TV camera's on the plus-Y strut - on the footpad.

04 19 26 41 CC With the white surface normal to the line of the Sun?

04 19 26 45 CDR That's correct. On dimension horizontal.

04 19 26 50 CC Roger. Roger. And on magazine Charlie-Charlie, I show you still have 3 minutes remaining.

04 19 27 04 LMP Okay. We'll leave it on there, then.

04 19 27 08 CC Roger.

04 19 27 23 CDR Okay, SRC-1 is open. Okay.

04 19 27 41 LMP Oh, damn, dropped the weigh bag.

04 19 27 53 CDR Wait a minute.

04 19 27 56 LMP I'll get it.

04 19 27 57 CDR I can give you some tongs, if you want them.

04 19 27 58 LMP Okay. It will probably save \*\*\* any dirtier than necessary. Well, I dropped both of them. The \*\*\*

04 19 28 21 CDR Okay. May as well put them in the pocket when you're through.

04 19 28 25 LMP Okay.

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[REDACTED]

04 19 29 28 CDR Okay, Houston. Magazine double Dog and double Easy going on the MET.

04 19 29 30 LMP \*\*\* handle.

04 19 29 37 CC Roger. Delta-Delta and Echo-Echo.

04 19 29 52 CDR Take that baby up a little.

04 19 29 56 LMP Yes. ... and while you're getting that ready, let me slip these babies in there.

04 19 30 07 CDR Okay.

04 19 30 13 LMP That's what I'm sweating.

04 19 30 14 CDR Okay, good.

04 19 30 17 LMP \*\*\* these suits are \*\*\*. These boots are sure \*\*\*

04 19 30 28 CDR And the sand's a little different, too.

04 19 30 30 LMP Yes.

04 19 30 49 CDR Well, now.

04 19 31 08 CDR Damn it!

04 19 31 10 LMP There it goes again.

04 19 31 13 CDR I should have lifted it up with one hand and then put it down.

04 19 31 20 LMP Lift it up and do what?

04 19 31 22 CDR Lift it up with one hand and put it over the other.

04 19 31 25 LMP That's what I was going to do - this time.

04 19 31 44 LMP Okay. It's a bit longer than expected.

04 19 32 31 CDR Okay, Houston. I've got three core tubes, no tabs.

04 19 32 41 CC Roger.

04 19 32 44 CDR 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.

[REDACTED]



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04 19 32 58 CC Roger.

04 19 33 10 LMP Okay, you putting on the other SESC?

04 19 33 12 CDR I've got the other SESC now.

04 19 33 16 LMP Okay, very good.

04 19 34 04 LMP The problem here is the clips are so tight that it 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 31 CDR Okay, and we'll put this one in the pocket. ...

04 19 35 21 LMP Okay, Houston. I have the closeup camera.

04 19 35 26 CC Roger. Still reading on even hundreds?

04 19 35 29 LMP I'm not there yet.

04 19 35 44 LMP 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 36 04 CDR Okay, can you see that little flag, Ed?

04 19 36 09 LMP Huh?

04 19 36 10 CDR Ed, can you see that little flag all right?

04 19 36 12 LMP Yes, I think I can see that. Good show.

04 19 36 36 LMP Okay, and here's one hammer for you.

04 19 36 39 CDR Okay. Thank you.

04 19 36 48 LMP Okay. We finally got to touch the flight gnomon.

04 19 37 04 CC 21 Nancy.

04 19 37 06 CDR (Laughter) Glad you're still with us, Bruce. Okay. Break there.

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04 19 38 28 CDR Okay, let's put that baby over here. That your last item?

04 19 38 35 LMP Let me doublecheck. Let's see, 1, 2, 3 - -

04 19 38 40 CDR Okay, Houston. We'll start a rundown here; I think we are about ready.

04 19 38 42 LMP Yes.

04 19 38 43 CDR 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, two SESCOs, 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 28 CDR 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. You with us? You with us?

04 19 39 39 CC Roger. Looks good.

04 19 39 40 CDR Okay. Let me just look at something.

04 19 39 44 CC And why don't you give us EMU status check before you set out?

04 19 39 48 LMP 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 14 LMP It looks like I'm reading 50 - No, sorry about that.

04 19 40 23 CDR Man, it's hard to see.

04 19 40 24 LMP Yes. I'm reading 55 percent, Bruce.

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04 19 40 28 CDR You're reading lower than that. It must be.

04 19 40 29 CC Roger.

04 19 40 32 LMP No, I'm reading more than that. I'm reading 55 percent.

04 19 40 35 CDF You are? Okay.

04 19 40 37 CC Go ahead, Al.

04 19 40 38 CDR Okay, Al is at 3.75, reading 62 percent, and I have no flags; I'm on MIN 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 site.

04 19 40 56 LMP Al, I'll go get it.

04 19 40 58 CDR 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 08 LMP 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 25 CDR 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. Focus at infinity.

04 19 41 45 CC Roger. Out.

04 19 41 46 CDR Okay. You should be able to see on the right side of your picture when I settle down here. You should be able to - \*\*\*

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04 19 42 09 LMP Al, you can get quite a ways further out, if you want to; you've got a little cable left.

04 19 42 12 CDR \*\*\* we're aimed right for the south \*\*\* Doublet now, South Doublet; and you'll probably be able to see \*\*\* star crater right in the very edge of your field of view. \*\*\* stop okay?

04 19 42 29 CC Yes, f-stop's fine. I've got what looks like two ridges and then the horizon in the picture, and I see a - just past the second ridge - -

04 19 42 49 CDR It may be two small boulders.

04 19 42 54 CC Okay, may be.

04 19 42 57 LMP Okay. I think we can find something out there that fits the bill.

04 19 43 04 CDR Okay. I'll go pick up the barbell.

04 19 43 07 LMP All right. The LR cubed 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 23 CDR Okay; you caught me just in time.

04 19 44 02 CDR 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 31 CDR 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 50 CDR Okay. We'll try to depress a little bit.

04 19 45 15 CDR 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 GC.

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04 19 45 27 CDR Well, it looks like that's the way we're going. You'll just have to stay in that line of sight, Bruce.

04 19 45 32 CC Okay. Very good.

04 19 45 44 CC Roger. You want a GCA?

04 19 45 47 CDR Yes. I think if you aim for a little to the left of that - -

04 19 45 53 CC Well, our ASR isn't working very well; but if we can once get you in the field of view, we'll acquire you.

04 19 45 59 LMP Roger. I'm headed over that way.

04 19 46 58 LMP Can you see \*\*\* yet, Bruce?

04 19 47 04 CC Negative, Ed. I believe you're off to our left.

04 19 47 08 LMP They won't get in the field of view until we get up pretty close to the site. Okay.

04 19 47 12 CC Okay. You're coming in now.

04 19 47 13 LMP 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 27 LMP Okay. Al should be coming in right now, too.

04 19 47 49 CDR Looks as if it might be a little secondary impact crater here by me.

04 19 47 52 LMP 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 04 CDR Okay. Going to your right.

04 19 48 22 CDR Okay, Houston. We're proceeding over a very fine-grain regolith we described before. Undulating surface getting more sloped - -

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04 19 48 36 CC Okay. You need to angle left just a little bit.

04 19 48 40 CDR Left?

04 19 48 43 CC Yes, you're doing fine, now.

04 19 48 49 LMP Say, Houston. This looks like brown talcum powder; it's so fine in most places.

04 19 49 01 CDR I think the Sun angle is increasing now.

04 19 49 03 CC The MET's going off to the right.

04 19 49 04 CDR The MET's trying to find a smooth place to go.

04 19 49 09 LMP 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 32 CDR Say again.

04 19 49 33 LMP I said we could make it, either way.

04 19 49 35 CDR Okay.

04 19 49 43 LMP See those two over there at 10 o'clock? Al, we can see those are on the map.

04 19 49 47 CDR The two at 10 o'clock?

04 19 49 48 LMP Yes.

04 19 49 51 CDR Yes. Okay, Houston. We'll be dropping down out of sight for a while, probably. Going down in - in a depression.

04 19 50 27 CDR Well, I don't know.

04 19 50 30 LMP I don't know either. Let's stop a minute, Al.

04 19 50 35 CDR I'm not sure but what we've picked just about as good a spot as anywhere.

04 19 50 38 LMP I think so.

04 19 50 42 CDR It looked a little further out here, because of being closer to zero phase, perhaps.

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04 19 50 49 LMP 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 02 CDR Well, we'll move on a little closer to Doublet.

04 19 51 07 LMP Okay. Okay.

04 19 51 34 LMP 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 47 CDR Yes, I think so. It's probably a pretty good spot. About right up there.

04 19 51 52 LMF Yes.

04 19 52 03 CDR Okay, Houston. We're in the general area of the planned ALSEP deployment now - on the chart. 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 25 CDR Okay.

04 19 52 29 LMP Think you ought to press a little - bear a little to the left, Al.

04 19 52 31 CDR Yes. I guess we'll have to. Nothing like being up to your armpits in lunar dust.

04 19 52 46 LMP I think just to the left of that rock that's ahead of us, it provides a path through here.

04 19 52 58 CDR The MET seems to be riding very well, Houston. It's bouncing a little bit, making nice tire marks, 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 23 LMP No. There is a little bit, Bruce, but it's not - the dirt feels to be kind of clumpy.

04 19 53 51 CDR Okay, I guess that ridge is the best place.

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04 19 53 54 LMP I think so.

04 19 53 55 CDR How are you doing?

04 19 53 56 LMP Fine.

04 19 53 58 CDR You still on your television, Bruce?

04 19 54 02 CC Yes, indeed. You're very well centered.

04 19 54 07 CDR \*\*\* ought to be 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 21 LMP Okay, about another 30, 40 feet now, and I think we're as good as we're going to get.

04 19 54 27 CDR Yes. 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 50 LMP Okay. Let's set it down and look for a minute, Al.

04 19 54 56 CDR All righty.

04 19 54 59 LMP Then, we can see here where we are.

04 19 55 07 LMP 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 35 CDR Okay. You got that other map on there, too?

04 19 55 38 LMP 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 03 CDR That one's right over there, I believe. Isn't it? That's an old rounder one right there. See what I mean?

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04 19 56 11 LMP 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 43 LMP ... that little, looking for that little distance thing. Here we go.

04 19 57 23 LMP Okay, I'd say we're probably about 400 feet out, almost directly out in front. Plus-X.

04 19 57 32 CDR Okay.

04 19 57 33 MS ...

04 19 57 34 CDR I think ... 80 meters along the track.

04 19 57 37 LMP Look here. See that crater right in between those two traverse tracks?

04 19 57 41 CDR Yes.

04 19 57 43 LMP Okay, those two craters and that crater that you pointed out.

04 19 57 45 CDR Right.

04 19 57 46 LMP Okay, I think that one between the traverse tracks is that one right there.

04 19 57 51 CDR Okay.

04 19 57 52 LMP 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 08 CDR Well, where do you think we are?

04 19 58 10 LMP I think that we are to the north - I think we're about BR; and, let's see, we're south of that - We're about CQ 0.8 and 62.5 - 61.5.

04 19 58 35 CDR Did you read that, Houston?

04 19 58 38 CC Roger. Charlie Quebec 8 at 61.5.

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[REDACTED]

04 19 58 43 CDR 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 54 LMP Yes. I need this clear area down here for that thumper.

04 19 58 57 CDR Okay, let's put it right up in there.

04 19 58 59 LMP Right up there, on that spot?

04 19 59 01 CDR 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 the 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 29 CDR Okay.

04 19 59 45 CDR I'm going to have to pull it over here a little, Ed; there's a crater there.

04 19 59 50 LMP 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 03 LMP What's wrong with right about here? It would just be a nice clear shot down there with the thumper.

04 20 00 09 CDR 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 17 CDR Okay. We'll turn them back on. This is where we're going to deploy.

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 29 CDR Yes. We understand, but it's all pretty much the same; the upslope is about - 4 or 5 degrees,

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pockmarked 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 52 LMP 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 20 CDR Are you done with your thumper geophone line?

04 20 01 22 LMP Yes, I'm through.

04 20 01 23 CDR Your line will put you right through those two craters. That'll give you a good reference.

04 20 01 26 LMP 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 43 CDR Let's see. Southwest is right - The best spot is right through those two craters.

04 20 01 47 LMP I'm going to have to go almost due south of the - -

04 20 01 50 CDR I mean, southeast of these.

04 20 01 51 LMP I'm going to have to go due south.

04 20 01 55 CDR Okay, you can go by the right edge of that baby.

04 20 01 57 LMP Yes.

04 20 01 58 CDR Okay, very good. Okay, we've got a spot, Houston. We will proceed with the deployment.

04 20 02 04 LMP We're not quite as far from those coordinates as we thought we were.

04 20 02 09 CC Roger, Antares.

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04 20 02 17 CDR Okay, Houston. We will start the 16 millimeter going here and - We may have to change magazines.

04 20 02 26 CC Okay, give me a hack.

04 20 02 29 CDR I'll give you a hack.

04 20 02 30 CC Roger. I'll keep track. And, if you have a free minute, we would like some commentary on the depth of the MET tracks.

04 20 02 52 LMP 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-quarter of an inch deep.

04 20 03 02 CC Roger.

04 20 03 46 CDR Can't get any closer without falling in that crater, Ed.

04 20 03 50 LMP It's fine right there, Al.

04 20 03 52 CDR Okay.

04 20 04 15 LMP Okay. ... six frames per second.

04 20 04 36 LMP 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 48 CDR Stand by.

04 20 05 01 CDR MARK. Camera's 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 29 minutes behind the time line at this point. Over.

04 20 05 30 LMP Okay.

04 20 05 38 CDR Okay; Ed is working on the central station, and I'm going over for the subpallet.

[REDACTED]

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04 20 05 46 LMP Houston, the RTG cable temperature is 175 degrees.

04 20 05 53 CC Roger. Out.

04 20 07 29 CDR Okay. Subpallet is deployed northeast of the central station.

04 20 07 35 LMP Houston, the current - -

04 20 07 36 CC Roger. Out.

04 20 07 37 LMP - - current reading is 8.

04 20 07 42 CC Understand 8 amperes before pressing the switch.

04 20 07 47 LMP That's affirmative.

04 20 07 55 CC Roger.

04 20 08 58 CDR \*\*\* that looks beautiful. \*\*\* all full of dust.

04 20 09 08 LMP \*\*\* Everything else is going to be full of dust before long. Be filthy as pigs.

04 20 09 15 CDR Okay. I'm going to have to lift this up. You want to help me?

04 20 09 18 LMP Okay. What you want to do?

04 20 09 20 CDR I'm going to have to lift it up and shake the dust out of it that Boyd bolt. I can't get it otherwise.

04 20 09 24 LMP Okay.

04 20 09 35 LMP Okay. Watch it.

04 20 09 40 CDR There it goes. Okay, watch that -

04 20 09 46 LMP Is there anything that's not tied on?

04 20 09 47 CDR That's loose, yes. I've already taken those out.

04 20 09 49 LMP Okay, I'll hold it.

04 20 09 55 CDR Okay. Let's turn it upside down and shake it.

04 20 10 03 LMP All those little Boyd bolts falling off.

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04 20 10 06 CDR Yes, but them's not the ones I got the problems with. Okay, flop it over a minute.

04 20 10 16 LMP That'll do it?

04 20 10 18 CDR No, it's still not clear.

04 20 10 32 LMP Okay, I believe that will get it.

04 20 10 34 CDR Let me just try it while it's right here.

04 20 10 35 LMP Okay, I'll hold it. Go ahead.

04 20 10 46 CDR Okay.

04 20 10 47 LMP Got it?

04 20 10 48 CDR Yes. Let's get the other one.

04 20 11 15 CDR I know it's down in here somewhere.

04 20 11 18 LMP Say again.

04 20 11 19 CDR 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 34 CDR Okay.

04 20 11 35 LMP Thank you.

04 20 11 38 LMP Let me tilt it down a little more; let me hold it, and you go ahead.

04 20 11 39 CDR I can do it. Turn it around and get the front of it. Can you hold it up a little?

04 20 11 45 LMP Yes, I got it.

04 20 11 54 LMP You better hold -

04 20 11 58 CDR There you are - Oops.

04 20 12 01 LMP Don't step on there.

04 20 12 04 CDR Just put it down there, Ed, I guess, is the best way. Let me fuss with it.

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04 20 12 09 LMP Don't step on the PSE cable there.

04 20 12 15 CDR Let it go.

04 20 12 49 LMP ...

04 20 12 51 CDR No, it's not going to do it, apparently.

04 20 13 37 LMP Maybe your tool is screwed up - let's see about - see if mine's any better. Full of dirt.

04 20 13 46 CDR Ain't no better ... one.

04 20 13 53 CDR Don't step on it, babe.

04 20 14 20 LMP Why, I'm not even sure there's one down there.

04 20 14 24 CDR Well, there should be.

04 20 14 35 LMP 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 42 CDR Okay. Let's ...

04 20 14 53 CDR And the cover off.

04 20 15 05 CDR Yes.

04 20 15 08 LMP There?

04 20 15 13 CDR Yes, it's there. See it?

04 20 15 17 LMP I can't see it; but if you think it's there, go get it.

04 20 15 22 CDR 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 33 LMP 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 LMP The one that's deep in the back. Just can't feel it any longer.

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[REDACTED]

04 20 15 50 CDR Let's do this. ... seems to be 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. Tilt it a little more this way.

04 20 16 20 LMP Okay. Just hold it right there.

04 20 16 22 CDR Okay. I'll try.

04 20 16 23 LMP See where it's not.

04 20 16 48 LMP Okay. What do you want?

04 20 16 52 CDR Well, I'm having just no luck at all that way. Yes, over there it is.

04 20 17 26 LMP I'll get it.

04 20 17 27 CDR Got it? Great. Okay.

04 20 17 33 LMP It takes two of us to do what half of us can do.

04 20 17 36 CDR Here we go. Okay.

04 20 17 41 CC Did you get it loose, Ed?

04 20 17 42 LMP Yes, it's loose.

04 20 17 45 CDR Yes, we got it. Okay, let me move it up. Are you ready to go?

04 20 17 56 LMP Yes. I'm ready to get the connector.

04 20 18 07 LMP Go on. We've got it.

04 20 18 11 CDR Okay. And here comes the SIDE out the subpallet.

04 20 18 19 LMP Okay, let me get the connector and -

04 20 18 36 LMP Wait a minute. Don't drag the connector through the dirt.

04 20 18 40 CDR Why don't you move this thing? Then, I need the tape to pull it up.

04 20 18 51 LMP There you go.

04 20 18 57 LMP Okay.

[REDACTED]



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04 20 19 21 CC Ed, this is Houston.

04 20 19 24 LMP Go ahead.

04 20 19 27 CC Roger. Your 16 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 40 LMP Okay. I'll do that right now, Bruce.

04 20 19 43 CDR I'll get it.

04 20 20 00 LMP (Humming) Okay. The SIDE connector is connected. Am I clear to press the shorting switch, Bruce?

04 20 20 17 LMP Houston?

04 20 20 20 CC Roger. Go, Ed.

04 20 20 25 LMP Turning switch is depressed. You'll be able to read it in a minute, I think.

04 20 20 31 CDR Is that - better on the reflection, Houston?

04 20 20 37 CC Yes, indeed. That's much better.

04 20 20 42 CDR Okay. Camera's off.

04 20 20 47 CC Roger.

04 20 21 04 CDR Magazine Charlie-Charlie is off?

04 20 21 31 CDR Magazine Echo-Echo will be going on.

04 20 21 36 CC Roger. Esmerelda-Ecuador.

04 20 21 44 LMP 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 52 CDR What have we done to deserve this?

04 20 21 53 CC You'd better believe it.

04 20 22 04 CDR What have we done to deserve this?

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04 20 22 15 CC Just wait until you get to J-J.

04 20 22 19 CDR (Laughter) I'm nervous - I'm nervous already.  
Okay; f/8, six frames per second, 250th.

04 20 22 43 CC Roger. Give me a hack when you start it.

04 20 22 47 CDR Okay, Bruce. Stand by.

04 20 22 57 CDR HACK, HACK.

04 20 23 14 LMP And, Houston, I verify that the switch number 5 is  
clockwise.

04 20 23 21 CC Roger, Ed.

04 20 23 40 LMP And the thumper geophone's coming off, now.

04 20 24 08 CDR Hey, got pretty good range out of that baby.

04 20 24 11 LMP Man, that thing really went, didn't it?

04 20 24 19 CDR Good range out of that baby.

04 20 25 07 CC All, this is Houston. Could you tell us where you  
are in the SIDE or PSE sequence?

04 20 25 16 CDR 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 30 LMP 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 45 LMP 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 03 CDR It's in my pocket. ... pocket?

04 20 27 39 LMP Yes. Okay. ...

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04 20 28 05 CDR Hey, that's got to be -

04 20 29 05 LMP Okay, Bruce. The mortar pack is in place.

04 20 29 24 CDR And we've had interim deployment of the PSE.

04 20 29 31 CC Roger, Al.

04 20 29 50 LMP You know, I don't think the solar wind is going to blow our antenna over like it generally does.

04 20 29 56 CDR How about that. Steady as a rock.

04 20 30 00 LMP Okay, the CPLEE's starting to come off now. Watch it, watch it, watch it, watch it, watch it.

04 20 30 05 CDR Yes, thank you, thank you, thank you, thank you, thank you.

04 20 30 08 LMP And let's see if I can get it back in line. Can you tap it toward me a little? We're a little too close - if we can get the - the whole thing a little further away. Kind of push it with your feet.

04 20 30 20 CDR I don't want to get too much dust on it; bad enough as it is.

04 20 30 33 LMP About another 8 inches or so. That looks pretty good.

04 20 30 38 CDR That about level?

04 20 30 40 LMP Yes. It looks pretty level to me, Al. Okay. CPLEE's coming off.

04 20 30 47 CDR No, it's not.

04 20 30 51 LMP Well, okay. We'll fix it up. When you get that baby out there.

04 20 31 02 CDR Okay, Houston. Al is reading 3.75, reading 55 on the  $C_2$ . I have no flags, I'm on MINIMUM cooling, and very comfortable.

04 20 31 17 CC Roger, Al. Go ahead, Ed.

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[REDACTED]

04 20 31 21 LMP Okay, hold 1 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 01 LMP 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 14 LMP Okay.

04 20 32 16 CDR 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 38 LMP Okay. We'll keep plugging ahead here. Okay. Have a good ... amount of dirt. Central station is level.

04 20 33 31 LMP Okay, Houston. The CPLEE is deployed. It is - the ball is within the inner ring and it is lined up due east.

04 20 33 44 CC Roger, Ed.

04 20 33 47 LMP And we're going for the SIDE now.

04 20 33 52 CDR And it looks clean and pretty, doesn't it? That little CPLEE all sitting there?

04 20 33 58 LMP It won't long.

04 20 34 00 CDR All prim and proper.

04 20 34 02 LMP You look very white and prim and proper yourself. Little tarnished now, but - -

04 20 34 08 CDR Except for the lower extremities, huh?

[REDACTED]

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04 20 34 19 CC Ed, Houston. You confirm interim or initial mortar pack deployment?

04 20 34 25 LMP That's affirmative. I confirm it. It's lined up almost due north, Bruce, in order to have a free flight away from all 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 54 LMP And I'm heading out with the SIDE and the CCIG at this point.

04 20 35 02 LMP 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 32 LMP 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. We understand that will not impact the experiment.

04 20 35 52 CC \*\*\* Houston. Do you copy deploy in accordance with the nominal plans?

04 20 35 57 LMP Okay. I got you, Bruce. Thank you. Sorry, I was busy - at that moment.

04 20 36 45 CDR 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 56 CDR (Laughter)

04 20 39 19 CDR 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 30 CDR Can you actually see it from there?

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[REDACTED]

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 43 CDR Flopping in what?

04 20 39 57 LMP 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 20 CDR Want some help up there, Ed?

04 20 40 23 LMP Give me another minute with it and I'll have it, I think.

04 20 40 25 CDR Okay.

04 20 40 30 CC Say again on that, Ed.

04 20 40 33 LMP Say again?

04 20 40 36 CC I missed your last.

04 20 40 39 LMP 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 this - is sufficiently a little stiff, that 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 13 LMP No, no, no, no. It's the cable from the CCIG to the SIDE.

04 20 41 19 CC Okay.

04 20 41 22 CDR A little hysteresis problem, huh?

04 20 41 26 LMP 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.

[REDACTED]

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04 20 41 59 CC Okay, Ed. If you have a problem, SIDE is first priority; CCIG comes second.

04 20 42 06 LMP Roger.

04 20 42 22 LMP 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 43 LMP Okay. The SIDE is deplo - the SIDE is deployed.

04 20 42 49 CC Roger. And copy the dust cover is off.

04 20 42 54 LMP Okay. We'll head back and get on to the thumper geophone.

04 20 43 01 CC What's the status of the CCIG, Ed?

04 20 43 04 LMP 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 45 LMP I was heading for it over there now, Al. I'll turn it off.

04 20 43 47 CDR Okay. You shut it off, and we'll change the MAG later.

04 20 44 04 LMP 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 34 LMP I've got it in between LOW and INTERMEDIATE now.

04 20 44 46 CC Roger, Ed.

04 20 44 51 LMP And I'm going to take the penetrometer measurement, now, Houston, until I get ready for the thumper.

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04 20 45 11 LMP That new extension handle works well. And, 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 51 CDR Six marks. Six blacks showing.

04 20 45 53 LMP Six - 1, 2, 3, - 1, 2, 3, a double one and a black and a 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 09 LMP That's with one hand; with two hands, I can push it all the way in.

04 20 46 19 CC Roger.

04 20 46 20 LMP I'll try it once more - -

04 20 46 22 CDR You have about 3 inches left there.

04 20 46 24 LMP Well, it - it was no problem getting it in, Al. It's my fingers won't reach any further.

04 20 46 27 CDR Okay.

04 20 46 32 LMP Okay. Here we go. One - one hand. \*\*\* two white and two black rings showing below the upper double ring. Understand? With one hand.

04 20 46 51 CC Roger. Understand.

04 20 46 52 LMP And two hands, all the way again.

04 20 46 57 CC Roger, Ed.

04 20 47 02 LMP And one more. At this site, Houston, I got it all the way to the upper double ring, one hand.

04 20 47 17 CC Roger, Ed.

04 20 47 19 LMP And again all the way in, two hands.



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04 20 47 24 CC And get all ... the geophone deployment.

04 20 47 27 LMP Roger. And, Houston, I'm back in MINIMUM cooling.

04 20 47 40 CC Roger, Ed.

04 20 48 23 LMP 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 08 CDR 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 07 LMP Now, let's see what that site looks like.

04 20 50 14 CDR Okay, the antenna is leveled. \*\*\*

04 20 50 32 LMP Al, you do take a picture down along this line. do you not?

04 20 50 35 CDR Yes.

04 20 50 36 LMP I've got me a site.

04 20 51 35 LMP 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 51 LMP That's affirm.

05 20 51 55 CDR 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 19 LMP Okay, Al, will you watch me and keep me honest here?

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04 20 52 26 CDR Just a sec, Ed. Number 1, clockwise. Number 5, counterclockwise. Okay. That's where they are, Bruce.

04 20 52 41 CC Roger. Out.

04 20 52 55 LMP I'm going to start moving out, Al.

04 20 52 56 CDR Okay. Let me just wait here for you for a minute.

04 20 52 59 CC And, Al, for your information, they're receiving a good signal back from ALSEP.

04 20 53 00 CDR Okay.

04 20 53 07 LMP See where my first geophone is, Al? Is it okay?

04 20 53 09 CDR Yes, I'll just - line you, babe; just a sec.

04 20 53 13 LMP Okay.

04 20 53 15 CDR 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 26 LMP Yes.

04 20 53 29 CDR That big intersection there.

04 20 53 30 LMP Okay.

04 20 53 31 CDR That's a perfect line for you.

04 20 53 32 LMP That's where I'm headed.

04 20 53 34 CDR Yes, beautiful. Okay, Houston, the ALSEP antenna alignment looks good.

04 20 53 45 CC Roger, out.

04 20 53 49 CDR Okay, let's press on with the LR cubed.

04 20 53 55 LMP And, Houston - -

04 20 53 57 CC Okay, we've also got the PSE final deployment.

04 20 54 07 CDR Okay, and we'll do that now.

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04 20 54 13 LMP (Humming) Okay. Pull it - feet out this way.  
And ... straight; plane \*\*\*

04 20 57 17 LMP Okay, Houston. The second geophone is in. And I  
was a little bit overly optimistic about the ease  
with 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 39 LMP The geophone isn't heavy enough to straighten it  
out.

04 20 57 40 CC Roger, Ed.

04 20 57 41 LMP But we got it in.

04 20 57 48 CC This "we" stuff?

04 20 57 51 LMP That's an editorial we. I was really referring  
to the end of the - -

04 20 58 00 CC And are you getting the - -

04 20 58 01 LMP I was really referring to the end of the thumper  
and me.

04 20 58 05 CC Are you getting the second flag in there?

04 20 58 06 LMP Yes, it's in.

04 20 58 12 CDR Okay, the final deployment of the PSE gives us a  
shadow reading of - 093.

04 20 58 29 CC 093 degrees and level. Over.

04 20 58 33 CDR 093 degrees and level - Make that - -

04 20 58 40 CC Beautiful.

04 20 58 54 CDR You can call it 093.5, if you want, Houston.

04 20 59 00 CC Roger, out.

04 20 59 02 LMP And the skirt is all deployed very nicely and  
level; it's flat all the way around.

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[REDACTED]

04 21 02 20 LMP Okay, Houston, this is Ed. I'm at the end of my geophone line. Looking back over it, I see that 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's 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 47 LMP Yes, the third one's in the ground. Somehow or another, I'm tangled up on this cable. Just a minute. There we go.

04 21 03 12 CDR Okay. The LR cubed is deployed 100 feet west of the central station. It is level, set index is zero. The cover is coming off, now.

04 21 03 29 CDR The cover - The cover is off.

04 21 03 30 CC Roger, Al. 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 GC to commence thumping.

04 21 03 45 LMP Okay. I'm standing still now.

04 21 03 50 CDR Okay. The cover is off of the laser, and it's completely clean.

04 21 03 59 CC Roger.

04 21 04 06 CDR And it did not move during the cover removal.

04 21 04 12 CC Roger, Al. And if you can do it without moving around, we'd like to get an EMU status report.

04 21 04 23 CDR 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 34 LMP Okay. This is Ed. I'm 3.75; 34 percent. I'm MIN cooling, no flags. Feel great.

04 21 04 50 CC Roger. Got it.

[REDACTED]

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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 16 LMP Okay. You're getting them from all three geophones, Houston?

04 21 05 23 CC That's affirmative.

04 21 05 25 LMP Okay. Here goes the first one.

04 21 05 29 CDR Okay.

04 21 05 30 LMP Do I need 20 seconds now, Houston?

04 21 05 33 CC That's affirmative.

04 21 05 36 LMP Okay. Started counting.

04 21 05 50 LMP 5, 4, 3, 2 - Start over. 5, 4, 3, 2, 1 -

04 21 06 05 LMP FIRE. I didn't feel anything, Houston.

04 21 06 16 CC Roger, we copy. Stand by.

04 21 06 25 CDR Ed, I'm going to mosey on back and start taking pictures in the meantime.

04 21 06 28 LMP 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 06 LMP Okay. I haven't moved. Al, if you'll hold your position, we'll give them another go at it.

04 21 07 12 CDR Okay, I'm steady.

04 21 07 28 LMP 5, 4, 3, 2, 1 -

04 21 07 34 LMP FIRE.

04 21 07 36 LMP Okay, we got it that time, Houston.

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[REDACTED]

04 21 07 40 CC Roger, very good.

04 21 07 41 LMP Okay, it's a hard trigger, that's all. That was the problem.

04 21 07 48 CC We copy.

04 21 07 50 LMP Say again. Okay.

04 21 07 58 CDR Houston, did you know that - we were filming that last magazine at six frames per second? Did you take that into account?

04 21 08 09 CC That's affirmative.

04 21 08 11 CDR Okay, the little indicator - -

04 21 08 15 CC Six frames per second was nominally 16 minutes, and we ran for almost 20.

04 21 08 21 CDR Okay, the little ball indicator was - indicating empty. Okay.

04 21 08 24 LMP Hey, Al, I'm ready for another one.

04 21 08 26 CDR Go.

04 21 08 45 LMP 5, 4, 3, 2, 1. Let me try it again.

04 21 09 02 LMP 5, 4, 3, 2, 1 -

04 21 09 10 LMP FIRE.

04 21 09 14 LMP A hair trig - trigger, this isn't. Okay - loading again - -

04 21 09 20 CC Okay, Ed. We copy it fired on that one, and we see it -

04 21 09 28 CDR 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 42 CDR Oh, dear (sigh).

[REDACTED]

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04 21 09 46 LMP Okay, Al, I'm ready for another one. And, Houston, this is - number 2.

04 21 09 55 CC It should be number 3, Ed.

04 21 09 58 LMP Okay, counting from zero, it's number 2. Zero, one, two.

04 21 10 07 CC Roger; counting from zero - counting from zero, it is number 2.

04 21 10 09 LMP All right.

04 21 10 10 CDR Okay.

04 21 10 25 LMP 5, 4, 3, 2, 1 -

04 21 10 30 LMP FIRE.

04 21 10 42 CC Beautiful, Ed.

04 21 10 44 LMP Okay.

04 21 10 47 CDR I'll set photos Juliett-Juliett. Starting frame is 6.

04 21 10 57 CC Roger; frame 6, Jogjakarta-Java.

04 21 11 03 CDR Do you have to be so prosaic?

04 21 11 10 LMP Okay, Al, I'm ready when you are.

04 21 11 12 CDR Go ahead.

04 21 11 30 LMP 5, 4, 3, 2, 1 -

04 21 11 37 LMP FIRE. 1, 2, 3, 4, 5. Besides having a hard trigger, this thing has a pretty good kick to it.

04 21 11 48 CC Okay, good shot, Ed.

04 21 11 53 LMP Kind of like firing both barrels of a 12-gage shotgun at once.

04 21 12 24 LMP Houston, am I on number 5 now?

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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 36 LMP Okay, give me the count from zero. That's what I'm marking on. Okay, Al, I'm ready.

04 21 12 42 CC Okay, from zero, you're on number 4.

04 21 12 47 CDR Okay, I'm ready, Ed. Go ahead.

04 21 12 58 LMP 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 10 LMP 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 53 LMP Okay. 1, 2, 3, 4, 5. I can't get that one to fire either. Let me try it again.

04 21 14 06 CC Okay, Ed. What I meant was the next geophone line station with the next initiator.

04 21 14 14 LMP Okay. Let me try - -

04 21 14 18 CC So, using initiator number 5, you'll -

04 21 14 24 LMP Say again what you want me to do, Bruce - on both number 4 and number 5.

04 21 14 34 CC Okay, 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 43 LMP 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.

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04 21 15 08 CDR Roger.

04 21 15 10 LMP Okay, Al, I'm ready to try it again.

04 21 15 14 CDR Okay. Go ahead, Ed.

04 21 15 36 LMP 5, 4, 3, 2, 1 - Durn. It just won't fire. I'll try that initiator once more.

04 21 15 55 CC Roger; repeat that one, at the same location?

04 21 15 58 LMP Roger. 1, 3, 4, 5 - -

04 21 16 04 CC Okay, and hold at ARM for 10 seconds.

04 21 16 08 LMP Okay, let me reinitiate the ARM. 1, 2, 3, 5, 6, 7, 8, 9, 10 -

04 21 16 24 LMP FIRE. It won't go, Bruce.

04 21 16 36 CC Okay, next igniter, next geophone station.

04 21 16 41 LMP Roger.

04 21 17 00 LMP Okay, Al, I'm ready.

04 21 17 03 CDR Okay, go ahead.

04 21 17 09 LMP Bruce, do you want a 10-second ARM on this one, or 5?

04 21 17 13 CC 10 seconds, please.

04 21 17 24 LMP 5, 4, 3, 2, 1 -

04 21 17 29 LMP FIRE. Got a good one. 3, 4, 5.

04 21 17 36 LMP Hurrah, we got one.

04 21 17 39 CDR Hurrah, we got one.

04 21 17 53 LMP 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 01 CDR Okay, go ahead.

04 21 18 04 LMP Okay, here we go.

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04 21 18 19 CC Ed, this is Houston. We would like you to proceed to the central geophone, that is, geophone number 2; select igniter number 11, or make that igniter number 10 by your count, and fire that one off. Over.

04 21 18 35 LMP Instead of the one I'm firing right now?

04 21 18 40 CC That's affirmative.

04 21 18 42 LMP All right, just about to push the trigger. Uh-oh, that's what I was afraid of, Bruce. This one's pulled out.

04 21 18 55 CC Which one pulled out?

04 21 18 58 LMP The middle geophone is not in the ground.

04 21 19 04 CC Okay; if you can reemplace it, do so.

04 21 19 06 LMP 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 35 CDR Right now, I'm taking the distance shots back to the LM from the RTG. Getting down to photograph the SIDE.

04 21 19 44 CC Roger. Out.

04 21 20 25 LMP Okay, Houston. Number 11, it is.

04 21 20 33 CC Be your igniter number 10, and you're at the second geophone.

04 21 20 40 LMP Okay, that's affirm. Al, I'm ready when you are.

04 21 20 45 CDR Go ahead.

04 21 21 04 LMP 5, 4, 3, 2, 1 -

04 21 21 08 LMP 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

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to and after the geophone thumps. Ed must still abide by the 20-second-before-and-5-second-after rule. Over.

04 21 21 29 CDR This is Al. I understand.

04 21 21 35 LMP 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 19 LMP Okay.

04 21 22 54 LMP Okay, Houston, here is number 11 coming up.

04 21 23 07 CC Roger.

04 21 23 22 LMP 5, 4, 3, 2, 1 -

04 21 23 26 LMP FIRE. Good shot.

04 21 23 30 CC Roger.

04 21 23 33 CDR You should have threatened it earlier in the game.

04 21 23 37 LMP You're right.

04 21 23 51 LMP Okay. Number 12.

04 21 24 10 LMP 5, 4, 3, 2, 1 -

04 21 24 14 LMP FIRE. Good shot.

04 21 24 19 CC Roger, Ed.

04 21 24 31 LMP ... the devil.

04 21 24 51 LMP Okay; number 13, Houston.

04 21 24 55 CC Roger.

04 21 25 01 LMP 5, 4, 3, 2, 1 -

04 21 25 06 LMP FIRE. No fire.

04 21 25 10 CC Okay, Ed. Press on to the next station; the next igniter.

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[REDACTED]

04 21 25 15 LMP Okay.

04 21 25 27 LMP Are we getting any decent signals back, Bruce?

04 21 25 32 CC That's affirmative, Ed.

04 21 25 35 LMP Okay. I'm on igniter 15.

04 21 25 40 CC Al, this is Houston. We need to have you stand still again.

04 21 25 45 CDR Okay.

04 21 25 51 CC And I - I show that you ought to be on your igniter number 14, Ed. Unless that was the one you last used.

04 21 25 59 LMP Okay.

04 21 26 06 LMP 5, 4, 2, 1 -

04 21 26 11 LMP FIRE. No fire. Let me try it once more, Bruce. ARX, 1 -

04 21 26 30 LMP FIRE. No fire. Okay, I'm moving on.

04 21 26 36 CC Roger, move on.

04 21 26 47 LMP Number 15. Okay.

04 21 27 10 LMP 5, 4, 3, 2, 1 -

04 21 27 14 LMP FIRE. No fire. Want me to press on?

04 21 27 22 CC Roger, next geophone, next position; or not next geophone, next station, next - next squib.

04 21 27 32 LMP Roger.

04 21 27 48 LMP Okay, Al.

04 21 28 08 LMP 5, 4, 3, 2, 1 -

04 21 28 13 LMP FIRE. Good shot.

04 21 28 17 LMP 2, 3, 4, 5.

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04 21 28 22 CC Roger, understand good shot on your igniter 17 - 16.

04 21 28 26 LMP That's affirm.

04 21 28 37 LMP Okay, number 17.

04 21 28 45 CDR Okay.

04 21 29 20 LMP 5, 4, 3, 2, 1 -

04 21 29 25 LMP FIRE. Good shot. 2, 3, 4, 5.

04 21 29 35 CC Roger, Ed.

04 21 30 06 LMP Okay, number 18.

04 21 30 13 CDR Okay, go ahead.

04 21 30 39 LMP 5, 4, 3, 2, 1 -

04 21 30 44 LMP FIRE. Good shot. 3, 4, 5.

04 21 30 58 LMP These latter shots are firing like it's supposed to, Bruce.

04 21 31 03 CC Roger, Ed.

04 21 31 04 LMP 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 15 LMP Okay, Al.

04 21 31 17 CDR Okay, go ahead.

04 21 31 33 LMP 5, 4, 3, 2, 1 -

04 21 31 38 LMP FIRE. Good shot. 2, 3, 4, 5.

04 21 31 47 CC Roger, Ed.

04 21 31 50 LMP And we only have one left, Bruce.

04 21 31 56 CC Okay, how many positions do you have to go?

04 21 32 00 LMP Well, I'm on 20, and I'm on my last position. I'm at the last geophone.

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04 21 32 12 CC Beautiful. Beautiful.

04 21 32 13 LMP 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 30 LMP 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 41 LMP 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 \*\*\* Al, are you both holding still for the calibration here?

04 21 33 13 CDR Affirmative.

04 21 33 27 LMP 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 36 LMP Thank you.

04 21 33 40 CC Okay, go ahead with the last shot, Ed.

04 21 33 44 LMP Okay, here we go.

04 21 33 45 CDR I'm ready.

04 21 33 59 LMP 5, 4, 3, 2, 1 -

04 21 34 03 LMP FIRE. Good shot. 3, 4, 5.

04 21 34 08 CC Good show.

04 21 34 10 CDR Okay. 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 MET for closeout?

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04 21 34 47 CC Roger. Counter 34, and stand by.

04 21 34 53 CDR ... not a bad batting average. Big-league stuff.

04 21 35 04 LMP I was hoping to get a few more shots off than that.

04 21 35 06 CDR Okay, we ought to look around the spot for the - our map. I think we'd better have a little change in strategy here.

04 21 35 25 CDR Okay, Houston, the switch number - -

04 21 35 29 CC Al and Ed, this is Houston with a one-half-hour extension. You have 18 minutes until you have to be back at the MESA.

04 21 35 41 LMP 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 53 LMP 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 11 CDR Hey. If you wait a minute, I'll come over and help you with that thing, Ed.

04 21 36 14 LMP Okay, Houston. Did you copy that switch number 5 is clockwise and safe?

04 21 36 20 CC Roger. I now copy that switch 5, clockwise and safe.

04 21 36 30 LMP Okay, we're going to arm the mortar pack, and unlock and pull the safety latch. Hold her down.

04 21 36 51 LMP ... a 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.

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04 21 37 12 LMP Okay, that's our intent, Houston.

04 21 37 17 CC 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 24 LMP Okay.

04 21 37 43 LMP \*\*\*

04 21 38 01 CDR Okay, it's a little off level, now.

04 21 38 03 LMP Yes. I'll relevel it after a while.

04 21 38 04 CDR Okay.

04 21 38 05 LMP Okay. I'm fixing to relevel it right now.

04 21 38 09 CDR I'll press on and back and look for a good spot for this - -

04 21 38 12 LMP 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 MAFK; 4 hours into the EVA.

04 21 39 05 LMP Okay.

04 21 39 06 CDR 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 17 LMP 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 32 LMP I will have it when I leave here; no, we don't have it yet.

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04 21 39 50 LMP 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 - pointed almost - 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 20 LMP Well, it's tangent to the inner ring on the north-west side.

04 21 40 32 CC Okay.

04 21 40 33 LMP 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 54 LMP Okay. Switch 5 is armed. Pretty hard to stay 15 feet back when it's - -

04 21 41 00 CC Okay. You got the safety - -

04 21 41 03 LMP - - 15 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 16 LMP That's affirm.

04 21 41 26 LMP And I have the extension handle, and I'm starting out after Alan, now.

04 21 41 42 LMP Whee. Hey, this is sure a different mode of traveling than carrying that barbell.

04 21 41 50 CDR 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.

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04 21 42 24 CDR And I've photographically doc - -

04 21 42 26 CC Roger, Al.

04 21 42 27 CDR - - I've documented this location with a locator shot back to the IM and to the ALSEP.

04 21 42 37 CC Roger, Al.

04 21 42 49 LMP Okay, Al. Need some help there?

04 21 42 51 CDR Yes, I wanted to pick up all the walnut-size rocks in your tongs. And we'll work the surface fines, here.

04 21 43 08 CDR Why don't you work that - that side of it, and I'll work this side.

04 21 43 12 LMP Okay.

04 21 43 29 CDR 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 51 LMP Oh, damn.

04 21 43 56 CDR Maybe we can only -

04 21 43 58 LMP Pardon?

04 21 43 59 CDR For this amount of time, we can really only get the - the ones that are essentially there.

04 21 44 05 LMP Yes, let me grab another weigh bag, because you're too far away for me to - -

04 21 44 08 CDR An inch in diameter.

04 21 44 15 LMP - - Can't help you very well this way. Put something together in a minute.

04 21 44 45 CDR I think I've got them, Ed.

04 21 44 47 LMP Okay. I'll get one for the fines.

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04 21 44 49 CDF 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 13 LMP Okay. You want the medium-size scoop or the big scoop for this?

04 21 45 19 CDR No, actually - the trenching tool, medium - no, 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 kicked up the rocks. Okay?

04 21 45 35 LMP Okay. \*\*\* bringing the stuff over right now. Probably have this done before I ... - -

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 51 CDR Okay, we will be able to bring the comprehensive sample at that time.

04 21 45 59 CC Beautiful.

04 21 46 00 LMP Hey, here - don't close it; here's one in here for that.

04 21 46 04 CDR What?

04 21 46 05 LMP Here's one in here I picked up.

04 21 46 06 CDR Oh, okay. Dump it in here, then.

04 21 46 21 CDR Okay. Good.

04 21 46 35 LMP Okay, I'll start over here in this undisturbed area.

04 21 46 45 CDR Yes, just get that area and then right here in this area. And fill up the bag to the line. And I'll head on back a little farther and get a football-size rock.

04 21 46 57 LMP Okay.

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04 21 47 44 CDR Okay. There's some pretty good-sized ones back over in here.

04 21 48 56 CDR Okay, that's too big. I'll get one that's a little smaller.

04 21 49 10 CC Al and Ed, 5 minutes.

04 21 49 12 CDR Okay. You want to start back now, Ed?

04 21 49 19 LMP All right, let me get about three more scoops, Al. I can get there before long.

04 21 49 23 CDR Good.

04 21 50 10 CDR 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 14 CDR The second small football appearing on the same crater - from near the same crater.

04 21 51 43 CDR 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 - what appears to be - -

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 06 CDR - - what looks to be a fairly large crystal in that second small football rock, and Al is starting back toward the MESA, now.

04 21 52 15 LMP And I'm on my way, too.

04 21 52 19 CC Roger.

04 21 52 29 CDR Okay. Away we go.

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04 21 52 31 LMP 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 rocks around some of the craters; but, by and large, it's a powdery surface. Don't run into that crater, Al.

04 21 52 54 CDR Don't - don't worry, babe. A little sidwinder action, here.

04 21 53 10 CDR The old man's traveling pretty well.

04 21 53 12 CDR Hey, how about keeping your eye on it because - -

04 21 53 14 LMP I am.

04 21 53 19 LMP Boy, my sample's packing down. It was more than this when I left the site.

04 21 53 36 CDR Okay, we're coming back down the hill, Houston. Got air brakes going downhill ... - -

04 21 53 42 CC Roger, Al. We're seeing you moving 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 06 CDR Okay.

04 21 54 13 LMP 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 31 CC And we go back to average, and f/44.

04 21 54 38 LMP How's the field of view right now?

04 21 54 43 CC It's pretty poor right now.

04 21 54 46 LMP Okay. Just a minute. Okay.

04 21 55 00 LMP Switch it to 40.

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04 21 55 03 CC Okay, can you elevate the camera a little?

04 21 55 06 LMP Yes, I'll have to dig in a - leg. How is that?

04 21 55 13 CC Very good. Very good.

04 21 55 15 LMP Okay. Oh, damn it. There went my sample bags.

04 21 55 26 CDR Put your UHT handles through it.

04 21 55 30 LMP I'll use the - this handle. Fortunately, I don't think more than a little bit fell out. Okay, we got it packed down to only half full.

04 21 56 56 CDR 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 36 LMP 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 47 CDR 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 14 CDR Okay. Okay, I guess we've got a little room to do that. I put the football-sized rocks in the ETB.

04 21 58 27 LMP Okay. Let's see, you put a 70-millimeter camera in the ETB?

04 21 58 33 CDR You want a bag? Yes, it's in there.

04 21 58 35 LMP Did you take out the TDS?

04 21 58 39 CDR No, not yet.

04 21 58 41 LMP Okay, it's probably in the bottom.

04 21 58 42 CDR Yes, it is.

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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 52 CDR It's on the MET, Bruce. It never made it on the camera.

04 21 58 59 CC I think Ed put it on.

04 21 59 02 LMF Negative.

04 21 59 04 CC But didn't start it.

04 21 59 05 CDR Oh, I'm sorry. I take it back; we did put it on.

04 21 59 14 CDR Okay, where's that good scoop?

04 21 59 19 LMP 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 26 CDR All right.

04 21 59 28 LMF Trenching tool.

04 21 59 29 CDR Want to hold the bag?

04 21 59 30 LMF Yes.

04 21 59 31 CDR Let's hit that little crater out there. It looks like a secondary.

04 21 59 34 LMF Okay, let's go get it.

04 21 59 35 CDR Right out here.

04 21 59 38 LMF 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 52 CDR Okay. Oh, God.

04 22 00 24 LMF There's a little different-colored layer in the bottom of it there.

04 22 00 26 CDR Yes. Scoop it out. ...

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[REDACTED]

04 22 00 35 LMP See, there is a different one color down there.

04 22 00 43 CDR Okay, how does that look to you?

04 22 00 45 LMP I can take another shovelful.

04 22 00 46 CDR Okay.

04 22 01 01 LMP That's good.

04 22 01 02 CDR Okay. Houston, that's from a small crater; looks like it might be a secondary impact, just hazard-ing 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 24 CDR And we'll put a documented sample bag in there with it.

04 22 01 25 CC Roger. That's the initial - -

04 22 01 30 CDR We'll put a documented sample bag in there with, and that will be bag number 1. Here you go, Ed. Stick it in there.

04 22 01 51 LMP Okay, put it in.

04 22 01 54 CDR One-November, 1-November.

04 22 01 59 CC Roger. Out.

04 22 02 03 LMP Okay. \*\*\* and that'll fill up this one - this SRC, and that'll do it very nicely.

04 22 02 07 LMP Okay. There you go.

04 22 02 12 CDR Hey, you got her.

04 22 02 16 LMP 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 47 CDR Okay, that's too big; stick that in the ETB, also. Go ahead, Houston. Those are the ... rocks - -

[REDACTED]



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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 to that, in this orientation, we're still viewing the IM. Over.

04 22 03 13 CDR Okay. Okay. At f/44, peak, and the long direction normal to the sunline.

04 22 03 22 CC Roger.

04 22 03 24 LMP Al, did you get the - did you get to put the maps in - No, the maps are right here.

04 22 03 30 CDR No, I haven't done anything yet. I'm just loading the SRC.

04 22 03 33 LMP Okay.

04 22 03 34 CDR The 70-millimeter camera in the ETB, and I'm storing - packing the SRC.

04 22 03 40 LMP Okay.

04 22 03 41 CDR 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. \*\*\* the football rocks are in one weigh bag, and you're adding another weigh bag containing the small rocks.

04 22 04 21 CDR Right, two weigh bags and they're both in the ETB. Get in there, baby.

04 22 04 28 CC Roger.

04 22 04 29 LMP We're going to have to make another ETB load, Al. I've got another 70-millimeter camera to go.

04 22 04 36 CDR It's not very heavy.

04 22 04 38 LMP But I'm thinking about volume.

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04 22 04 44 CDR Okay, SRC's closed now. 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 16 LMP Okay.

04 22 05 19 CC We copy those in the SRC.

04 22 05 20 CDR \*\*\* Get the good one off there, okay.

04 22 05 21 LMP Yes, I got it, Al.

04 22 05 22 CDR Okay, and the map should be in there - -

04 22 05 24 LMP I've got the map, already.

04 22 05 25 CDR - - and the lens/scribe/brush assembly.

04 22 05 28 LMP I'll grab it.

04 22 05 29 CDR Okay, I'll boot on out here and take care of - -

04 22 05 31 LMP Watch - You're tangled up in the cable.

04 22 05 37 CDR Okay, 44, peak, normal.

04 22 05 40 LMP Roger.

04 22 05 47 CC Roger, and we might as well go to 25 on the zoom, Al.

04 22 05 53 CDR I just zoomed by you. Verify 44 - -

04 22 05 59 CC We saw you zoom by us.

04 22 06 01 CDR - - 44 on the zoom; I mean 44 on the f-stop; 25 on the zoom - Want - want infinity on the - -

04 22 06 13 LMP Just a minute, Al; I've got to configure one more camera here.

04 22 06 15 CDR - - infinity on the focus. We're transmitting, and we're in peak, and we're long axis normal to the Sun. How's that?

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04 22 06 30 CC Roger, Al.

04 22 06 37 CDR You want the lens cap on or off?

04 22 06 41 CC Lens cap off, o-f-f.

04 22 06 45 CDR O-f-f. 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 07 LMP Yes, they're all in there; I just check them.

04 22 07 09 CDR Good show.

04 22 07 10 LMP And the SRC number 2 is on the MET.

04 22 07 15 CDR Okay, let's see if we can get you clean.

04 22 07 18 LMP Okay, I think that completes my checklist. Watch it. You're tangled up in the cable again - -

04 22 07 23 CC Roger, copy SRC number 1 sealed.

04 22 07 26 LMP - - the cable, the cable!

04 22 07 29 CDR Say again.

04 22 07 32 CC Is SRC number 1 sealed, and closeup camera off?

04 22 07 35 CDR SRC number 1 is sealed.

04 22 07 38 LMP And verify that closeup camera is off.

04 22 07 45 CDR Okay, it's going to be a - \*\*\* -

04 22 07 55 LMP Brush?

04 22 07 57 CDR Yes.

04 22 07 58 LMP Okay.

04 22 08 01 LMP Coming off.

04 22 08 08 CDR Okay?

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04 22 08 20 CDR Okay, next. Okay, let's get out in the Sun and see what we can see.

04 22 08 27 LMP Yes. Do it here. God, it - No, I don't know. God, you're a mess.

04 22 08 39 CDR Oh, it helps.

04 22 08 41 LMP Yes, it helps quite a bit. I'll just start at the tcp. It'll take a while, but we'll get it there.

04 22 08 57 CDR On these gloves, here.

04 22 08 59 LMP Pardon?

04 22 09 04 CDR Okay, press on. \*\*\*

04 22 09 20 LMP Got into you connectors, there.

04 22 09 33 CDR 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 \*\*\*

04 22 09 57 CDR Okay.

04 22 09 59 LMP 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 10 CDR All righty. Do you ever use soap on your clothes? Bet you been wallowing in them.

04 22 10 33 LMP 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 47 CDR (Laughter) Oh, ho, ho -

04 22 10 53 LMP Okay. That's it. Turn it around toward me a little bit more. Those overshoes are impossible.

04 22 11 07 CDR That came off pretty well.

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04 22 11 09 LMP Yes. I think we can do best by kicking them off of those, Al.

04 22 11 12 CDR Okay.

04 22 11 13 LMP Because you're just going to get back on as fast as - -

04 22 11 14 CDR 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 55 LMP Yes. It comes off it it's not too - much rubbed in; if it's just laying there, it brushes off well.

04 22 12 03 CDR Okay. You have a UHT still on.

04 22 12 07 LMP Okay. I'll take it.

04 22 12 13 CDR Okay. Now I'll add a little. Not much we can do with that. Okay. Yes. That comes - quite a bit of that stuff comes off, especially off the back. That's lot better.

04 22 12 48 CDR Okay.

04 22 12 49 LMP Okay, ready?

04 22 12 50 CDR Wait a minute, I've got a -

04 22 12 51 LMP Hey, you're in the S-band cable.

04 22 12 52 CDR 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 04 LMP Okay.

04 22 13 07 CDR Okay, we'll put a pair of tongs on that. Did you get it?

04 22 13 17 LMP No. These tongs will never pick it up. You can help me with it, though.

04 22 13 34 LMP Okay. Got it.

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[REDACTED]

04 22 13 36 CDR Okay. All righty, let's press on here. Okay.  
I want to get this baby out in the Sun.

04 22 13 51 LMP Lay that right there until tomorrow.

04 22 14 02 LMP Okay. Caught the cable again. Hold it. Al,  
hold it.

04 22 14 08 CDR Holding it.

04 22 14 31 LMP Go up to -

04 22 14 37 CDR That it.

04 22 14 38 LMP 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 42 CDR 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 51 CDR Okay.

04 22 14 52 LMP This EMU is about 4 feet in the air, right now.

04 22 14 55 CDR This is Al, 3.75; and I'm reading 40 - 40 percent;  
no flags on low flow; and I feel fine.

04 22 15 07 LMP Okay. I'm 3.75; reading 20 percent; and no flags;  
MINIMUM cooling, and feel great.

04 22 15 23 CC Roger. Thank you, Ed.

04 22 15 29 LMP Got it?

04 22 15 30 CDR Got it.

04 22 15 31 LMP Piece of cake.

04 22 15 34 CDR That EMU falls flat on his back.

04 22 15 36 LMP \*\*\* takes it with you.

04 22 15 54 CDR How's our buddy the redhead doing, Houston?

04 22 16 06 LMP I don't think they heard you.

[REDACTED]

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04 22 16 08 CDR Houston, this is Al. How's our buddy - -

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 19 CDR 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 35 CDR Ah, beautiful. Beautiful.

04 22 16 38 LMP Okay, Houston. I'm at the door, ready for ingress. Getting ready to open the hatch, now.

04 22 16 46 CC Roger, Ed.

04 22 16 50 LMP Hatch is open, and I'm ingressing.

04 22 16 58 CDR Okay, the -

04 22 16 59 CC Roger. Where's the SRC?

04 22 17 05 CDR Say again.

04 22 17 08 CC Did the SRC get up to the platform?

04 22 17 12 LMP Yes.

04 22 17 22 CDR 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 49 CDR Okay. The TV's ready to go.

04 22 17 54 LMP Okay. Get mine turned on the lanyard and away we go.

04 22 18 23 LMP Bum-bum-bum, ba-ba, bum-bum.

04 22 18 28 CDE Okay. He's coming up on the porch now.

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04 22 18 41 LMP 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 50 CDR I've got it.

04 22 18 51 LMP Okay.

04 22 19 04 CDR Houston, Al's starting up the ladder.

04 22 19 10 CC Roger. Did you get everything in the one ETB?

04 22 19 14 CDR Yes.

04 22 19 18 CC Roger. Very good.

04 22 19 42 CDR Okay. Al's up at the top of the ladder waiting for the LEC to come up.

04 22 19 57 LMP Now, it's up here.

04 22 19 59 CDR Okay.

04 22 20 12 LMP Okay. Here's the LEC.

04 22 20 18 CDR Okay. Thank you.

04 22 20 52 CDR Okay, are you ready for the sample box?

04 22 20 54 LMP Yes. Pass it in.

04 22 20 55 CDR Wait a minute; I'll give it up to you a little higher.

04 22 20 58 LMP Just push it right on in. I've got it.

04 22 21 02 CDR Okay, the SRC is in the cabin, Houston.

04 22 21 07 LMP And Al will be starting in any moment.

04 22 21 08 CC Roger, Al.

04 22 21 13 LMP Okay, Al; let me get over behind the door.

04 22 21 16 CDR All righty.

04 22 21 34 CDR Okay, are you behind the door?

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04 22 21 37 LMP No, your hoses are in my way. I'm coming around the other d - way.

04 22 21 41 CDR I had those babies pulled pretty far - pretty far back. I guess they came out again.

04 22 21 45 LMP Between your hoses and the ISA, which keeps falling off the hook, it's getting pretty messy. Okay, come on in.

04 22 21 53 CDR Okay, I'm going through the hatch.

04 22 22 03 LMP Okay. If you'll hold there just a second, I'll clear your antenna.

04 22 22 16 LMP Okay. Come on through.

04 22 22 19 CDR All clear?

04 22 22 21 LMP Yes. Roll toward me; roll toward me. Okay. Come on up. There - turn to your -

04 22 22 41 CDR Coming around. Okay. Okay. Stand by 1 minute. (Grunting) Get this -

04 22 22 57 LMP ... about it first.

04 22 23 00 CDR Okay?

04 22 23 01 LMP Okay, Houston. Al is in the cabin, and PLSS FEEDWATER's coming off.

04 22 23 06 CC Okay, Al in the cabin, and PLSS FEEDWATER, off.

04 22 23 13 LMP And - and Ed's feedwater is off.

04 22 23 17 CDR Oh, man, I can't get it off.

04 22 23 18 CC Roger, Ed.

04 22 23 19 LMP You want me to get it?

04 22 23 20 CDR \*\*\*

04 22 23 29 LMP Stand up again. There you go, it's \*\*\*

04 22 23 38 CDR Okay.

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[REDACTED]

04 22 23 44 LMP I'm ready to close the hatch. \*\*\* all the way \*\*\*

04 22 23 51 CDR \*\*\*

04 22 23 58 LMP \*\*\*

04 22 24 00 CDR \*\*\*

04 22 24 02 LMP Lean forward and then back in. Harder.

04 22 24 12 CDR There. Just a -

04 22 24 32 CDR Okay. The hatch is closed and locked.

04 22 24 35 LMP In AUTO? I'll get it.

04 22 24 39 CC Roger the hatch.

04 22 24 42 CDR Hatch is closed.

04 22 24 58 LMP Right. Your hoses were holding me off. I was still -

04 22 25 04 CDR \*\*\* AUTO. Dump valves in AUTO?

04 22 25 20 LMP Both AUTO. I will verify as soon as I can turn. I can't - \*\*\*

04 22 25 37 LMP Okay. OVERHEAD DUMP valve in AUTO.

04 22 25 42 CDR CABIN REPRESS, AUTO.

04 22 25 59 LMP It's just the thing. We'll go to here. LIGHTING: ANNUNCIATOR/NUMERICS, BRIGHT. CABIN REPRESS, AUTO. Circuit breaker CABIN REPRESS, closed. Okay, and cabin's coming up.

04 22 26 33 CDR Got your circuit breaker in?

04 22 26 35 LMP Say again.

04 22 26 48 CDR PRESS REGs A and B to CABIN.

04 22 26 54 LMP Now, I read you. \*\*\* Ready to go on? \*\*\* Put the PLSS O<sub>2</sub> off.

04 22 27 24 CDR Okay. You got your - you got your \*\*\* on?

[REDACTED]

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04 22 27 40 LMP I'll get it for you.

04 22 27 45 CC Al and Ed, this is Houston. Over.

04 22 27 47 LMP Go ahead, Houston.

04 22 27 48 CDR Okay. PLSS O<sub>2</sub> is off.

04 22 27 50 CC We request that you do not break your suit/PLSS integrity until we call you again. Over.

04 22 27 59 LMP Okay. I'm reading you through the \*\*\* Commander.

04 22 28 24 LMP Yes. I read you. I read you. Hear me?

04 22 28 28 CDR Yes.

04 22 28 -- LMP \*\*\* minus 6, minus \*\*\*

04 22 28 -- CDR I can't -

04 22 28 34 LMP We're in CABIN, yes.

04 22 28 -- CDR Plus \*\*\* 77. \*\*\*

04 22 28 -- LMP Reset. Okay, hold the \*\*\*, just a little.

04 22 28 -- CDR \*\*\*

04 22 29 01 CC Ed, this is Houston.

04 22 29 03 LMP 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 the 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 51 LMP \*\*\* You go ahead. The I'll just \*\*\* - -

04 22 29 55 CDR Yes. I'll go here. Okay, cabin's at - -

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[REDACTED]

04 22 29 58 LMP Cabin's at 4.6.

04 22 30 43 CDR \*\*\* do this.

04 22 30 45 LMP Why?

04 22 30 57 LMP \*\*\* I'm just going to blow mine up here in a minute.

04 22 30 58 CDR What?

04 22 31 03 LMP Go ahead, do it. \*\*\* RETURN, AUTO.

04 22 31 07 CDR CABIN GAS RETURN is AUTO.

04 22 31 10 LMP \*\*\* CIRCUIT RELIEF, AUTO. Shit. Can you move over a little bit? I'll get it; there we go. SUIT GAS DIVERTER, PUSH-CABIN.

04 22 31 35 CDR Okay.

04 22 31 45 LMP Okay.

04 22 31 47 CDR Okay. CABIN GAS return's in AUTO; suit \*\*\* and SUIT GAS DIVERTER, PUSH-CABIN.

04 22 31 52 LMP Okay. Let's get the EVA circuit breakers.

04 22 32 07 CDR Okay, circuit breakers. Mine are all good.

04 22 32 59 LMP Circuit breaker okay, Al?

04 22 33 22 CDR Okay, circuit breakers are verified - -

04 22 33 24 LMP \*\*\* finish the rest of it. You can doff your helmet and \*\*\* doff.

04 22 33 27 CDR Huh? Go ahead and doff.

04 22 33 37 LMP Houston, I'm going back to 57.

04 22 33 40 CC Say again, Ed.

04 22 33 42 LMP I'm going back for this \*\*\*

04 22 33 47 CDR Let me see; that's on the second page, isn't it?

[REDACTED]

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04 22 33 52 CC That's correct. It's over in the left-hand column.

04 22 34 02 LMP \*\*\*52. Okay, PLSS O<sub>2</sub> coming on. PLSS O<sub>2</sub> is on.

04 22 34 27 CDR O<sub>2</sub> and PRESS flags.

04 22 35 18 LMP Okay.

04 22 35 42 LMP Push it on down to 10 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 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 06 LMP Okay.

04 22 38 21 CDR Wait a minute. Let me get your antenna.

04 22 39 02 LMP Where's my purge valve?

04 22 39 23 LMP Al, where's my purge valve?

04 22 40 58 CDR Okay. Put it on the top of the ETB. Okay, you got your purge valve.

04 22 41 35 CDR Okay, your purge valve's removed.

04 22 41 37 LMP Okay.

04 22 41 44 CDR Disconnect OPS O<sub>2</sub> hose.

04 22 41 48 LMP Okay. Why don't you turn the fan off here?

04 22 41 52 CDR Okay, there it goes.

04 22 41 57 CC Ed, this is Houston. We'd like to confirm that you have closed the O<sub>2</sub> valve on your PLSS. Over.

04 22 42 05 LMP That's affirm.

04 22 42 09 CC Roger. Out.

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04 22 42 19 LMP I'll doublecheck it, Bruce, but - I verify it's closed.

04 22 42 37 CDR Okay. Connect the LM O<sub>2</sub> hoses.

04 22 42 38 LMP Okay.

04 22 43 27 CDR Okay.

04 22 43 28 LMP Okay.

04 22 43 29 CDR Got to SUIT FLOW on the ISOL valve. Okay, your PLSS PUMP, OFF?

04 22 43 41 LMP OFF and OFF.

04 22 43 44 CDR Connect your PLSS water. Connect the LM water.

04 22 44 09 LMP \*\*\* help me with that water.

04 22 44 10 CDR Huh?

04 22 44 12 LMP You're going to have to help me with the water connection. I can't close that one.

04 22 44 13 CDR Say again?

04 22 44 15 LMP I said I can't close that one.

04 22 45 04 CDR Okay.

04 22 45 37 LMP \*\*\* popping this one in for me, too, will you?

04 22 45 58 CDR Okay. I put that one in.

04 22 46 25 LMP ...

04 22 46 28 CDR What kind of fitting was in there?

04 22 46 30 LMP Huh? You stuck this one in that one. Doesn't go very well. Okay, put - -

04 22 46 39 CDR Okay.

04 22 46 40 LMP PLSS mode, both off, 0.

04 22 46 44 CDR \*\*\* LM water.

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04 22 46 46 LMP Yes.

04 22 46 47 CDR ECS: LCG PUMP breaker, closed.

04 22 46 49 LMP Closed.

04 22 46 50 CDR Okay. Adjust cooling gradually. PLSS mode, both 0. Okay. \*\*\* in?

04 22 46 52 LMP Okay.

04 22 46 53 CDR Okay. AUDIO, BIOMED, \*\*\* A, RECEIVE; OFF; B, OFF.

04 22 46 55 LMP A, RECEIVE; B, OFF.

04 22 46 56 CDR ICS/PT - \*\*\* And relay off.

04 22 47 00 CC Antares, this is Houston. Over.

04 22 47 04 CDR 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 18 LMP Okay, will do.

04 22 47 21 CDR Okay. S-band TRANSMITTER/RECEIVER, SECONDARY.

04 22 47 26 LMP Okay, it's SECONDARY.

04 22 47 27 CDR VHF, OFF, ON, OFF.

04 22 47 30 LMP Okay.

04 22 47 32 CDR And OFF, LEFT, HI.

04 22 47 33 LMP OFF.

04 22 47 37 CDR OFF, ON, OFF.

04 22 47 39 LMP Okay.

04 22 47 40 CDR OFF, LEFT, HI.

04 22 47 42 LMP OFF, LEFT, HI. You got it.

04 22 47 45 CDR Okay; RECORDER, OFF.

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## EVA-2 PLSS COMMUNICATIONS TO POST-EVA-2

05 10 35 57 LMP - - VHF antenna to EVA.

05 10 36 -- CDR \*\*\* Connect to PLSS comm. AUDIO C \*\*\*

05 10 36 -- LMP All right, Houston, I'm going to comm now - to PLSS comm.

05 10 36 -- CDR Okay. \*\*\* A. Now we - we're right. Okay \*\*\* PLSS mode, A, counterclockwise. Tone, on; vent flag, P; PRESS flag, 0; O<sub>2</sub> \*\*\* PLSS O<sub>2</sub> pressure gage. Put \*\*\* on A.

05 10 36 36 LMP Okay, there I am, mode A.

05 10 36 -- CDR Okay, read you loud and clear.

05 10 -- -- LMP \*\*\* loud and clear. A ... PRESS flag, 0.

05 10 -- -- CDR Okay.

05 10 -- -- LMP Yes.

05 10 -- -- CDR \*\*\*

05 10 -- -- LMP \*\*\* I'm reading ...

05 10 -- -- CDR Leave your antenna in, and I'll - -

05 10 -- -- LMP Yes, I'll just leave it in.

05 10 -- -- CDR Say again?

05 10 -- -- LMP Leave it in.

05 10 -- -- CDR And I'm going to PLSS comm. \*\*\*

05 10 38 58 LMP Okay, and I'll pull mine. Okay, they're off.

05 10 39 19 CDR Flag P; PRESS flag, 0; C<sub>2</sub>. ... and tones.

05 10 39 33 LMP Okay, I read you loud and clear.

05 10 39 37 CDR Roger; and my PLSS O<sub>2</sub> is reading 85 percent.



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05 10 39 40 LMP Okay, I go B. You go A.

05 10 39 43 CDR Okay. Now. Do you read?

05 10 39 50 LMP Loud and clear; how me?

05 10 39 51 CDR Loud and clear.

05 10 39 52 LMP Okay.

05 10 39 53 CDR Both AR. Okay, to AR.

05 10 40 03 LMP Loud and clear; how me?

05 10 40 04 CDR Read you loud and clear. And I have a tone.

05 10 40 06 LMP And, Houston, how do you read Ed?

05 10 40 11 CC Ed, I read you loud and clear.

05 10 40 14 LMP Okay, Fredo. And I have an 0 - PLSS O<sub>2</sub> quantity of 87 percent.

05 10 40 32 CDR And this is Al with a PLSS O<sub>2</sub> quantity of 85 percent. How do you read?

05 10 40 40 CC Al, we copied the quantity and you're coming in loud and clear.

05 10 40 44 CDR Okay, we're proceeding with final systems PREP. Okay. Verify CABIN REPRESS ECS breaker.

05 10 40 52 CDR/LMP Closed.

05 10 40 53 CDR SUIT FAN DELTA-P, SUIT FAN 2; open.

05 10 40 54 LMP Okay.

05 10 40 57 CDR Okay, we got a caution?

05 10 41 00 LMP Yes - Wait a minute. We do not have a caution yet.

05 10 41 13 CDR It'll take a little while. In the meantime, go ahead, SUIT GAS DIVERTER, PULL-EGRESS.

05 10 41 19 LMP Okay, SUIT GAS, PULL-EGRESS.

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[REDACTED]

05 10 41 22 CDR CABIN GAS RETURN, EGRESS, and SUIT CIRCUIT RELIEF, AUTO.

05 10 41 29 LMP EGRESS, and SUIT CIRCUIT RELIEF, AUTO.

05 10 41 33 CDR Okay, while we're waiting for the caution and warning, come turn around and I'll unstow your OPS - O<sub>2</sub> actuated - if you'll bend forward slightly.

05 10 42 13 CDR Okay. All your flaps are snapped. No Irish pen-nants. And the actuator is on, connecting it to the RCU. It's connected. And you can put your ISOL - SUIT DISCONNECT - I can get it for you.

05 10 42 45 LMP Okay.

05 10 42 49 CDR \*\*\*connect the LM O<sub>2</sub> hoses; let me get those.

05 10 43 03 CDR Off, it is off.

05 10 43 08 LMP What's off?

05 10 43 09 CDR That is off. Okay, there's - -

05 10 43 11 LMP ECS, yes, and WATER SEP. Okay.

05 10 43 13 CDR Okay, connect the CPS O<sub>2</sub> hose. Blue to blue.

05 10 43 28 CDR Blue to blue and locked.

05 10 43 30 LMP Okay. Okay, \*\*\* retrieve purge valve.

05 10 43 38 CDR Hey, I have one.

05 10 43 42 LMP ... LO.

05 10 43 45 LMP/CDR LO.

05 10 44 15 CDR ... Okay, you're locked.

05 10 44 17 LMP Okay.

05 10 44 23 CDR FGA DIVERTER valves, vertical.

05 10 44 27 LMP \*\*\* vertical.

05 10 44 31 CDR Okay.

[REDACTED]

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05 10 44 32 LMP ... and repeat. Okay.

05 10 44 36 CDR Right here.

05 10 44 38 LMP Unstow OPS O<sub>2</sub> actuator. ... are coming forward.

05 10 45 02 LMP Connecting it. Okay.

05 10 45 09 CDR Okay. SUIT ISOL valve to DISCONNECT. I got it. Okay.

05 10 45 19 LMP Actuator to RCU SUIT ISOL valve.

05 10 45 20 CDR Got that.

05 10 45 21 LMP Connect O<sub>2</sub> hoses.

05 10 45 37 LMP Okay.

05 10 45 38 CDR Okay, connect the OPS PLSS with the blue and lock.

05 10 45 43 LMP Okay.

05 10 45 55 LMP Locked. \*\*\* your purge valve.

05 10 46 04 CDR Locked and LO.

05 10 46 05 LMP LO. A, in locked.

05 10 46 22 LMP Okay, it's locked. The lockup lock's locked.

05 10 46 24 CDF Okay. DIVERTER valves, vertical.

05 10 46 26 LMP Vertical.

05 10 46 27 CDF 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 48 LMP And drink.

05 10 47 24 CDR Okay. Shut off the DESCENT WATER valve.

05 10 47 29 LMP WATER valve, CLOSED. Okay, just like that. Watch your set. And strap's set.

05 10 47 46 CDR Okay, PLSS fan, ON; vent flag, clear.

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05 10 47 49 LMP Far, ON.

05 10 47 54 CDR Vert flag, clear.

05 10 47 56 LMP Vert flag, clear.

05 10 48 02 CDR Okay, you ready for your helmet?

05 10 48 03 LMP Yes.

05 10 48 24 LMP Get all the stuff up. Get that?

05 10 48 26 CDR Just a minute. This ...

05 10 48 35 CDR Okay.

04 10 48 37 LMP Okay.

05 10 48 45 CDR All righty.

05 10 49 22 CDR Okay, I believe that's good.

05 10 49 24 LMP ... Locked?

05 10 49 28 CDR You're locked.

05 10 49 29 LMP Great.

05 10 49 52 CDR Hey, can you see your controls?

05 10 49 53 LMP Yes.

05 10 49 55 CDR Mine?

05 10 49 57 LMP Yes.

05 10 49 58 CDR Okay, your LEVVA is installed. Check your drink bag position.

05 10 50 11 LMP ... you're pressurized. Okay, can you reach it?

05 10 50 16 CDR Yes, I got it.

05 10 50 28 LMP Okay. ...

05 10 50 52 CDR ... Yes.

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05 10 51 01 LMP Cobra cable's coming out.

05 10 51 16 LMP I think it made it in the back. Here we go.

05 10 51 20 CDR Sounds better. Okay?

05 10 51 46 LMP It's latched.

05 10 52 02 LMP Bags.

05 10 52 03 CDR Right here.

05 10 52 04 LMP Let me look behind now. You look at the other side. Yes, I was afraid of that. Okay, now you're all tucked down.

05 10 52 21 CDR Okay, LCG is positioned as required; open the LCG PUMP breaker.

05 10 52 25 LMP Let's take a shot of cold air and chill down, if you don't - cold water ...

05 10 52 31 CDR Yes. Do you want me to go ahead and disconnect my -

05 10 52 35 LMP Okay. Okay.

05 10 52 45 CDR Okay, go ahead. I'll be putting these hoses in the back, here.

05 10 52 48 LMP 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 02 CDR Okay. I think - that ought to do it.

05 10 53 26 LMP ...

05 10 53 47 CDE Okay.

05 10 53 57 LMP \*\*\* there. It went. Can't do two things at once.

05 10 54 36 LMF Get it locked?

05 10 54 38 CDF Yes.

05 10 54 40 LMF Sure? It didn't feel like it. Okay.

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[REDACTED]

05 10 54 46 CDR Okay, you ready?

05 10 54 48 LMP Okay, LCG PUMP, opening.

05 10 54 51 CDR Okay. Here, I'll get this.

05 10 54 59 LMP Okay. ...

05 10 55 34 LMP Here, I'll get them for you.

05 10 55 46 CDR Okay, you're locked.

05 10 55 49 LMP Okay, verified. Helmet and visor, alined and adjusted.

05 10 55 58 CDR They are.

05 10 55 59 LMP Okay. Torso tiedown and adjusted. I'm going to pull it down a little bit more today - this stiff suit's not quite tight enough.

05 10 56 35 LMP Okay, O<sub>2</sub> connectors, three.

05 10 56 38 CDR Turn around. They're locked; red locked, blue locked.

05 10 56 44 LMP Purge valves, one.

05 10 56 46 CDR Purge valve's locked.

05 10 56 47 LMP Water connector, one.

05 10 56 49 CDR Water connector's locked.

05 10 56 50 LMP Comm connector, one.

05 10 56 52 CDR Comm connector's locked.

05 10 56 53 LMP Okay, do it for me.

05 10 56 57 CDR Okay, helmet and visor, alined and adjusted.

05 10 57 00 LMP Do you verify that?

05 10 57 01 CDR My torso tiedown is okay. Three O<sub>2</sub> connectors?

[REDACTED]

**CONFIDENTIAL**

05 10 57 07 LMP Okay, three O<sub>2</sub> connectors, verified locked, and lock locked.

05 10 57 12 CDR One purge valve.

05 10 57 13 LMP One purge valve, in, and lock locked.

05 10 57 16 CDR Water connector.

05 10 57 17 LMP Water connector.

05 10 57 18 CDR And comm connector.

05 10 57 19 LMP Locked and locked.

05 10 57 22 CDR Take a look at the EVA circuit breakers.

05 10 57 25 LMP Okay. Wait a minute. Hold it. Let me move there. Move the little container here. Okay, EVA circuit breakers.

05 10 58 05 CDR Okay. They're verified.

05 10 58 06 LMP Mine are all verified. Let's don EV gloves.

05 11 00 10 CDR Okay. Bring your ring around a little bit.

05 11 00 43 CDR I think that did it. Now try it.

05 11 00 48 LMP No. Something's catching on it, Al.

05 11 00 58 CDR \*\*\* it off.

05 11 00 59 LMP Huh?

05 11 01 00 CDR \*\*\* it off?

05 11 01 13 LMP Yes. \*\*\* perfectly straight ... this time.

05 11 01 33 LMP That felt good.

05 11 02 11 LMP \*\*\* go in here.

05 11 02 21 LMP Okay. Got it.

05 11 02 23 CDR Okay. Four wrist locks locked; glove straps adjusted. Verify PLSS DIVERTER in MIN.

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05 11 02 33 LMP Okay. DIVERTER in MIN.  
05 11 02 34 CDR And PLSS pump, ON.  
05 11 02 36 LMP Pump, ON.  
05 11 02 38 CDR Okay. PRESS REGs A and B to EGRESS.  
05 11 02 50 LMP Okay. Thank you. Okay. PRESS REGs A and B.  
05 11 02 53 CDR PRESS REGs A and B to EGRESS.  
05 11 02 58 LMP PRESS, EGRESS.  
05 11 03 02 CDR Okay. Pressure integrity check. Turn your PLSS  
C<sub>2</sub> ON. Should get tone. O<sub>2</sub> flag, 0.  
05 11 03 14 LMP C<sub>2</sub>, ON. There we go.  
05 11 03 17 CDR Go?  
05 11 03 18 LMP Flag, 0.  
05 11 03 19 CDR Flag, 0.  
05 11 03 21 LMP There's the tone. O<sub>2</sub> flag, 0.  
05 11 03 26 CDR PRESS flag, feed.  
05 11 03 31 LMP PRESS, 0.  
05 11 04 06 CDR PRESS flag cleared, 3.1.  
04 11 04 08 LMP And mine's cleared.  
05 11 04 10 CDR Okay.  
05 11 04 19 CDR And I'm stable at 3.7.  
05 11 04 20 LMP I'm not quite there yet. Okay. There it is.  
05 11 04 27 CDR And the O<sub>2</sub> flag is clear.  
05 11 04 29 LMP Mine's clear. My O<sub>2</sub> is off.

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05 11 04 31 CDR Okay. And we're stabilized at 3.7. And O<sub>2</sub> coming OFF.

05 11 04 36 LMP 3.7, starting the check. Okay. There's 40. I have about 0.22.

05 11 05 49 CDR Okay, Houston; 0.22 drop on the LMP and 0.15 drop on the CDR. Okay. PLSS O<sub>2</sub>, ON.

05 11 06 02 CC We copy.

05 11 06 05 LMP Okay. PLSS O<sub>2</sub> is ON. And O<sub>2</sub> flag, clear; tone is on.

05 11 06 16 CDR Okay. And the pressure is back up to 3.7.

05 11 06 19 LMP Okay. And, Houston, we're ready for CABIN DEPRESS.

05 11 06 27 CC Okay. We're GO, Ed.

05 11 06 29 LMP Okay.

05 11 06 30 CDR Okay. Okay. Circuit breaker ECS CABIN REPRESS, open.

05 11 06 42 LMP CABIN REPRESS breakers, open.

05 11 06 45 CDR And CABIN REPRESS valve, CLOSED.

05 11 06 53 LMP It's CLOSED.

05 11 06 55 CDR Okay. I'll get the - -

05 11 06 59 LMP Forward or the overhead?

05 11 07 01 CDR I'll get the forward.

05 11 07 02 LMP Okay.

05 11 07 07 CDR Okay. Going down.

05 11 07 12 LMP Okay. We're going to drop - go to AUTO at 3.5.

05 11 07 17 CDR Coming down.

05 11 07 19 LMP Okay. There's 4.5. 4. 3.5.

05 11 07 29 CDR Okay, we're back in AUTO. Cuff gage reading 4.9.

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[REDACTED]

05 11 07 33 LMP And so is mine.

05 11 07 36 CDR Okay.

05 11 07 37 LMP Okay.

05 11 07 40 CDR Cabin at 3.5.

05 11 07 41 LMP That's verified.

05 11 07 43 CDR IM suit, 3.6 to 4.3.

05 11 07 44 LMP That's at 4.5.

05 11 07 45 CDR And PGA is greater than 4.8, and it's coming down.

05 11 07 50 LMP And mine's coming down. Okay. Start the wrist-watch.

05 11 07 55 CDR Okay, Houston. Time zero -

05 11 07 56 CDR MARK.

05 11 08 01 CC We got it start.

05 11 08 04 LMP \*\*\* time zero. Open the - -

05 11 08 07 CDR Coming open.

05 11 08 20 LMP \*\*\* 2 pounds.

05 11 08 22 CDR Okay.

05 11 08 43 LMP One pound.

05 11 09 13 LMP Four-tenths.

05 11 09 16 CDR Okay.

05 11 09 30 LMP Okay. \*\*\* give it a try.

05 11 09 44 LMP Okay. Water flag A.

05 11 10 24 LMP Okay. Turn PLSS FEEDWATER, on.

05 11 10 42 LMP FEEDWATER, on.

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05 11 10 46 CDR Can you get the - -

05 11 10 48 LMP Pardon.

05 11 10 49 CDR Can you reach the feedwater for me?

05 11 10 51 LMP Yes. Okay. Just a second. Let me -

05 11 11 08 LMP Okay.

05 11 11 13 CDR Okay. \*\*\* get a water flag A?

05 11 11 15 LMP And mine is cleared.

05 11 11 18 CDR Already clear?

05 11 11 19 LMP Yes. Well, we used them yesterday. It shouldn't take too long.

05 11 11 28 LMP Okay. I've got PREAMPS and on ECS light. Better - SEP COMPONENT light is on. Switch the lighting to the ANNUNCIATOR/NUMERIC DIM position. And I'll start the DET. Okay. Oh, I think I see what my suit problem is, Al. I've got a broken cable in my wrist.

04 11 12 10 CDR Oh, really?

05 11 12 11 LMP Yes. See, I - I can't control the right hand.

05 11 12 19 CDR \*\*\*

05 11 12 20 LMP Keeps pulling back to the inside of me.

05 11 12 22 CDR Pull it there?

05 11 12 24 LMP 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 30 CDR Okay. We have both water bags clear. Hatch is coming open. And you want to get my antenna on the way out?

05 11 12 39 CC Roger, Al.

05 11 12 39 LMP Yes.

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05 11 12 43 CDR Okay.

05 11 12 44 LMP Okay. Watch the hatch cover. Kick it closed with your knee - I mean the han - handle cover.

05 11 12 54 CDR Okay.

05 11 13 04 LMP Okay. You're going to have to lean toward me.

05 11 13 07 CDR All right.

05 11 13 08 LMP You're hung up on the purse. There you go.

05 11 13 10 CDR Coming over your way.

05 11 13 12 LMP Okay. Okay. Now hold it while I get your hatch - I get your antenna.

05 11 13 21 LMP Okay. You're GC. Go right on out.

05 11 13 35 LMP Back straight on out. Now you're in good shape.

05 11 13 42 CDR Okay, Houston. Al is on the porch.

05 11 14 02 CDR Okay. I'm ready for jettison bag, Ed.

05 11 14 05 LMP Okay. Let me get my checklist open here.

05 11 14 30 CDR Okay. Got it.

05 11 14 43 CDR And it's clear.

05 11 14 52 LMP Okay.

05 11 15 08 LMP Wait, I'll come down and get it.

05 11 15 10 CDR That's all right.

05 11 15 15 LMP Just hand it to me. I'm right here.

05 11 15 18 CDR Okay.

05 11 17 03 LMP Okay, Houston, Al's on the surface.

05 11 17 06 CC Roger, Al.

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05 11 17 07 LMP Al, the LEC's - -

05 11 17 08 CC And we got a good picture here, and we just saw you hop off.

05 11 17 11 CDR Okay.

05 11 17 12 LMP And the LEC's ready to - the ETB's ready to come down.

05 11 17 28 LMP Wait a minute. Let me get a little tension on it. Okay.

05 11 17 33 CDR Okay. Coming down.

05 11 17 53 CDR Okay. Slow it just a sec.

05 11 17 57 LMP Okay.

05 11 18 00 CDR Okay. I've got it.

05 11 18 04 LMP \*\*\*

05 11 18 05 CDR Let it go.

05 11 18 07 LMP I'm checking the circuit breakers.

05 11 18 57 LMP Okay. Houston, I'm about ready to egress.

05 11 19 17 LMP Houston, Ed. Do you read?

05 11 19 20 CC \*\*\* Ed. You're cleared to come out.

05 11 19 24 LMP Okay.

05 11 19 52 LMP And, Houston, Ed's on the porch. Starting down the ladder.

05 11 20 20 LMP Well, it's nice to be out in the sunny day again.

05 11 20 23 CDR Yes, it's a beautiful day here at Fra Mauro Base. Not a cloud in the sky.

05 11 20 29 CC The Sun ought to be a little higher today.

05 11 20 33 CDF Yes, going on oxygen today.

05 11 20 38 LMP Beautiful day for a game of golf. Okay.

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05 11 21 18 CDR Ed, I started to get a picture of home sweet home right straight up there.

05 11 21 23 LMP Yes. Could you undo my EVA antenna, please?

05 11 21 28 CDR Okay.

05 11 21 42 CDR Okay, you're now undone.

05 11 21 44 LMP Okay. I've been undone before.

05 11 21 50 CDR I really like this.

05 11 22 00 LMP Al?

05 11 22 01 CDR Yes.

05 11 22 02 LMP One more problem here. My gold visor's caught. I can't seem to - -

05 11 22 11 CDR Okay.

05 11 22 12 LMP - - pull down.

05 11 22 21 CDR Okay.

05 11 22 23 LMP In there. Thank you. Want some help?

05 11 22 26 CDR No, it's okay. All righty.

05 11 22 30 LMP Okay, we're all set.

05 11 23 17 LMP \*\*\* two spares right up here.

05 11 23 24 CDR Okay.

05 11 23 26 LMP They fit up there okay.

05 11 23 58 CDR Watch your foot. Back up.

05 11 24 07 LMP Okay.

05 11 24 11 CC \*\*\* pretty neat jig there.

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05 11 24 14 LMP Yes.

05 11 24 34 CDR Okay, while you're down there, pick up the - handle. Okay, very good.

05 11 24 55 LMP You able to read it?

05 11 24 58 CDR Okay, I think so, after we \*\*\* it off a little.

05 11 25 03 LMP \*\*\* it off, baby.

05 11 25 05 CDR Easy.

05 11 25 10 LMP Here, you want the brush? ... Get a clean little brush out of there.

05 11 26 02 LMP Just turn it over.

05 11 26 26 LMP Little things proceed to eat your time line up.

05 11 27 31 CC And, Al and Ed, we've got about 10 minutes left now to complete the MET load.

05 11 27 38 LMP Okay, Fredo. It'll be completed easily in that time.

05 11 27 46 CC \*\*\* good. We're going to need all we can get.

05 11 28 00 CDR Okay. In accordance with your desires, we are leaving the organic sample out of SRC number 2. Is that correct?

05 11 28 07 LMP \*\*\* No. That isn't the sample he referred to, I don't believe. Sample underneath the LM.

05 11 28 21 CC \*\*\* Al.

05 11 28 22 CDF \*\*\* did you read, Houston?

05 11 28 36 CC Okay, Albert, continue as nominal now.

05 11 28 42 CDR Okay.

05 11 29 46 LMP Oh, you son of a gun. Oh, this is going to jerk that cable out yet.

05 11 29 49 CDR Okay. Let's run over the MET stowage. We have the BSLSS - -

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05 11 29 53 LMP Yes.

05 11 29 54 CDR - - extension handle, 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 lens brush again, please?

05 11 30 42 CDR Okay. Thank you.

05 11 31 17 LMP Okay.

05 11 31 20 CDR Can load up a MAG right here if we want.

05 11 31 24 LMP Okay. I'll have some MAGs in a minute.

05 11 31 26 CDR Good. There you got it.

05 11 32 00 CDR Houston, on the 16-millimeter, we're putting magazine Hotel-Hotel.

05 11 32 12 CC \*\*\* Al. Hotel-Hotel.

05 11 32 15 CDR Roger.

05 11 32 53 CDR Can I help you there?

05 11 32 54 LMP No. I'm getting it.

05 11 33 00 CDR \*\*\* yet?

05 11 33 01 LMP Yes, there's some more in there. And, Houston, on the 16-millimeter MAGs, I put Foxtrot-Foxtrot and GG, George-George, in the \*\*\* I'm putting - -

05 11 33 21 CC \*\*\* Ed.

05 11 33 22 LMP - - Hasselblad Kilo-Kilo on the MET storage area.

05 11 33 36 CC Roger. Kilo-Kilo Hasselblad MAGs.

05 11 33 40 LMP Yes.

05 11 34 00 LMP I've got the closeup camera turned on. Is that all the MAGs?



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05 11 34 07 CDR There's one more Hasselblad back there.

05 11 34 13 CDR Okay, there's an extra - 16-millimeter going in here.

05 11 34 34 CDR Okay. We have 16-millimeter camera, and two and a half magazines, two SESCOs 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 02 LMP Have you gotten the polarizing filter and the TDS yet, Al?

05 11 35 09 CDR The polarizing filter is - is - is already in, and the TDS, I'll be getting now.

05 11 35 19 LMP Okay. So it looks like the MET stowage is complete. Let me look over my list. 70-millimeter MAGs -

05 11 35 28 CDR Negative. We need some more weigh bags.

05 11 35 30 LMP Okay.

05 11 35 34 CC Roger, Al and Ed. I show you short the weigh bags, MESA brush, and a map.

05 11 35 38 LMP Okay. The MESA brush is there and the map is there.

05 11 35 45 CDR Okay. Here we come.

05 11 35 49 LMP \*\*\* close that.

05 11 36 19 CDR Okay. The TDS sample is on.

05 11 36 28 LMP Okay. And we need two weigh bags on.

05 11 36 39 LMP That's all the weigh bags we have there.

05 11 36 40 CDR Pardon?

05 11 36 41 LMP That's all the weigh bags we have there; we have two more in here.

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05 11 36 45 CDR Okay. We have a total of four.

05 11 36 52 LMP Why don't we get them stowed on outside then.

05 11 36 56 CDR Okay. Why don't you put this one on the back?

05 11 37 06 CDR And I'll put this one down here.

05 11 37 32 CDR Okay, the MET's loaded, Houston.

05 11 37 37 CC Roger, Al. The MET is loaded.

05 11 37 45 CDR Okay. We'll go to pick up the - -

05 11 37 48 LMP LPM right now.

05 11 37 49 CDR - - LPM; and then, we'll move the television camera after that.

05 11 37 54 LMP Just watch your cables ...

05 11 37 55 CC Okay. We're right about on the time line.

05 11 37 58 CDR Got it?

05 11 37 59 LMP Okay. I got it.

05 11 38 01 CDR Okay. \*\*\* the cable.

05 11 38 05 CDR It'll go around the S-band.

05 11 38 29 CC You really look neat there.

05 11 38 33 CDR Say again.

05 11 38 36 CC I said that really looks neat. I can see it bouncing a little bit - -

05 11 38 42 CDR Yes, it bounces a little.

05 11 38 43 CC - - and your tracks are quite visible.

05 11 38 52 CDR Okay, up on top of the hill.

05 11 39 22 CDR And it's very level there.

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05 11 39 44 LMP Okay. The pallet's removed; the thermal cover is replaced.

05 11 40 00 CDR And, let's do this slow.

05 11 40 18 LMP Okay. It's all yours.

05 11 40 23 CDR Okay.

05 11 40 33 LMP Wait, I'll give you a little more slack. You up there?

05 11 40 39 CDR Yes.

05 11 40 58 CDR 201 in the Sun.

05 11 41 11 LMP Okay.

05 11 41 12 CDR Got it?

05 11 41 15 LMP Okay. All right, we'll take off the electronics package. Throw away the caging device.

05 11 41 38 LMP High scale, ON.

05 11 42 26 CDE That nearly caught there. Okay. Clear.

05 11 42 45 LMF Houston, you wanted LPM temperature. It's 125.

05 11 42 51 CC \*\*\* Ed. 125.

05 11 43 14 CDR Okay. Okay.

05 11 43 24 LMP All right. And, Houston, the LPM is loaded on board the MET. I'll start on out, if you want to turn the camera around.

04 11 43 33 CDR 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 46 LMP Yes, that's right over that way.

05 11 43 49 CDR And it's - \*\*\* - about 350 meters, a thousand feet.

05 11 43 57 LMP Okay. We'll start off that direction and take a look around.

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[REDACTED]

05 11 44 00 CDR Okay, and I'll aim the camera toward Cone.

05 11 44 04 LMP Okay.

05 11 44 08 CDR Okay, Houston. We're going to try to put the TV camera in the shade, aim it up toward Cone. 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. We're about 2 minutes behind starting out.

05 11 44 26 CDR \*\*\*

05 11 44 27 CC You can leave them just as they are right now.

05 11 44 37 CDR Say again?

05 11 44 40 CC The settings that are on the TV are - right now, are good.

05 11 44 46 CDR You don't want to aim it toward Cone Crater?

05 11 44 51 CC \*\*\*ive, 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 01 CDR Okay. We'll aim it up toward Cone. It's going to be fairly close to the Sun. We'll see what happens.

05 11 45 11 CC \*\*\* Al.

05 11 45 26 CDR 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 in there, but we have a picture, Al.

05 11 45 46 CDR I'm going to bring it a little further to the right. How's that?

05 11 45 49 CC \*\*\* Al. We can see the slope - flank of Cone coming in.

05 11 45 58 CDR Okay. Okay, you're looking at Cone.

[REDACTED]

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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 crest of Cone.

05 11 46 17 CDR Okay. Okay, we'll probably be off the camera to the right.

05 11 46 42 LMP \*\*\* ought to check our position right about here, Al. See if we can find out where we are.

05 11 47 01 CDR Okay. While you're checking your position, I'll be using the closeup.

05 11 47 24 CDR Okay. Taking the picture of the MET tracks, Houston. With the closeup and the Sun angle's - -

05 11 47 29 CC \*\*\* Al.

05 11 47 30 CDR \*\*\* at 11 o'clock.

05 11 48 09 CDR Okay, 30, one, and two. My track's at 11, 303, and 4; footprints, Sun at 10 o'clock.

05 11 48 22 CC \*\*\* Al. I copied the frame numbers. And we still have you in the picture.

05 11 48 28 CDR Okay. Head on out, man.

05 11 48 29 LMP Yes, let's go.

05 11 48 30 CDR You get it?

05 11 48 31 LMP I don't know exactly where we are.

05 11 48 33 CDR Well, keep the map in your hand - -

05 11 48 34 LMP Right.

05 11 48 35 CDR - - and keep going. I got this.

05 11 48 37 LMP If I can locate a familiar crater.

05 11 48 44 CDR Okay, Houston. We're headed just about toward the center of Cone Crater.

05 11 48 50 LMP Okay, Al. Is this North Triplet right here to - to our right? It is, isn't it?

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[REDACTED]

05 11 48 56 CDR Yes, sir.

05 11 48 57 LMP Okay. This nice big depression over here.

05 11 49 04 CDR 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 58 LMP 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 02 CDR Right.

05 11 50 03 LMP That's Weird.

05 11 50 04 CDR Okay.

05 11 50 05 LMP We head to the north of that, we're in business.

05 11 50 07 CDR Okay. That means that point A is, in fact, right in the valley.

05 11 50 14 CC Roger, Al.

05 11 50 19 CDR The - There seems 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 48 LMP A little further to the left. Okay. Point A, Al, is right - it's not quite in the valley. It's right beyond over here.

05 11 51 09 CDR Okay. \*\*\* fairly subdued craters now.

[REDACTED]

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05 11 51 13 LMP Yes. Okay, this chain that we're going through right here - -

05 11 51 16 CC Is there any basic change in the - any basic change in the surface texture as you're heading out across toward A, there?

05 11 51 25 LMP No. It looks all the same, Fredo. We're - Fredo, see the crater - -

05 11 51 30 CC \*\*\* what I was afraid of.

05 11 51 31 LMP See the crater 60 meters to the west of point A? The fairly sharp one?

05 11 51 45 CC Roger, Ed.

05 11 51 48 LMP Okay. We're coming up on that one right - -

05 11 51 49 CC I think I have it on the chart.

05 11 51 50 LMP 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 09 LMP 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 35 CLR Probably A right here, is it not?

05 11 52 36 LMP It's right over here to our left a little bit, Al, I believe. Now, let me see. A is right beside a - -

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?

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05 11 53 06 CDR/LMP No.

05 11 53 07 CDR We don't see any ray pattern, I would say. They're fairly generally scattered.

05 11 53 20 LMP Fred, right here in the center of these three for A. Okay.

05 11 53 30 CDR Buy that?

05 11 53 32 LMP Well, it's pretty close. I don't think it's exactly at A, but it's close. Real confusing. This - -

05 11 53 39 CC Okay, I'll - clock you at A, right now.

05 11 53 42 LMP Okay. That large crater to your right, Al, just doesn't show up. Aha! It does, too. That's the one. Just beyond that is A.

05 11 53 54 CDR That's what I thought. Right about 20 feet ahead of me, right?

05 11 53 57 LMP Yes, yes.

05 11 53 58 CDR Okay, babe. Fred, the surface, here \*\*\* talk 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 seem 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 30 LMP Yes, this is 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 50 CDR 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.



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05 11 55 02 LMP Okay, at point A, we do a double-core LPM. I'll start with the LPM and a pan.

05 11 55 11 CDR Okay, I'll start with the TDS.

05 11 55 21 CDR Fred, did you read? We're proceeding as written on the checklist.

05 11 55 26 CC Roger, I copied - I copied all of that.

05 11 55 34 CDR 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 \*\*\* Well, it fits the description of it.

05 11 56 37 CDF Okay. In the TDS, Houston; serial number 1002.

05 11 57 11 CDR And the frame counter on the closeup is now 305.

05 11 57 20 CC Roger. Serial number 1002 and 305.

05 11 57 26 CDR Roger. And I'm now dusting that sample.

05 11 57 36 CDR \*\*\* remark before I start, 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 53 CDR Okay.

05 11 57 56 LMP 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.

05 11 58 12 LMP Okay. I'm here now.

05 11 58 16 CC Starting the clock.

05 11 58 19 LMP Okay. May I get a Hasselblad?

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[REDACTED]

05 11 58 21 CDR Sure. You may have a Hasselblad. What would you like?

05 11 58 26 LMP I'll take mine, if you don't mind.

05 11 58 28 CDR Okay, Senor.

05 11 58 32 LMP No Sun. I want f/8. Thank you.

05 11 59 05 LMP And, Houston. The locator shot for the placement of the MET - of the LPM is frame 7, magazine MM. I'll take two of them.

05 11 59 20 CC Roger. And, you can go with reading.

05 11 59 26 LMP \*\*\* I took two shots of that for your locators.

05 11 59 32 CC \*\*\* Ed. And we're GO for the readings.

05 11 59 35 LMP Okay. Be there in just a second. Fredo? Okay. I'm on high scale.

05 11 59 59 CC Go ahead, Ed.

05 12 00 01 LMP X is 9.6, 54.2; Z, 7.3; X, 9 point - -

05 12 00 19 CC Okay. Copied.

05 12 00 20 LMP - - 9.6; Y, 3.8; Z, 6.7; X, 9.6; Y, 3.7; Z, 6.5.

05 12 00 50 CC Okay. I got all - all readings, Ed.

05 12 00 54 LMP And that was the high-scale reading.

05 12 00 58 CC Roger. High scale.

05 12 01 23 LMP And now verifying the second TDS, serial number 2001.

05 12 02 19 LMP Okay, 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 42 LMP 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 - alinement.

[REDACTED]

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05 12 03 00 CC Roger. Copy, Ed.

05 12 03 06 LMP \*\*\* I'm back at the MET.

05 12 03 13 CC And the clock is starting.

05 12 03 17 LMP Okay.

05 12 03 27 CC And, while we got a few seconds there, Ed. The raindrop pattern you mentioned, was it - is it pretty general or is it just here and there that you noticed this texture?

05 12 03 38 LMP No, it seems to be fairly general, Fred.

05 12 03 52 CDR 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 16 LMP Okay.

05 12 04 24 CDR Get in there, baby. Okay.

05 12 04 26 LMP Okay, Fredo. On high scale again; X, 01.1 - Hold it.

05 12 04 44 CDR I'm holding it. Oh, okay.

05 12 04 48 LMP Roger. You bumped the MET. I was afraid you were going to turn it over. X, 1.1; Y, 3.7; Z, 4.0; X, 1.1; Y, 3 point - No, Y is 4.0; Z, 3.7; X, 1.1; Y, 3.9; Z, 3.6. Over.

05 12 05 40 CC Okay, Ed. We've got all of your readings.

05 12 05 44 LMP Okay. Returning to the third one.

05 12 05 48 CDR Okay, I 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-textured pattern which Ed - of which he spoke. Now, 13 is a picture of a foot track - -

05 12 06 10 LMP ...

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05 12 06 11 CDR - - foot track in the same - area.

05 12 06 20 CDR And I see some - -

05 12 06 21 CC Roger, Al.

05 12 06 23 CDR 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 fillet 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 backroom 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 15 CDR Okay, we'll try to put it in the center of the three craters to get all three - well, to get whatever stratigraphy we have here. And the last fillets - picture, shadow 9 o'clock - was 18.

05 12 07 40 CC \*\*\* Al.

05 12 07 44 CDR Okay. And since I've already taken a couple of pictures of the MET tracks, I won't do any more of that here, and probably won't again unless we see some difference in these tracks. They're - 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 22 LMP Fredo, I've left the LPM, 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 37 LMP I'm at the MET.

05 12 08 58 CDR Okay, I'll set up for the double core, here.

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05 12 09 00 LMP Okay, I'll be with you in a second. I have a pan to take, and I'll be right with you. Now be careful with the Velcro on the tongue. You can see it came off, except for one batch.

05 12 09 09 CDR God damn. Why don't we just - ... it's about the right size.

05 12 09 15 LMP It'll go in that outer pocket fine. I'll carry it - one of us can carry it when we're going between stops - -

05 12 09 20 CDR It won't go down that way. Also, 16-millimeter MAG.

05 12 09 24 LMF Okay.

05 12 09 26 CDR Okay. Core tubes.

05 12 09 33 LMF Okay, Fredo. You about ready?

05 12 09 38 CC Okay, 1 minute. You go ahead.

05 12 09 42 LMP Okay, Y - This is high scale - Y is 1.0. I'm sorry. X is 1.0; Y is 8.1; Z is 6.6. Second set: X is 1.0; Y is 8.1; Z is 6.6. Third set: X is 1.0; Y, 8.1; Z is 6.65. Okay?

05 12 10 20 CC Roger, Ed. And I assume all of those were high scale again.

05 12 10 25 LMF Beg your pardon? Those were all high scale. That's affirm.

05 12 10 30 CC Okay. We got them.

05 12 10 36 CDR 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 01 CDR That is correct.

05 12 12 02 LMF Okay. I need a pair of tongs -

05 12 12 14 CC And have you started reeling it up yet, Ed?

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05 12 12 17 LMP I'm starting that right now, Fred. The electronics are in the box, and I'm - -

05 12 12 22 CC Yes. I just - -

05 12 12 23 LMP \*\*\* up the reel now.

05 12 13 21 LMP Oh, no.

05 12 13 22 CDR \*\*\* the matter?

05 12 14 26 LMP This is a can of worms.

05 12 14 31 CC You're having some problem reeling it in there, Ed?

05 12 14 36 LMP 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. It's - I'm not sure I'm going to get wound or not.

05 12 15 00 CC Roger, Ed.

05 12 15 11 LMP \*\*\* a different method of holding it.

05 12 15 23 CDR Okay, Houston. A couple of quick stereos in the locator of the core tube as it's about to be driven, and the locator of the LM is in the background.

05 12 15 40 CC \*\*\* Al.

05 12 16 00 LMP 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 22 LMP Al, you haven't taken a pan, have you?

05 12 16 26 CDR No.

05 12 16 27 LMP 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.

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05 12 16 42 LMP Okay.

05 12 18 14 CDR 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 14 LMP Okay, Houston. The pan is completed, and I took it from the rim of a - old crater with fresh crater right in the bottom of it, and several small ones - small ones around it.

05 12 19 28 CDR 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 33 LMP Yes. Okay.

05 12 19 37 LMP \*\*\* better give them map coordinates ... - -

05 12 19 38 CC Okay. We copied, Al and Ed.

05 12 19 48 CDR Okay. And the core bit, just for the fun of it, is going in bag 2-November.

05 12 19 51 LMP We need a DAC.

05 12 20 00 CC And, Al, they'd like a description of the surface where you drove the core tube.

05 12 20 29 CDR Okay, Fred. Nothing, but it's the same textured pattern of which we spoke coming up in this traverse.

05 12 20 44 LMP Uh oh.

05 12 20 46 CDR What?

05 12 20 47 LMP Where's our color chart?

05 12 21 00 CDR Here you go. Did you read the core tip \*\*\* 2-November, Fred?

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05 12 21 09 CC

Roger, Al. We've got that, and for your information, we're about 5 minutes behind in the total time line, for departing A.

05 12 21 21 CDR

Okay. 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 - that little 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 50 LMP

Okay. \*\*\*

05 12 23 03 CDR

Get that by yourself?

05 12 23 04 LMP

Yes.

05 12 23 57 LMP

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 26 LMP

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

\*\*\* Ed. 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 50 CDR

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 01 LMP

Al.

05 12 25 02 CDR

Yes.

05 12 25 04 LMP

Can you hand me another baggy?

05 12 25 06 CDR

Okay.

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05 12 25 09 LMP Houston, I can't get all of this sample in 3-N. Consequently, it will go into 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 29 CDR Okay.

05 15 25 37 CC Roger, Ed.

05 12 26 10 CDR Okay. Now head on up the hill to B.

05 12 26 14 LMP Okay.

05 12 26 17 CC Okay. And we still need an EMU check from you, Ed.

05 12 26 22 LMP Okay, Fredo. Give it to you in a minute.

05 12 26 29 CDR Can you catch up with me all right?

05 12 26 30 LMP Yes, I'll catch up. Go ahead.

05 12 26 32 CDR Okay. Al is heading up with the MET. From A, we go down into a valley. We drop down a - a fairly consistent slope of approximately, oh, 8 to 10 degrees. The texture, here again, is pretty much the same on the surface. The basic regolith, of course is - 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 30 LMP And, Houston, I'm - I'm treading along behind Al now, starting to catch up with him. It - it hasn't been described 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 08 LMP And it leaves gaps every now and then as it bounces.

05 12 28 12 CDR Think you've found B?

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05 12 28 16 LMP Yes. It's this - this big crater over here, isn't it?

05 12 28 18 CDR It's way up the hill.

05 12 28 19 LMP Pardon?

05 12 28 21 CDR I think it's up the hill.

05 12 28 23 LMP 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 28 CDR Roger.

05 12 28 45 CDR 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 \*\*\* 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 14 LMP 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 38 LMP 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 - 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 a - about a 20-foot-wide, fairly fresh crater. The boulders - a dozen of them or so - are 4 or 5 feet in diameter. Lot of filleting around them.

05 12 30 35 CC Roger, Ed.

05 12 30 39 CDR Okay. Let's see if we can find this -

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05 12 30 41 LMP This crater's the one, I think, Al. It's halfway between A and B, isn't it?

05 12 30 56 CDR Yes, I think so. This little - -

05 12 30 59 LMP Can you see the boulders off to the side there on the map?

05 12 31 01 CDR No, they don't show very well. I think -

05 12 31 12 LMP 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 25 CDR Ed, I don't see any craters right there.

05 12 31 29 LMP Kind of small.

05 12 31 31 CDR That will make us right here, huh?

05 12 31 32 LMP Pardon?

05 12 31 34 CDR There's no big one to go with it. A sharp one to go with it. This is that one right up there. How about that?

05 12 31 48 LMP Yes. Let's take a look.

05 12 31 50 CDR That's probably Weird right up there. We're probably about even with Weird right now, although we can't see it on the ridge.

05 12 31 57 LMP That's Weird, that big one right over there, Al.

05 12 31 59 CDR Yes, that's what I say. I think B is that deep crater right directly ahead of us, Ed.

05 12 32 05 LMP No, I disagree. I think - See that crater right over there we came by? To the south, the big one?

05 12 32 13 CDR Yes.

05 12 32 15 LMP I think this is the crater that's at - that's at B. I think this boulder field, we can see it here, if you look.

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05 12 32 27 CDR This crater right here?

05 12 32 29 LMP Yes. Yes, we have to be considerably past Weird.

05 12 32 39 CDR Not even halfway to the - to the rim of Cone yet.

05 12 32 43 LMP Yes, this place all looks alike out here.

05 12 32 51 CDR Well, let's go on ahead - -

05 12 32 53 CC And, Al and Ed. I don't - Yes. 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, that should be good enough on B.

05 12 33 12 LMP 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 27 CDR Which way are you pointing?

05 12 33 29 LMP Pardon?

05 12 33 30 CDR Where at?

05 12 33 31 LMP 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 39 CDR Where do you think B is?

05 12 33 40 LMP I think B's the one we just passed, back there where we were talking.

05 12 33 45 CDR All right.

05 12 33 46 LMP And here's the little - Aha, 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 33 59 CDR Okay, let's go sample B.

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05 12 34 00 LMP Let's sample B.

05 12 34 06 CDR Okay - -

05 12 34 07 CC Okay. And, Al and Ed, this is a grab sample at B, and we need the panorama. And while someone is doing that, we can get our site description.

05 12 34 20 CDF I'll get a pan, then.

05 12 34 21 LMF Okay. And while Al takes the pan, I'll go ahead and give you a site description. The area here is an area of 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 can see is probably a larger number of smaller craters. I say probably; they're so numerous, 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 - 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. Out.

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05 12 36 47 CC Roger, Ed. And has Al got the grab sample completed now?

05 12 36 53 LMP He's - -

05 12 36 54 CDR I'm grabbing it now.

05 12 36 55 LMP - - grabbing it now.

05 12 36 58 CDR Houston, 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 15 LMP Okay. Fredo, we expect we're going to fall behind you; there's no way we can help it. We'll pick it up later.

05 12 37 24 CDR Well, we'll see about that.

05 12 37 33 CDR Okay. Grab sample from the west rim of Bravo Crater, bag 5-November.

05 12 37 41 LMP And, Fredo, to complete this description - -

05 12 37 42 CC \*\*\* Al - -

05 12 37 43 LMP - - 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. Topography doesn't show up on the map, but indeed is there. About 500 yards to the north and - and west is the lowest point that I can see in this area. Okay, you ready to press on?

05 12 38 27 CDR As soon as I get my handle screwed back on here.

05 12 38 30 LMP Okay, the next stop is the top of Cone. Let's get everything secured for that trip.

05 12 38 36 CDR Okay, Houston - -

05 12 38 37 CC Okay. And we'd like the frame count before you depart.

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05 12 38 39 CDR Yes.

05 12 38 40 LMP Yes.

05 12 38 41 CDR Yes, you've got a frame count of 34 from Al.

05 12 38 51 LMP And 29 from Ed.

05 12 38 57 CC Roger; 34 and 29.

05 12 39 00 CDR Handle was loose.

05 12 39 03 LMP Handle work loose for you?

05 12 39 05 CDR Yes.

05 12 39 08 LMP Okay. I've got the MET.

05 12 39 11 CDR Okay. You want to go first and I'll follow.

05 12 39 13 LMP Okay. To the top of Cone Crater.

05 12 39 17 CDR Yes. And now, let's - stick to the action here.  
We're supposed to -

05 12 39 22 CC \*\*\* we're starting the clock - -

05 12 39 25 LMP Okay.

05 12 39 27 CDR We could go almost to the east here and then up - -

05 12 39 28 LMP Yes.

05 12 39 29 CDR - - by Flank.

05 12 39 30 LMP East, a little bit to the - -

05 12 39 31 CDR See? See, there's Flank up there.

05 12 39 34 LMP Oh, yes. I can just barely see the rim of it on  
the far side of it.

05 12 39 37 CDR Right, so we probably ought to head directly for  
Flank and on up from there.

05 12 39 41 LMP Okay.

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05 12 39 50 CDR Okay, and -

05 12 39 57 LMP Houston, as we go across here, this ground is - Al's 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 33 LMP Lots of - As we come on up toward Cone, we're getting to seeing lots more buried rocks, bigger rocks.

05 12 40 49 CDR 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 04 LMP I have to shift hands. I'm good.

05 12 41 06 CDR Okay. By the time we get a little closer up to Flank, we might find some kind of a contact. The edge 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 44 LMP 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 inside. This is about the freshest crater this size we've seen, Al.

05 12 42 14 CDR 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 - rcek from the side.

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05 12 42 40 LMP Very soft, too. Al just dropped down on a knee - -

05 12 42 42 CC Roger, Al.

05 12 42 43 LMP - - to pick up a rock, and he went - went in 3 or 4 inches. Need some help, Al?

05 12 42 50 CDR Yes, I think so. I can't get any.

05 12 42 53 LMP Okay. Come on, give me your hand.

05 12 42 54 CDR Wait a minute; I got it now. Okay.

05 12 42 59 LMP Okay. Come on up.

05 12 43 00 CDR Okay (grunt). Thank you.

05 12 43 03 LMP You're on your feet.

05 12 43 06 CDR Okay. That's just a quick hand sample from the side of that crater.

05 12 43 09 LMP Do you think you're following us and know about where we are, Fredo?

05 12 43 16 CDR That's going in bag - -

05 12 43 17 CC Well, the board, I think, is - -

05 12 43 19 CDR Say, that's good. And - -

05 12 43 20 CC - - looking about halfway between D and E.

05 12 43 29 CDR Roger. And ...

05 12 43 30 LMP Yes. And we're starting uphill now. Climb's fairly gentle at this point, but it's definitely uphill.

05 12 43 40 LMP Okay, baby!

05 12 43 41 CDR Okay, I got it.

05 12 43 42 LMP Almost turned, didn't it?

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05 12 43 43 CDR Yes. Now that grab sample from the west rim of the crater, \*\*\* described as blocky, is in bag 6.

05 12 43 53 CC Roger, Al. Bag 6.

05 12 44 02 CDR Okay, the going is still very smooth as far as the - the area that we're able to pick out. Of course, we're tracing a kind of sinuous course here, staying out of the craters.

05 12 44 27 LMP And, Fredo, we're - 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 (heavy breathing).

05 12 45 12 CC Roger, Ed. And you described the blocks there a couple of times now. I think you used the term "rubble." By that, I assume you implied they were just lying loose, just nothing really in place.

05 12 45 24 LMP 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 33 CDR There's a lot of glass in that rock, Ed.

05 12 45 34 LMP Yes. Oh, there sure is. It looked like - Some of that so-called rubble looked like it had - might be the - 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 53 CDR It was splattered with glass.

05 12 45 54 LMP Yes.

05 12 45 55 CC Roger. About how big is it?

05 12 45 56 LMP It's about a foot and a half, 2-footer - yes, about a foot and a half across.

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03 12 46 06 CDR That was a glass splatter, Fred.

05 12 46 07 CC Roger, Ed. And we copy the glass.

05 12 46 28 LMP 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 43 CDR Take a what?

05 12 46 44 LMP We haven't taken any pictures since the last one, I don't think.

05 12 46 52 CC Okay, Ed.

05 12 46 54 CDR Okay. We'll slow down the traverse here. Okay. Should be Flank right here, Ed.

05 12 47 10 LMP Pardon?

05 12 47 11 CDR Should be Flank right over here.

05 12 47 13 LMP Just out of sight, you mean?

05 12 47 14 CDR Right - Yes, right there.

05 12 47 17 LMP Oh. Let's go over and see.

05 12 47 37 CC Okay, Al and Ed. I assume you're on the move now and heading toward Flank. Is that correct?

05 12 47 43 LMP That's correct. Heading toward where we think Flank is. I'll pull for a while, Al.

05 12 47 51 CDR That's okay. I got it for a while.

05 12 48 07 LMP Why don't we pull up beside this big crater?

05 12 48 10 CDR Okay.

05 12 48 11 LMP Take a break, get the map, and see if we can find out exactly where we are. Press on from there. This one should be distinctive enough.

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05 12 48 19 CC And \*\*\*

05 12 48 28 LMP If you'll take the pan, Al, I'll grab the map and get over here and see if we can find the -

05 12 48 36 CDR Pull it up on a little more level ground.

05 12 48 38 LMP Okay. Give you a push.

05 12 48 42 CDR Okay, there we are. Level?

05 12 48 46 LMP That looks good.

05 12 48 54 CDR Okay.

05 12 49 39 LMP That old LM looks like it's got a flat over there, the way it's leaning.

05 12 49 47 CC Say that last again, Ed.

05 12 49 50 LMP Just talking. Never mind.

05 12 50 29 CDR Okay, Houston. The pan is complete on magazine - magazine Lima-Lima. Frame count is 57.

05 12 50 45 CC ...

05 12 50 50 CDR You're breaking up, Fred.

05 12 50 55 CC ...

05 12 51 04 CDR \*\*\* reading him? Ed, are you reading?

05 12 51 07 LMP Yes, I read.

05 12 51 08 CDR Read him?

05 12 51 10 LMP I can't read Fred, no.

05 12 51 11 CC ...

05 12 51 14 LMP Fredo, you're breaking up completely. ... statement.

05 12 51 23 CDR Okay.

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05 12 51 33 CDR (sigh) Start on up toward the rim?

05 12 51 35 LMP Yes. Just 1 second, though. I think I got it; just a minute.

05 12 51 40 CDR Okay, I'll head on out.

05 12 51 49 LMP Fredo, can you read? Now I'm getting the feedback from my own voice.

05 12 52 01 CDR Okay. Ed, I'm coming through.

05 12 52 02 LMP Okay. Do you want me to pull awhile, Al?

05 12 52 03 CDR No, that's all right.

05 12 52 07 LMP ...

05 12 52 13 LMP 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 26 CDR Houston, your transmissions are still unreadable. Is Flank over there?

05 12 52 31 CC ...

05 12 52 33 LMP I think it's dead ahead of you, Al. Oh, wait a minute. This is probably it, right here. Yes.

05 12 52 41 CDR Am I right?

05 12 52 42 LMP Yes. Let's just doublecheck and see.

05 12 52 47 CDR It's got a - about a 4-meter-radius crater in the - in the south wall.

05 12 52 59 LMP That has to be it.

05 12 53 03 CDR 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 ...

05 12 53 18 CDR Fred, you're still unreadable.

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05 12 53 25 LMP Let me pull awhile, Al. You're having all the fun.

05 12 53 35 CDR Well, we still have a little way to go.

05 12 53 36 LMP Yes, we sure do. Putting the map away.

05 12 53 43 CDR Huh?

05 12 53 44 LMP I'm just putting the map away.

05 12 53 46 CDR All righty.

05 12 54 07 LMP Okay. Fredo, you back with us?

05 12 54 20 CC Okay, I'll try again. How do you read, Ed?

05 12 54 23 LMP Okay. That's much better. You got a background squeal.

05 12 54 30 CC Okay. Evidently, that station switch gave us some problems. I've been copying \*\*\*

05 12 54 55 CC Okay. We've been copying you most of the time, and I have you by a point now.

05 12 55 00 LMP That's affirmative. And the grade is getting pretty steep.

05 12 55 18 LMP 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.

05 12 55 47 CC That should help you with the climb there.

05 12 55 53 LMP 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 02 CDR Left, right, left, right.

05 12 56 09 CC There's two guys here that figured you'd carry it up.

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05 12 56 13 LMP 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 23 LMP Well, it'll roll along here, except we can just move faster carrying it.

05 12 56 31 CDR Okay. You want to rest here by this rock?

05 12 56 32 LMP Okay.

05 12 56 36 CDR \*\*\* I think it's worthwhile taking a picture of it with the closeup. Go ahead and keep going.

05 12 56 43 LMP I'll pull on up. We probably ought to take a pan to locate everything here while you're taking a closeup (heavy breathing). Okay, you get that - -

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 07 CDR 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 37 LMP And I'm taking a Hasselblad of the rock and will take a pan now - at - from this location. Help document our course going to the top of Cone Crater.

05 12 57 52 CC Roger. Copy.

05 12 58 51 LMP And I can look right across into the breach in the north rim of Old Nameless. We're about even with it, now. And my frame - -

05 12 59 08 CC Okay, and copied, Ed. And was there any noticeable dust on the large boulder?

05 12 59 17 CDR Not where I took the picture, but some fillets around the bottom.

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05 12 59 24 CC Okay, copy and out.

05 12 59 28 LMP Okay. And 44, Fred, was my frame count. I believe that was - If I remember it.

05 12 59 34 CC Roger, Ed.

05 12 59 37 LMP Now, I'm going to move on out. Al's ahead of me here.

05 13 00 17 CDR 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 small rocks.

05 13 00 51 LMP Small rocks and smaller --

05 13 00 52 CC Roger, Al.

05 13 00 53 LMP - - smaller, fresher craters, as well. 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 11 CDR Okay. Let's make an EMU stop.

05 13 01 18 LMP Okay. Let me pull awhile.

05 13 01 19 CDR I'd like to stop and rest here for a minute.

05 13 01 22 LMP Okay.

05 13 01 28 CDR Boy, I tell you, we're really going to get a panorama. We've got a tremendous one here, Houston, 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 01 58 LMP 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.

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05 13 02 07 CDR Well, I don't know. I tell you, it's probably the lowest spot right -

05 13 02 10 LMP Oh, right in that particular local area.

05 13 02 12 CDR Right in that area, yes.

05 13 02 13 LMP But that's the low spot over to the right that I was talking about. And there's a low spot - -

05 13 02 19 CDR Well, there's a crater over there. It's true, yes.

05 13 02 20 LMP Yes. Yes. Doggone it, you can sure be deceived by slopes here. The sun angle is very deceiving.

05 13 02 28 CDR Yes.

05 13 02 29 LMP Okay, let me pull awhile. You ready to go?

05 13 02 30 CDR Yes. All set.

05 13 02 36 LMP Go back to MIN cool, MINIMUM cool first.

05 13 02 51 CDR I guess right straight up is the best way to go.

05 13 02 53 LMP Beg your pardon?

05 13 02 54 CDR Right straight up is the best way to go.

05 13 02 55 LMP Yes, I think so.

05 13 02 59 CDR Stay away from the rocks.

05 13 03 02 LMP Okay. Get a little momentum going.

05 13 03 17 CDR Okay, Houston. We're proceeding onward now.

05 13 03 22 CC Roger, Al.

05 13 03 25 LMP 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).

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05 13 03 59 CDR Well, we haven't reached the rim, yet.

05 13 04 00 LMP Oh boy, we got fooled on that one. I'm not sure that was Flank we were in a minute ago, either (heavy breathing). 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 (heavy breathing). We're going to hit it on the south side. We'll have to move on around it. This looks like easy going right here. See, there's the boulder field that shows in the photograph - right up ahead of us?

05 13 04 52 CDR There's a crater up there, Ed.

05 13 04 53 LMP Yes. Pardon?

05 13 04 55 CDR Crater up there.

05 13 05 05 CC Okay, Al and Ed. They'd like you to take another stop here.

05 13 05 12 LMP 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 25 CDR 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 54 CDR Okay. That's at least 30 minutes up there.

05 13 06 04 LMP Yes.

05 13 06 08 CDR And - I would say we'd probably do better to go up to those boulders there, document that, use that as the turnaround point.

05 13 06 20 LMP Yes. It's going to take longer than we expected. 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.

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05 13 06 36 CDR Well, perhaps you can think - -

05 13 06 37 CC Okay, Ed. And - -

05 13 06 38 CDR - - 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 54 LMP Let's look at that map.

05 13 06 56 CDR And what I'm proposing is perhaps we use that as the turnaround point. It seems to me that we spend an awful lot of time on 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. They'd like your note, if you do see any dust, particularly on the top surfaces of boulders in the - 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 39 LMP \*\*\* We're not really in that boulder territory, yet.

05 13 07 42 CDR 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 - and sample -- what I feel is pretty sure is 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 12 CDR Well, let's head for these two babies up here.

05 13 08 38 LMP Hey, Al?

05 13 08 39 CDR Yes.

05 13 08 40 LMP I'd - \*\*\* keep going around this crater, but - except you're right here.

05 13 08 57 CDR Well, maybe. I thought we'd get those boulders up there, Ed. They - -

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05 13 09 01 LMP Yes.

05 13 09 02 CDR - - undoubtedly came from - -

05 13 09 03 LMP 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 07 CDR Right here.

05 13 09 08 LMP Pardon?

05 13 09 09 CDR Right here.

05 13 09 10 LMP Yes, right - clear on up at the top, you mean.

05 13 09 11 CDR No.

05 13 09 12 LMP Huh?

05 13 09 13 CDR I don't think we'll have time to go up there.

05 13 09 14 LMP Oh, let's give it a whirl. Gee whiz. We can't stop without looking into Cone Crater.

05 13 09 18 CDR Yes.

05 13 09 19 LMP \*\*\* everything if we don't get there.

05 13 09 26 CDR I think we'll waste an awful lot of time traveling and not much documenting.

05 13 09 31 LMP 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 41 CDR 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 49 LMP Yes. As you look back along your path, there's quite a bit of it.

05 13 09 53 CDR Yes, this crater -

05 13 10 08 LMP Fredo, how far behind time line are we?

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05 13 10 17 CC Okay. The best I can tell right now - about 25 minutes down, now.

05 13 10 30 LMP Okay.

05 13 10 31 CDR We'll be an hour down by the time we get to the top of that thing. You got six samples.

05 13 10 40 LMP 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 11 LMP Think you're finks.

05 13 11 23 CC That decision, I guess, was based on Al's estimate of another, at least, 30 minutes; and, of course, we - we cannot see that from here. It's kind of your judgment on that.

05 13 11 40 LMP Well, we're three-quarters there.

05 13 11 52 LMP 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 03 CDR 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 13 LMP But not the lowermost part, which is what we're interested in.

05 13 12 18 CDR 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 50 LMP We got it.

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05 13 12 51 CDR Yes. That's affirmative, Fred. Thank you.

05 13 14 00 CDR Okay. Stop at this little rise here and take a panorama.

05 13 14 04 LMP Okay.

05 13 14 23 CDR Okay, Al's going to MEDIUM flow.

05 13 14 28 LMP Okay, I'll take a pan from here.

05 13 14 34 CC Roger, Ed.

05 13 14 38 CDR Well, I'll tell you, it's a fantastic view from here, as this pan will show.

05 13 15 04 CDR 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 pressing on in that direction. Al's back to MIN flow.

05 13 15 35 CC Roger, Al. You're moving to the west rim.

05 13 15 47 CDR Al's 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 12 LMP It's not that hard with the MET. We need those tools.

05 13 16 19 CDR 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 37 LMP Give you a hand, Al.

05 13 16 38 CDR It's all right.

05 13 16 43 LMP You caught a boulder with your wheel as you went around that corner (heavy breathing).

05 13 17 00 LMP Al?

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05 13 17 01 CDR Yes.

05 13 17 02 LMP Head left. It's right up there.

05 13 17 05 CDR Yes. I'm going there.

05 13 17 55 LMP You need a little more lift. Go right up through there. I'll give you a hand.

05 13 18 13 CDR Okay. We're now right in the middle of the boulder field on the west rim. We haven't quite reached the rim yet.

05 13 18 49 CDR Okay. Want to rest here a minute?

05 13 18 50 LMP Yes. Let's take a look at the map. I think we're closer than that (heavy breathing).

05 13 19 07 CDR Okay, I'll just go ahead slowly with this.

05 13 19 22 CDR Okay. Find the crater?

05 13 19 27 LMP Yes. The rim's right up here.

05 13 19 38 LMP Let's see if we can spot this one, Al - -

05 13 19 40 CDR Okay.

05 13 19 41 LMP - - 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 54 CDR Yes. Okay. We're resting now.

05 13 19 57 LMP Look. Let me show you something.

05 13 20 00 CDR Okay.

05 13 20 03 LMP Here's that crater. We're down here. We got to go there.

05 13 20 09 CDR What crater?

05 13 20 11 LMP That crater right there is that one right there.

05 13 20 16 CDR Okay. Want to pull for a while?

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05 13 20 26 LMP Yes.

05 13 20 29 CDR 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 54 CDR Okay. Thank you.

05 13 20 59 LMP Let me set mine. If we're in that good a shape, let me set mine, Houston, if I'm okay, too.

05 13 21 07 CC That's affirm, Ed. I guess the low item is the batteries.

05 13 21 13 LMP Okay.

05 13 21 25 LMP Oop! It's going over. No, got it.

05 13 21 41 LMP Fantastic stabilization, Al; it's going to turn over.

05 13 21 48 CDR Okay. We better reconnoiter here. I don't see the crater yet.

05 13 21 55 LMP I agree. \*\*\* rock under my wheels.

05 13 22 26 CDR See this boulder pattern and all that we're in here, right now? This boulder field and all?

05 13 22 31 LMP 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 43 LMP Oh, yes.

05 13 22 44 CDR That'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 56 CDR Oh, the rim. This is negative. We don't - haven't found that yet.



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05 13 23 08 LMP 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 15 CDR Well, I don't know but what the rim is still - way up there 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 35 LMP Okay, Fredo.

05 13 23 38 CDR Okay. We'll observe with a pan from here. I'll take that.

05 13 23 45 LMP All right, I'll start sampling.

05 13 24 24 CDR 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've quite reached the rim yet, although 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 11 LMP Okay. Come on.

05 13 25 33 CDR Okay, you about to start taking documented samples?

05 13 25 36 LMP Right here.

05 13 25 38 CDR 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 - 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.

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[REDACTED]

05 13 26 23 CDR I understand, you will not be.

05 13 26 27 CC That's affirm. You can delete that one.

05 13 27 25 CDR Okay, Al's going back to 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 41 LMP Yes, we can take it at this location.

05 13 27 46 CC Okay. What I have on the board here to perform at - 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 03 LMP Okay.

05 13 28 06 CDR Okay. Let me suggest that we take one of these football-sized rocks from here, too, Fredo.

05 13 28 12 LMP Yes.

05 13 28 15 CC Roger, Al. Very good.

05 13 28 22 LMP 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 and EMU check.

05 13 29 25 CDR 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 37 LMP 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 47 LMP Okay. LPM deploy.

05 13 29 48 CC Roger.

05 13 30 19 CDR 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

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second layer, 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 00 CDR On second thought, forget that core tube. It's too granular, and most of the material came out of the tube. I'll just scoop a couple of samples, and bag it, of the two top layers.

05 13 31 19 CC Roger, Al.

05 13 31 46 LMP Hey, Fredo; I'm having a hard time leveling the -

05 13 31 48 CC Okay - -

05 13 31 49 LMP Okay, there it is.

05 13 32 02 CC And, Al. About what sample bag number are you up to now?

05 13 32 06 LMP 7-N was the last one I put in.

05 13 32 09 CDR Okay, Fredo, we're up on 12 here. I don't know whether that's consecutive or not, apparently not.

05 13 32 25 LMP Okay, Fredo, I'm - I'm back at the MET, having left the LPM; took my time.

05 13 32 39 LMP The LPM is alined about 3 degrees - -

05 13 32 40 CC Roger, Ed.

05 13 32 41 LMP - - 3 degrees to the north of the east-west line.

05 13 32 49 CC Okay. 3 degrees to north.

05 13 32 53 LMP And it is level; the bubble's just about in the center.

05 13 33 02 CC What's the size of the largest block y'all have passed, Ed?

05 13 33 07 LMP That we've gone past? Oh -

05 13 33 22 CDR Would you hand me the shovel, please, Ed?

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05 13 33 23 LMP Roger.

05 13 33 46 LMP Hey, Fred, are you ready to read the LPM?

05 13 33 59 LMP Fredo. Houston, you still with us?

05 13 34 04 CC Affirm, Ed.

05 13 34 06 LMP Okay, can I read the LPM?

05 13 34 08 CC All right. You can go ahead with the reading, Ed.

05 13 34 11 LMP Okay. I'm on - -

05 13 34 12 CC All right. Go ahead, Ed.

05 13 34 13 LMP - - 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 28 LMP 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 46 CDR 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 had disrupted the surface regolith and gone on down into the gray area. Okay.

05 13 36 16 CC Roger, Al.

05 13 36 17 CDR You want to - -

05 13 36 19 LMP Oh, we'll make - make a grab sample here, as well as documenting. Get one that'll ...

05 13 36 43 CC Okay. And, Ed, is the LPM still in your immediate area, then?

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05 13 36 50 LMP Yes.

05 13 36 53 CC Okay. They wanted a temperature reading off of it.

05 13 37 00 CDR Okay, he'll get it for you in a minute.

05 13 37 02 LMP Here, I'll get it - minute. Okay.

05 13 37 22 CDR Do you want the gnomon?

05 13 37 23 CC Okay. And, Al, did - did you mention either seeing a white boulder or a brown - a brownish-gray boulder earlier?

05 13 37 37 CDR I mentioned there's a boulder definitely whitish in color, Fred. And we'll be over there in a minute. Not in our immediate vicinity. But it definitely looks well worthwhile sampling.

05 13 37 49 LMP All right, the LPM -

05 13 37 50 CC That's affirm. They concur here and we'd like you to sample from the white boulder. Go ahead, Ed.

05 13 37 56 LMP 125 on the LPM.

05 13 38 01 CC Roger, copy.

05 13 38 08 LMP Okay. Where is it you're headed for, Al?

05 13 38 11 CDR Well, - -

05 13 38 12 LMP I'll get the bag.

05 13 38 13 CDR - - something we ought to do, if we want to drag the MET with us, is - See that white boulder down there?

05 13 38 21 LMP Yes, I saw it. And there's a - that's a - bummer. Yes.

05 13 38 24 CDR We can sample both - both types of boulders right down in that area; so, let's go on down there.

05 13 38 29 LMP All right.

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05 13 38 31 CDR 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 48 CDR Okay.

05 13 38 49 LMP Okay. You want the hammer? I'll grab it.

05 13 38 57 CDR Okay. I guess we just run down there this way, huh?

05 13 39 06 LMP Yes. Okay. I see - 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 31 CDR Yes, I believe that's probably a - -

05 13 39 33 CC Okay, Ed. I assume you're going to sample some of those.

05 13 39 37 LMP That's where we're headed right now. It's about 50 yards away.

05 13 39 43 CDR Why don't you go on down and start, and let me bring the MET down.

05 13 39 46 LMP All right. Yes. It's further than it looks.

05 13 39 51 CDR That's the order of the day.

05 13 40 22 LMP 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 46 LMP First of all, let met start my photographing. This whole area.

05 13 41 33 LMP They're all so darn big that there's hardly anything that I can find. Let me see if I can chip one.

05 13 41 51 LMP Okay, Fredo - -

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05 13 41 52 CC Okay, Ed and Al, 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 18 LMP Okay. And Fredo, I've just - -

05 13 42 22 CC And another note I'll remind you of later on. Go ahead. I'm sorry.

05 13 42 29 LMP 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 that's what I'm looking for.

05 13 42 52 CC Roger, Ed. 13-N.

05 13 43 10 CDR Now, just going around picking up hand-size grab samples from the immediate vicinity of where Ed is - is operating. I have a couple that are going in bag 16.

05 13 43 30 CC Roger, Al.

05 13 44 27 CDR \*\*\* help with that one?

05 13 44 28 LMP That's all right; I can do it.

05 13 44 33 CDR 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 39 LMP That's better.

05 13 44 54 CDR That can go in one of the Z-bags.

05 13 44 55 CC Roger, Al; we copy.

05 13 44 58 CDR Okay. You got a sample of that white rock?

05 13 45 01 LMP Yes, I got one batch of particles.

05 13 45 04 CDR Okay. Put it right in here.

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05 13 45 07 LMP I don't think it'll go.

05 13 45 08 CDR Yes. Core tube's out of the way. It'll go.

05 13 45 20 CDR Okay. We'll just try it back that way.

05 13 45 22 LMP Okay. Let's get another one.

05 13 45 24 CC Okay, Al and Ed. We have about 1 more minute here at C.

05 13 45 31 CDR Okay. We're moving on down the hill, now. Okay. Can you see Weird from here?

05 13 45 39 LMP No.

05 13 45 42 CDR Kind of hard to find.

05 13 45 45 LMP I can't even see Triplet from here (laughter).

05 13 45 50 CDR Okay, let - let's - -

05 13 45 51 LMP Wait a minute, Al. Let me take one quick look at the map before we move. Waste a minute looking.

05 13 45 57 CDR 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 11 CDR Okay. We're leaving C now, Houston.

05 13 46 20 LMP Hey, Al?

05 13 56 21 CDR Yes?

05 13 46 22 LMP Do you see North Triplet?

05 13 46 23 CC Roger, Al. And to rephrase 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 - samples en route to Weird.

05 13 46 33 CDR Okay.

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05 13 46 34 LMP 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 46 CDR Yes.

05 13 46 47 LMP You agree?

05 13 46 49 CDR It's between - it's halfway between those two large boulders and one way down.

05 13 46 57 LMP Yes, I think that's right. Uh-huh, that's the one.

05 13 47 00 CDR Okay.

05 13 47 09 CDR Okay. These rocks - these boulders in - in this field here appear to be very weathered, obviously not by atmosphere but - 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 55 CDR No, it hasn't. We might turn it on now - follow the progress.

05 13 48 00 CC Roger, Al.

05 13 48 08 CDR It running now?

05 13 48 13 LMP Have you checked the setting on it?

05 13 48 16 CDR Guess I better.

05 13 48 21 LMP ...

05 13 48 22 CC And, Al, without taking any extra time, if you - -

05 13 48 24 LMP Come across.

05 13 48 25 CC - - come across any boulders large enough, we might fill the comm check on the way down, if you haven't already done that on the way up.

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05 13 48 36 LMP 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 - and up the hill a bit more.

05 13 48 47 CDR Let's go on - Did you want anything back there?

05 13 48 50 LMP No.

05 13 48 51 CDR Oh, okay.

05 13 48 52 LMP You want me to hold you back?

05 13 48 53 CDR No, that's all right.

05 13 48 59 LMP Watch out. Bet you're going to go over here a minute.

05 13 49 35 LMP I can't catch you. Okay.

05 13 49 48 CDR And here again, Houston, the texture here appears to be - the regolith appears to be a lot of - of pebbles, approximately a quarter of an inch on down to go along with the fines. And the same textured pattern we spoke of before and photographed is also here.

05 13 50 15 CC Roger, Al.

05 13 50 21 CDR Okay. Why don't we stop here to see if we're really going to Weird.

05 13 50 28 LMP Yes. Man, the LM doesn't seem like it's getting much closer.

05 13 50 32 CDR Is that Weird right down there, you think?

05 13 50 35 LMP Hun? No, Weird is - Weird is almost due east of the LM. That's - Oh, there it is. Look, see - -

05 13 50 48 CC And, Al and Ed - -

05 13 50 49 LMP Switch ...

05 13 50 50 CC - - We'd like an EMU check.

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05 13 50 54 CDR Okay; this is Al. 3.75 and 45 percent; and on MIN - MEDIUM flow; and I'm comfortable.

05 13 51 04 LMP Okay, this is Ed. I'm on 3.75; MIN flow. I'm 40 percent and very comfortable. And there's Weird, Al. You can see the triple crater in it. It's the - -

05 13 51 15 CDR Okay.

05 13 51 16 LMP - - the white spot?

05 13 51 17 CDR Roger.

05 13 51 18 LMP Got it?

05 13 51 19 CDR Yes. With the boulder in the near foreground.

05 13 51 21 LMP Yes.

05 13 51 35 CDR Okay. We're now out of the boulder field, Houston, and proceeding on down to Flank.

05 13 51 44 CC Roger, Al.

05 13 51 48 CDR And, I believe - just get a shot - let's get a sample of that baby right there. Let's grab something from that one.

05 13 51 52 LMP All right.

05 13 51 55 CDR He's 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.

05 13 52 00 LMP Okay.

05 13 52 01 CDR Don't hit the fillets until I photograph it.

05 13 52 02 LMP All right.

05 13 52 03 CDR It's not there. Why don't you let me get a quick shot there. Okay, a quick pan across there. Okay. That looks like - Yes, we ought to get a piece of that baby.

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[REDACTED]

05 13 52 33 LMP No, man; that's hard, hard, hard! Look at that melt in it.

05 13 52 42 CDR Yes. Okay, here's a piece of it. All right?

05 13 52 55 LMP Come way on back here.

05 13 52 57 CDR Crystals here; don't lose it. Okay, that was about - it's about where we - No, I guess not.

05 13 53 13 LMP Hold it a minute. Hold it! Let me get a bag.

05 13 53 15 CDR Okay.

05 13 53 16 LMP This darn bag dispenser is not doing what it's supposed to do.

05 13 53 22 CDR Go ahead and take two. Small.

05 13 53 26 LMP Houston, the rock we're taking is in 14-N. Grab sample from a filleted rock.

05 13 53 33 CC Roger, Ed. 14-N.

05 13 53 34 LMP Large filleted rock that - Al photographed. Okay, let's go on. Do you want me to pull awhile?

05 13 53 40 CDR No, just watch everything. We don't want anything to drop off.

05 13 53 45 LMP You want me to hold back awhile and -

05 13 53 47 CDR No, no, no. I'd let it - just let it run. We don't want to lose anything.

05 13 53 53 LMP No. It's holding in very well. \*\*\* doesn't turn over. A little higher c.g. now than we had before with that big rock in there.

05 13 54 16 CDR Fredo, could you give us an idea of about what time we should arrive at Weird? How much more time?

05 13 54 24 CC Roger. Stand by 1.

05 13 54 51 LMP That 16-millimeter's bouncing all over every place.

05 13 54 54 CDR Ought to be a good - good -

[REDACTED]

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05 13 54 56 LMP It's taken photos from every view.

05 13 55 15 CDR Okay. I hate to make a grab here that's not from this crater. Looks like that cut fairly deep, though.

05 13 55 26 LMP Yes. Let's - Hey, here's a whole batch of them right down here, Al. Let's grab those.

05 13 55 32 CDR Which way, left or right?

05 13 55 34 LMP Off to the left and ahead - around that little crater. They're all from this same area.

05 13 55 40 CDR Houston. Unable to see any stratigraphy in any of these craters. The slumping has been such that it's pretty much destroyed - -

05 13 55 54 LMP I'll grab this one right here.

05 13 55 56 CDR - - any evidence of stratigraphy.

05 13 56 00 CC Roger, Al. And I assume, positionwise, you're past Flank, now. Is that correct? Or at least, the D position of Flank?

05 13 56 13 CDR No, we're not, Fredo. We're - no, we're not at Flank - at Flank, yet. I'd say we're probably 15 minutes away from Weird. Did you get it on board?

05 13 56 25 LMP As a matter of fact, I think this is - this is Flank right here.

05 13 56 29 CDR Get it on board?

05 13 56 30 LMP Yes, I've got the rock on board.

05 13 56 31 CDR 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 48 CDR 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.

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05 13 56 59 LMP

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 either 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 - it's not substantiated.

05 13 57 45 CC

Roger, Ed.

05 13 58 07 LMP

Hold it.

05 13 58 10 CDR

That's what I'm trying to do.

05 13 58 45 CDR

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. It sounds like you're making a little better time going down than up.

05 13 59 03 LMP

Yes, the slope's a different way, Fredo. In this case, the MET helps.

05 13 59 20 CDR

Okay, don't let me lose that baby. That's it right there with the three - -

05 13 59 22 LMP

Yes.

05 13 59 23 CDR

- - with the three rocks beyond it.

05 13 59 24 LMP

Yes. We're getting down to the place where we won't see it.

05 13 59 38 CDR

This is probably Flank right here, isn't it?

05 13 59 46 LMP

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 13 59 59 CDR

Yes, I know.

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05 14 00 01 LMP I think we've already passed Flank. Now, it's stopped. We'll have to wait on 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 22 LMP No, this is a big crater. It - it's 40 - 50 meters across. It has a fairly sharp crater in the south edge of it, which is 20 - 30 meters across.

05 14 00 42 CC Okay, that looks like it may be the one by E.

05 14 00 44 LMP Yes, I think that's it, Fredo. And it's - No, it's at least 50 or 60 feet deep.

05 14 01 01 CDR Why don't we just grab a couple from right here?

05 14 01 02 LMP Yes. Okay.

05 14 01 19 CDR That baby came apart. Very soft.

05 14 01 27 LMP Yes, it's falling apart as you pick it up. Very crumbly, isn't it?

05 14 01 30 CDR Okay. You got a bag ready?

05 14 01 31 LMP Yes.

05 14 01 33 CDR Very, very soft rock - Remember that crater? - Plus another one very close to us with crystal in it. It's flashing. Now, going in the bag.

05 14 01 44 LMP 15-N.

05 14 01 45 CDR Okay.

05 14 01 49 CC Okay, copied 15-N.

05 14 01 54 CDR Okay to rush?

05 14 01 55 LMP Not quite; let me get it in there.

05 14 02 00 CDR Stay behind me; we don't want to lose anything, now.

05 14 02 02 LMP Okay.

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05 14 02 03 CDR Okay, that's where we're going, right there.

05 14 02 05 LMP Yes, going right for Weird. Head right for the big boulder. Then, Weird's right beyond it.

05 14 02 10 CDR All right.

05 14 02 29 CDR Easy.

05 14 02 32 LMP Okay, keep going.

05 14 02 49 LMP This is Ed. I'm going back to MEDIUM cooling.

05 14 02 54 CC Roger, Ed.

05 14 03 05 LMP We - One of the problems of going downhill 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 28 LMP It's completely either blacked out or washed out right - -

05 14 03 31 CC Copy, Ed.

05 14 03 32 LMP - - immediately - immediately down-Sun of you. We're going predominantly down-Sun, now.

05 14 04 05 CDR Okay, Fred, we're still moving, and - looks about 3 minutes away now from Weird.

05 14 04 17 CC Roger, Al.

05 14 04 21 LMP The crater we're going by now, we're just to the north of it, Fredo, is an old subdued crater.

05 14 04 30 CDR If you want to run over behind that boulder over there, I'll try to talk to you.

05 14 04 34 LMP You're the one that has to get behind it and try to talk to Houston.

05 14 04 36 CDR Oh, that's right.

05 14 04 38 LMP I'll pull the MET. Go ahead.



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05 14 04 39 CDR Okay. On second thought, maybe it's not big enough. I'll just - -

05 14 04 49 LMP No, don't think it is.

05 14 04 51 CDR 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 right?

05 14 05 20 CDR Oh, probably a couple of hundred meters short of Weird.

05 14 05 40 CDR 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 05 58 CDR Okay, back with you.

05 14 06 00 LMP 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 18 CDR Well - -

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 37 LMP Okay.

05 14 06 39 CDR Okay, I'll get the pan. I think A itself is right in here, isn't it?

05 14 06 44 LMP Where are you?

05 14 06 45 CDR Behind you, to your left. See right down there?

05 14 06 52 LMP No, I didn't think so; I think this is it right here.

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05 14 06 56 CDR No, that's too small, I believe. Well, anyway, we're in the area, Houston.

05 14 07 03 LMP Take us a minute to find it. I suppose you probably - Well, that's a pretty big one over here.

05 14 07 10 CC Okay, Al, I think the - the pan will fill us in as to the exact position.

05 14 07 16 CDR Okay, pan's underway, now.

05 14 07 46 CDR Okay, pan's complete. Did you get a grab sample, Ed?

05 14 07 51 CC Roger, Al.

05 14 07 54 LMP \*\*\* grab some right up here, Al.

05 14 07 57 CDR Okay.

05 14 08 32 CC And I guess this is going in bag 16. Is that right, Ed?

05 14 08 38 LMP This is in bag 17, Fred. Sixteen got used - some time back.

05 14 08 46 CC Okay.

05 14 08 48 CDR Okay; let's press on.

05 14 08 50 LMP It's so darn big, it's hard to fold out.

05 14 08 53 CDR 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'd like to proceed on to the North - -

05 14 09 02 CDR Whup!

05 14 09 03 CC - - Triplet, and - -

05 14 09 04 CDR Wait a minute.

05 14 09 05 CC - - I'll give you - the - tasks when we get there.

05 14 09 13 CDR Okay, we'll try to get to North Triplet.

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05 14 09 15 LMP You ran out from under me just as I was picking it up.

05 14 09 18 CDR Oh, I'm sorry.

05 14 09 26 LMP Okay.

05 14 09 34 CDR Okay.

05 14 09 36 LMP Oh, man.

05 14 10 03 LMP \*\*\* some blocks from the - -

05 14 10 04 CC And, Al and Ed, 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 22 LMP 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.

05 14 10 30 LMP Okay.

05 14 10 31 CC Triple core.

05 14 10 32 LMP I think we're seeing the rim of the Triplet series right ahead of us, aren't we, Al?

05 14 10 48 CDR I would say so, yes. If we can say that's the rim of the North right there.

05 14 10 51 LMP 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 00 CDR I'd say we are. Right here.

05 14 11 05 LMP The way we've been estimating distances today, that rim has to be at least 6 miles from here.

05 14 11 10 CDR Okay, Houston; we're about one diameter to the east of North Triplet.

05 14 11 16 LMP To the west of - yes, east of Triplet. Excuse me.

05 14 11 20 CDR Okay.

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05 14 11 21 CC Okay, copied, and the number 1 item is the triple core.

05 14 11 28 CDR Okay.

05 14 11 30 LMP Where's the third core tube?

05 14 11 32 CDR Well, why don't you use clean ones?

05 14 11 34 LMP I don't have clean ones.

05 14 11 35 CDR Yes, you do. They're down in this pocket, right there.

05 14 11 38 LMP This one?

05 14 11 39 CDR Let me get my camera tightened up.

05 14 11 41 LMP This one's been used.

05 14 11 42 CDR No, no, no. In here, Ed.

05 14 11 46 LMP Oh, okay.

05 14 11 47 CDR The three tabs should be clean.

05 14 11 49 LMP All right.

05 14 11 52 CDR Okay, we'll pull it back together here.

05 14 12 04 LMP Do you have an O to that -

05 14 12 24 LMP Now, I'm clear to the bottom of that, I think.

05 14 12 29 CDR 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 50 CDR Okay, I'll get it.

05 14 12 55 LMP 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 05 CDR Okay, the three tabbed ones, we haven't used yet. Let me get them, Ed.

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05 14 13 35 LMP Okay. I'll take the tabbing off of this one.

05 14 13 41 CDR 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 50 LMP I don't have a back from that one; where'd it go?

05 14 13 54 CDR The bottom one will be number 1 tube with a tab, Fredo. Got 2 there?

05 14 14 02 CC Roger.

05 14 14 04 LMP Number 3.

05 14 14 06 CDR Okay. Hold on to that one. Okay? And the other one will be number 2 with a tab.

05 14 14 31 CDR 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 \*\*\* extension due to PLSS oxygen.

05 14 14 49 CDR Okay. You still planning on - -

05 14 14 54 CC So that gives us about -

05 14 14 55 CDR Go ahead.

05 14 15 03 CC Okay. That gives us approximately 25 minutes at stop G, here.

05 14 15 11 CDR Twenty-five minutes until what?

05 14 15 14 LMP \*\*\* help you. Okay, I got this one. Go ahead; start your trench, if you like.

05 14 15 32 CDR Okay. I'll dig the trench in the far wall of this crater here, Ed.

05 14 15 52 LMP Right.

05 14 16 44 LMP 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; very soft - It will not support the weight of the core tube. Now, I've got it balanced, and I can take a picture of it, perhaps.

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05 14 17 16 CC Okay. We're reading you, Ed.

05 14 17 44 LMP 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 07 LMP That's affirm. Al's digging - busy with his trench.

05 14 18 16 CC Okay; very good.

05 14 18 23 LMP I'll go over and help him photograph it in - a while. And it - it's not going in easy, Fred.

05 14 18 39 CC Roger, Ed.

05 14 19 12 LMP 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 28 LMP 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 48 LMP 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 17 LMP Okay.

05 14 20 34 CC How's the trench going, Al? Are you getting - getting down there?

05 14 20 38 CDR I've got a trench here. It's going fairly easily, but I need the extension angle - handle to get it deeper; so, I'll wait until Ed's through with that. I'm cutting into the rim of a crater which is approximately - oh, 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

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to be quite a bit of glass; and then, a third layer of some very light material. And we should be able to sample all three of these.

05 14 21 32 LMP Fredo, the core tube cap - -

05 14 21 33 CC Roger, Al.

05 14 21 34 LMP - - core tube cap from that sample is in 18-N.

05 14 21 43 CC Roger, Ed. Roger, Ed.

05 14 22 00 CDR 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 except where it's fractured. It's fracture face is very light gray with very small crystals.

05 14 22 28 CC Roger, Al; and if you can get any with your samples down in the trench itself that have any ... rock fragments, you might include those as part of your sample.

05 14 22 40 LMP Put it in the side bag. Put it in that side bag if you can; these are all - full - full back here.

05 14 22 48 CDR Okay.

05 14 22 50 LMP Let me help you. Okay, baby.

05 14 23 01 CDR Are you about through with the extension handle, or are you going to go -

05 14 23 04 LMP Go ahead and take it. I don't really need it to - to drive.

05 14 23 10 CDR I'll go over and cut that baby, and we'll - over here. 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 kicked up by foot-prints, or by tracks, or the like. Appears to be some of that here in this trench.

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05 14 24 13 LMP Fredo, did you get my - -

05 14 24 16 CC Roger, Al.

05 14 24 18 LMP - - my report that the core tube cap - tip was in 18-N?

05 14 24 26 CC Roger, Ed. I got that; 18-N.

05 14 24 32 LMP Okay, and I have taken the bottom core of that one, which was core 1 flagged; and it's now by itself - as a single core tube; I'm going to replace that with - number 1 unflagged, which is 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 13 CDR 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 say, we're not going to get a classic vertical wall here, Houston, on this trench.

05 14 25 57 LMP Yes.

05 14 26 20 CC And, Ed, are you having any better luck on the triple core this time?

05 14 26 25 LMP 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; then, we'll go ahead and drive it the rest of the way in.

05 14 26 36 CC Roger, Ed.

05 14 26 58 LMP 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 on this one. I think it might go.

05 14 27 29 CC Very good, Ed.

05 14 27 46 LMP Okay, I'm getting down low enough; I'm going to have to have an extension handle to finish driving it, I think.

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05 14 27 52 CDR 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 03 CDR Yes.

05 14 29 17 CDR Okay, Fred. Bag 19 for the sample of the surface fine - that is, from the - 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 40 CDR I am unable to take from the walls of the trench the type of material - blocky type of material that I could see while I was digging; so, I'll just get a shovelful 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 12 CDR Well, the trench is about a - - it was covering all the evidence of stratigraphy.

05 14 30 26 CC Roger, Al.

05 14 30 29 LMP 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. I'm maybe driving it a millimeter a stroke.

05 14 30 52 CC Okay, Ed.

05 14 30 53 LMP I'll hit it a few more licks, and we'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're getting it in any further, you can stop there.

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05 14 31 31 LMP 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 44 LMP 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 08 CDR Okay, Houston; this is Al. And bag 21 is kind of a collection of the - the combination of the top two layers. Second layer is a thin layer of small glassy-like pebbles. And I was not able to separate that by the trench method; so, I gave it to you mixed up in the - 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 47 CDR Well, it's really ephemeral - it's (laughs) 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 in the grain structure as I was digging the trench.

05 14 33 05 CC Roger, Al.

05 14 33 11 CDR And in bag 20, 20, we'll fill a sample of the bottom material; also, mixed up with the - some of the surface material that's fallen down in on top of it. And that's about - call it 18 inches below the 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 47 CDR Okay.

05 14 33 55 CDR This is Al, at 3.75 and reading - about - -

05 14 34 05 LMP Oh, hell.

05 14 34 08 CDR Reading 35; I have no flags; and I'm in - MEDIUM flow now, going to MIN flow; and feeling good.

05 14 34 18 LMP Okay, this is Ed. I'm 3.75 - -

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05 14 34 20 CC Okay, and what kind of misery are you having now, Ed?

05 14 34 24 LMP 3.75; 32 percent. MINIMUM - INTERMEDIATE - just a minute - I'm in MEDIUM cooling and doing great.

05 14 34 41 LMP Now, my problem is I can't get the - -

05 14 34 42 CC Okay.

05 14 34 43 LMP - - driving down - driving down to that rock, I couldn't get the core cap off; I'm going to have to get some help from Al, soon as he puts his handful of samples down. Okay, that's great.

05 14 35 03 CDR Okay, let me get rid of this trencher.

05 14 35 09 CC Okay. On the - on the agenda here, we have remaining documented samples, and we need a pan.

05 14 35 19 LMP Roger. We'll get it for you.

05 14 35 20 CDR Oh, God.

05 14 35 21 LMP Get another one; skip it; we've got plenty.

05 14 35 32 LMP Shit.

05 14 35 33 CDR Yes.

05 14 35 36 LMF Okay, Houst - -

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 47 CDR Well, I told you the trench was kind of a miserable failure, 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 03 LMP Okay, Fredo, the bottom - bit on this string was at - what - 23? Isn't it, Al? That's the one you got.

05 14 36 13 CDR Twenty-three, right; 23.

05 14 36 17 CC Roger, Ed.

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05 14 36 24 CDR Okay, we need a pan from here; I can get that.

05 14 36 27 LMP Okay.

05 14 36 40 LMP 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 55 CDR 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 24 CDR 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 49 CDR Okay.

05 14 37 59 LMP 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, even though it drove down -

05 14 38 15 CC Roger, Ed.

05 14 38 17 LMP - - even though it drove in about 3 inches, it didn't get anything.

05 14 38 26 CC Okay, Ed.

05 14 38 32 LMP 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 56 LMP Okay.

05 14 39 06 CDR Okay. SESC can - that's over in that pocket, right?

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05 14 39 09 LMP Yes.

05 14 39 29 LMP Okay. Documented samples coming up.

05 14 39 46 CDR This white stuff on the rim here, Ed?

05 14 39 49 LMP Beg your pardon?

05 14 39 50 CDR This white stuff on the rim here?

05 14 39 52 LMP 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 05 LMP Oh, no; we're still at the same place.

05 14 40 07 CDR Negative.

05 14 40 09 LMP That's pretty well disturbed, Al; I'll grab it - I'll grab it without much documentation.

05 14 40 13 CDR Okay.

05 14 40 16 CDR We're digging the bottom of the trench for you, Fredo.

05 14 40 21 CC Okay, Al.

05 14 40 26 CDR I'm redigging the trench.

05 14 40 38 LMP 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 kicked-up rock.

05 14 40 57 CC Roger, Ed.

05 14 40 59 LMP 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 41 59 CDR Okay, we're packing up now.

05 14 42 02 LMP One more documented sample.

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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 19 LMP 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 09 CDR Oh, no!

05 14 43 30 LMP What's the matter?

05 14 43 33 CDR I can't believe it!

05 14 43 34 LMP What's the matter, Al?

05 14 43 35 CDR Oh, that - seal came off that thing, and -

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 44 59 CDR Okay. Okay, you're right.

05 14 45 12 LMP Fred, this documented sample that I got of the buried rock, it's too big for our regular weigh bags. See what I can do with it. The regular sample bags - 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. It's bag number - -

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 00 LMP It's bag 26-N.

05 14 46 02 CC Okay, Ed.

05 14 46 14 LMP Okay. I'll grab the gnomon. We're on our way.

05 14 46 20 CDR ... the last I see of that son of a bitch.

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05 14 46 29 LMP They're miserable, aren't they?

05 14 46 36 CDR Okay.

05 14 46 40 LMP Oh, let me grab it for you.

05 14 46 42 CDR What? That thing? What? What do you mean - that can?

05 14 46 46 LMP Yes.

05 14 46 47 CDR Forget it.

05 14 46 48 LMP Okay.

05 14 46 49 CDR We're never going to use it again. Okay, headed for the LM, and we're probably about 2 minutes away from the LM, Houston.

05 14 47 05 CC Roger, Al.

05 14 47 09 CDR Okay, everything's on so far.

05 14 47 39 CDR Okay, we're -

05 14 47 41 LMP We're close ...

05 14 47 43 CDR Here's the - -

05 14 47 46 LMP Triplet right up ahead of us.

05 14 47 48 CDR Could be.

05 14 47 49 LMP We'll have to do a little bit to the north to get around it, I think.

05 14 47 54 CDR Yes.

05 14 47 56 LMP We're approaching Triplet from the - from the - east, North Triplet from the east. There's some - a little rock field down here - a small boulder field, Al, to get a documented sample from.

05 14 48 16 CDR Okay.

05 14 48 21 LMP Looks good. Yes, looks like they might have come from there.

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05 14 48 26 CDR Oops.

05 14 48 28 LMP Did you lose something?

05 14 48 30 CDR You lost you know what.

05 14 48 33 LMP Oh, no. What?

05 14 48 36 CDR (Laughter) This shiny can.

05 14 48 38 LMP Damn SESC, huh?

05 14 48 42 CDR Okay, the shiny can is retrieved. Press on. Going to have to mush, Ed, right down the middle and get a documented sample there.

05 14 48 54 LMP Okay.

05 14 49 00 CDR Man, that pile of rocks - beautiful, right there - right to your left. Oh, just the right size.

05 14 49 08 LMP/CDR Okay.

05 14 49 09 CDR Don't walk over them!

05 14 49 11 LMP No, I'm trying to stay away from them.

05 14 49 12 CDR There you go.

05 14 49 13 LMP Are these the ones - the ones over here?

05 14 49 15 CDR Yes.

05 14 49 16 LMP Okay.

05 14 49 18 CDR God damn that thing.

05 14 49 21 LMP Okay.

05 14 49 27 LMP Gnomon is in place.

05 14 49 34 CDR Okay, why don't -

05 14 49 36 LMP I'll get the - Go ahead. I'm on this side; I'll get the stereo.

05 14 49 42 CDR Okay.



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05 14 49 45 LMP Get the locator.

05 14 49 49 CDE Can't even see the camera settings.

05 14 49 56 LMP 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, we're going to have to press on back to the LM, or we're going to be really tight on the closecut.

05 14 50 10 LMP Okay.

05 14 50 11 CDR Okay.

05 14 50 28 CDR All covered with dirt, huh?

05 14 50 30 LMP 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 37 CDR Okay. Listen, just put it in that - in that thing. And let's press - because we don't have the time.

05 14 50 42 LMP All right. I'll grab it, and let me take a picture - an extra picture here.

05 14 50 46 CDR All right. I'll grab one right here in the foreground.

05 14 50 50 LMP Okay.

05 14 50 52 CDR Okay, bag 27-Nancy. And another documented sample - -

05 14 51 00 CC Roger, Al; 27-Nancy.

05 14 51 02 LMP - - 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 13 CDR Put it in that one right there. Can you get it?

05 14 51 15 LMP Yes.

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05 14 51 27 CDR Okay.

05 14 51 28 LMP It has a very definite shape; I think you'll be able to sort it out.

05 14 51 33 CDR Okay.

05 14 51 34 LMP Okay, let's mush for the LM.

05 14 51 36 CDR Okay.

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 50 LMP That's where we are. We're at the - we're at the rim of North Crater, on the west - -

05 14 51 58 CC Okay.

05 14 52 00 LMP - - rim of North Crater.

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.

05 14 52 14 LMP That's right. That's where we're headed.

05 14 52 16 CC That's the Antares.

05 14 52 17 CDR Okay, that's where we're headed. Hold it.

05 14 52 27 LMP I'll get it; keep going. He lost the core tube.

05 14 52 32 CDR Okay. Got it?

05 14 52 34 LMP I'll have it in a minute. I got it.

05 14 52 48 CDR Okay.

05 14 53 20 CDR Everything still hanging on?

05 14 53 22 LMP Yes. Everything is still there.

05 14 53 27 CDR Good.

05 14 54 00 CDR Okay, we're approaching the LM now. Coming in to Fra Mauro Base.

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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 31 CDF/LMP Okay.

05 14 54 33 CDF I'd suggest - well, you can do it the way you want to - I guess you can do without the LM.

05 14 54 39 LMF Without the MET, yes.

05 14 54 42 CDR Without the MET, because there's nobody to - if anything falls off, we've lost all those goodies.

05 14 54 48 LMF I think I'll just take a couple of rock bags - -

05 14 54 49 CC Okay, that's it.

05 14 54 50 LMF - - Fredo, my tongs and camera, and go.

05 14 54 54 CDR Okay, Al's on the way.

05 14 54 57 CC That's a good point, Ed. Yes. That'll be fine.

05 14 55 02 LMF Okay. Al's on the way out to the ALSEP.

05 14 55 15 LMF 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, I - the sample bags are too small, anyhow.

05 14 55 32 CC Roger, Ed.

05 14 55 33 LMF Houston - -

05 14 55 34 CC 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 48 CDR Okay, I'm just going to go through the same procedure as I used during the setup; that is - -

05 14 55 53 CC Okay, and I got - I got a change for you on the azimuth.

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[REDACTED]

05 14 55 54 CDR All right. Let me give you a call when I get there, and when I'm alined and level.

05 14 56 33 LMP 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 18 CDR 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 Okay. Alined and level. Go ahead with your readings.

05 14 58 13 CC Okay, Al. The - setting we need is now - actually a change in the azimuth reading to 16, 16.00.

05 14 58 30 CDR 16.00.

05 14 58 35 CDR Okay, you have 16.00, and you have - -

05 14 58 39 CC Okay, would you verify elevation is still at 6.41?

05 14 58 44 CDR 6.41 is still elevation. Stand by - -

05 14 58 49 CC Okay, stand by 1, Al.

05 14 58 51 CDR 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 35 CDR Okay. Are the ALSEP signals satisfactory?

[REDACTED]

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05 14 59 43 CC That's affirmative.

05 14 59 45 CDR Okay. Heading back to the LM.

05 15 00 57 CC And, Al; Houston.

05 15 01 01 CDR Go ahead, Houston.

05 15 01 04 CC Okay, a little change in the priorities. 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 24 CDR Roger; I'm going for the camera, now.

05 15 01 30 CC Okay. And we haven't changed the settings, Al; so, it's - it should - should be in good shape when you turn her to the MESA.

05 15 01 54 CDR 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 06 CDR Yes. I'm just setting it up, Fred.

05 15 02 11 CC Okay.

05 15 02 14 CDR Okay, that's f/22. How does that look?

05 15 02 23 CDR Well, should - a little more - more to the left. Just a minute.

05 15 02 33 CDR 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. You got good azimuth on it, now.

05 15 02 56 CDR 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 05 CDR It's on the side of a hill; that's a problem out here.

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05 15 03 09 LMP 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 34 LMP Okay.

05 15 03 37 CDR 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.

05 15 04 45 CDR All right.

05 15 04 48 CC Okay, the last - just got an input. They want f/11 at 1/25th.

05 15 04 55 CDR Okay. Will do.

05 15 05 34 CC And, Al; Houston.

05 15 05 37 CDR 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 52 CDR 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 03 LMP Yes, understand.

05 15 06 04 CDR Okay. Al's camera is in, and magazine Lima-Lima has got a 109.

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05 15 06 18 LMP Okay, Houston. And 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 32 LMP Okay.

05 15 06 33 CDR Okay, I'm putting my camera in the ETB. Let me slide by you there just a minute.

05 15 07 06 CC Okay, Ed; Houston.

05 15 07 07 LMP 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 the one camera, the CDR's.

05 15 07 29 LMP Okay, Houston.

05 15 07 35 CDR ... excuse me just a minute.

05 15 08 01 LMP Right. Right. Fredo, correct me, now; MAG Kilo-Kilo has never been used. Isn't that correct?

05 15 08 11 CC Stand by.

05 15 08 15 CDR 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 sandtrap shot here.

05 15 08 51 LMP You got more dirt than ball that time.

05 15 08 56 CDR Got more dirt than ball. Here we go again. Here we go.

05 15 09 01 CC That looked like a slice to me, Al.

05 15 09 03 CDR Straight as a die; one more.

05 15 09 18 CDR Miles and miles and miles.

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05 15 09 26 CC Very good, Al. And - to 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 41 LMP Hey, that's right. We got some of that to start with, didn't we?

05 15 09 44 CDR Yes.

05 15 09 47 LMP Okay.

05 15 10 12 LMP How many films did we take with this? Seven, huh?

05 15 10 15 CDR Approximately. Seventeen; okay.

05 15 10 30 CC Okay, Ed; Houston.

05 15 10 32 LMP 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 EFB.

05 15 10 46 LMP Okay. Okay, there's three cassettes and three frames.

05 15 11 39 LMP Okay. The closeup camera cassette is removed, Fred.

05 15 11 47 CC Roger, Ed.

05 15 11 49 LMP And stowed. That'll go in there?

05 15 12 15 CDR Houston, do you read me?

05 15 12 16 LMP Think that'll clear?

05 15 12 17 CDR Yes. Okay.

05 15 12 19 CC Loud and clear, Al.

05 15 12 21 CDR Okay, tell me about this tube, Ed. Has this got anything in it?

05 15 12 24 LMP No, that's - that's one that's left - nothing in it. Before you throw it, get the number. That's the tube that we didn't get anything from.

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05 15 12 35 CDR Okay. Okay. In SRC-2, Fredo, we have the organic control sample, and we have four core tubes.

05 15 12 56 CC Roger.

05 15 12 59 CDR And let's see -

05 15 13 21 CDR We have one SESC.

05 15 13 39 LMP Get it in without dropping it again.

05 15 14 07 CDR Okay.

05 15 14 23 LMP Okay, where's the SWC bag?

05 15 14 27 CDR It should be in the top of the MESA, Ed.

05 15 14 58 CDR Also, in the SRC, we have -

05 15 15 03 LMP This baby won't fit.

05 15 15 13 CDR - one weigh bag, which is mostly documented samples.

05 15 15 19 LMP Closed - -

05 15 15 20 CC Roger, Al.

05 15 15 22 LMP - - Closed.

05 15 15 25 CDR Okay. That supposed to go in here, too?

05 15 15 33 LMP No, that's the - it goes in the ETB.

05 15 15 36 CDR Okay. Take out - the core tubes out, maybe.

05 15 15 39 LMP Okay.

05 15 15 40 CDR Get the rocks in.

05 15 15 56 LMP This baby's what's hurting us.

05 15 16 24 LMP We didn't get anything in that magnetic sample container, did we?

05 15 16 27 CDR No, we did not. TDS stuff's up there.

05 15 16 31 LMP I've got it.

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05 15 16 32 CDR Good.

05 15 16 37 LMP Your feet are about to get tangled up in the - TV cable again. Don't fall.

05 15 16 41 CDR Okay.

05 15 16 57 CDR Oh, my God. Scratch.

05 15 17 04 LMP Okay. Contaminated samples, scratched; 30-millimeter camera MAGs; 16 MAGs; closeup camera MAGs; SWC; TDS; magnetic sample - we didn't get a magnetic sample; map. Say, are you going to have any weigh bags?

05 15 17 25 CDR Yes, we'll have some weigh bags. These two.

05 15 17 39 CDR Okay.

05 15 17 44 LMP Okay. Can you get them? Okay.

05 15 17 50 CDR Houston. That completes SRC-1; then we have the - the organic control sample, one SESC container, four core tubes, and one bag of documented samples.

05 15 18 07 CC Roger, Al.

05 15 18 10 CDR Okay. Now, can you fit -

05 15 18 20 LMP This is what?

05 15 18 21 CDR - this rock in this bag, if we put it this way?

05 15 18 26 LMP I'll give it a try. Wait for me there, just a second ...

05 15 18 37 CDR No, it won't go.

05 15 18 39 LMP All right. We need the plus-Z 27 bag, right?

05 15 18 44 CDR Yes. Either that or else put that in the weigh bag and take this up with it.

05 15 18 54 LMP All right, I'm getting you a bag for it.

05 15 18 56 CDR Okay, we'll use that one then. Here's your two-way bags that go in the ETB.

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05 15 19 05 LMP How are you fixed for room there?

05 15 19 08 CDR I'm getting loaded. We'll probably have to make two trips.

05 15 19 14 LMP Okay. Let me - babies right here, so we don't lose them.

05 15 19 55 CDR Okay. I'll put that in the weigh bag on my next trip. Thank you.

05 15 20 00 LMP That can just be a separate trip by itself.

05 15 20 02 CDR No. Yes, okay ... to hold it up.

05 15 20 03 LMP Okay. Now, have you got everything else? Got all the others in here?

05 15 20 10 CDR Yes, let me do one more check here. See if we got some more in this bag.

05 15 20 16 LMP These weigh bags are going to be - You're going to make a sep - separate trip out of them, huh?

05 15 20 19 CDR I guess we'll have to, Ed. I sure can't get it in there, now.

05 15 20 27 LMP Okay. Fredo, how much time have we got?

05 15 20 34 CDR We should be in pretty good shape.

05 15 20 40 LMF Houston, how much time do we have left?

05 15 20 47 CC Stand by, Ed.

05 15 20 56 LMF That do it now for those other items?

05 15 20 58 CDR We've lost a bunch of them - -

05 15 20 59 CC Okay, we've got about 18 minutes now.

05 15 21 03 LMP Oh, we've got lots of time; okay. Watch your feet again.

05 15 21 07 CDR Yes, I'm watching them. Okay. You have the ETB stowed, right?

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[REDACTED]

05 15 21 14 LMP ETB's stowed.

05 15 21 15 CDR How are the SRCs doing?

05 15 21 17 LMP Okay.

05 15 21 18 CDR And I'll see what we got left. There's the greatest javelin throw of the century!

05 15 21 29 LMP See if it is.

05 15 21 31 CDR Old Lefty, himself. Outstanding! Right in the middle of the crater. Stood up.

05 15 21 38 LMP Stabilized - wasn't bad at all.

05 15 21 40 CDR Beautiful. Beautiful.

05 15 21 48 LMP Okay.

05 15 21 49 CDR The documented sample bag.

05 15 21 50 LMP Okay. We missed one there, didn't we?

05 15 21 51 CDR Put that in the weigh bag.

05 15 21 58 CC Okay, Ed. I didn't hear the solar wind called off there. Did you get that one stowed?

05 15 22 05 LMP Yes. Yes, Fred. It's in the ETB now.

05 15 22 19 LMP Okay. We'll just have these three weigh bags now.

05 15 22 24 CC Okay, and did - okay, did the 100-foot tether also get into the ETB?

05 15 22 28 LMP That's affirmative; it's there.

05 15 22 34 CDR Okay. Okay; we'll take - take those along.

05 15 22 45 LMP Yes. How we going to handle them?

05 15 22 51 CDR I'll put them here in the ...

05 15 22 53 LMP Okay.

[REDACTED]

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05 15 23 03 CC And, Al and Ed, I just wanted to check 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 16 LMP That's affirm, Fredo.

05 15 23 19 CDR There's nothing left on the MET.

05 15 23 23 LMP I think we've cleaned it all.

05 15 23 24 CC Okay.

05 15 23 30 CDR Okay, let's press on. You want to -

05 15 24 03 CDR Want to head on up the ladder? I'll hand you the - SRC. I believe if you stomp your feet on the way up, it'll be as effective as the brush was yesterday.

05 15 24 17 LMP Okay. You're probably right.

05 15 24 20 CDR Okay.

05 15 24 21 LMP Did you - I saw you over here. Did you get a picture?

05 15 24 24 CDR I did.

05 15 24 26 LMP With the LM in the foreground?

05 15 24 28 CDR Yes.

05 15 24 32 LMP Yes. Okay, you ready to go up?

05 15 24 35 CDR Sure.

05 15 24 36 LMP All right, Fredo. I'm starting up the ladder.

05 15 24 40 CC Roger, Ed.

05 15 24 44 LMP How's that doing?

05 15 24 45 CDR Looks good. Shaking the heck out of the LM.

05 15 24 49 LMP What?

05 15 24 50 CDR That's enough of that. Moving the footpad.

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05 15 24 53 CC Okay. Something must have got caught in the cable; we just saw the TV go over.

05 15 25 00 CDR Well, we finally did it to you. Sorry. I'll check it out as soon as I --

05 15 25 04 CC Okay.

05 15 25 05 CDR I'll go set it - I'll go set it back up again. Got it?

05 15 25 08 LMP Okay.

05 15 25 13 CDR Okay. Fix up the television camera.

05 15 25 44 CDR 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 57 CDR 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 08 CDR (Laughing) Okay, we'll see to it that all 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 29 CDR Okay.

05 15 26 32 LMP Did you see that mighty leap, Fredo?

05 15 26 35 CDR Okay, Ed, you can start on up now.

05 15 26 38 LMP I'm already halfway up.

05 15 26 39 CDR Okay, good show.

05 15 26 41 LMP Rock box in one hand.

05 15 26 47 CDR Okay.

05 15 27 07 CDR How are you doing?

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05 15 27 08 LMP Fine. Let me get some of my visors up here so I can - -

05 15 27 13 CDR Okay.

05 15 27 23 LMP How far back do I have to look?

05 15 27 25 CDR That far?

05 15 27 28 LMP About there.

05 15 27 30 CDR Yes, I'd say about there.

05 15 27 38 LMP Oh, I'm looking the wrong way.

05 15 27 42 CDR Okay, shall we press on?

05 15 27 46 LMP ... seconds. There it is.

05 15 27 53 CDR We got two loads of the ETB.

05 15 27 55 LMP Okay. There you go.

05 15 27 57 CDR Okay.

05 15 28 01 LMP Said to have a quick look at Earth from the - -

05 15 28 03 CDR Yes.

05 15 28 04 LMP - - surface.

05 15 28 05 CDR Oh, we have some pictures of the LM in the foreground; so, hope it comes out all right.

05 15 28 11 LMP Pretty small sliver left, isn't it?

05 15 28 13 CDR Yes. Not much.

05 15 28 49 CDR Okay, Ed, you take the first ETB as soon as you're ready and then we can run the tracker light thing in between. Okay, stand by. You ready for it?

05 15 29 07 CDR Hear me, Ed?

05 15 29 09 LMP Okay.

05 15 29 12 CDR Houston, do you read?

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05 15 29 14 LMP You read me, Al?

05 15 29 15 CDR Yes, I read you.

05 15 29 16 CC Roger, Al. Houston reads you loud and clear.

05 15 29 17 CDR Yes, I read you, Al - Ed.

05 15 29 21 LMP Okay, I'm ready to bring it up.

05 15 29 23 CDR Okay, stand by. I'm going to get around a little bit more here. Okay, let her go.

05 15 29 28 CDR Very good.

05 15 30 39 CDR 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 52 CDR Okay, that's good.

05 15 32 25 LMP Okay, Al, bring it down.

05 15 32 27 CDR All righty, coming back down.

05 15 32 42 LMP Okay, hold it there. Okay.

05 15 32 47 CDR Okay, I have it. Little more.

05 15 32 51 LMP Huh?

05 15 32 52 CDR A little more down, please.

05 15 32 54 LMP Okay, you got it?

05 15 32 55 CDR Okay. I've got it, now. Thank you.

05 15 33 03 CDR Okay. Hook on there. ...

05 15 33 52 CDR 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 33 59 LMP Okay. You ready to bring the other two up?

05 15 34 02 CDR Just a second.

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05 15 34 23 CDR Okay, you can take the string now, if you like.

05 15 34 26 LMP Okay. There she comes.

05 15 34 57 CDR Okay, it's all yours.

05 15 34 59 LMP Okay, I've got it.

05 15 35 03 CDR Want to check the tracking light now, before I come up?

05 15 35 06 LMP Yes. Got your eye bones out of the way?

05 15 35 11 CDR I'm not looking at it. Let me know when you turn around.

05 15 35 19 LMP Okay, ... Your track light, closed. Okay, here it comes.

05 15 35 37 CDR Okay. Let's see. Yes, track light's working.

05 15 35 45 LMP Okay. Okay.

05 15 35 50 CDR 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 08 LMP That's - -

05 15 36 12 CC Well, I guess not now, Ed.

05 15 36 31 CDR Okay, the dust is knocked off.

05 15 36 52 CDR How'd you like one more bag of rocks?

05 15 36 55 LMP Okay, if you'll take one LEC.

05 15 37 01 CDR Okay. Can't see you - Wait a minute. Let me get -

05 15 37 08 LMP Wait a minute. I'm just about to it.

05 15 37 11 CDR Okay.

05 15 37 25 LMP I'm running out of room in here, Al. Take this while you're at it, before you come in.

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05 15 37 56 LMP Okay.

05 15 38 00 CDR Okay. The condensate [?] tank has already been discarded, Houston.

05 15 38 07 CC Roger, Al.

05 15 38 10 CDR Okay, and - -

05 15 38 12 LMP Could you push it a little further?

05 15 38 14 CDR Huh?

05 15 38 15 LMP No. Okay. Now I've got it.

05 15 38 20 CDR Get it up on top of the pile.

05 15 38 22 LMP Man, the pile is high in here, too. Two ETB loads, an SRC, and an extra rock bag.

05 15 38 31 CDR Okay.

05 15 38 35 LMP Okay.

05 15 38 36 CDR If you're ready, get over behind the door, and - -

05 15 38 38 LMP Okay. That's all of it. I'm moving out of your way.

05 15 38 41 CDR - - come on in.

05 15 38 48 LMP There's something caught in the door. Okay. I see what it is. It's that - -

05 15 38 54 CDR Thing down there, huh?

05 15 38 55 LMP Okay. Push it \*\*\* 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 18 CDR Yes.

05 15 39 22 LMP All right, come on in.

05 15 39 25 CDR Okay.

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05 15 39 45 CDR We have to have more door than that, Ed.

05 15 39 47 LMP All right, just a minute. Wait a minute; back out, Al. I've got to turn. Okay, now come on in.

05 15 39 55 CDR Beautiful.

05 15 39 59 LMP Okay, straight up. Straight up here.

05 15 40 06 CDR Okay.

05 15 40 07 LMP Fine shape.

05 15 40 11 CDR All righty.

05 15 40 22 CDR I keep hitting on something back here.

05 15 40 24 LMP Yes, you're hitting on the - shelf.

05 15 40 27 CDR Okay.

05 15 40 31 LMP Now you seem clear. Okay, Houston, the door is closed. Let's take this \*\*\*

05 15 40 47 LMP WATER valve is CLOSED.

05 15 40 49 CDR Afraid you'll have to - ... the suits.

05 15 40 58 LMP The FEEDWATER valve is CLOSED.

05 15 41 00 CDR Okay, let me go down and get the forward hatch, and I'll lock it.

05 15 41 14 CDR Okay. The forward hatch is closed and locked.

05 15 41 17 LMP Okay. Say, can you get the dump valve while you're there?

05 15 41 20 CDR Yes. Okay, dump valve, AUTO.

05 15 41 29 LMP Okay. Dump valve, AUTO. ...

05 15 41 34 CDR Let me just check that -

05 15 41 39 LMP Okay.

05 15 41 42 CDR All righty.

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05 15 41 43 LMP Okay. Look out. You're caught again. There, you're all right.

05 15 41 48 CDR Okay.

05 15 41 49 LMP Okay. LIGHTING: ANNUNCIATOR/NUMERIC, BRIGHT.

05 15 41 52 CDR Okay.

05 15 41 53 LMP CABIN REPRESS, I'm turning to get it - to turn it to AUTO.

05 15 42 03 CDR/LMP Okay.

05 15 42 07 LMP CABIN REPRESS, AUTO.

05 15 42 09 CDR Okay. SUIT PRESS circuit breaker coming closed.

05 15 42 13 LMP Cabin pressurizing. Standing by for your O<sub>2</sub> valve.

05 15 42 19 CDR Okay, Houston. The cabin is repressurized.

05 15 42 25 CC Very good, Antares.

05 15 42 34 LMP Okay. PRESS REG A and B going to CABIN. And you can turn your PLSS oxygen off at 2 and a half.

05 15 42 49 CDR Okay. We're at 2.5.

05 15 42 51 LMP 2.5; PLSS O<sub>2</sub>, OFF.

05 15 42 54 CDR PLSS O<sub>2</sub> is OFF.

05 15 43 20 CDR Okay. CABIN warning light is off.

05 15 43 22 LMP Okay. We're at 5 pounds.

05 15 43 26 CDR Steady at about 4.6.

05 15 43 29 LMP Can't beat pressurized air.

05 15 43 36 LMP Okay. The DET is counting up. Okay.

05 15 43 46 CDR Okay. Verify EVA circuit breaker configuration.

05 15 43 49 LMP Okay.

05 15 44 04 LMP Mine's good.

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05 15 44 06 CDR Okay, mine's good.

05 15 44 09 LMP SUIT FAN 2, closed; SUIT FAN DELTA-P, closed; ECS caution and WATER SEP component lights, out. ... up. Are they out? Okay. We can doff gloves.

05 15 44 16 CDR Okay. Gloves off, stow on the comm panels. Verify the safety's on the dump valve, which it is. Go DESCENT WATER valve, OPEN.

05 15 44 38 LMP Okay. Okay, DESCENT WATER valve is OPEN.

05 15 44 52 CDR Okay.

05 15 44 54 LMP Okay. Purge valve.

05 15 44 57 CDR Let's see. Have we got - that?

05 15 46 04 LMP Pardon?

05 15 46 05 CDR Yes. I just checked - rechecking it, to be sure we had everything. Okay. Purge valves. Stow in the purse.

05 15 46 15 LMP Okay.

05 15 46 16 CER And disconnect the -

05 15 46 20 LMP OPS O<sub>2</sub> hose.

05 15 46 21 CDR OPS O<sub>2</sub> hose, somewhere.

05 15 46 24 LMP Right there. Okay.

05 15 46 30 CDR Okay. Connect LM O<sub>2</sub> hoses red to red and blue to blue.

05 15 46 40 LMP PUMP, OFF; and FAN, OFF.

05 15 46 42 CDR Stand by 1, Ed. Would you verify this hose for me?

05 15 46 44 LMP Okay.

05 15 47 59 LMP Okay. They're locked.

05 15 48 02 CDR Okay. SUIT FLOW. Yes.

05 15 48 06 LMP PUMP, OFF; and FAN, OFF.

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05 15 48 08 CDR Good. PUMP, OFF; and FAN, OFF. PLSS water from  
PGA. ... this way, babe. Okay.

05 15 48 28 LMP Okay, there's your water.

05 15 48 29 CDR And connect LM water to PGA. ... want to go? ...

05 15 49 06 LMP Got it?

05 15 49 07 CDR Yes. Got that one.

05 15 49 25 LMP It's a real bitch, isn't it?

05 15 49 28 CDR Okay. Okay; close the LGC [sic] PUMP breaker.

05 15 49 36 LMP LCG PUMP breaker is closed.

05 15 49 38 CDR Okay. PLSS mode, both, to 0, and connect to the -  
Okay. Now wait a minute. Do you - Let's do it  
together.

05 15 49 49 LMP Yes.

05 15 49 50 CDR Both set our panels alike.

05 15 49 52 LMP Yes.

05 15 49 53 CDR And we'll talk and set it up so that ...

05 15 49 57 LMP Okay.

05 15 49 58 CDR Okay? Going to 0.

05 15 51 26 CDR Okay, we're on spacecraft comm now, and we're  
proceeding with the PLSS OPS undoffing - doffing,  
I should say. Okay -

05 15 51 37 CC Roger, Al.

05 15 51 39 LMP Okay, verify that.

05 15 51 41 CDR Okay, S-BAND TRANSMITTER/RECEIVER, PRIMARY. VHF:  
OFF, OFF, OFF; and OFF, LEFT, HI. And RECORDER,  
OFF.

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## LIFT-OFF MINUS 16 TO POSTDOCKING

05 21 31 15 LMP Okay, we're at ICS/PTT.

05 21 31 19 CDR Okay, and RECORDER, ON; VHF ANTENNA, AFT.

05 21 31 22 LMP VHF ANTENNA, AFT.

05 21 31 24 CC Antares, Houston. You can treat BATs 2 and 4 per the checklist. Over.

05 21 31 29 CDR Okay, here we go. BATs 2 and 4, OFF/RESET.

05 21 31 33 LMP Okay.

05 21 31 36 CDR Talkback barber pole.

05 21 31 38 LMP 2, coming off. And it dropped. 4, coming off. It dropped. 5 and 6 - are carrying the load.

05 21 31 51 CDR Okay. DESCENT BATs, DEAD FACE?

05 21 31 53 LMP DEAD FACE.

05 21 31 55 CDR Okay. DESCENT ECA and ECA CONTROL, open.

05 21 31 58 LMP ECA and ECA CONTROL are open.

05 21 32 00 CDR DESCENT ECA and ECA CONTROL, open here.

05 21 32 02 LMP Okay.

05 21 32 03 CDR Okay. Give me a circuit breaker configuration.

05 21 32 08 LMP Okay, on your panel?

05 21 32 10 CDR Yes.

05 21 32 11 LMP One, out; four, in.

05 21 32 12 CMP Roger.

05 21 32 13 LMP One, out; two, four, six, seven, in.

05 21 32 16 CDR Okay.

05 21 32 17 LMP One, out; one, in.

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05 21 32 18 CDR Right.

05 21 32 19 LMP Three, out; one in.

05 21 32 20 CDR Right.

05 21 32 21 CC Antares, Houston. Both batteries 5 and 6 are looking good.

05 21 32 24 LMP Thank you. Next row, all in, except THRUST.

05 21 32 27 CDR Okay, verify.

05 21 32 28 LMP Next row, two, out; one, in.

05 21 32 31 CDR Okay.

05 21 32 32 LMP Two, out; two, in.

05 21 32 33 CDR Okay.

05 21 32 34 LMP One, out; two, four, six, in.

05 21 32 36 CDR Okay.

05 21 32 37 LMP Two, out; three, in.

05 21 32 40 CDR Okay.

05 21 32 42 LMP Next row, five, in; one, out.

05 21 32 43 CDR Okay.

05 21 32 44 LMP Two, in; one, out.

05 21 32 45 CDR Okay.

05 21 32 46 LMP Two, four, six, seven, in.

05 21 32 48 CDR Okay.

05 21 32 49 LMP Two, out -

05 21 32 50 CDR Three, in.

05 21 32 51 LMP Three, in.

05 21 32 52 CDR Okay.

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[REDACTED]

05 21 32 53 LMP Next row, two, four, five, in.

05 21 32 55 CDR Right.

05 21 32 56 LMP Two, out.

05 21 32 57 CDR Right.

05 21 32 58 LMP Four, in.

05 21 32 59 CDR Is that four, in; or three, in?

05 21 33 01 LMP I have four, in; and one, out.

05 21 33 04 CDR Okay. This the last row you got on that?

05 21 33 06 LMP Yes.

05 21 33 07 CDR I got five, in; two, out.

05 21 33 12 LMP That's right.

05 21 33 14 CDR Four, in; one, out.

05 21 33 15 LMP That's what I got.

05 21 33 16 CDR Okay, good. ...

05 21 33 18 LMP No.

05 21 33 19 CDR Okay. Top row, in, all except next to the last one - Next two.

05 21 33 25 LMP Okay.

05 21 33 27 CDR Okay. Second row, in, all the way over to the DESCENT ENGINE OVERRIDE, which is out.

05 21 33 33 LMP I can't hear you, Al.

05 21 33 35 CDR In, all the way over to the DESCENT ENGINE OVERRIDE, which is out.

05 21 33 39 LMP Okay.

05 21 33 40 CDR Five, in.

05 21 33 41 LMP Okay, good.

[REDACTED]

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05 21 33 42 CDR Okay. All right, in, all the way over to TV, which is out.

05 21 33 45 LMP Okay.

05 21 33 46 CDR One, in; one, out.

05 21 33 47 LMP Right.

05 21 33 48 CDR One, in; one, out.

05 21 33 49 LMP All right.

05 21 33 50 CDR Five, in.

05 21 33 51 LMP That's good.

05 21 33 54 CDR Okay. DESCENT ECA and ECA CONTROL are out.

05 21 33 58 LMP Okay.

05 21 34 01 CDR One, in; two, out; two, in.

05 21 34 03 LMP Okay, I'm with you.

05 21 34 06 CDR Okay, we're at 5 minutes.

05 21 34 11 LMP Okay, RENDEZVOUS RADAR ... Okay?

05 21 34 17 CDR Okay.

05 21 34 19 LMP Okay, keep the book.

05 21 34 22 CDR What's that noise? Is that the VHF?

05 21 34 24 LMP No, I'd say - I suspect that's the relay. We'll try it. Yes, it's - it's B, it's VHF B.

05 21 34 42 CDF Is it B?

05 21 34 44 LMP It's VHF B.

05 21 34 47 CDR Well, now.

05 21 34 52 LMP I just - I turned the SQUELCH up. That'll help it.

05 21 34 55 CDR Okay.

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05 21 34 58 LMP Okay.

05 21 35 00 CDR I'd turn up some more.

05 21 35 04 LMP Maybe your VOX is too high, Al.

05 21 35 06 CDR Say again - -

05 21 35 07 LMP Oh, we're not on VOX.

05 21 35 08 CDR Say again.

05 21 35 09 LMP I said maybe the - Never mind.

05 21 35 20 LMP/CDR Okay.

05 21 35 21 CDR Checking APS burn guidance.

05 21 35 22 LMP APS burn guidance.

05 21 35 23 CDR Why don't you turn VHF B, OFF?

05 21 35 26 LMP Say again.

05 21 35 28 CDR Let's turn VHF B, OFF, unless you can get more squelch out of it.

05 21 35 31 LMP Okay, I had all of my - had all the squelch I could get.

05 21 35 35 CDR Okay, let's turn it OFF.

05 21 35 37 LMP Okay, it's OFF.

05 21 35 39 CDR No use listening to that.

05 21 35 40 LMP Stu will be calling us before long, but not yet.

05 21 35 42 CDR No, he's not here yet.

05 21 35 43 LMP Okay, APS.

05 21 35 44 CDR Right.

05 21 35 45 LMP ENGINE OVERRIDE LOGIC is closed. All S&C circuit breakers, closed, except -

05 21 35 52 CDR AEA and DECA POWER.

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05 21 35 54 LMP On your side, and ENGINE OVERRIDE on mine. Okay. CROSS TIE, BALANCE LOADS is open on my panel. RATE SCALE, 25.

05 21 36 05 CDR 25.

05 21 36 06 LMP ATTITUDE/TRANSLATION, 4 JETS.

05 21 36 08 CDR 4 JETS.

05 21 36 09 LMP COUPLES, ON.

05 21 36 10 CDR COUPLES, ON.

05 21 36 11 LMP DEAD BAND, MIN.

05 21 36 12 CDR MIN.

05 21 36 13 LMP Pushbuttons, reset.

05 21 36 14 CDR Pushbuttons, reset.

05 21 36 15 LMP ATTITUDE CONTROL, MODE CONTROL.

05 21 36 16 CDR Three, MODE CONTROL.

05 21 36 17 LMP MODE CONTROL, two, AUTO.

05 21 36 18 CDR Two, AUTO.

05 21 36 19 LMP Stop pushbutton, reset.

05 21 36 20 CDR Light's out.

05 21 36 23 LMP Okay, it's reset. And mines out. TTCA, two of them in JETS.

05 21 36 26 CDR JETS.

05 21 36 27 LMP Okay, I'm going to select 411; 11 plus 10000 ENTER; and at 2 minutes, I'm standing by for 400 plus 1000.

05 21 36 49 CDR Okay, we go right to this page.

05 21 36 53 LMP Okay.

05 21 36 55 CDR Okay, now I guess we still plan to go to VCX, huh?

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[REDACTED]

05 21 36 58 LMP Yes, sir.

05 21 37 00 CDR Okay.

05 21 37 01 LMP I'll call it, if they don't, if we need it.

05 21 37 14 LMP Okay, BIOMED's reading LEFT; HI BIT RATE; ... have to select ... - -

05 21 37 25 CDR Haven't heard anything about sensors in the last couple of days.

05 21 37 27 LMP Pardon.

05 21 37 29 CDR We haven't heard anything about sensors in the last couple of days.

05 21 37 32 LMP No, maybe they gave up.

05 21 37 37 CDR Okay, Ed, get that. Okay.

05 21 37 43 LMP Is everything secured over there?

05 21 37 45 CDR Yes.

05 21 37 46 LMP Okay, it's all secured.

05 21 37 48 CDR Got a couple of bags that may come floating out, but - stick them down here, actually.

05 21 38 02 CDR In with our rocks.

05 21 38 28 LMP Okay, just hold one more time, and we've got it made.

05 21 38 34 CDR Hey, god damn it.

05 21 38 37 LMF What's the matter?

05 21 38 38 CDF I'm still freaking with snaps down here. We've got everything snapped in. This is - They've always got about 15 of these things, you know.

05 21 38 59 LMF Yes.

05 21 39 12 CDR I think that'll hold it.

05 21 39 20 LMP You're snapped over here. Everything's secured. You have your 5-minute checklist. The - -

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05 21 39 33 CDR PRIMARY RADAR breaker AC is in.

05 21 39 34 LMP Yes.

05 21 39 35 CDR Okay.

05 21 39 37 LMP Medical kit was loose.

05 21 39 50 LMP Okay. ... go into the big one.

05 21 40 01 CDR No, this is the little one. It's only half of the big ones.

05 21 40 14 CDR Okay, turn on the MASTER ARM at 1 minute. You can start the camera. Ten seconds, ABORT STAGE, push; ENGINE ARM, ASCENT. You give me a PRC at 5 and a 99.

05 21 40 26 LMP Will do.

05 21 40 28 CDR And I'm going to push this son of a bitch at plus 1 second anyway. Even if it was AUTO ignition - even if it wasn't AUTO ignition, it's going to get pushed anyway.

05 21 40 42 LMP Right. Well, I like your spirit (laughter).

05 21 40 48 CDR Okay. Yaw right, 30 and then we watch it.

05 21 41 03 CDR Okay, you'll probably be going to B now to see what we've got.

05 21 41 05 LMP Hell, it's quiet now. VHF B's quiet.

05 21 41 11 CDR Okay. I don't know what happened to it. Okay, it's - I think we have not settled. It's still about 6 and a half degrees.

05 21 41 20 LMP Yes.

05 21 41 24 CDR Okay. All we have to do is hang on 4 more minutes.

05 21 41 34 CC Antares, Houston. A mark at 4 minutes. Stand by.

05 21 41 39 CC MARK. Four minutes.

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05 21 41 41 CDR Okay, we're right with you. 240 thousand miles away. Okay, baby, we want you to fire. ASCENT HELIUM, PRESS 2 is good. HELIUM 1 is good.

05 21 42 12 CDR Okay. GUIDANCE, PGNS; MODE SELECT is in AGS; we're in H and H-dot. We're at LO MULT; okay, we have computer; we're in PGNS; 25; PROP, ENABLE; 4 jets; COUPLES, ON; MODE CONTROL, three, to AUTO. Right on the money. Boy, my visor's so scratched up - -

05 21 42 36 LMP Mine is too.

05 21 42 37 CDR - - when the Sun shines in it, you can't even see - -

05 21 42 39 LMP See a cottonpicking thing. Okay, 3 minutes.

05 21 42 44 CDR And the light level will decrease soon.

05 21 42 47 LMP Yes, it won't be quite as bad when we get a little higher.

05 21 43 02 CDR Kitty Hawk, Antares. How do you read?

05 21 43 18 CC Antares, Houston. Kitty Hawk is reading you 3 by on VHF.

05 21 43 23 CDR Roger. We're not reading him. And Antares is counting - counting down to 2 minutes; 3, 2, 1 -

05 21 43 39 CDR MARK. Two minutes and counting.

05 21 43 44 CC We concur.

05 21 43 47 CDR You son of a bitch. Okay, AUDIO MODE, both VOX.

05 21 43 53 LMP All right, VOX.

05 21 43 58 CDR 400, set 10000.

05 21 44 08 LMP Okay; 400.

05 21 44 09 CDR 400 plus 10000.

05 21 44 15 LMP Plus 10000.

05 21 44 17 CDR Okay.

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05 21 44 19 LMP Watch is reset.

05 21 44 24 CDR Okay, Houston. The MASTER AFM is ON. The A and B lights are on. Okay. 367 read-out and ... in 1. ..., there's our boy. Read you loud and clear. We're 45 seconds and counting.

05 21 45 01 CDR Okay - -

05 21 45 02 LMP Okay, hello.

05 21 45 03 CDR - - be up to see you shortly.

05 21 45 06 CDR Okay. DSKY's on time.

05 21 45 09 LMP Have a nice cool one set up.

05 21 45 28 CDR Okay. The ABORT STAGE is set. ASCENT ENGINE is ARMED. 6, 5, 4, 3, 2, 1, 0 -

05 21 45 40 LMP IGNITION.

05 21 45 41 CDR We have ignition - -

05 21 45 42 LMP What a lift-off!

05 21 45 43 CDR - - And LIFT-OFF.

05 21 45 50 LMP ... pitchover.

05 21 45 51 CDR There's pitchover. Ten seconds. Okay, baby. \*\*\* over is good. Pitchover. There's AUTO ignition.

05 21 46 17 LMP Boy, and here we're going across Cat's Paw.

05 21 46 23 CDR Watch the ball. Everything looks good, Houston. Coming up on 1 minute.

05 21 46 35 LMP A1 - -

05 21 46 37 CDR 2, 1 -

05 21 46 39 CDR MARK; 1.

05 21 46 41 LMP MARK; 1. Little bit low and slow, but it's - -

05 21 46 55 CDR Okay, you want to give me a 623?

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05 21 46 58 LMP Okay. PGNS and AGS together.

05 21 47 02 CDR Okay. Yaw is complete, Houston.

05 21 47 12 CDR Okay. Let me look at the target again. 54829313.  
Targeting is still good. Okay.

05 21 47 31 LMP On 2.

05 21 47 34 CDR Okay. Coming up on 2 minutes. 3, 2, 1 -

05 21 47 39 CDR MARK; 2.

05 21 47 40 LMP H-dot is good. H-dot's right on. H is right on.  
PGNS and AGS are together.

05 21 47 49 CDR Okay. Steering is good. PGNS looks good, Houston.  
... luck. Tight as a drum.

05 21 48 32 LMP Okay. Steering is still good, Houston; coming up  
on 3 minutes: 3, 2, 1 -

05 21 48 39 CDR MARK it.

05 21 48 41 LMP MARK; 3 minutes.  $V_I$  is good, H-dot's good, H is  
\*\*\*, PGNS and AGS agree.

05 21 48 54 CDR Okay.

05 21 48 55 LMP Must have been oscillation - oscillation in our  
ECS pressures, but I'm sure it's \*\*\*

05 21 49 10 CDR \*\*\*31. Okay, Bruce. Looks good here.

05 21 49 40 LMP MARK; 4.

05 21 49 41 CDR 4, 4.

05 21 49 45 LMP Fire is good.

05 21 49 47 CDR Fire and pitch is good.

05 21 49 48 LMP H-dot is good; H is good; AGS are right together.

05 21 50 03 CDR Okay.

05 21 50 20 LMP ... good.

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05 21 50 21 CDR Okay. Thank you. About 225 to go; out of plane looks good.

05 21 50 29 LMP It looks good. That's good.

05 21 50 35 CDR Okay, you can stop your camera, if you want.

05 21 50 39 LMP Okay. ...

05 21 50 43 CDR Okay. We're a little beyond 5. We go until 5:30.

05 21 51 06 CDR We are at 5:30. 2 -

05 21 51 09 CDR MARK it.

05 21 51 12 LMP 5:30. That is good; H-dot's good; H is good; pitch is good; PGNS and AGS agree.

05 21 51 37 CDR Okay. Let's take one more at 6:30.

05 21 51 39 LMP All right.

05 21 51 49 CDR Houston, we'll look at - -

05 21 51 50 LMP 6:30's what you said.

05 21 51 53 CC Antares, this is Houston.

05 21 51 56 CDR Okay. VERB 85 versus 500 for a minute.

05 21 52 02 CDR ... 8946.

05 21 52 03 LMP Okay. I'll stay with 500.

05 21 52 07 CDR Okay. Very good.

05 21 52 08 LMP You're looking good. There's 800, 750, \*\*\* 550, 500. MAIN VALVES are OPEN - -

05 21 52 26 CDR Okay. MAIN VALVES, OPEN; ASCENT FEED, CLOSED.

05 21 52 27 LMP - - ASCENT FEED, CLOSED. 350, 300, 250, 200, 150, 100, 80, 60, 50, 40, 30, 10.

05 21 52 52 LMP SHUTDOWN.

05 21 52 53 CDR Okay. We've had a shutdown on the PGNS.

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05 21 52 59 LMP And those residuals are good.

05 21 53 00 CDR \*\*\* STAGE, reset. \*\*\* button, push; KEY RELEASE.

05 21 53 07 LMP Hit PRO.

05 21 53 08 CDR Okay. \*\*\*

05 21 53 09 LMP Here's your residuals - -

05 21 53 11 CDR Okay.

05 21 53 12 LMP - - minus 0.8.

05 21 53 13 CDR Okay.

05 21 53 18 LMP \*\*\* when we shut down. Go with that, Al. Looks good.

05 21 53 29 CDR Okay, minus 0.1, minus 0.4, plus 0.5.

05 21 53 39 LMP \*\*\* close.

05 21 53 40 CDR \*\*\* extend. \*\*\*kay.

05 21 53 45 LMP Say them again, Al. Minus 0.1, minus 0.4 - -

05 21 53 47 CDR And hold.

05 21 54 13 LMP Okay. Pressing on with the checklist.

05 21 54 24 CDR Okay. We can go IC \*\*\*T.

05 21 54 26 LMP Okay. INVERTER - INVERTER 2 - I'm on INVERTER - -

05 21 54 32 CC Antares, Houston. There will be a tweak burn. It'll come up shortly.

05 21 54 41 CDR Okay.

05 21 54 42 LMP Roger. All right, INVERTER 1 circuit breaker, open.

05 21 54 44 CDR Just a minute. Let me get the - Be sure I got the right attitude. I'm in attitude.

05 21 54 48 LMP Okay.

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05 21 54 49 CDR Okay. INVERTER 1 breaker's open.

05 21 54 53 LMP Did you get plus or minus 5 SHAFT/TRUNNION?

05 21 54 55 CDR Affirmative.

05 21 54 56 LMP LOGIC POWER.

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 at the nominal yaw 30 attitude. Read  
back.

05 21 55 19 LMP Roger. 142:36:51. Minus 2.0, plus 5.0, minus 8.0.  
Okay.

05 21 55 32 CC Antares, Houston, did you copy the tweak burn?  
Over.

05 21 55 38 CDR That's affirmative, Houston. We're setting up for  
it now.

05 21 55 41 LMP Roger. 142:36:51, and minus 2.0, plus 5.0,  
minus 8.0.

05 21 55 50 CC Roger, Ed.

05 21 55 51 CDR What was that  $T_{ig}$  again?

05 21 55 55 LMP 36:51, Al.

05 21 55 57 CDR Okay. 47's called up.

05 21 56 01 LMP Getting AGS set up for you. Which axis you  
going to do first?

05 21 56 05 CDR Okay, what's the biggest?

05 21 56 06 LMP Biggest one is Z - minus Z.

05 21 56 12 CDR Minus Z is minus 8?

05 21 56 14 LMP Minus 8.

05 21 56 15 CDR Okay, we'll do that first.

05 21 56 18 CC X, Z, Y, Ed. X, Z, Y.

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05 21 56 21 LMP Do X, Z, Y. All right, they want X, Z, Y.

05 21 56 24 CDR Okay. 36 what?

05 21 56 29 LMP 51, 20 seconds.

05 21 56 30 CDR And the first one is X, and that'll be what?

05 21 56 34 LMP That's minus 2.

05 21 56 36 CDR Minus 2.0. Minus 2.0?

05 21 56 40 LMP Minus 2.0.

05 21 56 41 CDR Okay.

05 21 56 48 LMP Ready? Give it - -

05 21 56 49 CDR We're burning.

05 21 56 58 LMP Good.

05 21 56 59 CDR Okay.

05 21 57 02 LMP B is minus 8.

05 21 57 05 CDR Minus 8?

05 21 57 07 LMP B, minus 8. Knocking down Z.

05 21 57 10 CDR Okay.

05 21 57 11 LMP Burn. 1, 2, 4, 5, 7 - 6, 7, 1 foot more.  
6, 7, 9, - -

05 21 57 31 CDR Okay.

05 21 57 32 LMP That looks good. 471 -

05 21 57 35 CDR That's about - out of plane?

05 21 57 41 LMP Out of plane is plus 5 right, 2 and a half, 4 and  
a half; that's great. Right there. Hold it.

05 21 57 52 CDR Okay, Houston. Tweak's complete.

05 21 57 56 LMP Okay. Let's get old P47.

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05 21 57 58 CC Roger, Al.

05 21 58 00 CDR Okay.

05 21 58 01 LMP Okay.

05 21 58 04 CDR ... get in attitude.

05 21 58 05 LMP Right.

05 21 58 06 CDR Okay. We'll do it in RATE COMMAND. We got plenty of RCS? Yes.

05 21 58 12 LMP Pardon.

05 21 58 13 CC Antares, Houston. You're GO for the APS TPI. APS TPI. Over.

05 21 58 17 LMP Roger. Thank you.

05 21 58 40 LMP Okay. You're slewing. Okay. When you get just a second - did you get LOGIC POWER circuit breakers, open?

05 21 58 47 CDR LOGIC POWER A's open.

05 21 58 48 LMP CABIN FAN circuit breaker, closed. CABIN FAN 1.

05 21 58 54 CDR Wait just a minute, Ed.

05 21 58 55 LMP Okay.

05 21 59 24 CC Antares, Houston. How do you read?

05 21 59 26 LMP Loud and clear, Bruce. I'll lock up for you as soon as we're in position.

05 21 59 40 CDR Okay. We're about in attitude now. Okay, what are those breakers again?

05 21 59 43 LMP Okay. CABIN FAN 1.

05 21 59 44 CDR It's out. Do you want it out or in?

05 21 59 49 LMP I want it in.

05 21 59 50 CDR Okay. It's in.

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05 21 59 53 LMP Okay, Houston. We're locked up on the steerable.  
Okay. RENDEZVOUS rate - RENDEZVOUS RADAR mode  
LGC - -

05 22 00 03 CDR Okay. ...

05 22 00 04 LMP - - Call P20.

05 22 00 05 CDR 20's called.

05 22 00 07 LMP VERB 80.

05 22 00 08 CDR Well, we haven't - -

05 22 00 10 LMP Oh - -

05 22 00 11 CDR - - locked yet.

05 22 00 12 LMP Haven't got it up yet.

05 22 00 13 CDR No. Searching now.

05 22 00 22 LMP Pardon.

05 22 00 23 CDR I say it's searching now. I don't have a visual.

05 22 00 33 LMP Okay. We'll give him a tracking light.

05 22 00 56 CDR Okay. It's found him. Okay. 000003, we'll take  
that. We - -

05 22 01 12 CC Antares, Houston. No state vector updates are  
required. Over.

05 22 01 17 LMP Roger. Thank you. You move your hand a minute,  
Al?

05 22 01 20 CDR Okay. You want a PRO on that?

05 22 01 21 CC And Stu reports he's having problems locking on  
in VHF.

05 22 01 27 LMP Yes. Okay.

05 22 01 32 CDR You haven't got a 50 18.

05 22 01 38 LMP Beg your pardon.

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05 22 01 39 CDR You don't get a 50 18.

05 22 01 41 LMP Not when you're within 10 degrees.

05 22 01 46 CDR Okay. We'll go to AUTO and see what it does.

05 22 01 49 LMP Am I supposed to have the tape recorder still on?

05 22 01 51 CDR I don't know.

05 22 01 53 LMP Should be a turnoff here somewhere. I guess not. We'll leave it on. I haven't got anything to do with it but run it out anyhow.

05 22 02 02 CDR Okay. Let's get a VERB 80 going. Okay. And call 34.

05 22 02 08 LMP 34. Okay. We can set the -counting down to TPI.

05 22 02 23 CDR Okay. Have you got a T<sub>ig</sub> for me?

05 22 02 24 LMP Have it in just a second.

05 22 02 25 CDR Okay.

05 22 02 32 LMP T<sub>ig</sub> is 143:10:54, A1.

05 22 02 38 CDR 25 ENTER; plus 143 ENTER; plus 10 ENTER; plus 54.00. Right?

05 22 02 53 LMP Yes. Let me say it again, 143:10:54.00. That's a good number.

05 22 02 59 CDR NOUN 37 is 143:10:54.00.

05 22 03 02 LMP That's a good number.

05 22 03 03 CDR Okay. PRO. It might not enter. Okay.

05 22 03 09 LMP OPERATOR ERROR; okay.

05 22 03 10 CDR Yes, I got that.

05 22 03 11 LMP Okay.

05 22 03 12 CDR Okay. We want a zero, we want a zero, we want a 130. Right?

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05 22 03 16 LMP Okay.

05 22 03 20 CDR You marked early. Okay. Let's get the COAS on; this is getting ready to go. Okay. What's next?

05 22 03 43 CC Antares, this is Houston. We believe that the command module VHF ranging lock problem may be due to 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 04 CDR Understand.

05 22 04 05 LMP Roger. We understand. Give us a call, Stu, when you need it.

05 22 05 32 CMP ...

05 22 05 38 CDR Okay, Ed. You got an ORB RATE ball.

05 22 05 42 LMP Okay. Coming up.

05 22 05 48 CDR You got an ORB RATE ball.

05 22 05 49 LMF Okay.

05 22 05 55 CDF Through?

05 22 05 59 CDR Are you through with 54?

05 22 06 01 LMP Yes, I'm through with it.

05 22 07 39 CC Antares, this is Houston. We've been informed that all systems are looking good. In particular, BATs ...

05 22 07 54 CDR He said everything's looking good, but then he lost us.

05 22 07 56 LMP Yes, we broke - popped S-BAND ANTENNA breaker again.

05 22 08 03 CDR Yes, was just like in the LMS and CMS. I don't see him.

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05 22 08 09 LMP Houston, Antares. I lost my S-BAND ANTENNA breaker again.

05 22 08 31 CC Antares, this is Houston.

05 22 08 34 CDR Go ahead, Houston.

05 22 08 40 CC Antares, Houston. Request AFT OMNI and LO BIT RATE.

05 22 08 44 CDR Okay. AFT OMNI and LO BIT RATE.

05 22 08 47 LMP 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 02 LMP Maybe so, but it also popped a circuit breaker.

05 22 09 08 CC Roger. If it runs into the stop, I believe it will.

05 22 09 11 LMP It didn't. It popped it before it went to the stops.

05 22 09 16 CC Roger. Out.

05 22 09 31 LMP Okay. Range rate, 349, 3 - 000 - ...

05 22 11 11 CDR Okay. It's looking pretty good so far.

05 22 11 13 LMP Sure is.

05 22 11 21 CDR Sure you're on VHF B, RECEIVE, now?

05 22 11 22 LMF I'm on B, RECEIVE, yes.

05 22 11 24 CDR With all that noise?

05 22 11 29 LMF Yes. That's the weird noises that Cernan was talking about.

05 22 11 46 CC ...

05 22 11 59 CDR Okay. Eighteen minutes. Should be 20 ... ECS.

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[REDACTED]

05 22 13 05 CC Antares, Houston. Comm check; over.

05 22 13 08 CDR Loud and clear, Houston. How me?

05 22 13 13 CC Roger. Out.

05 22 13 24 LMP Core tube stopper.

05 22 13 28 CDR Yes.

05 22 13 34 LMP What time's LOS?

05 22 13 36 CDR Okay; LOS in a couple minutes.

05 22 13 40 LMP Okay.

05 22 13 41 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 08 LMP Roger. Copied plus 63, plus 1, plus 67. Thank you.

05 22 14 18 CC Roger. Out. Ten seconds -

05 22 14 23 LMP Yes, we lost them.

05 22 14 34 LMP Okay. What's for LOS procedures, Al? You got them there?

05 22 14 40 CDR Okay. TRACK MODE, SLEW; S-BAND ANTENNA, AFT.

05 22 14 44 LMP Okay.

05 22 14 45 CDR Set PITCH, plus 114.

05 22 14 48 LMP Okay.

05 22 14 50 CDR YAW, minus 46.

05 22 14 51 LMP Okay.

05 22 14 53 CDR BIOMED, OFF.

[REDACTED]

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05 22 14 54 LMP BIOMED, OFF.

05 22 14 55 CDR PCM, LO.

05 22 14 56 LMP PCM is LO.

05 22 14 59 CDR UPLINK SQUELCH, ENABLE.

05 22 15 00 LMP Okay. It's ENABLE.

05 22 15 44 CDR Anyway, I didn't make the ... pullouts.

05 22 15 49 LMP Isn't this supposed to be cut - cut through?

05 22 15 51 CDR Is it?

05 22 15 52 LMP Yes.

05 22 15 53 CDR It's not. See how can slide it back and forth?

05 22 16 28 CDR There he is.

05 22 16 30 LMP Find him?

05 22 16 32 CDR Yes. There's sunlight on him.

05 22 16 43 LMP Give me a VERB 82. Let's see how we agree.

05 22 16 46 CDR Looks just like a star. ... - -

05 22 16 53 LMP Ooh, I'd like to get these helmet and gloves off.

05 22 16 58 CDR You want to take them off?

05 22 16 59 LMP What?

05 22 17 01 CDR Want to take them off?

05 22 17 03 LMP Yes, I'd like to (laughter). There's no crap in the cat - in the cockpit.

05 22 17 10 CDR 8.65 by 50.9.

05 22 17 14 LMP Okay. I've got 50.3 by 4 - let's see, 403; 8.1, so that's - we're right together, Al.

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[REDACTED]

05 22 17 27 CDR Okay. And it looks good, babe.

05 22 17 31 LMP Good solutions.

05 22 17 37 CDR Looks good. Oh, I'm sorry. It's not him - it is not he. Thought he was moving, but he's not - just - don't see him at all.

05 22 17 46 LMP VERB 62.

05 22 17 49 CDR Glad we're not doing this visually.

05 22 18 20 LMP 4.1.

05 22 18 49 CDR Everything's looking good. Everything's quiet.

05 22 18 53 LMP Okay. I'm going to retarget PGNS here, I mean AGS here. 514,00000,515. Move your hand a bit. There's the problem. Plus 4 all zeros, 516, plus 00000. ENTER.

05 22 19 55 LMP Okay.

05 22 20 04 CDR Okay. Everything's going very nicely.

05 22 21 00 LMP Sounded like Stu went off the air.

05 22 21 02 CDR Yes, it sure does.

05 22 21 04 LMP Thought he was starting to - took a RESET RANGING set.

05 22 21 07 CDR Oh, yes. ... any good.

05 22 21 11 LMP ... 2, 4, 42 ...

05 22 21 15 CDR Sure are noisy.

05 22 21 42 LMP Okay. I'm ready to - How about that - there's no use in being this miserable. Do you want to break helmets and gloves?

05 22 21 56 CDR Well, we'll - we can put them on just before docking, can't we?

[REDACTED]

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05 22 21 59 LMP We can.

05 22 22 01 CDR The only thing is we'll have a different configuration on the CABINs.

05 22 22 04 LMP What we need to do is go CABIN, CABIN.

05 22 22 08 CDR Well, AUTO on both, CABIN GAS RETURN.

05 22 22 12 LMP AUTO on both of those.

05 22 22 25 CDR Is CABIN holding?

05 22 22 28 LMP I don't see any flow; it had been holding. It hadn't moved.

05 22 22 32 CDR Okay.

05 22 22 33 CMP Okay, Antares. I ... maneuver.

05 22 22 38 LMP Okay, Stu.

05 22 22 53 CDR Okay. We're in final COMP, 34.

05 22 23 15 CDR Okay. You want to copy down the solution?

05 22 23 17 LMP Yes. Just a second here.

05 22 23 32 CDR You're going to have a transfer angle of 30 degrees.

05 22 23 40 LMP Okay. Let's have a solution, NOUN 55. I don't need -

05 22 23 46 CDR Begin the transferring with 30 degrees.

05 22 23 48 LMP Just a minute. Let me write it down. Okay, you have 30.

05 22 23 55 CMP 30.16.

05 22 23 56 LMP AGS says 29.86.

05 22 23 59 CDR Good show.

05 22 24 02 LMP You'll have to move those four to burn, because they'll end up down there. Okay, NCUN 58 - are 446 -

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05 22 24 13 CDR 885, 287.

05 22 24 16 LMP 885, 287. All right.

05 22 24 21 CDR Okay. Here we go. 81 - boy, it's close to the ground.

05 22 24 27 LMP 621, plus 1, plus 631. That's pretty close to what - they gave us from the ground.

05 22 24 39 CDR It really is.

05 22 24 58 CDR Okay. Stu, did you read our NOUN 81?

05 22 25 04 CMP ...

05 22 25 05 CDR Did you read our NOUN 81?

05 22 25 08 LMP Okay. We had 62 - plus 62 1, plus 0.1, plus 63 1, and I'll take yours.

05 22 25 19 CMP ...

05 22 25 30 LMP Okay.

05 22 25 33 CDR Getting pretty good on that sextant, huh?

05 22 25 37 CMP Yes ...

05 22 25 44 LMP That's affirm. We have VHF RANGING on A and RECEIVE on B.

05 22 25 50 CDR Do you want 59?

05 22 25 52 LMP No, I don't care.

05 22 25 55 CDR Okay.

05 22 26 06 CDR Okay. I'm going to call up 42.

05 22 26 09 LMP Pardon? Okay.

05 22 26 11 CDR Calling up 42.

05 22 26 15 LMP Okay. Our solutions are good enough. We'll go - go with your PGNS, Al.

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05 22 26 23 CDR Okay. Let me just change the adapter up in there.

05 22 26 35 LMP Stu - Stu, we're going to burn plus 62.1, plus 0.1, plus 63.1.

05 22 26 46 CMP ...

05 22 26 48 CDR Okay. Going to burn attitude. It's only 2 degrees off.

05 22 26 57 CDR Okay. We're sitting in burn attitude.

05 22 27 01 LMP Can you get the checklist while I finish targeting AGS?

05 22 27 03 CDR Sure.

05 22 27 14 LMP Okay. I need VERB 16. Could be NOUN 86 is -  
Okay. 450, plus 00621, ENTER; 451, plus - 452, plus 00631, ENTER.

05 22 27 49 CDR Okay, Stu. We're in burn attitude. Looks like we're going to make the burn all right.

05 22 27 55 CDR Okay. You through with - -

05 22 27 56 LMP Okay. I'm through with those. You can have them.

05 22 27 59 CDR Okay. Counting down at 40. You want to check your DISPLAY/ENGINE OVERRIDE/LOGIC, closed; and DESCENT ENGINE OVERRIDE's open.

05 22 28 09 LMP Okay. What was the closed one?

05 22 28 11 CDR DISPLAY/ENGINE OVERRIDE/LOGIC.

05 22 28 13 LMP Okay, it's closed. DESCENT ENGINE OVERRIDE, open - -

05 22 28 15 CDR Okay.

05 22 28 16 LMP - - is open.

05 22 28 18 CDR RATE SCALE, 25; 4 JETS - -

05 22 28 19 LMP Okay. Let's get these helmets down.

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05 22 28 23 CDR BALANCE COUPLES, ON. DEAD BAND, MIN ... ABORT  
STAGE, reset; MODE CONTROL, three; PGNS, AUTO;  
AGS, AUTO; ... reset, reset.

05 22 28 43 LMP I had to put it on to get rid of it.

05 22 28 50 CDR Now, mine will be okay.

05 22 28 53 LMP Yes, yours is all right.

05 22 28 56 CDR Okay. One minute 56 seconds to go. You had a  
400 and a plus 10000?

05 22 29 04 LMP 400 and - plus 10000.

05 22 29 06 CDR Okay. Okay. Okay. To end, I'm going to put the  
ABORT - set the ABORT STAGE, start manual ullage,  
and I want you to PRO at 5.

05 22 29 24 LMP Okay.

05 22 29 30 CDR Okay. At ignition, if no ignition?

05 22 29 33 LMP ENGINE ARM, ASCENT; MANUAL START, MANUAL STOP in  
3 seconds.

05 22 29 36 CDR Okay. You should have an ENGINE ARM, ASCENT  
before you get there, or somewhere.

05 22 29 40 LMP Well, it - see, you're not - you're only arming  
with the abort stage; if you don't get it, go  
ENGINE ARM, ASCENT.

05 22 29 47 CDR Okay.

05 22 29 51 LMP And on and off.

05 22 29 53 CDR Okay, 1 minute. AGS, MODE CONTROL.

05 22 29 55 LMP Okay.

05 22 30 17 CDR Okay. DSKY's on time.

05 22 30 40 CDR Okay. ABORT STAGE is set. Starting ullage. 6,  
5, 4, -

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05 22 30 47 CDR/LMP PRO.

05 22 30 48 CDR 3, 2, 1. We have -

05 22 30 51 CDR IGNITION. 31, shutoff.

05 22 30 56 LMP Man - -

05 22 30 58 CDR Okay. We made the burn. - -

05 22 30 59 LMP - - Oh, man. What a burn!

05 22 31 02 CMP Okay. Sounds like you got a good burn.

05 22 31 06 LMP Boy, that's a wild ride, Stuart.

05 22 31 10 CMP I've been told ...

05 22 31 14 CDR Yes, we're trimming now.

05 22 31 46 LMP Beautiful, Al; 0, 0, and 3. Let me write them.

05 22 31 50 CDR Okay; C, C, plus 0.1.

05 22 31 52 LMP Okay, you got them; 0, 0, plus 0.1. AGS is plus 0.2, 501, minus 0.5, 502, plus 0.4. Good burn. Good burn.

05 22 32 23 CDR Okay, Ed. Engine stop, reset. Now, we ought to get back into AUTO TRACK.

05 22 32 34 LMP That's affirm. You should be in it.

05 22 32 38 CDR Okay.

05 22 32 55 CDR Radar needles are off.

05 22 32 57 LMP Pardon. Say you got a 50 18 to take you back.

05 22 33 02 CDR Okay. Just got a - I just - just came up - there you go.

05 22 33 15 CDR Okay. We are back in attitude, and we're in good shape.

05 22 33 18 LMP So, I just need to see the checklist. That's all right. 1909, and 15, 2059, 372 - -

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05 22 33 34 CDR Go ahead.

05 22 33 35 CMP I was - I was wondering if I could ... see if I could get my VHF locked up?

05 22 33 40 CDR Sure.

05 22 33 41 LMP Say when you need it.

05 22 33 42 CDR Give us a mark. We'll be quiet for 20 seconds.

05 22 33 44 CMP Okay. 3, 2, 1 -

05 22 33 45 CMP MARK.

05 22 34 06 CMP Okay, Ed. I got - I got a ...

05 22 34 11 CDR Hang on, we stayed 20 seconds - -

05 22 34 12 LMP That's pretty good.

05 22 34 16 CMP Well, I ... what ...

05 22 34 19 CDR Okay. VERB 67 is in, loaded.

05 22 34 26 LMP Yes, everytime you get a reset, Stu, give us a yell.

05 22 34 30 CMP Okay.

05 22 34 33 LMP Because we don't know unless you tell us.

05 22 34 36 CMP All right.

05 22 34 48 LMP 1, 30, 2. ...

05 22 35 19 CDR Okay. How's your AGS doing over there?

05 22 35 21 LMP Man, it's just staying right in there.

05 22 35 22 CDR Good.

05 22 35 23 LMP Just hanging in as pretty as can be.

05 22 35 35 CDR Say, Stu. They tell us from Houston, now, they want us to plus-X thrust anyway, on the first docking attempt. Do you get that word from them?

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05 22 35 44 CMP Say again, ...

05 22 35 46 CDR They called us from the control center a little while - well, before we left the surface, and said now on the docking - on the normal docking, the first attempt, they want us to thrust plus-X with you anyway.

05 22 36 00 CMP Yes, that's what they said.

05 22 36 01 CDR Okay. Well, I'll thrust plus-X, four jets then, when you give me a contact.

05 22 36 07 CMP Okay.

05 22 36 11 CDR I'm not sure I like it, but -

05 22 36 12 CMP No, I'm not sure I will either. Why don't we go ahead and dock and see if we capture. And, if not, I'll give you a GO for thrusting.

05 22 36 20 CDR I like that idea better. We'll just play it nominal first.

05 22 36 36 CDR Okay. Let's just check the devil at TPI plus 6. The line-of-sight radar ought to be 52, and that's what it is. Line-of-sight reads good. Well, I guess we could go ahead and throw in a ... in there.

05 22 37 36 CDR Did you reset your ball?

05 22 37 38 LMP I haven't reset it. No, Al.

05 22 37 40 CDR You want to give me a - -

05 22 37 41 LMP I - Here's a number to reset it on.

05 22 37 43 CDR Okay.

05 22 37 44 LMP 3922.

05 22 37 48 CDR Okay. What does it look like? What - it's all right, isn't it?

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05 22 37 50 LMP 40. It's pretty damn close. If you'll change - let me give you an apogee and perigee to reset on. There's 44 1 by - by 59, so it's 44 by 60.

05 22 38 04 CDR ... 4 is 52.

05 22 38 05 LMP Okay.

05 22 38 06 CDR Okay. Off and running.

05 22 38 24 CDR Three degrees, and 21.

05 22 39 30 CDR Ah, there's your docking light.

05 22 39 38 LMP Yes, there he is.

05 22 39 39 CDR Tracking light, I should say. There he is.

05 22 39 45 LMP You reading - can you see our light, Stuart?

05 22 39 50 CDR Ch, yes. Yes, he said that solution he had was sextant only.

05 22 39 55 LMP Yes. That's right, he did, didn't he? 18 miles.

05 22 41 50 CDR Okay. Final comp in 1 minute.

05 22 41 52 LMP 10, 12, 14, 16, 17.2 -

05 22 41 57 LMP MARK. 17 -

05 22 41 58 LMP MARK. 262 plus 00171. I have an 11-foot mid-course, but I wouldn't count too much on it. It's not enough marks.

05 22 42 14 CDR We're just about right on the nominal track.

05 22 42 18 LMP Okay. That midcourse is what I initialized after TPI. They're not very good.

05 22 42 39 CMP ... quite a few updates.

05 22 42 43 LMP Yes, could be. You got a final - oh, you don't get a final comp until - -

05 22 42 51 CDR Right now.

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05 22 42 52 LMP Okay.

05 22 42 57 CDR Right now.

05 22 43 10 LMP Okay, there they are: 0.9, 0.2, and 0.6.

05 22 43 11 CDR Okay, NOUN 81. Stu, you ready?

05 22 43 16 CMP Roger.

05 22 43 18 CDR Minus 0.9, plus 0.2, minus 0.6.

05 22 43 25 LMP ... Wait a minute. ...

05 22 43 27 CMP Minus 0.9, plus 0.2, minus 0.6.

05 22 43 30 CDR That's right, and I think we'll burn it RCS.

05 22 43 32 CMP Okay. Mine are plus 1.3, minus 0.1, minus 1.1.

05 22 43 40 CDR Not bad a-tall. Not bad a-tall. Everything's right direction; very close.

05 22 43 53 LMP Okay.

05 22 43 54 CDR You got them?

05 22 43 55 LMP Yes.

05 22 44 08 LMP Okay. You're in ATT HOLD, going AGS -

05 22 44 10 CDR AGS. I will be.

05 22 44 11 LMP Okay. Which one are you going to burn first? It's nearly all X, right now.

05 22 44 28 CDR Oh, I wiped it out.

05 22 44 29 LMP VERB 16 NOUN 85 - -

05 22 44 30 CDR VERB 16 NOUN 85. You always burn X first.

05 22 45 08 CDR Did you write down the 81s?

05 22 45 11 LMP No, I didn't, Al.

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05 22 45 14 CDR Oh, okay. Probably better ought to do that.

05 22 45 17 LMP Well, I can tell you what they are, because I - -

05 22 45 19 CDR Well, I mean for - you know - debriefing - -

05 22 45 20 LMP Yes.

05 22 45 21 CDR - - later on. Okay - -

05 22 45 23 LMP I did write them down, too. In here.

05 22 45 27 CDR Okay, Stu, we'll do it. On time.

05 22 45 52 CDR Okay, we're burning.

05 22 46 00 CDR Burr complete. Okay. Plus 0.1 in all registers.

05 22 46 13 LMP Okay. In all axes?

05 22 46 21 CDR Right.

05 22 46 26 LMP Okay. VERB 76; MODE CONTROL, AUTO.

05 22 46 31 CDR Okay, it's in AUTO.

05 22 46 35 LMP P35.

05 22 46 37 CDR We're in 35.

05 22 46 39 LMP Okay. VERB 93.

05 22 46 45 CDR Got it.

05 22 46 57 LMP 2209.

05 22 47 36 CDR Yes, let me have that; I'll - continue with the plot.

05 22 47 38 LMP Okay.

05 22 47 51 LMP I want to put another film MAG on and get more of Stuart than I've got left on this one. I've got a batch of empty MAGs.

05 22 48 01 CDR Okay.

[REDACTED]

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05 22 48 05 LMP 84.

05 22 48 18 CDR We're right on the nominal. Right on the nominal plot.

05 22 48 48 CMP Man, I tell you, your lights are really bright from out here.

05 22 48 52 CDR Glad you like it. Okay, you're in sunlight, huh? Yes, there he is.

05 22 49 34 CDR So are we in sunlight.

05 22 49 41 CMP Man, that ... slow.

05 22 49 44 CDR (Laughter) You get a little star down here?

05 22 50 18 LMP Okay, dock. T<sub>8</sub>.

05 22 50 42 LMP Okay; T<sub>8</sub>, 250 at 10.

05 22 50 50 CDR You got to focus it.

05 22 50 53 LMP Huh?

05 22 50 54 CDR It says here you got to focus it. They don't tell you what the focus is going to be.

05 22 50 57 LMP Well, anything on this one over - -

05 22 51 00 CDR Six feet?

05 22 51 02 LMP - - 6 feet's infinity.

05 22 51 06 CDR Okay.

05 22 51 10 LMP Okay, we'll put it 250 at 10.

05 22 51 37 CDR Man, I'm glad we're not going for a long rendezvous today.

05 22 51 40 LMP Me, too.

05 22 52 06 LMP Stu, could you see us without the light? I'll turn it off.

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05 22 52 09 CMP That's affirmative. ...

05 22 52 12 LMP Okay. It's off. Give me another camera setting, Al. For this one, it's - -

05 22 52 19 CDR Okay. 250th, f/11.

05 22 52 24 LMP Okay. 250th - -

05 22 52 28 CDR Oh, and focus.

05 22 52 31 LMP Okay, whatever the distance is -

05 22 52 32 CDR Take five shots, it says.

05 22 52 35 LMP Okay, I got the batches.

05 22 52 38 CDR Okay, (yawning) you can start taking shots now, if you want.

05 22 52 40 LMP Pardon?

05 22 52 42 CDR Get - Venus up there.

05 22 52 52 LMP Now, if I can remember where I put my camera bracket.

05 22 52 57 CDR Okay, you had them down there. Okay.

05 22 53 02 LMP Oh, there's a goodie I forgot.

05 22 53 04 CDR Yes, I stuck that one in there while you were packing up.

05 22 53 28 CMP Boy, there's just hardly any kind ...

05 22 53 33 CDR Yes, I noticed that, Stu. It's the - seems to be right on the ball all the way. Right on the ball. The old bellyband.

05 22 54 24 LMP You got time to check and see if that angle bracket is over in the regular stowage? I thought I put it somewhere else to get it out of your way, and I can't remember where now.

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05 22 54 45 CDR Here it is.

05 22 54 48 LMP Good show.

05 22 55 16 CDR Climbing up the hill.

05 22 55 21 LMP Okay. We're up on number 2 midcourse?

05 22 55 23 CDR Yes. We'll have comp in another couple of minutes. Twenty-nine thou and - -

05 22 55 32 CMP Man, now that is a wild sight watching ...

05 22 55 44 LMP Twenty-nine thou and 80 degrees - 80 degrees. And ... Okay, we're bellying out just a little bit. Say again, Stu?

05 22 55 58 CMP I was saying that's a wild sight, looking down on you with the - just about starting to cross the terminator.

05 22 56 07 CDR Yes, I'll bet it is.

05 22 56 20 CDR I'll bet it is.

05 22 56 44 CMP Hey, you know, I saw the - I could see the ALSEP ... coming over the hill.

05 22 56 52 CDR That's what they said. Ron was telling us that. Man!

05 22 56 57 CMP I got a real good track on you ... shadow. ...

05 22 57 07 CDR Great. You think we were pretty close to the landing site?

05 22 57 15 CMP I should say you were.

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[REDACTED]

05 22 57 16 CDR (Laughter)

05 22 57 52 CDR Okay. We're in final comp now for MCC-2.

05 22 58 23 CDR Okay, NOUN 81, Stu. Minus 0.1, minus 0.2, minus 1.4.

05 22 58 29 LMP I got them now.

05 22 58 33 CMP I copy minus 0.1, minus 0.2, minus 1.4.

05 22 58 37 LMP Okay, I got them.

05 22 58 38 CDR ... You got them down there?

05 22 58 42 LMP Yes.

05 22 58 53 CMP Okay, ... plus 0.6, minus 0.2, plus ...

05 22 59 06 CDR Okay, very good.

05 22 59 23 CDR I guess we'll burn it.

05 22 59 25 LMP Okay.

05 22 59 28 CDR If I can still help you over here.

05 23 00 33 CDR Okay. We'll burn Z first. As a matter of fact, that's all we've got left.

05 23 00 41 CMP ...

05 23 01 06 LMP Okay; trim to 111.

[REDACTED]

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05 23 01 11 CDR Plus 111. Okay. Burn's complete, Stu. Okay, put me back on the checklist now.

05 23 01 22 LMP Okay. Go to P00.

05 23 01 30 CDR Okay.

05 23 01 33 LMP VERB 48, 11 - Oh, you had to change that. Your VERB 48, 13002.

05 23 01 40 CDR Yes, well, we're supposed to load four jets, you see, in case we have to -

05 23 01 44 LMP Yes. Well, do you want to put that in now or wait?

05 23 01 46 CDR Yes, might as well.

05 23 01 47 LMP Okay, 13002.

05 23 02 01 LMP Okay. DAP's changed.

05 23 02 06 CC Antares, this is Houston. How do you read? Over.

05 23 02 08 LMP Go P47.

05 23 02 11 CDR We read you loud and clear, Houston.

05 23 02 17 CC Roger, Antares. How'd it go?

05 23 02 19 CDR Well, things just as nominal as they could be. We had good TPI and then midcourses of around 1.9 and 1.1 feet per second, DELTA-V total. Give you the exact numbers if you want them, but everything's just about nominal.

05 23 02 40 LMP And you're locked up on the steerable, Houston.

05 23 02 41 CC We'd like the numbers for TPI, if you would, please.

05 23 02 42 CDR Okay, Ed'll give them to you.

05 23 02 43 LMP Stand by.

05 23 02 47 CC Say again, Ed.

05 23 02 48 CDR Ed'll give them to you.

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05 23 02 49 LMP 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 01 CC Roger.

05 23 03 17 LMP Okay.

05 23 03 18 CDR Okay, you got NOUN 78s down there.

05 23 03 22 LMP All right.

05 23 03 23 CDR L7s are running in the back.

05 23 03 24 CC Kitty Hawk, Houston. Are you reading us now?

05 23 03 26 CMP I'm reading you loud and clear, Houston.

05 23 03 32 CC Roger, Stu. Could we have your TPI solution, please?

05 23 04 01 CDR Everything's looking good.

05 23 04 03 LMP Huh?

05 23 04 04 CDR Everything's looking good.

05 23 04 05 LMP Yes.

05 23 04 06 CDR I guess we'd probably better get locked up for - docking.

05 23 04 12 CC Go ahead, Kitty Hawk.

05 23 04 18 CMP ... I had ... after TPI. And everything worked out good.

05 23 04 39 CC Understand you did get the VHF ranging going after TPI?

05 23 04 46 LMP I can't lock down. No, you have to push it; you have to set it.

05 23 04 53 CC Sounds good.

05 23 04 54 LMP There it goes.

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05 23 05 27 LMP Okay. I'll go back to the other configuration.

05 23 05 29 CDR Stand by. I'm not locked in yet. One more glove to go.

05 23 05 36 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 - -

05 23 05 47 LMP Ready?

05 23 05 48 CMP - - and all of a sudden it quit.

05 23 05 49 LMP You ready, Al?

05 23 05 50 CDR Just a minute.

05 23 05 54 LMP Want some help?

05 23 05 55 CDR Okay - Wait a minute; wait a minute. Okay, got it; go ahead.

05 23 06 00 CC Stand by on that, Stu. We can probably get it working again.

05 23 06 15 CDR Okay, your rates are looking good there, man; only a couple of blips so far on these inertials.

05 23 06 20 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 30 CMP Okay. What are you doing way down there, oh Fearless One?

05 23 06 38 CDR (Laughter) I'm coming up to find you, Rojo.

05 23 06 44 LMP It won't be long.

05 23 07 07 CDR Okay. First gate is 30 at 6.

05 23 07 11 LMP Right; 6000 feet to go.

05 23 07 14 CDR I think we're a leetle [sic] slow.

05 23 07 48 LMP Man.

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05 23 07 50 CDR Nothing like this; I don't think I've ever seen  
a -

05 23 07 52 LMP Anything quite as railroad trackish as this?

05 23 07 55 CDR As good as this, with that much RCS fuel left.  
Man.

05 23 08 00 LMP Well, fortunately, SIM SUP didn't see fit to work  
us out very hard today.

05 23 08 08 CDR Yes. ... on us after the other day.

05 23 08 17 CMP Okay, I show you at 1.52 or something like that.

05 23 08 22 LMP We agree with that, Stu. I've got 9500 feet.

05 23 08 54 CC Kitty Hawk, Houston. We'd like you to load the  
nominal LM weight in the DAP, please, 5700.

05 23 09 03 CMP Okay.

05 23 09 16 CMP I got a spot out over here where I - maybe I can  
do that, Bruce.

05 23 09 29 CDR Okay, babe, we're coming to the first braking  
gate right on the money; no braking required.

05 23 09 34 CMP Okay.

05 23 09 36 CDR The next one is 3015.

05 23 09 38 LMP That's good.

05 23 09 39 CDR Okay.

05 23 09 42 LMP No, 3020.

05 23 09 43 CDR 3020. Thank you.

05 23 09 48 CMP The line-of-sight through the COAS looks real good.

05 23 09 52 LMP Yes, the needles are nulled here.

05 23 09 59 CDR Only because they're getting a little attention.

05 23 10 03 LMP Yes.

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05 23 10 09 CDR Oh, boy, I tell you, it's sure nice when things go right.

05 23 10 17 CC Okay, Stu. We're getting a good 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?

05 23 10 38 CDR (Laughter) Son of a bitch never gives up, does he?

05 23 10 44 LMP He's always got an answer.

05 23 10 50 CDR Well, if he can get it through that tracking light.

05 23 10 54 LMP Oh, the tracking light's off.

05 23 10 56 CDR Oh, it is?

05 23 10 57 LMP Yes. We're in daylight, too. I asked him if he needed it.

05 23 11 03 CMP Right on the top of B and C. On the line in between them, it looks like, Bruce.

05 23 11 10 CC Is that B-2 and -3?

05 23 11 13 CMP Well, let me see. I can't see that far over to the monitor. Let me take another look. Just a minute; I'll look out the window here, first.

05 23 11 24 CC Oh, don't worry about it.

05 23 11 38 CC Okay. We got it now.

05 23 11 44 CDR Two thousand feet at 20. Yes, slight out of plane but man, not enough to really even talk about it.

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 00 CMP Okay.

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05 23 12 05 CDR Okay, Stu, I'm going through gate 2. And we're braking.

05 23 12 12 CMP Roger.

05 23 12 21 CDR Braking complete.

05 23 12 30 CDR We lost your comm, Stu; it's breaking up now.

05 23 12 49 CDR Okay. The next gate is -

05 23 12 51 LMP 1510 feet per second.

05 23 12 54 CDR 1510.

05 23 13 01 LMP Boy, he's getting big out there, too.

05 23 13 04 CDR He's bigger than we are.

05 23 13 24 CDR 0.26, 0.25. Okay, we're going through gate 3 and we're braking.

05 23 13 37 CDR Ten feet per second.

05 23 13 51 CDR Last one is 600 feet at 5, right?

05 23 13 53 LMP Right.

05 23 13 59 CMP Looking mighty pretty.

05 23 14 00 LMP Yes, so do you.

05 23 14 01 CDR You too; you too.

05 23 14 07 LMP Hope you didn't drink any of the coffee while we were gone. Sure is going to taste good.

05 23 14 13 CDR (Laughter) Have to worry about that, huh?

05 23 14 18 LMP That was a bonus for this flight. Corner all the coffee. Didn't even make Stu unhappy at all.

05 23 14 31 CMP Okay, I believe I'll just have a few pictures of you here.

05 23 14 35 LMP Okay. I was just getting ready to turn mine on too, Stuart.

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05 23 14 51 CDR Okay. We're going through the final gate, slowing to 5. And we've got it.

05 23 15 14 CDR Oh, you look good.

05 23 15 18 CMP You lost a little weight since the last time I saw you.

05 23 15 20 CDR Yes.

05 23 15 21 LMP Yea, verily. It runs in the crew.

05 23 15 44 CDR Okay. You going to take pictures of his turnaround now with the - -

05 23 15 47 LMP I'll take it with both cameras - -

05 23 15 48 CDR - - with the Has - with the Has - with both of them, okay. I'll try to stop it at about 100 feet, Stu; that should be a good range, for turraround.

05 23 15 58 CMP Okay.

05 23 16 08 LMP You're going to have to help me because I haven't got a clear window, but - Shuffle the camera back and forth.

05 23 16 14 CDR Can we stop flying, first?

05 23 16 15 LMP Yes.

05 23 16 30 CDR Okay. We're slowing down, now.

05 23 16 45 CDR Okay. We'll ease it on in a little more.

05 23 16 55 CDR 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 05 CC Roger, Al. We got you on television, and it's looking beautiful.

05 23 17 11 LMP Not nearly as good as the command module locks.

05 23 17 14 CMP Okay, any time you're ready, Al, you -

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05 23 17 19 CDR Okay, we've got you, Stu. Go ahead and turn it around; we'll photograph you.

05 23 17 23 CMP Okay. I'm going to turn the TV off, here.

05 23 17 27 CC Stu - hey, 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. Okay, I'm going to turn the TV off here before I blast it into the Sun on this pitcharound, Bruce.

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 docking.

05 23 18 13 CMP Okay.

05 23 18 16 CDR Okay, I see a smooth loop there.

05 23 18 20 CMP That's - that's no problem, Bruce, because I dock and I'll go FREE. And then, I'll get all that squared away, but I - I'll load it in. Okay, stand by 1, here.

05 23 18 30 CC Yes.

05 23 18 33 CMP Okay, I shall do a loop, Leader.

05 23 18 40 CDR Okay, make it smooth.

05 23 18 44 CMP And around we go.

05 23 18 45 CDR Show us a little style. Oh, you look good.

05 23 18 54 CMP There I was at 240,000 coming over the top.

05 23 18 57 LMP And there's our home. That's our home away from home.

05 23 19 15 CC Would you believe 360,000?

05 23 19 21 LMP Yes.

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05 23 19 31 CDR Okay, Houston. Kitty Hawk is doing an extremely smooth loop. We're sitting at 70 feet, watching him go round. He looks very clean.

05 23 19 47 CDR Okay. Engine bell looks very clean. All these streak patterns are radial and uniform. No hot spots at all.

05 23 20 11 LMP Looks pretty nice.

05 23 20 26 CDR Okay, now, you want to put that thing down; let me review the - No, the - the time line instead of the docking procedures again?

05 23 20 33 LMP Okay.

05 23 20 34 CDR I'll look at them.

05 23 21 22 LMP Starting to drift off.

05 23 21 26 CMP Man, the old Earth went right through the COAS.

05 23 21 29 LMP I'll take them.

05 23 21 33 CDR Okay. And down through here, got - radar's driving to 00320.

05 23 21 42 LMP Yes, I'll check and keep you honest. Just a second, Al.

05 23 21 44 CDR Okay.

05 23 21 53 CDR Oh, you look clean. Nice and clean, Stu.

05 23 21 56 CMP Okay.

05 23 22 08 CDR I'll come in a little closer and save you some gas.

05 23 22 23 CC Ed, this is Houston. When you get a chance, on panel 16, would you check the ASA and AEA circuit breakers? We've lost data from the AEA only. Over.

05 23 22 37 LMP They're both in.

05 23 22 40 CDR About close enough?

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05 23 22 43 CMP Yes, that ought to do it.

05 23 22 48 LMP Okay, we go to DOCK; SHAFT/TRUNNION, 50. I'll park the antenna for you, Al.

05 23 22 57 CDR Okay, I've already called 00320.

05 23 23 02 LMP Okay. The - -

05 23 23 03 CDR Should - should be there. Okay, open RENDEZVOUS RA - -

05 23 23 09 LMP Let me - let me look at it first.

05 23 23 10 CDR All right.

05 23 23 11 LMP Okay. It's good. It's there.

05 23 23 13 CDR Okay, RENDEZVOUS RADAR breaker - -

05 23 23 14 LMP Wait a minute. All right, that's good enough.

05 23 23 16 CDR - - coming open.

05 23 23 17 LMP Okay.

05 23 23 18 CDR Okay, Stu, if you've got it, I'll pitch it around.

05 23 23 22 CMP Okay. I - I've got the stationkeeping.

05 23 23 25 CDR Okay. I'll cut up a little bit here. That should be about right. And we pitch.

05 23 23 30 CMP Houston, what that is trailing is a little bit of that foil - -

05 23 23 33 CDR Okay.

05 23 23 34 CMP - - on the bottom part of that tank area, there.

05 23 23 37 CDR 2\*\*\*3 -

05 23 23 39 CMP Looks like during separation, the foil - -

05 23 23 41 CC Thank you, Stu.

05 23 23 42 CDR 232.

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05 23 23 43 CMP - - that insulation got - got ripped. The other side is down tight. And the side you're looking at there is - is ripped out pretty badly.

05 23 23 58 CDR 233.

05 23 23 59 CC Roger. Thank you, Stu. And we got a real good TV picture.

05 23 24 03 CDR 323.

05 23 24 18 LMP Okay, 36, tracker reset. Okay. Your COAS to the overhead window?

05 23 24 29 CDR Okay.

05 23 24 30 LMP It's the only thing that's remaining.

05 23 24 31 CDR I don't believe it.

05 23 25 05 CDR Okay. We're about there, Stu. Got about 20 more degrees to go.

05 23 25 12 CMP Okay.

05 23 25 29 CDR Okay, how does that look for pitch?

05 23 25 35 CC Antares, this is Houston. Request LO BIT RATE, AFT OMNI. Over.

05 23 25 39 CDR Okay. Now let's just wait again, then.

05 23 25 41 LMP Say again?

05 23 25 42 CDR Get the pitch.

05 23 25 43 CMP You want LO BIT RATE, AFT OMNI.

05 23 25 45 CDR Okay, we yaw from here.

05 23 25 46 LMP Yaw right to aline.

05 23 25 48 CDR Okay.

05 23 25 50 CMP I wouldn't come in much closer than that, Al.

05 23 25 52 CDR I thought you had it, Stu.

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05 23 25 55 CMP Aren't you going to do your roll?

05 23 25 57 CDR Yes, I'm going to do my roll right now.

05 23 25 58 CMP Okay.

05 23 25 59 CDR Do you have formation flight?

05 23 26 01 CMP Yes.

05 23 26 02 CDR Okay, I'm starting my roll.

05 23 26 13 LMP Houston, Antares. How do you read?

05 23 26 52 CDR Okay, I'm within about 15 degrees. If you want to give me your mark, I can stop it about where you need it.

05 23 26 59 CMP Okay, why don't you just stop it there. I need to translate down and to the right, anyway.

05 23 27 04 CDR Okay, I'll stop it there.

05 23 27 06 CMP Okay.

05 23 27 09 LMP Houston, this is Antares. Over.

05 23 27 11 CC Kitty Hawk, we show you P47 for the docking. Go ahead, Antares.

05 23 27 19 LMP Roger. You're on the OMNIs, and be advised I seem to have lost AGS, although I have no warning.

05 23 27 26 CDR Okay, Ed. Let me see the checklist a minute, please?

05 23 27 28 CMP Okay, Houston, I have - -

05 23 27 30 CC Roger, Ed. We copy.

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05 23 27 31 CMP Houston, I have the LOGIC ON and would like a GO for PYRO ARM - -

05 23 27 34 LMP We are complete, Al, except shutting it off when you dock.

05 23 27 37 CDR Okay.

05 23 27 38 LMP You're in plus-X.

05 23 27 41 CDR Okay. We're going to let Stu try it, and we're not going to trust plus-X in the first attempt. Okay, Stu?

05 23 27 46 CC Kitty Hawk, Houston. You're GO for PYRO ARM.

05 23 27 51 CMP Okay. They're coming off.

05 23 28 07 CDR We ought to get a wild illusion with this yaw angle, for us, watching the ground.

05 23 28 12 LMP Yes.

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.

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[REDACTED]

05 23 28 30 LMP Roger. We understand that. Say again the angles now; let's check them.

05 23 28 38 CC Okay. PITCH, 170; YAW, plus 55, Ed. Over.

05 23 28 44 LMP I got it. Okay, I'm locked up, Al.

05 23 28 55 CDR Good. Okay, we're locked up, Stu.

05 23 28 58 CMP Say again?

05 23 28 59 CDR We're locked up now, so press on.

05 23 29 02 LMP Houston, we're locked up. How do you read? Wait a minute. They may not have HIGH BIT RATE yet.

05 23 29 06 CC Roger. Loud and clear, Ed, and we have HIGH BIT RATE.

05 23 29 10 LMP Okay.

05 23 29 11 CDR Okay, I guess that means you're GO for docking, Stu.

05 23 29 38 CMP I can't believe you're docking.

05 23 29 39 CC Apollo 14, this is Houston. You're GO for the docking.

05 23 29 43 LMP Roger. We got you.

05 23 29 47 CDR This has been your docking practice flight, Stu.

05 23 29 50 CMP Yes. How about that?

05 23 29 53 LMP Where's he at?

05 23 29 58 CDR Huh? You see him?

05 23 30 02 LMP Yes.

05 23 30 04 CDR Here he comes. And he's doing it. Okay, I'm going to swing around and take a look at that probe - I don't think we're doing anything - really see. We're not too ...

[REDACTED]

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05 23 30 19 LMP I don't think you're going to be able to see it very well, are you?

05 23 30 21 CDR Oh, it's hard to get in there. Hell, I can't - Let me get out of this son of a bitch.

05 23 30 37 CDR Might be able to see whether that's flush enough - before we dock.

05 23 31 10 CDR You ought to be able to. ...

05 23 31 35 CDR Okay, the central pin looks flush, Stu.

05 23 31 47 CDR It looks flush, right on out there.

05 23 31 51 CMP Say again?

05 23 31 53 CDR I'm looking at the end of the probe and the pin looks flush.

05 23 32 05 LMP Okay, get back in here.

05 23 32 11 CDR We're standing by for your capture call to go FREE.

05 23 32 30 CMP Okay, we capture.

05 23 32 32 CDR Okay, we're FREE.

05 23 32 39 CC Beautiful. Normal docking.

05 23 32 46 CDR Stand by for those latches.

05 23 32 50 LMP There we go.

05 23 32 51 CDR Okay.

05 23 32 52 CMP Got a hard dock.

05 23 32 53 CDR Ripplefire again.

05 23 32 55 LMP Let me look at that schedule.

05 23 32 57 CC Beautiful.

05 23 32 58 LMP 144:12. There we are.

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[REDACTED]

05 23 32 59 CC A big sigh of relief being breathed around here.

05 23 33 04 CDR All over the world, there is.

05 23 33 06 CMP You ought to try it from up here.

05 23 33 07 CDR (Laughter)

05 23 33 10 CDR/LMP Okay.

05 23 33 11 LMP Verify - -

05 23 33 12 CC This world and out of this world, too.

05 23 33 14 LMP Verify the FORWARD DUMP VALVE, AUTO.

05 23 33 17 CDR Okay, FORWARD DUMP VALVE's AUTO. We ought to reconfigure VHF so - Stu won't have to listen to everything - even music.

05 23 33 25 LMP Yes.

05 23 33 26 CMP Let me - let me clean up over here and I'll be with you.

05 23 33 29 LMP He can shut his off.

05 23 33 30 CDR Yes. Okay, FORWARD DUMP VALVE's AUTO.

05 23 33 35 LMP Okay.

05 23 33 39 CDR Okay. Now, Stu, I'll go - -

05 23 33 42 CC Antares, Houston. When you have a - -

05 23 33 52 LMP ...

05 23 33 56 CDR Okay, you have it, Houston. We'll have to hold. Why don't we take these things off?

05 23 34 05 LMP All right, Houston. Are you going to give me LM and command module weights?

05 23 34 16 CC Ed, this is Houston. Understand you want the command module weight now?

05 23 34 21 LMP Whenever you have them, I'm ready to copy. Let's press on.

[REDACTED]

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05 23 34 27 CC Okay. CSM is 34727 and the LM is 5103. Over.

05 23 34 41 LMP Understand. 5103, 34727.

05 23 34 50 CC Correct, Ed.

05 23 34 52 LMP Okay, Al. CABIN FAN 1, open.

05 23 34 56 CDR Okay, CABIN FAN 1, open.

05 23 34 58 LMP Okay. Put the window shades up.

05 23 35 04 CC And, Kitty Hawk; Houston. When you're through with what you're doing there, Stu, I do have a SEP pad for you and a - an updated DAP load, but there's no rush on either one.

05 23 35 15 CMP Okay. I'll take the DAP load now. That's what I'm working on.

05 23 35 21 CC Roger. CSM is 34727.

05 23 35 27 CDR Okay.

05 23 35 34 CMP 34727; thank you.

05 23 35 37 LMP Okay, crash bars up.

05 23 35 39 CC LM, 5103.

05 23 35 44 CDR Okay. For the first time in the flight.

05 23 35 48 CMP Okay, and 05103.

05 23 35 51 CDR We want to take this back, don't we?

05 23 35 53 LMP What's that? Yes, you're damn right.

05 23 36 02 CC Antares, Houston. I have a LM impact P30 pad for you when you're free.

05 23 36 11 LMP Roger. Give me 5 seconds.

05 23 36 16 CDR Okay, ATTITUDE, DIRECT; TTCA, DISABLE; ACA/JET, DISABLE.

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05 23 36 31 CMP Well, I guess we better get to cracking, troops. I've got to put your 160 pounds of rocks some place.

05 23 36 38 LMP Yes. We can't do it until we get the tunnel open.

05 23 36 42 CMP Roger. I'll be working on that in just a second here. I'll start equalizing.

05 23 36 50 LMP Yes, it's going to take me awhile to copy these pads, Al. So you'll have to press on with that.

05 23 37 02 CDR Press on with what, Ed?

05 23 37 09 LMP I said you're going to have to press on with that, because it'll take me a little while to get these pads squared away.

05 23 37 15 CDR Roger.

05 23 37 28 CMP Okay, Antares. I'm going to be off the - off the air for about 3 minutes here.

05 23 37 38 LMP Okay, Stu.

05 23 37 54 LMP All right, Bruce. Call up your P30 pad.

05 23 38 02 CC Say again, Ed.

05 23 38 04 LMP I'm ready to copy P30 pad.

05 23 38 09 CC Okay. P30 purpose, goodbye 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 04 LMP Roger. 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 And you've already got the LM weight.

05 23 39 47 LMP That's affirm.

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05 23 39 53 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 08 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 started to look at it for a backup braking 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 have no warnings, all the circuit breakers are in, but I cannot access it to get a self test.

05 23 40 49 CC      When was the last time you tried to access it, Ed?

05 23 40 56 LMP      Well, just now and - -

05 23 40 57 CC      Successfully.

05 23 40 58 LMP      - - Oh, about - oh, shortly before we hit the braking gates.

05 23 41 25 CC      Ed, this is Houston. We'd like you to - on panel panel 16, cycle the ASA and AE circuit breaker - AEA circuit breaker, if you would, please.

05 23 41 43 LMP      Okay. They're cycled. I - In further answer to that last question, Bruce, it was some - somewhere around AOS, but I don't remember exactly where.

05 23 41 54 CC      \*\*\* Ed. That's close enough.

05 23 41 56 LMP      Good enough. I abandoned the AGS and started setting up cameras for the docking about that point. You coming out, Al?

05 23 42 03 CDR      No, I got the screw out all right, and it looks like that ought - -

05 23 42 06 CC      Okay, Ed - -

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05 23 42 07 LMP Oh, those springs just hook; I think you can just get rid of them.

05 23 42 11 CC - - 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 33 LMP Okay. That hasn't done any good. We'll try the other one.

05 23 42 59 LMP That doesn't seem to help either, Bruce.

05 23 43 05 CC Okay. Which one was that?

05 23 43 09 LMP Any of them. I - have put in the Commander's circuit breaker and still have 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 44 CDR You've checked coming out of that - thing.

05 23 43 47 LMP It's not?

05 23 43 48 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 54 LMP Okay, I'm ready to copy.

05 23 43 59 CC Okay. Item number 1, the 100-foot tether. Over.

05 23 44 08 LMP Okay, we got that one.

05 23 44 13 CC Number 2, the LEC waste-tether combination. Over.

05 23 44 21 LMP Okay.

05 23 44 26 CC Number 3, 30-foot tiedown webbing. Over.

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05 23 44 40 LMP Okay.

05 23 44 43 CMP Okay, I'm cracking the hatch now.

05 23 44 45 CC Item number 4 - -

05 23 44 46 CDR Okay.

05 23 44 47 CC - - We would like to bring - -

05 23 44 48 CDR Okay, Stu.

05 23 44 49 CC - - 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, \*\*\* Commander's Hasselblad. Over.

05 23 45 05 LMP (Cough) 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 CDR Man, I can't figure out what the hell's - -

05 23 45 17 CC - - 5, we want both of the LMP's EVA gloves. Over.

05 23 45 23 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 56 LMP Okay, we've already stowed most of this stuff, Bruce. The tether - the 100-foot tether is already in the ISA (clears throat); 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 24 CDR I'm not going to be able to get it. I don't know what the hell's the matter with this thing.

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05 23 46 26 CC Okay. Stand by, please.

05 23 46 30 LMP Just not going to come, huh?

05 23 46 31 CDR No, I got those screws out just fine. And that thing that looks like it's going to - supposed to flop down - ought to flop down? That little - -

05 23 46 38 LMP And it won't flop down?

05 23 46 39 CDR - - split bearing, that bushing there?

05 23 46 41 LMP Yes?

05 23 46 42 CDR Can't get that to flop for sour owlshit.

05 23 46 44 LMP Well, did you try to pry it on it?

05 23 46 45 CDR Man, I've been trying to pry it and push it -

05 23 46 48 LMP Well, that's supposed just to break right loose. Let's - let's look on the bottom. Did you?

05 23 46 56 CDR See, it looks like it'd pivot.

05 23 46 59 LMP Yes, it's supposed to.

05 23 47 01 CDR Well, let's leave this stuff right here for the moment.

05 23 47 04 LMP Okay. Stu's cracking the hatch.

05 23 47 06 CDR Yes, stay on our time line. Okay, this purse ought to go in the - ISA bottom forward pocket.

05 23 47 20 CDR Okay, going to keep us honest?

05 23 47 23 LMP Trying to.

05 23 47 25 CC Ed, this is Houston. Over.

05 23 47 29 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

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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 03 LMP Okay, we'll see what we can do. Did you hear that?

05 23 48 05 CDR We've got lots of time to do that on the way home.

05 23 48 06 LMP Well - -

05 23 48 07 CC Roger.

05 23 48 08 LMP No, but we've got to put it in the DECON bag just a little while. If we can rip that 100-foot tether out right now, why, we'll save ourselves a lot of headache.

05 23 48 18 CDR Okay.

05 23 48 25 CDR Okay.

05 23 48 28 LMP If you could stick this in there when you're getting in -

05 23 48 29 CDR Okay, I guess I'll just have to - get baby now, huh?

05 23 48 36 CC Kitty Hawk, Houston. Are you back on the line? Over.

05 23 48 40 CMP That's affirmative.

05 23 48 45 CC Okay. I don't want to interrupt, but whenever you're free, I've got your SEP pad.

05 23 48 50 LMP Okay, Al, empty your PGA pockets into the accessory - -

05 23 48 53 CMP Why don't I take it now?

05 23 48 54 LMP - - accessory bag in the flight data file.

05 23 48 58 CDR Okay.

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05 23 49 01 CC Okay, let me know when you're ready.

05 23 49 04 CMP Well, let her rip.

05 23 49 08 CC Okay. CMS SEP, RCS, T<sub>ig</sub>, 146:30:00.00; NOUN 81, minus 0001.0; Y and Z are all zips; roll, 301 - -

05 23 49 32 LMP Find that - That's it.

05 23 49 33 CC - - 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 01 CMP Okay. SEP pad, 146:30:00.00; DELTA-V<sub>X</sub>, minus 1.0, all zips, all zips; 301, 355, 348; jettison, 146:25:00.00; 301, 355, and 348.

05 23 50 31 LMP Okay, can I pass it on to you so I can get - get on back to work here?

05 23 50 35 CDR Where do you want to put it, back in the data file?

05 23 50 37 LMP Huh? Well, that's as good a place as any right now.

05 23 50 39 CDR Yes.

05 23 50 42 LMP Okay, Bruce. I'm ready to copy any pads you have for me.

05 23 50 48 LMP You can - Al, you can place the LEVA bags on the floor, right side and forwards.

05 23 50 50 CC Ed, this is Houston. I believe we're up to date already on you.

05 23 50 56 LMP Okay. Misunderstood. I thought you had a call for me a minute ago.

05 23 51 06 LMP Okay, let's take the LEVA bags.

05 23 51 07 CDR Okay.

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05 23 51 08 LMP One - We'll put them on the floor, right side forward. Both of them, both of them.

05 23 51 17 LMP ...

05 23 51 24 CDR Man, that was a beautiful rendezvous.

05 23 51 28 LMP Sure was.

05 23 51 29 CDR Everything worked perfect. Okay, here they come. Right side forward.

05 23 51 37 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 52 CMP Okay. You've got POO and ACCEPT, and DIRECT, OFF.

05 23 51 55 CDR Okay. Let me turn these lights off, and we can cut those bastards off, anyway.

05 23 52 10 CDE Okay, just a minute. Let me - -

05 23 52 13 LMP Stu, are the pressures equal in the tunnel yet?

05 23 52 14 CMP That's affirmative. I'm about to drop the hatch.

05 23 52 18 LMP Okay. OVERHEAD DUMP VALVE, AUTO, A1.

05 23 52 20 CDR OVERHEAD DUMP VALVE's in AUTO.

05 23 52 24 LMP Okay. PRESS REGS A and B, EGRESS.

05 23 52 29 CDR Okay. A is EGRESS, B is EGRESS.

05 23 52 34 LMP Okay. Stow the 70-millimeter camera with MAG in ISA bottom pocket.

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05 23 52 52 CMP And, Ed, did you verify, or Al, the FORWARD DUMP VALVE to AUTO?

05 23 52 56 LMP That's verify, Stu.

05 23 52 57 CMP Okay.

05 23 53 07 CDR Okay.

05 23 53 08 CMP How dusty was it down there?

05 23 53 12 LMP Well, we don't have a lot of dust in here, but our suits are sure filthy.

05 23 53 15 CMP Okay.

05 23 53 18 CDR Okay.

05 23 53 19 LMP Where's the tool kit?

05 23 53 21 CDR It's hanging on the instrument panel. Going to try yours?

05 23 53 29 LMP Yes, but I want to get this cable over here first.

05 23 54 00 LMP Okay. You can put the - camera - this camera in the ISA top pocket.

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05 23 54 11 CDR Okay. Stand by.

05 23 54 12 LMP In the bag.

05 23 54 20 CDR Say, I'll tell you; there's one thing about this data file. It just is not made for me.

05 23 54 31 LMP Yes, it's not the easiest one to work with.

05 23 54 44 CDR That son of a bitch is all full.

05 23 54 48 LMP Well - What's all full?

05 23 54 50 CDR The damn data file. Yes, I can get it in there, I guess.

05 23 55 10 CDR Well, it ain't going to make it.

05 23 55 12 LMP What's not going to make it?

05 23 55 14 CDR Well, it's part of the data file; it's rendezvous charts.

05 23 55 20 LMP Well, stick it in the purse.

05 23 55 26 LMP Well, that data file is supposed to be available to us - yes, put it in the purse - should be available to us in debriefing.

05 23 55 33 CDR Yes, we can get it out of the purse.

05 23 55 34 LMP Okay.

05 23 55 36 CDR Okay, let me get this - Are we through with the purse?

05 23 55 40 LMP You can put this in it. This you give me goes in the ISA top pocket.

05 23 55 46 CDR Get your scissors?

05 23 55 48 LMP No, I don't. Where - They're in the data file.

05 23 55 52 CDR Okay.

05 23 55 56 LMP Just stick them in the accessory bag there with that other personal stuff that we find, unless you want to use it.

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05 23 56 01 CDR Yes. Better cut those lights off again.

05 23 56 04 LMP Cut what?

05 23 56 05 CDR Cut those lights off.

05 23 56 06 LMP What lights?

05 23 56 08 CDR The -

05 23 56 12 LMP Utility lights?

05 23 56 13 CDR Yes.

05 23 56 14 LMP Well, hell, I've got dikes for that, Al, and I just reach up and take them off like this.

05 23 56 19 CDR Okay. Just stick those in the purse.

05 23 56 28 LMP Here they are.

05 23 56 38 LMP Here's all these goodies.

05 23 56 39 CC Kitty Hawk, Houston. Computer is yours.

05 23 56 48 CDR Put them in there.

05 23 56 57 CDR One of them's still warm.

05 23 56 58 LMP Huh?

05 23 57 00 CDR That camera's still warm.

05 23 57 02 LMP It is? Well, hell, it was running just a minute ago.

05 23 57 14 LMP Okay, Al, now that you got those out of the way.

05 23 57 20 CDR Well, I haven't got them out of the way. I'm going to put them in the ISA.

05 23 57 23 LMP Okay.

05 23 57 25 CDR Now, you want me to get the ISA - you want me to get 100-foot tether out of there?

05 23 57 28 LMP Yes, you'd better.

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05 23 57 29 CDR Okay. Why don't you hold the purse, and let me get the ISA down, then.

05 23 57 33 LMP Okay.

05 23 57 34 CDR Because we - I'll have to get into it - Damn - Have to get into it to find out what we're looking for there.

05 23 57 40 LMP We're - running kind of late.

05 23 57 48 CDR Well, we can always get it up on the way back.

05 23 57 53 LMP Well, we got to stow this damn --

05 23 57 57 CC Kitty Hawk, Houston. Were you calling?

05 23 58 01 LMP Well, if you can find it handy, go get it, Al. Otherwise, don't.

05 23 58 07 CDR It's not a - it's not a 100-foot tether; it's a 50-foot tether. You talking about the one in that bag?

05 23 58 13 LMP Yes, they want the one we took out on the lunar surface.

05 23 58 15 CDR Yes. It's 50 feet.

05 23 58 21 LMP It's 100 - It's supposed to be. Well, there's 50 for you and 50 for me but -

05 23 58 30 CDR Shit.

05 23 58 50 CDR I don't know. I don't feel it in there, anyway.

05 23 59 03 LMP You sure you put it in there and not in the other compartment?

05 23 59 05 CDR Shoot, I don't know. I thought we stuck it in here. Look in the purse; maybe it's in there.

05 23 59 22 LMP No. Well, we really haven't got time to look for it. We're just going to have to - -

05 23 59 30 CDR I don't think so. Give me the -- stick the purse in here.

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05 23 59 32 LMP Huh?

05 23 59 33 CDR Stick the purse in here.

05 23 59 34 LMP Okay.

05 23 59 41 LMP I got one more item - a couple of more items, if it'll go.

05 23 59 44 CDR In the ISA?

05 23 59 45 LMP Yes. Did you get the PPKs and the flag kit out?

05 23 59 48 CDR No, hell no. You didn't tell me to.

05 23 59 51 LMP Okay.

05 23 59 52 CDR Got plenty of room in that.

05 23 59 54 LMP Okay.

05 23 59 55 CDR Plenty of room.

06 00 00 18 LMP Okay. All this stuff -

06 00 00 32 CDR Huh?

06 00 00 39 LMP These, we'll just forget about and stick them back. I don't know what they are.

06 00 00 44 CDR All right. Those are in.

06 00 00 48 LMP Pardon?

06 00 00 49 CDR Those are all in. What's next?

06 00 00 53 LMP Okay. Flag kit, unstow sample bag, left-hand stowage compartment, temporarily stow in aft cabin under netting.

06 00 01 06 CDR In aft cabin under netting?

06 00 01 08 LMP Yes, just hide it out of the way.

06 00 01 12 CDR You mean the rocks?

06 00 01 14 LMP Yes. So we can put them in DECON bags later, Al.

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06 00 01 24 LMP I think I'll just leave them right where they are.

06 00 01 26 CDR Why now?

06 00 01 27 LMP No, no, we don't want to because the goddamn drogue comes in here, gets in the way.

06 00 01 34 CDR Okay, it's ...

06 00 01 36 LMP Could you stuff them back there under the netting somewhere?

06 00 01 45 CDR Okay?

06 00 01 46 LMP Okay, open the hatch -

06 00 01 48 CC Apollo 14, this is Houston; 12 minutes to LOS.

06 00 01 54 LMP Okay, Bruce. We got to get the hatch open; we're - we're about 20 minutes late.

06 00 02 02 CDR Stu's working on it now; I can hear him. Hell, we can open the hatch, anyway.

06 00 02 08 LMP Yes, open ours.

06 00 02 11 CDR Let me just go to DUMP on this valve, just to be sure. Look at DELTA-P across here.

06 00 02 19 LMP Is it?

06 00 02 21 CDR Yes.

06 00 02 22 LMP Well, the DELTA-P's higher on our side, then. There shouldn't be any DELTA-P from his side.

06 00 02 39 LMP Okay, we just went up a little bit.

06 00 02 45 CDR Okay, watch the ISA for a minute.

06 00 02 54 LMP Why don't you grab the drogue and bring it on in and tie it down?

06 00 02 57 CDR Okay. Let's see. Hey, that baby's hot.

06 00 03 30 CDR Okay, here comes the drogue. Howdy, how are you doing?

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06 00 03 37 CMP Okay.

06 00 03 38 CDR Nice docking.

06 00 03 39 CMP Man.

06 00 03 40 CDR It worked okay that time, huh?

06 00 03 42 CMP Yes. It sure did. I even ... too. ...

06 00 03 50 LMP Yes, I got the ISA out of your way.

06 00 03 51 CDR Okay. Reach.

06 00 03 53 CMP ... back and safe.

06 00 03 56 LMP Hold on just a second. Grab the LEC - package out of there. That's the waste-tether package, isn't it?

06 00 04 11 CDR I think so. Yes.

06 00 04 12 LMP And the two - and the two brushes?

06 00 04 14 CDR Yes.

06 00 04 15 LMP Okay. Let me have them.

06 00 04 17 CDR Do we need the waste tether to tie down?

06 00 04 18 LMP Yes.

06 00 04 20 CDR Okay.

06 00 04 31 CDR I got nothing else in there we need. Here's some tape. Do we need that?

06 00 04 38 LMP Okay. Tape, we need.

06 00 05 01 LMP Okay, can you tie that drogue down there?

06 00 05 04 CDR Sure. Sure can.

06 00 05 09 LMP Okay, there's nothing else in those pockets now that we need back there, is there?

06 00 05 12 CDR I don't know; I was going to look at it.

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06 00 05 13 LMP Double check because I - There shouldn't be, because I've gotten them all out, but -

06 00 05 25 CDR Here's your pills.

06 00 05 28 LMP Okay, tie it down and let's move on.

06 00 05 32 CDR Oh, another thing, we have those rocks in there. You got the rocks out so we're all set. Okay, it's tied down.

06 00 05 39 LMP Okay.

06 00 05 55 LMP Hey, Stuart. We'll take our helmet - accessory bags first, if you don't mind.

06 00 06 08 CDR Hell, the accessory bags.

06 00 06 10 LMP I mean helmet bags; we've got the accessory bags.

06 00 06 14 CDR You ought to put something in those. What did we put in there? We put a glove or something of yours in one of those, didn't we?

06 00 06 22 LMP What?

06 00 06 27 CDR Okay, it's tied down. Okay, the drogue's tied down. What's next?

06 00 06 34 LMP Okay, that's all. Now help me get this - We need the DECON bags, the helmet bags, and start getting stuff over to Stu.

06 00 06 42 CDR Okay.

06 00 06 44 CMP Hey, Al.

06 00 06 45 CDR/LMP Yes.

06 00 06 47 CMP ... Remember where you put them? I don't believe I've seen them.

06 00 06 54 CDR Yes, they're in the temporary stowage bag on your side, I think.

06 00 06 57 CMP Okay.

06 00 07 02 CDR Let's see.

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06 00 07 03 LMP Why don't you put your helmet, your gloves, and  
your helmet -

06 00 07 09 CDR There's one glove.

06 00 07 18 LMP You lost a glove?

06 00 07 20 CDR Yes, it's floating around somewhere.

06 00 07 53 LMP ... Here, let me take ...

06 00 08 00 CDR Zipping what?

06 00 08 02 LMP Start unzipping these suits.

06 00 08 04 CDR Okay.

06 00 08 23 LMP ...

# # #