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NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

APOLLO 15 LUNAR MODULE ONBOARD VOICE TRANSCRIPTION

(U)

Classification changed to U

By authority of ISC Security Classification Officer

Date 11-6-73 - 2/9/79 - Sally Hahn

RECORDED ON THE DATA STORAGE EQUIPMENT ASSEMBLY (DSEA)

AUGUST 1971

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

CLASSIFIED DOCUMENT - TITLE UNCLASSIFIED

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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 15 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.

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 down-link 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 delayed lift-off, 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. Dashes in the time column indicate that the time could not be determined because of the use of the VOX mode.

Speakers in the transcript are identified as follows:

CDR	Commander	David (Dave) R. Scott
CMP	Command module pilot	Alfred (Al) M. Worden
LMP	Lunar module pilot	James (Jim) B. Irwin
SC	Unidentifiable crewmember	
MS	Multiple speakers	
CC	Capsule communicator (CAP COMM)	

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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. Words given unusual emphasis by the speaker are underlined.

The Apollo 15 mission was flown July 26 to August 7, 1971; lift-off occurred at 13:34:00.79 G.m.t. (9:34:00.79 a.m. e.d.t.) on July 26. The CM was designated Endeavour and the LM was called Falcon.

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LM ACTIVATION

04 02 23 20 LMP *** is ON.

04 02 23 21 CDR Okay. Okay, there, Endeavour. How do you read the Falcon on SIMPLEX B?

04 02 23 25 CMP Beautiful.

04 02 23 26 CDR Say again.

04 02 23 27 CMP Beautiful.

04 02 23 28 CDR Good.

04 02 23 29 LMP And, Al, how do you read me?

04 02 23 30 CMP Read you loud and clear, Jim.

04 02 23 31 LMP You're beautiful.

04 02 23 32 CDR Okay. Let's configure for SIMPLEX A.

04 02 23 35 CDR VHF A TRANSMITTER, VOICE.

04 02 23 38 CMP Did you want a T_{ephem}, Dave?

04 02 23 40 CDR Stand by.

04 02 23 41 CMP Okay.

04 02 23 42 CDR Did Al get - -

04 02 23 43 CMP Give it to you if you want.

04 02 23 44 CDR Stand by.

04 02 23 45 CDR Configure for SIMPLEX A.

04 02 23 46 CMP Okay.

04 02 23 47 CDR Okay. The VHF A TRANSMITTER, VOICE.

04 02 23 48 LMP VOICE.

~~CONFIDENTIAL~~

04 02 23 49 CDR A RECEIVER, ON.

04 02 23 50 LMP ON.

04 02 23 51 CDR B TRANSMITTER, OFF.

04 02 23 52 LMP TRANSMITTER, off.

04 02 23 53 CDR AUDIO, both, VHF B, RECEIVE, and A to T/R.

04 02 23 56 LMP Okay.

04 02 23 59 CDR Okay, Al. How do you read on A?

04 02 24 00 CMP Loud and clear, Dave.

04 02 24 01 CDR That's nice.

04 02 24 02 LMP And, Al, how do you read me?

04 02 24 03 CMP Loud and clear, Jim.

04 02 24 04 LMP Very good.

04 02 24 06 CDR Okay, now you can give me your T_{ephem}.

04 02 24 07 CMP Okay.

04 02 24 17 LMP Self-test is successful.

04 02 24 18 CMP - - ...?

04 02 24 20 CDR Go.

04 02 24 21 CMP Just like SIMs. All balls in the R₁; R₂ is 32251; R₃ is 26157.

04 02 24 31 CDR Okay. All balls, 32251, 26157.

04 02 24 35 CMP Okay.

04 02 24 36 CDR Okay, Jim. We got those self-tests?

04 02 24 38 LMP Okay. Yes. Okay, a VERB 21 NOUN 27, and a zero.

04 02 24 45 CMP ... clock sync?

~~CONFIDENTIAL~~

Day 5

1-3

[REDACTED]

04 02 24 47 CDR Stand by 1. Okay?

04 02 24 49 LMP Okay.

04 02 24 51 CDR Got that done?

04 02 24 52 LMP Okay, we're ready to - Clock sync coming up.
25 NOUN 36. Load mission time. Gee, I can do
it from here. Yes. Let's see. 98:25:30.

04 02 25 32 LMP I got to call Houston - -

04 02 25 33 CDR Okay, Al. VERB 06 - 6 - VERB 06 NOUN 65; I'll
give you a mark.

04 02 25 37 CMP Give me a mark. I'm waiting.

04 02 25 41 LMP I'm going to call Houston, Dave.

04 02 25 43 CDR Okay, just a second. 3, 2, 1 -

04 02 25 46 CDR MARK.

04 02 25 48 CMP Okay; 98:25:45.60.

04 02 25 55 CDR Okay; 25:45.60.

04 02 25 58 CMP Roger.

04 02 25 59 CDR Okay; subtract -

04 02 26 01 LMP Let's see, ours was 98 -

04 02 26 02 CDR 60.

04 02 26 03 CC Apollo 15, Houston. Standing by.

04 02 26 05 CDR Go ahead, Jim; I'll get this.

04 02 26 08 LMP Roger, Houston; this is Falcon. Read you loud
and clear.

04 02 26 12 CDR We don't have S-band up yet, Jim.

04 02 26 14 LMP Sure do.

[REDACTED]

CONFIDENTIAL

04 02 26 15 CC Houston, Falcon. Reading you - -

04 02 26 16 CDR Oh!

04 02 26 17 CC We have a lot of noise on the loop. Maybe it will go away in a moment.

04 02 26 20 LMP Okay, let's hope so.

04 02 26 30 CDR Okay. DELTA-T is - minus - -

04 02 26 32 LMP I got .61.

04 02 26 35 CDR Yes.

04 02 26 36 LMP Is that what you got?

04 02 26 37 CDR Okay; 6 - yes, minus 61.

04 02 26 40 LMP Yes.

04 02 26 49 CDR Okay, Endeavour. Another NOUN 65, if you're ready.

04 02 26 57 CMP On your mark.

04 02 26 58 CDR 3, 2, 1 -

04 02 27 00 CDR MARK.

04 02 27 01 CMP Okay; 98:26:59.60.

04 02 27 07 CDR Okay. We're within 3/100ths.

04 02 27 10 CMP Okay.

04 02 27 16 CDR Okay, give me the next.

04 02 27 18 LMP Okay; you can unload CA - T_{ephem}?

04 02 27 20 CDR Yes.

04 02 27 21 LMP Okay. 17 06. Load T_{ephem}.

04 02 27 30 CDR Zero.

CONFIDENTIAL

Day 5

1-5

[REDACTED]

04 02 27 39 CDR Okay. That look good to you?

04 02 27 43 CC Endeavour, Houston. Do you read?

04 02 27 44 CDR It's good.

04 02 27 46 CMP Endeavour, Houston. This is Endeavour. Loud and clear.

04 02 27 52 CC Okay, Al. We read you through the static. Let us have NARROW on the HIGH GAIN, please.

04 02 27 59 CMP Okay, you got it. NARROW and REACQ.

04 02 28 01 CDR Okay, why don't you go ahead and do the -

04 02 28 03 LMP Yes.

04 02 28 04 CDR What's next, the S-band?

04 02 28 05 LMP Yes.

04 02 28 07 LMP Yes, and, Houston, this is Falcon. We're going to configure for secondary S-band transmitter and receiver.

04 02 28 23 CC Okay, Falcon. Press on with secondary S-band.

04 02 28 25 LMP Roger.

04 02 29 08 LMP Houston, this is Falcon. How do you read?

04 02 29 11 CMP All right.

04 02 29 12 CDR (Laughter) Oh, yes. Oh, God, yes.

04 02 29 16 CMP Hello, folks. How you doing?

04 02 29 17 CC Endeavour, Houston. Verify on your last P52, you used option 1.

04 02 29 19 CMP I'm going to take your umbilical.

04 02 29 21 LMP Hey, Al, they're trying to call you.

04 02 29 23 CMP Houston, Endeavour. Go ahead.

[REDACTED]

CONFIDENTIAL

04 02 29 29 CC Roger, Al. Verify that on your last P52 you used option 1.

04 02 29 37 CMP I think that's a negative, Ed. I used option 3. Stand by 1, and I'll check.

04 02 29 43 LMP Yes, Houston, how do you read Falcon?

04 02 29 47 CC Roger. We're standing by.

04 02 29 51 CC Falcon, Houston. You're coming through. We have a lot of static on the line. We're trying to clear it up now. You're way down in the mud.

04 02 29 57 LMP Okay. I give you my prime evap flow time as 97:54:55.

04 02 30 03 CDR Okay.

04 02 30 04 LMP Okay. We're ready to set the -

04 02 30 17 CMP Houston, Endeavour.

04 02 30 21 LMP Maybe if we do the steerable, we'll get signal.

04 02 30 24 CC Go ahead, Endeavour.

04 02 30 25 CMP Okay, Ed. I did do that on an option 3.

04 02 30 27 CDR No. He said -

04 02 30 31 LMP They're trying to clear it up down there, but if - -

04 02 30 32 CC We now have some words for you. And we're ready to up-link to you, Endeavour, if you will give us POO and ACCEPT.

04 02 30 38 LMP If we go to HIGH GAIN - -

04 02 30 39 CMP POO and ACCEPT.

04 02 30 41 CDR They said they had line - static on their lines.

04 02 30 43 LMP Yes.

CONFIDENTIAL

Day 5

1-7

[REDACTED]

04 02 30 44 CC Falcon, Houston. Your S-band check is okay. You can press on and I'll have your update for you in a little while.

04 02 30 50 CDR Roger.

04 02 30 52 LMP Okay. You want to do this S-band -

04 02 30 54 CDR Yes.

04 02 30 55 LMP Okay. HEATER CONTROL TEMP MON to S-BAND.

04 02 30 57 CDR Okay. Go to S-BAND. Reading about 15.

04 02 31 03 LMP Looks good.

04 02 31 04 CDR Okay.

04 02 31 05 LMP Okay. If you read to me.

04 02 31 06 CC Apollo 15, Houston. I'm going to hold off reading you any pads at the moment until we can clear up our comm on the ground.

04 02 31 13 LMP Roger.

04 02 31 14 CDR Okay. S-BAND, PM.

04 02 31 15 LMP PM.

04 02 31 16 CDR SEC.

04 02 31 17 LMP SEC.

04 02 31 18 CDR PRIM.

04 02 31 19 LMP PRIM.

04 02 31 20 CDR VOICE.

04 02 31 21 LMP VOICE.

04 02 31 22 CDR PCM.

04 02 31 23 LMP PCM.

[REDACTED]

~~CONFIDENTIAL~~

04 02 31 24 CDR RANGE.

04 02 31 25 LMP RANGE.

04 02 31 26 CDR OFF.

04 02 31 27 LMP OFF.

04 02 31 28 CDR HI.

04 02 31 29 LMP HI.

04 02 31 30 CDR Okay, HIGH GAIN: PITCH, minus 75; YAW, minus 12.

04 02 31 31 LMP Set.

04 02 31 32 CC Falcon, Houston. Bring up your steerable, please - -

04 02 31 33 LMP Yes.

04 02 31 34 CC - - see if that helps our comm.

04 02 31 35 CDR In work. TRACK MODE, SLEW. Wait 30 seconds.

04 02 31 37 LMP SLEW. Okay?

04 02 31 39 CDR Okay. It should be PITCH and YAW for MSFN.

04 02 31 44 LMP Yes. We'll use - use those settings. You might want to call up VERB 48.

04 02 31 50 CDR VERB 64 you mean.

04 02 31 51 LMP No, I was thinking of setting the DAP.

04 02 31 53 CDR I did.

04 02 31 54 LMP Oh, you went through this all already?

04 02 31 55 CDR All done.

04 02 31 56 LMP Using these values, huh?

04 02 31 57 CDR Yes.

~~CONFIDENTIAL~~

[REDACTED]

04 02 32 00 LMP Shoot, you're way ahead of me. Okay. How about the E- - oh, well, we'll get - -

04 02 32 04 CDR No, I haven't done that.

04 02 32 05 LMP I guess when we get on the stereo, it will be okay.

04 02 32 07 CDR Yes.

04 02 32 08 LMP Okay, there's 30 seconds. I'm going to -

04 02 32 10 CDR Okay. PITCH and YAW. You're going to go 134 and 6. That ought to be right. Plus 134 and plus 6.

04 02 32 17 LMP Okay, I'm going there now. 134 and plus 6.

04 02 32 27 CDR And SLEW.

04 02 32 34 LMP Okay, I'm going to SLEW.

04 02 32 36 CDR Signal's straight greater than 3 - -

04 02 32 37 LMP Beautiful. Greater than 4 - -

04 02 32 39 CDR Yes? Great. TRACK MODE, AUTO.

04 02 32 40 LMP Okay, going to AUTO.

04 02 32 42 CDR UPLINK SQUELCH, OFF.

04 02 32 44 LMP OFF. Just ... the antenna - -

04 02 32 46 CDR The antenna.

04 02 32 49 CDR Oh, yes.

04 02 32 50 LMP Slew it in.

04 02 32 52 CDR Good grief. UPLINK SQUELCH, OFF; RANGE CWEA, ENABLE.

04 02 32 58 LMP RANGE CWEA, ENABLE.

04 02 33 00 CDR Okay.

[REDACTED]

CONFIDENTIAL

04 02 32 01 LMP Okay.

04 02 32 02 CDR S-band check with MSFN.

04 02 33 03 LMP Okay.

04 02 33 05 CDR Biomed switch, RIGHT.

04 02 33 08 LMP Houston, this is Falcon. We're locked up on the - the high gain. How do you read?

04 02 33 16 CC Okay, Jim. Reading you loud and clear now. That seemed to have improved our comm and I'm - I'm ready to start with the pads. I'll start with the CSM first. Al, whenever you're ready.

04 02 33 29 CDR Okay, he's working right now. Are you ready for an E-memory dump from the Falcon?

04 02 33 37 CC Stand by.

04 02 33 41 LMP We can go with the landing gear ...

04 02 33 42 CDR Yes.

04 02 33 44 LMP You want to do it?

04 02 33 46 CDR Yes.

04 02 33 47 LMP Okay. CB(11) ED: LANDING GEAR FLAG, close.

04 02 33 51 CDR Okay. LANDING GEAR FLAG, closed.

04 02 33 52 LMP LOGIC POWER A, open.

04 02 33 54 CDR LOGIC POWER A, open.

04 02 33 56 LMP Okay, we want Al, though, to be in position to watch it.

04 02 33 59 CDR No, he can't see anything.

04 02 34 02 LMP The landing gear?

04 02 34 03 CDR No. Not much.

CONFIDENTIAL

[REDACTED]

04 02 34 04 LMP Okay.

04 02 34 05 LMP (Yelling) Okay, Al. We're going to extend the landing - -

04 02 34 08 CC Falcon, Houston. We're ready for the E-MOD dump.

04 02 34 10 CMP What?

04 02 34 11 LMP Okay; stand by.

04 02 34 14 LMP (Yelling) We're going to extend the gear. You'll hear a little thump, okay?

04 02 34 18 CMP I got your ...

04 02 34 21 LMP (Yelling) Good.

04 02 34 22 LMP They're ready for the E-memory dump, Dave.

04 02 34 23 CDR It's on the way. I gave it to them.

04 02 34 24 LMP Oh, you gave it to them!

04 02 34 25 CC En - Endeavour, Houston. The computer's yours.

04 02 34 26 LMP Okay, MASTER ARM, ON.

04 02 34 27 CMP Roger, Houston.

04 02 34 28 CDR MASTER ARM going ON.

04 02 34 30 LMP SYSTEM B light, on.

04 02 34 31 CDR B light's on.

04 02 34 32 LMP LANDING GEAR DEPLOY, FIRE.

04 02 34 33 CDR Here we go.

04 02 34 36 LMP I heard it. Gadzooks!

04 02 34 39 CDR Clunk! Back to SAFE.

04 02 34 41 LMP Okay, we got a gray?

[REDACTED]

CONFIDENTIAL

04 02 34 44 CDR Got a gray.

04 02 34 45 LMP Good. CB(11) ED: LOGIC POWER A, closed.

04 02 34 47 CDR Closed.

04 02 34 48 LMP SYSTEM A light should be on.

04 02 34 49 CDR On.

04 02 34 50 LMP LANDING GEAR DEPLOY, FIRE.

04 02 34 51 CDR FIRE.

04 02 34 53 LMP Okay.

04 02 34 54 CDR SAFE.

04 02 34 55 LMP MASTER ARM, OFF.

04 02 34 56 CDR MASTER ARM, OFF.

04 02 34 57 LMP A and B lights, off.

04 02 34 58 CC And, Endeavour; Houston. We will stay with the REFSMMAT you have.

04 02 34 59 CDR A and B lights are off.

04 02 35 00 CMP Okay, Ed. Thank you.

04 02 35 01 LMP CB on 11 ED: LANDING GEAR FLAG, open.

04 02 35 04 CDR LANDING GEAR FLAG coming open. Barber pole. Okay.

04 02 35 10 LMP Okay, you got the DAP; we got the E-memory dump; we got the steerable. We're ready for the suit fan wat - We'll have to get the up-link - when - -

04 02 35 18 CDR That's right. Let's get the suit fan stuff.

04 02 35 20 LMP Okay. Read to me?

04 02 35 22 CDR CB(16) ECS: SUIT FAN 2, open.

CONFIDENTIAL

Day 5

1-13

[REDACTED]

04 02 35 24 LMP SUIT FAN 2 coming open.

04 02 35 28 CDR MASTER ALARM; SUIT/FAN. SUIT FAN component lights are on.

04 02 35 31 LMP Verified.

04 02 35 32 CDR Okay, CB(11).

04 02 35 33 LMP ECS SUIT FAN 1, closed.

04 02 35 35 CDR FAN 1, closed. H₂O SEP SELECT, push SEP 1.

04 02 35 40 LMP Push SEP 1.

04 02 35 42 CDR Okay, SUIT FAN, select number 1.

04 02 35 44 LMP Number 1.

04 02 35 46 CDR Lights go off.

04 02 35 50 CDR CB(16) ECS: SUIT FAN number 2, closed.

04 02 35 52 LMP Closed.

04 02 35 55 CDR Okay. Glycol pump check.

04 02 35 58 LMP Yes. Okay, CB on 11, ECS: GLYCOL PUMP 1, open - -

04 02 36 01 CC Falcon, Houston. Give us POO and DATA. I have an up-link for you.

04 02 36 06 CDR Roger. POO and DATA. Go, DATA.

04 02 36 11 CMP (Yelling) Dave.

04 02 36 12 CC And I'm ready to give the pads, Falcon, whenever you want them.

04 02 36 16 CDR Go ahead, Jim. (Yelling) Okay, I'll check them - -

04 02 36 17 LMP Go ahead, Ed.

04 02 36 19 CMP (Yelling) Are you all set?

[REDACTED]

[REDACTED]

04 02 36 20 CDR (Yelling) Yes, looks good.

04 02 36 23 CC All right, your LM DAP data first: CSM weight, 37679; LM weight, 36630. Your GDA drive angles on board are good.

04 02 36 46 LMP Okay, copy. CSM weight is 37679; LM weight, 36630.

04 02 36 56 CC That's affirm. AGS abort constants: 224 - -

04 02 37 00 LMP Go ahead.

04 02 37 01 CC - - plus 60442; 225 plus 29365; 226, plus 60449; 305, minus 01659; 662, minus 55021; 673, minus 32306.

04 02 37 39 LMP Okay. Readback on the AGS abort constants: 60442, 29365, 60449, 01659, 55021, and 32306.

04 02 38 00 CC Affirm. The first three are plus; the last three are negative.

04 02 38 03 LMP That's affirm.

04 02 38 05 CDR Let me tell him something here. Houston, Falcon.

04 02 38 13 CC Go ahead, Falcon.

04 02 38 15 CDR Okay, everything is in order up to this point as far as the checkout goes with the exception of the LGC. When we pushed in the LGC circuit breaker, we got a PROGRAM light. With a 400, an R₁, a VERB 5 NOUN 9 gave us - gave us an 1105, which seems to be of little consequence. Just thought you might like to know.

04 02 38 43 CC We copy, Dave.

04 02 38 49 LMP Okay, Dave, you ready to press on with that glycol pump check?

04 02 38 51 CDR Wait a minute. (Yelling) Say again, Al?

04 02 38 52 CMP ...

[REDACTED]

Day 5

1-15

[REDACTED]

04 02 38 54 CDR (Yelling) Okay. Good boy. (Yelling) We're going to be up here with a docked IMU a line in about 5 minutes.

04 02 39 06 CMP What?

04 02 39 07 CDR (Yelling) We're going to be up with a docked IMU a line in about 5 minutes.

04 02 39 15 CDR Okay, go.

04 02 39 17 LMP Okay. On 11, ECS: GLYCOL PUMP 1, open.

04 02 39 23 CDR GLYCOL PUMP 1, open.

04 02 39 24 LMP You should get a MASTER ALARM, ECS caution and GLYCOL component lights, on.

04 02 39 28 CDR We did.

04 02 39 29 LMP Okay, ECS GLYCOL PUMP 1, closed.

04 02 39 32 CDR Okay; closed.

04 02 39 33 LMP Component lights should come on.

04 02 39 34 CDR Did. Okay.

04 02 39 35 LMP GLYCOL INSTRUMENTATION, SECONDARY. And reading 8 psi.

04 02 39 43 CDR Okay.

04 02 39 44 LMP Okay, I'll close INSTRUMENT SEC - GLYCOL PUMP SEC.

04 02 39 47 CDR Okay - -

04 02 39 48 LMP We got a pressure rise. GLYCOL PUMP SEC coming open; pressure decrease. Okay, GLYCOL to PUMP - -

04 02 39 55 CDR/LMP 2.

04 02 39 57 CDR Good.

04 02 39 59 CC Falcon, Houston. The computer's yours.

[REDACTED]

~~CONFIDENTIAL~~

04 02 40 01 CDR Roger.

04 02 40 04 LMP Okay. CB on 11, ECS: GLYCOL PUMP AUTO TRANSFER, open.

04 02 40 08 CDR Okay. AUTO TRANSFER, open.

04 02 40 09 LMP Go on to PUMP 1.

04 02 40 10 CDR PUMP 1.

04 02 40 12 LMP Okay, good pressure. About 25. Okay.

04 02 40 17 CDR Okay, how about going to - off of DATA over there?

04 02 40 19 LMP Yes. Okay, we can do the ascent BAT checkout while we're - -

04 02 40 23 CDR Yes.

04 02 40 24 LMP - - waiting for Al.

04 02 40 25 CDR Okay.

04 02 40 26 CMP I'm ready.

04 02 40 27 CDR CB(16) EPS: ASCENT ECA CONTROL, closed.

04 02 40 31 LMP Closed.

04 02 40 32 CDR POWER/TEMP MONITOR select to LUNAR.

04 02 40 37 LMP LUNAR.

04 02 40 38 CDR LMP LUNAR BATTERY, OFF/RESET, barber pole.

04 02 40 42 LMP OFF, OFF, and barber pole.

04 02 40 43 CDR Then ON, talkback, LMP.

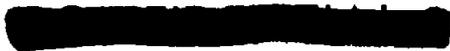
04 02 40 47 LMP ON, talkback, LMP.

04 02 40 48 CDR Okay, verify lunar BAT current.

04 02 40 51 LMP Verified. Reading - 25.

~~CONFIDENTIAL~~

Day 5



1-17

04 02 40 54 CDR Okay. LMP LUNAR BATTERY, OFF/RESET, barber pole.

04 02 40 58 LMP OFF and barber pole.

04 02 40 59 CDR POWER TEMP MONITOR, select BAT 5.

04 02 41 03 LMP Wonder if we ought to tell Houston we're doing this. So they're - they'll probably get it anyway.

04 02 41 07 CDR They're watching.

04 02 41 08 CC And, Endeavour; Houston. Are you about ready for your pad?

04 02 41 09 LMP Okay, I'm on BAT 5.

04 02 41 11 CDR Okay. BAT 5, NORMAL, LM - -

04 02 41 14 CMP Roger, Ed. Stand by 1.

04 02 41 15 CDR BAT 5, NORMAL LMP FEED, ON, gray.

04 02 41 19 LMP ON and gray.

04 02 41 20 CDR Verify BAT 5 current.

04 02 41 21 LMP Verified.

04 02 41 22 CDR Okay. LMP BAT 1, HI - VOLTAGE, OFF/RESET, barber pole.



[REDACTED]

[REDACTED]

PDI PREPARATION TO POSTTOUCHDOWN

--- -- -- -- LMP *** read me?

--- -- -- -- LMP *** Endeavour, Falcon. How do you read on VOX?

--- -- -- -- CDR *** Endeavour, Falcon. How do you read on VOX?

--- -- -- -- LMP *** the other antenna.

--- -- -- -- CDR Endeavour, Falcon. How do you read on VOX?

04 07 31 25 CDR Well, we'll check them. I'm - I'm back ICS, Jim.

04 07 32 02 LMP Find a better place for this.

04 07 32 08 CDR What is it? Oh, Yes, let's find a better place for that. Yes. Where is a better place? Could we get it in here?

04 07 32 18 LMP I have mine in there - but - Be careful when we stick it in, because we have those - ascent - -

04 07 32 24 CDR Yes.

04 07 32 25 LMP - - cables in there.

04 07 32 26 CDR Okay, stick it in there. That's all that's in there. Stick it in there.

04 07 32 37 LMP Did you - Tuck it in. I can't push from this angle - -

04 07 32 38 CDR I'll get it. I'll get it.

04 07 32 40 LMP Here, let me hold them cables.

04 07 32 53 CDR Jeess. Something we should have done a long time ago.

04 07 33 03 LMP Stick that somewhere else.

04 07 33 37 LMP Why don't you put these in the McDivitt bag?

04 07 33 38 CDR Yes. I've got room over here.

~~CONFIDENTIAL~~

04 07 34 54 CDR Well, I think I'm going to have to do something.
Don't want to break that.

04 07 35 32 CDR Daylight, huh?

04 07 35 35 LMP That means we might as well get ready, huh?

04 07 35 48 LMP For the biggest landing of your life.

04 07 35 49 CDR Ahh.

04 07 35 55 LMP I'm going to dress up for it.

04 07 36 00 CDR Got 54 minutes to go yet?

04 07 36 37 LMP I'm on VOX. Do you read me?

04 07 36 38 CDR Yes.

04 07 36 40 LMP No clipping?

04 07 36 42 CDR No.

04 07 38 21 CDR How do you read me on VOX, Jim?

04 07 38 22 LMP Loud and clear.

04 07 38 23 CDR Okay.

04 07 38 31 LMP Okay, you got helmets and gloves on, huh?

04 07 38 32 CDR Right.

04 07 38 33 LMP Okay, you want to read this to me?

04 07 38 35 CDR I'll get some light here.

04 07 39 06 CDR Okay. Where are we?

04 07 39 09 LMP Right here.

04 07 39 11 CDR Okay, helmets and gloves, on; CABIN REPRESS, CLOSED.

04 07 39 16 LMP CABIN REPRESS, CLOSED.

04 07 39 18 CDR SUIT GAS DIVERTER, EGRESS.

~~CONFIDENTIAL~~

[REDACTED]

04 07 39 20 LMP SUIT GAS DIVERTER, PULL - SUIT GAS DIVERTER, EGRESS, huh?

04 07 39 26 CDR Yes.

04 07 39 27 LMP Okay, EGRESS.

04 07 39 28 CDR CABIN GAS RETURN, EGRESS.

04 07 39 29 LMP CABIN GAS RETURN, EGRESS.

04 07 39 32 CDR PRESS REGS A and B, EGRESS.

04 07 39 34 LMP A and B, EGRESS.

04 07 39 35 CDR And you got the DET RESET, counting down?

04 07 39 39 LMP Yes, counting down.

04 07 39 40 CDR Okay, switch settings. Let's go through that.

04 07 39 44 LMP Okay.

04 07 39 45 CDR VHF ANTENNA, FORWARD.

04 07 39 47 LMP Okay, FORWARD.

04 07 39 48 CDR CB(11) EPS: INVERTER 1 to close. It's closed.

04 07 39 56 LMP Okay, I'm selecting INVERTER 1.

04 07 39 58 CDR Okay.

04 07 40 04 LMP And, get voltage.

04 07 40 06 CDR Okay.

04 07 40 16 LMP Okay, circuit breakers on 11. STAB CONTROL AELD, closed.

04 07 40 20 CDR Closed.

04 07 40 21 LMP Circuit breaker (11) STAB CONTROL: ABORT STAGE, closed.

04 07 40 24 CDR Closed.

[REDACTED]

04 07 40 25 LMP Okay, reset engine stop pushbutton.

04 07 40 29 CDR Want me to do it again?

04 07 40 30 LMP That's what it says. I don't know.

04 07 40 37 CDR We'll just - -

04 07 40 38 LMP ... it's reset.

04 07 40 40 CDR Yes, I got the light out in the dark.

04 07 40 42 LMP Yes.

04 07 40 43 CDR Okay. Window bars are set.

04 07 40 45 LMP Yes. Okay, if you'll read to me.

04 07 40 50 CDR CB(16) STABILITY and CONTROL: AELD, closed.

04 07 40 53 LMP AELD, closed.

04 07 40 55 CDR ABORT STAGE, closed.

04 07 40 56 LMP Closed.

04 07 40 57 CDR Cycle CWEA circuit breaker.

04 07 40 58 LMP Okay.

04 07 41 03 CDR Waiting for 40 minutes.

04 07 41 12 CDR Besides that, they've been looking at us, and they could tell whether the stop button was set or not.

04 07 41 23 LMP Okay, I'm going to put my CROSSPOINTER SCALE on LG MULT.

04 07 41 32 CDR Okay. Let's see, we'll give it to the PGNS - at 30 seconds on the MODE SELECT, right?

04 07 41 46 LMP Uh-huh.

04 07 41 49 CDR Let's run through it here one time. LANDING RADAR circuit breaker - Let's see, at 5 minutes, CB LR, closed; 4 minutes trim, GO/NO GO; 1 minute, MASTER ARM; 30 seconds to PGNS, ENGINE ARM to DESCENT.

[REDACTED]

Okay, at 0:07, we should get the ullage, and we'll feel it in here. We'll know it comes on. No ullage, we go manual; ignition, we get the START; no START, we go manual; 5 seconds, DESCENT OVERRIDE, ON; 26 seconds, throttle, up; NOUN 69; I think I can reach that okay.

04 07 42 37 LMP See what AGS has for altitude.

04 07 42 55 CDR Beautiful scenery. Your camera isn't handy, is it? Oh, you've got it all tucked away?

04 07 43 00 LMP No, it's not tucked away. I can bring it out - real fast.

04 07 43 05 CDR It's so pretty.

04 07 43 08 LMP Yes.

04 07 43 11 CDR Yes, bring it out. We got plenty of time. We'll take a picture.

04 07 43 49 CDR Here; I had my fun. Up to 33.

04 07 44 12 LMP AGS has us 6 miles high.

04 07 44 15 CDR Six miles.

04 07 44 16 LMP Uh-huh.

04 07 44 18 CDR Six miles high, where?

04 07 44 20 LMP Well, probably be 6 miles high when we - get over there - PDI.

04 07 44 23 CDR Really?

04 07 44 24 LMP 36,000 feet. Well, but they'll - they'll update your state vector.

04 07 44 31 CDR Yes.

04 07 44 35 LMP Take a look at it.

04 07 45 02 CDR Nine miles. 60.6 by 9. Huh.

[REDACTED]

CONFIDENTIAL

04 07 45 17 CDR That's funny.

04 07 45 22 LMP Let's see what my orbit is. Nine by 60.

04 07 45 33 CDR That's good.

04 07 45 34 LMP Yes (sigh).

04 07 46 46 LMP Make a great ski area, if they'd just put some snow on it.

04 07 46 48 CDR (Laughter) Looks like there is in some parts.

04 07 46 50 LMP Yes.

04 07 47 35 LMP God, it seems like we're going slow.

04 07 47 37 CDR Huh? Yes.

04 07 49 12 LMP Time's going slow, but I imagine it'll speed up in the last 20 minutes.

04 07 49 15 CDR Oh, yes.

04 07 50 10 LMP I put that mark on my window -

04 07 50 12 CDR Uh-huh.

04 07 50 13 LMP I found out it's right where the sequence camera points (laughter).

04 07 50 16 CDR Oh (laughter).

04 07 50 23 LMP Good thinking.

04 07 50 31 LMP Okay, we're at 40 minutes, Dave. I'm going to get the ASCENT BATs on.

04 07 50 34 CDR Okay.

04 07 50 37 CDR I'll write the GET down.

04 07 50 39 LMP I can get it, if you want.

04 07 50 40 CDR No, I'll get it. I got nothing to do.

CONFIDENTIAL

Day 5

2-7

[REDACTED]

04 07 50 44 LMP BATs 5 and 6 are on. Warming up.

04 07 50 52 CDR Okay.

04 07 51 21 CDR Guess some point along in here, we lock the restraints, huh? Is that in here anywhere?

04 07 51 27 LMP Why, I've never seen it, Dave.

04 07 51 30 CDR Seems to me we probably ought to - Don't you think. Or do we? Or are they - probably like the shoulder harness.

04 07 51 39 LMP No - the only - Yes, the only reason you lock - the lock is in there, I think, is for the docking.

04 07 51 44 CDR Oh, it is?

04 07 51 45 LMP I think so.

04 07 51 46 CDR Yes.

04 07 51 47 LMP These are inertia reels anyway.

04 07 51 48 CDR Yes. I guess they are.

04 07 52 01 LMP Boy, there's - Tsiolkovsky.

04 07 52 10 CDR Where?

04 07 52 11 LMP Got it right out my window.

04 07 52 12 CDR Do you really? Oh, we're going right smack over it, aren't we?

04 07 52 15 LMP Yes.

04 07 52 17 CDR Can you get a picture of the central peaks, good?

04 07 52 18 LMP Sure.

04 07 52 19 CDR Take a bunch.

04 07 52 20 LMP Oh, shoot. Al'll -

04 07 52 22 CDR He's not going to be this low.

[REDACTED]

~~CONFIDENTIAL~~

04 07 52 24 LMP Okay. About an f/8, I'd say, huh?

04 07 52 28 CDR Yes, that's a good guess; 1/250th, f/8.

04 07 52 35 LMP Okay.

04 07 52 36 CDR Wait - wait until we get right over it.

04 07 52 48 CDR Or better yet, I bet I'd get a better picture, huh?

04 07 52 51 LMP You might.

04 07 53 13 CDR Yes, it's going to be good right out my window.

04 07 53 16 LMP Here you go, boss.

04 07 55 06 CDR Okay, I've had my fun.

04 07 55 07 LMP Okay.

04 07 56 30 LMP Great scenery, isn't it?

04 07 56 32 CDR Beautiful.

04 07 56 54 LMP I didn't hear any of that strange John Young noise on the back of the Moon.

04 07 56 57 CDR We didn't have our VHF on. I think it was just VHF. I - I think that's what it was, when they were - -

04 07 57 07 LMP You mean the VHF on the - on the command module?

04 07 57 10 CDR Yes. On - so I think that they heard it during the rendezvous.

04 07 58 32 CDR The - the sky is just as black as the ace of spades, isn't it?

04 07 58 36 LMP Uh-huh. Don't think there's any atmosphere.

04 07 58 40 CDR No. No airglow.

04 07 58 51 LMP I'm going to write me a joke - Astronauts come back from the Moon; said it's great, but no atmosphere.

~~CONFIDENTIAL~~

[REDACTED]

04 07 58 55 CDR (Chuckle) That's a good one. You ought to save that for the surface sometime.

04 08 00 51 CDR Let's see; when do we pick them up - 0 - -

04 08 00 52 LMP 04 - -

04 08 00 53 CDR - - 4.

04 08 00 54 CDR Few minutes. Let's take a last look around here. Let's see, that looks good; good; good.

04 08 01 05 LMP A piece of glass. Almost hate to pick it up with my gloves.

04 08 01 09 CDR Yes.

04 08 01 10 LMP I don't think I will. It'd be too easy to puncture them.

04 08 01 40 CDR Let's see. You got that abort card and everything all ready?

04 08 01 45 LMP You mean for manual aborts?

04 08 01 47 CDR Yes.

04 08 01 48 LMP Yes.

04 08 01 52 LMP Go to local vertical.

04 08 01 54 CDR Yes.

04 08 01 56 LMP And I'll - by that time, I hope to have the card
4 - -

04 08 02 00 CDR Okay.

04 08 02 01 LMP - - in my hot little hand.

04 08 04 19 CDR Should be picking them up, I guess?

04 08 04 23 LMP What's that, Dave?

04 08 04 24 CDR I said we should be picking them up, I guess.

04 08 04 26 LMP Should be.

[REDACTED]

~~CONFIDENTIAL~~

04 08 05 09 LMP Look at the Earth coming up over there, Dave.

04 08 05 13 CDR Shee! Oh, isn't that something! Beautiful! I'll be darned. That's a ... of something.

04 08 05 33 LMP That means we ought to get them, get comm pretty soon.

04 08 05 36 CDR Yes.

04 08 05 39 LMP Here they come.

04 08 05 40 CDR Yes.

04 08 06 02 CC Falcon, Houston.

04 08 06 05 CDR Houston, Falcon. Go.

04 08 06 10 CC Roger, Falcon. We're ready for your ASCENT BAT-on time ... your ... BAT report.

04 08 06 17 LMP Roger, Ed. The ASCENT BATs were on at 103:50:45, and I'll check ED BATs now.

04 08 06 52 LMP And, Houston; this is Falcon. ED batteries both check at 37 volts.

04 08 06 59 CC Copy; 37 volts. And I have an update for your PDI pad.

04 08 07 05 CDR Roger. Go ahead.

04 08 07 10 CC And, Falcon, give us POO and DATA ... and up-link.

04 08 07 18 CDR I'll get them.

04 08 07 19 LMP Go ahead.

04 08 07 20 CDR POO and DATA, and go ahead with the pad.

04 08 07 25 CC Roger. India 10 ...

04 08 07 35 CDR It's the up-link, Ed.

04 08 07 36 CC Falcon, ...

04 08 07 56 LMP Ed, if you're reading us, you ought to call us after the - the up-link. We cannot read you.

~~CONFIDENTIAL~~

Day 5

2-11

[REDACTED]

04 08 08 01 CDR We're not getting the up-link either.

04 08 08 15 CDR You locked up good?

04 08 08 16 LMP Yes. Let me go to SLEW again. There it comes; don't change it. It's coming in.

04 08 08 23 CDR Good.

04 08 08 31 LMP Okay, let's go through this, and I'll get the update when it comes up. THROTTLE CONTROL, AUTO.

04 08 08 37 CDR AUTO.

04 08 08 38 CC Falcon, Houston. How do you read now?

04 08 08 41 LMP Read you loud and clear, Ed. I'm ready for that update now.

04 08 08 47 CC Roger. India 104:30:08.54; NOUN 61 cross range, plus 0003.3; DEDA 231, plus 56943.

04 08 09 12 LMP Roger. 104:30:08.54; cross range, plus 0003.3; and DEDA 231, plus 56943.

04 08 09 29 CC Readback is correct, and be advised that cross range number means you're going from south to north. You'll probably see some roll during the PDI.

04 08 09 38 CDR Go ahead.

04 08 09 39 LMP Roger.

04 08 09 43 LMP Okay. Your TTCA to THROTTLE at min.

04 08 09 46 CDR Okay. THROTTLE, min.

04 08 09 51 LMP Okay, I'm THROTTLE and I'm soft stop.

04 08 09 53 CDR Okay.

04 08 09 54 LMP RATE SCALE, 25 DEGREES PER SECOND.

04 08 09 56 CDR 25.

04 08 09 57 LMP ATTITUDE/TRANSLATION, 4 JETs.

[REDACTED]

[REDACTED]

04 08 09 58 CDR 4.

04 08 09 59 LMP Check DPS, APS, RCS, ECS, and EPS. Okay?

04 08 10 05 CDR DPS looks all right.

04 08 10 19 LMP Okay, we checked the RCS. That looked okay.

04 08 10 26 CDR ECS look all right? EPS look all right?

04 08 10 28 LMP Yes.

04 08 10 29 CDR Okay.

04 08 10 55 LMP When they finish with the up-link, Dave, I'll need a - a VERB 47.

04 08 10 59 CDR Yes.

04 08 11 42 CC Endeavour, Houston. Standing by.

04 08 12 03 LMP Well, I wonder if they're finished with our computer.

04 08 12 05 CDR They'll tell us.

04 08 12 07 CC Falcon, Houston. Computer's yours.

04 08 12 09 CDR Roger. Thank you.

04 08 12 10 LMP Okay. I'm going to VOICE BACKUP.

04 08 12 17 SC ...

04 08 12 20 CDR Okay.

04 08 12 22 LMP That's VOICE BACKUP.

04 08 12 23 CDR Okay. You ready?

04 08 12 24 LMP Yes.

04 08 12 50 LMP Okay, it looks like I got it, Dave.

04 08 12 53 CDR Okay.

04 08 13 13 CC Endeavour, Houston. ... you read?

[REDACTED] **CONFIDENTIAL** [REDACTED]

Day 5

2-13

[REDACTED]

04 08 13 22 CC Endeavour, Houston. You're on scan limit. Go to REACQ ...

04 08 13 40 LMP Okay. Looks good.

04 08 13 41 CDR Good.

04 08 14 33 LMP Okay, I'm CWEA ENABLE on the S-BAND.

04 08 14 36 CDR Okay. AGS says it's at about 12 miles.

04 08 14 43 CC Endeavour, Houston. How do you read?

04 08 14 51 CC Roger, Endeavour. I have an update for the PDI pad India.

04 08 14 58 LMP Okay, we can put MODE SELECT to - Well, you've got it there - -

04 08 15 01 CDR Yes.

04 08 15 02 LMP Good. Okay. Standing by for 10 minutes.

04 08 15 05 CDR Yes.

04 08 15 08 CC It's 104:30:08.54, Al.

04 08 15 25 CC Good readback.

04 08 16 34 CC Endeavour, Houston. We're ready for AUTO on the HIGH GAIN, please.

04 08 18 44 CC Falcon, Houston.

04 08 18 46 CDR Houston, Falcon. Go.

04 08 18 42 CC Roger. We did not see the 231 load go in. ... Verify that, please.

04 08 19 02 LMP In work.

04 08 19 07 CDR Did you get it in, Jim?

04 08 19 10 LMP Uh-huh. There's the read-out. I didn't put 231 in. You want that also, Ed? I normally don't load 231.

[REDACTED]

~~CONFIDENTIAL~~

04 08 19 18 CC That's affirmative, Falcon.

04 08 19 19 LMP Hmm.

04 08 19 48 CC Okay, Falcon. Thank you.

04 08 20 07 CDR Okay. Let's go to work.

04 08 20 11 LMP Okay, boss. PGNS MODE CONTROL, AUTO, and AGS MODE CONTROL, AUTO.

04 08 20 14 CDR Okay.

04 08 20 15 LMP Call P63.

04 08 20 30 LMP You ready to go to VOX?

04 08 20 32 CDR Yes.

04 08 20 34 LMP Okay, Houston; Falcon on VOX. How do you read?

04 08 20 35 CDR *** lots of clipoff.

04 08 21 17 LMP PROPELLANT QUANTITY MONITORS, DESCENT 1.

04 08 21 19 CDR Okay ***

04 08 21 21 LMP Are you ready for the DPS configuration card?

04 08 21 25 CDR Roger.

04 08 21 26 LMP Okay; CBs on 11. DECA GIMBAL AC, closed.

04 08 21 27 CDR DECA GIMBAL AC is closed.

04 08 21 31 LMP *** ENG ***RIDE LOGIC is closed. STAB CONTROL circuit breakers, all closed, except AEA, open.

04 08 21 38 CDR Roger. Verified.

04 08 21 39 LMP RATE SCALE, 25 DEGREES PER SECOND.

04 08 21 42 CDR 25.

04 08 21 43 LMP *** CONTROL, AUTO, CDR.

04 08 21 44 CDR AUTO, CDR.

[REDACTED]

04 08 21 45 LMP ATTITUDE/TRANSLATION, 4 JETs.
04 08 21 46 CDR 4 JETs.
04 08 21 47 LMP BALANCE COUPLE, ON.
04 08 21 48 CDR ON.
04 08 21 49 LMP ENG *** GIMBAL, ENABLE.
04 08 21 50 CDR ENABLE.
04 08 21 51 LMP COMMAND OVERRIDE, OFF.
04 08 21 52 CDR OFF.
04 08 21 53 LMP ABORT, ABORT STAGE, RESET.
04 08 21 54 CDR RESET.
04 08 21 55 LMP DEAD BAND, MIN.
04 08 21 56 CDR MIN.
04 08 21 57 LMP ***, three, to MODE CONTROL.
04 08 21 58 CDR MODE CONTROL.
04 08 21 59 LMP *** AGS to AUTO.
04 08 22 00 CDR *** AUTO.
04 08 22 01 LMP Stop pushbutton, both, RESET.
04 08 22 02 CDR Both RESET.
04 08 22 03 LMP *** the throttle, yours to min and mine to soft stop.
04 08 22 07 CDR *** Soft stop. And you're - you're clipping a little bit on the first part, Jim.
04 08 22 13 LMP Okay.
04 08 22 27 LMP *** down here whether I can take a VERB 40 NOUN 20.
04 08 22 32 CDR Okay. ***

[REDACTED]

~~CONFIDENTIAL~~

04 08 23 04 LMP *** on.

04 08 23 05 CDR *** again.

04 08 23 06 LMP *** steering is in.

04 08 23 08 CDR Okay.

04 08 23 16 LMP *** for 5 minutes - 10 minutes.

04 08 25 10 CDR Okay. LANDING RADAR, closed.

04 08 25 12 LMP *** breaker is in. *** transmitter.

04 08 25 16 CDR Altitude transmitter is 3.7; velocity's 3.8.

04 08 25 21 LMP *** for 4 minutes for ***

04 08 25 34 LMP Reading me any better now?

04 08 25 35 CDR Yes.

04 08 26 07 LMP Okay. PRO for the final trim.

04 08 26 17 CDR Roger. GO for PDI.

04 08 26 36 LMP ***

04 08 26 41 CDR Okay, Endeavour, how do you read the Falcon?

04 08 27 06 CDR Endeavour, Falcon. If you're reading, we're not reading you.

04 08 27 25 CDR Okay, fine. Thank you.

04 08 27 38 LMP Stand by for 1 minute.

04 08 27 39 CDR Okay.

04 08 27 49 LMP *** oxidizer ... low, aren't they?

04 08 28 00 LMP ***cle the cir***

04 08 28 05 CDR No. That's all right. *** later on.

04 08 28 12 LMP Houston, we're reading 87 and 85 on the *** quantity.

~~CONFIDENTIAL~~

Day 5

2-17

04 08 29 11 CDR Okay, MASTER ARM's ON; I have two lights.

04 08 29 36 CDR Average g. *** ARM to DESCENT. *** have guidance.

04 08 29 47 LMP *** by for ullage.

04 08 30 01 MS Stand by for ullage.

04 08 30 05 CDR ULLAGE. GO for the PRO.

04 08 30 07 CDR PRO.

04 08 30 08 LMP Going. ...

04 08 30 10 CDR AUTO IGNITION. *** percent; the OVERRIDE is ON.

04 08 30 35 CDR Throttle up.

04 08 30 41 LMP The MASTER ARM, OFF.

04 08 30 42 CDR Okay, the MASTER ARM is coming OFF. Lights are OFF. Looks stable.

04 08 30 50 LMP H-dot's looking a little higher than normal.

04 08 30 54 CDR Okay - a little higher than normal.

04 08 31 09 SC ***

04 08 31 11 LMP H-dot's about 20 high.

04 08 31 14 CMP Okay.

04 08 31 16 LMP Fuel is a little low; oxidizer is a little high.

04 08 31 35 CDR Roger; minus 2 - minus 02800. Standing by for the ENTER.

04 08 31 44 CDR GO for ENTER.

04 08 32 11 CDR Roger; GO at 2. PGNS and AGS compare.

04 08 32 16 LMP H-dot's a little high. We're about 2 percent low on fuel.

04 08 32 21 CDR Okay.

~~CONFIDENTIAL~~

04 08 32 22 LMP ****t 1.

04 08 32 40 LMP *** Altitude's good; H-dot's 4 high.

04 08 32 49 CC Falcon ...

04 08 32 51 CDR Okay, that's nice to hear.

04 08 32 07 CDR Okay, 3 minutes showing to zero.

04 08 33 11 LMP Altitude's ***. H-dot's right on, Dave.

04 08 33 14 CDR Good.

04 08 33 15 LMP Still reading 2-per*** low, but Houston's happy with it.

04 08 33 23 CDR Roger; GO at 3.

04 08 33 27 CDR Altitude light is out. We have a 3400 DELTA-H. Velocity light is out. DELTA-H looks good up here, Houston. What do you think?

04 08 33 50 CDR Roger. Accepting. It's going in.

04 08 33 56 LMP And, Houston, ED batteries check.

04 08 34 10 LMP Four minutes. Altitude is 2000 high.

04 08 34 13 CDR Okay.

04 08 34 14 LMP About 3 low. Fuel and oxidizer looking good. *** in 1 percent.

04 08 34 19 CDR Okay. PGNS and AGS look good.

04 08 34 40 LMP *** 30. Altitude's *** thousand high, H-dot's right on. *** and oxidizer are good..

04 08 34 46 CDR Okay.

04 08 34 48 LMP DELTA-H is 2000.

04 08 35 09 LMP *** 5 minutes. Altitude, 4000 high. *** dot, about 9 high.

04 08 35 16 CDR Okay.

~~CONFIDENTIAL~~

Day 5

CONFIDENTIAL

2-19

04 08 35 23 CDR Okay; understand. GO at 5.

04 08 35 40 LMP Altitude - altitude is 3000 high. H-dot, 10 high.
*** and oxidizer, good.

04 08 35 48 CDR Okay.

04 08 36 11 LMP Altitude, 2000 high. H-dot, 6 high.

04 08 36 14 CDR Okay. It's coming in.

04 08 36 15 LMP Oxidizer, good.

04 08 36 17 CDR And the DELTA-H is looking pretty good.

04 08 36 29 CDR Roger. GO at 6.

04 08 36 32 CDR ***ty K.

04 08 36 41 LMP ***tude, a thousand high. H-dot, about 4 high.

04 08 36 48 CDR Okay. X-axis override's out.

04 08 37 01 CDR Roger. 7 plus 23.

04 08 37 10 LMP Seven minutes. A thousand high. H-dot just about
on. Oxidizer's running about 1-percent low.

04 08 37 31 LMP ***

04 08 37 32 CDR Throttle down; 7 plus 22.

04 08 37 41 LMP ***

04 08 37 44 CDR Okay.

04 08 37 45 LMP Oxidizer, good.

04 08 37 46 CDR Okay.

04 08 37 47 LMP Check the - *** manual.

04 08 37 53 CDR No flags. Looks good.

04 08 38 12 CDR Roger. DESCENT 1, and it looks like P64 at 9:23.

04 08 38 36 LMP ***

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04 08 38 39 CDR MARK.
04 08 38 42 LMP Good.
04 08 39 16 LMP Okay. Coming up on 8000.
04 08 39 22 CDR Okay.
04 08 39 30 LMP *** thousand feet.
04 08 39 33 LMP ***64.
04 08 39 34 CDR Okay.
04 08 39 35 LMP *** LPD.
04 08 39 38 CDR LPD. Coming right.
04 08 39 43 LMP Forty.
04 08 39 45 LMP 5000 feet; 39, 39, 38, 39.
04 08 39 54 LMP 4000 feet; 40, 41, 45, 47, 52.
04 08 40 04 LMP 3000 feet; 52, 52, 51, 50, 47, 47.
04 08 40 19 LMP 2000 feet; 42.
04 08 40 24 CDR Okay. I got a good spot.
04 08 40 26 LMP Good; 42, 43.
04 08 40 29 LMP 800 feet.
04 08 40 31 LMP 44, 45.
04 08 40 33 CC ... GO for landing.
04 08 40 34 CDR Roger. GO for landing.
04 08 40 37 LMP 44, 45.
04 08 40 41 LMP 1000 feet; 45.
04 08 40 45 LMP 900; 45.
04 08 40 47 LMP 800; 4***

~~CONFIDENTIAL~~

Day 5

2-21

04 08 40 51 LMP *** hundred; 46.

04 08 40 56 LMP *** hundred; 48.

04 08 41 00 LMP 500; 49, minus 17, minus 15.

04 08 41 06 LMP 400 at minus 14. *** P66?

04 08 41 11 CDR Okay.

04 08 41 13 LMP 300 feet; minus 11, minus 11.

04 08 41 20 LMP 250; minus 11; 9-percent fuel.

04 08 41 29 LMP ***dred and 50; minus 7, minus 6.

04 08 41 34 LMP 120 feet; minus 6.

04 08 41 37 CDR Okay. I've got some dust.

04 08 41 38 LMP Minus 5; 100 feet at 5; 9-percent fuel; minus 5.

04 08 41 44 LMP 80 at 5; minus 3.

04 08 41 49 LMP 60 at 3.

04 08 41 52 LMP 50 at 3. Crosspointers look good.

04 08 41 56 LMP 40 at 3.

04 08 42 00 LMP 30; 3.

04 08 42 03 LMP 25; 2; 7-percent fuel.

04 08 42 10 LMP 20 at 1.

04 08 42 12 LMP 15 at 1; minus 1, minus 1; 6-percent fuel.

04 08 42 20 LMP 10 feet; minus 1.

04 08 42 25 LMP 8 feet. Minus 1.

04 08 42 27 LMP CONTACT.

04 08 42 32 LMP Bam!

04 08 42 34 CDR Okay, Houston. The Falcon is on the plain at Hadley.

~~CONFIDENTIAL~~

~~CONFIDENTIAL~~

04 08 42 46 LMP No denying that. We had contact.

04 08 43 06 CDR ECS looks good.

04 08 43 12 LMP Okay.

04 08 43 14 CDR *** open. *** looks steady. Okay, did you get the LANDING RADAR open?

04 08 43 23 LMP Yes.

04 08 43 24 CDR Okay.

04 08 43 31 CDR Standing by for T-1.

04 08 43 32 LMP Roger.

04 08 43 40 CDR *** Looks good on board.

04 08 43 51 CDR Roger; STAY for T-1.

04 08 43 55 LMP Okay.

04 08 43 57 CDR Okay. Let's get on with *** list.

04 08 44 00 CDR Hey, I'm back on ICS/PTT, Jim.

04 08 44 34 CDR Hey, from now on, we're Hadley Base. Okay?

04 08 44 39 LMP Okay. Okay. Let me write that down.

04 08 44 56 LMP Doggone, this 1/6th is about as bad as zero. Things really float around.

04 08 45 00 CDR Yes.

04 08 45 04 CC Falcon, we have a NOUN for you.

04 08 45 06 CDR Okay.

04 08 45 20 CDR Got the pad for Pl2, Jim?

04 08 45 23 LMP Yes.

04 08 45 34 LMP 104:50:49.67 GET.

04 08 46 03 LMP Okay, plus 55, 158, plus 195.

~~CONFIDENTIAL~~

[REDACTED]

04 08 46 13 CDR Okay.

04 08 46 38 CDR See that little elevation in front of us there?

04 08 46 40 LMP I do. And that looks like it's across the rille.

04 08 46 42 CDR No, we're not across the rille.

04 08 46 44 LMP No, I mean that hill is across the rille.

04 08 46 46 CDR Oh. Hard to tell.

04 08 47 11 LMP Either that, or it's the North Complex.

04 08 47 14 CDR No, we're not there. We're not too far from Salyut. I did find that - I think.

04 08 47 21 LMP Man, we really touched down.

04 08 47 23 CDR One foot per second.

04 08 47 24 LMP I know it, but it felt - felt like we were coming down about 5 (laughter). I couldn't believe it.

04 08 47 30 CDR Oh.

04 08 48 30 LMP They should be giving a STAY/NO STAY, here, Dave.

04 08 48 32 CDR Roger.

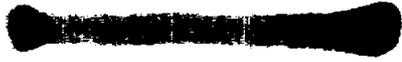
04 08 48 35 LMP We're approaching the deadline. You want to give them a call?

04 08 48 38 CDR They'll call.

04 08 48 41 CC Falcon, Houston. You're STAY for T-2.

04 08 48 42 CDR Okay, STAY for T-2.

[REDACTED]



EVA-1 FINAL PREPARATION

04 23 07 20 LMP TAPE RECORDER going ON.

04 23 07 22 CDR ... VHF antenna, EVA.

04 23 07 27 LMP EVA.

04 23 07 28 CDR Up-link squelch, ENABLE.

04 23 07 31 LMP Up-link squelch, ENABLE.

04 23 07 33 CDR Okay, let me get my panel over here. Okay, S-BAND, T/R; ICS, T/R; RELAY is OFF. MODE to *** VOX. *** MAX. VHF A to T/R; B to RECEIVE. Okay. CB(16) COMM: SE AUDIO, open, and you connect to the PLSS comm.

04 23 08 00 LMP Okay.

04 23 08 38 CDR *** PLSS PT *** MAINTAIN, right, verify. *** okay, PLSS mode, A, wheel counterclockwise.

04 23 08 52 LMP *** wheel is full counterclockwise.

04 23 08 56 CDR Okay. Tone on, vent flag P, PRESS flag 0, O₂ momentary.

04 23 09 01 LMP Okay; they're on.

04 23 09 03 CDR Okay. PLSS O₂ pressure grage [sic] greater than 85.

04 23 09 07 LMP Verified.

04 23 09 09 CDR Okay. You've made your comm check with me. Give ***

04 23 09 11 LMP Houston, how do you read the LMP?

04 23 09 18 CC Jim, you're loud and clear. There's a squeal in the background.

04 23 09 21 LMP Roger. I have that squeal, also. Turn the squelch down a little bit, ...

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04 23 09 33 CC Jim, stand by; we'll *** Roger. And, Jim, stand by. We're thinking about that tone a minute here - about the squeal in the background.

04 23 09 42 LMP Okay. I'm standing by.

04 23 10 18 CC Jim, this is Houston. Could you turn your volume down a little bit for us, please? - -

04 23 10 28 LMP-LM Okay. The volume's down now.

04 23 10 29 CC And that's volume on the wheel.

04 23 10 31 LMP-LM Okay. It's down about three quarters of the way. How do you read now?

04 23 10 36 CC Jim, that's beautiful. The squeal's gone and you're 5 by.

04 23 10 39 LMP Okay, very good. I changed the ... - -

04 23 10 40 CC And we're ready to go to the next step. Roger. We're ready to go to the next step.

04 23 10 44 CDR-LM Okay. CB(11) COMM: CDR AUDIO, open.

04 23 12 06 CDR-LM Okay. I have a tone on, vent flag plee - P, and pressure flag 0. O₂ pressure gage is reading about 94 percent. And how do you read me, Jim?

04 23 12 20 LMP-LM I read you loud and clear.

04 23 12 23 CDR-LM Okay. You need to make a comm check with Houston then.

04 23 12 25 LMP-LM Houston, how do you read the LMP?

04 23 12 31 CC Jim, you're 5 by.

04 23 12 32 LMP-LM You're the same.

04 23 12 33 CC And, Dave, you're 5 by. Sounds beautiful.

04 23 12 36 CDR *** ... he can't - talk to me.

04 23 12 37 LMP Understand.

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Day 5

~~CONFIDENTIAL~~

3-3

04 23 12 39 CDR-LM Okay. PLSS mode LMP to - Now you won't be able to hear Houston.

04 23 12 42 LMP-LM Yes.

04 23 12 44 CDR-LM PLSS mode, LMP to B and CDR to A.

04 23 12 48 LMP-LM *** B.

04 23 12 50 CDR-LM Okay. I'm in A; how do you read?

04 23 12 54 LMP-LM I read you loud and clear, Dave.

04 23 12 56 CDR-LM Okay; I read you loud and clear. Houston, how do you read the CDR?

04 23 13 03 CC Dave, you're 5 by, and Jim's 5 by.

04 23 13 05 CDR-LM Okay. PLSS - PLSS mode, both, to AR, tone on.

04 23 13 11 LMP-LM *** Okay, I'm AR.

04 23 13 14 CDR-LM *** Okay, I'm AR, and you're loud and clear to me. How me to you?

04 23 13 17 LMP-LM Same.

04 23 13 19 CDR-LM Okay, Houston. How do you read the CDR?

04 23 13 26 CC Dave, you're loud and clear.

04 23 13 28 CDR Okay, we need a TM check with you. And O₂ quantity on the CDR is 94, and give them yours, Jim.

04 23 13 36 LMP Okay, I'm reading about 92.

04 23 13 38 CC Roger; we copy.

04 23 13 45 CDR Okay, CB(16) ECS: LCG PUMP - closed.

04 23 13 47 CC And, Falcon, the data looks good. We have a TM check.

04 23 13 53 CDR Okay. Understand a good TM check. Good.

04 23 13 57 LMP Okay. LCG PUMP going closed, now.

04 23 14 00 CDR Okay, I hear the pump. Okay, LCG COLD is required.

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04 23 14 06 LMP I feel it already. Feels good.

04 23 14 08 CDR Yes. Sure does, doesn't it?

04 23 14 09 CDR Okay. CB(16) ECS: CABIN REPRESS, closed; verify.

04 23 14 14 LMP Verified.

04 23 14 15 CDR SUIT FAN, DELTA-P, open.

04 23 14 17 LMP Open.

04 23 14 18 CDR SUIT FAN 2, open.

04 23 14 19 LMP Open.

04 23 14 20 CDR SUIT FAN, select number 2, and I'll get that. ECS caution H₂O SEP component lights, on.

04 23 14 28 CDR Okay. I've got to get a ...

04 23 14 36 LMP Same here.

04 23 14 40 CDR Okay, it's gone. Okay, ECS caution lights are out.
*** Okay, SUIT GAS DIVERTER, PULL/EGRESS; verify.

04 23 14 53 LMP That's verified.

04 23 14 55 CDR Okay, CABIN GAS RETURN to EGRESS; verify.

04 23 14 58 LMP That is verified.

04 23 14 59 CDR SUIT CIRCUIT RELIEF, AUTO; verify.

04 23 15 01 LMP That's verified.

04 23 15 03 CDR Okay, OPS, connect. SUIT ISOLATION to SUIT DISCONNECT. And disconnect the LM O₂ hoses and secure about the PGA.

04 23 15 12 LMP Okay, let's take those one at a time.

04 23 15 19 CDR Stand by. We got a MASTER ALARM. Let's see what it is.

04 23 15 22 LMP *** It's just the second one on the fan.

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04 23 15 26 CDR ***

04 23 15 27 LMP ***

04 23 15 28 CDR ***

04 23 15 30 LMP *** WATER SEP.

04 23 15 31 CDR It should go out - out directly.

04 23 15 37 CC Guys, it looks okay. It's the WATER SEP light.

04 23 15 41 LMP Yes. Read those next steps there, Dave, I *** the time.

04 23 15 45 CDR Yes. Okay. Connect the OPS O₂ hose to PGA, blue to blue.

04 23 15 52 LMP Okay. Let me find that. I might have to turn around and let you do that.

04 23 15 57 CDR Yes. I - I can get it. Here.

04 23 16 01 LMP In fact -

04 23 16 02 CDR Hey, why don't you turn around, Jim?

04 23 16 03 LMP Yes. ... time.

04 23 16 08 CDR That's pretty good cooling, isn't it?

04 23 16 09 LMP Beautiful.

04 23 16 15 CDR You had enough.

04 23 16 16 LMP (Laughter)

04 23 16 18 CDR Think I'll turn this stuff up.

04 23 16 20 LMP Yes, we'll need it. We ought to cool down as much as we can.

04 23 16 22 CDR Yes.

04 23 16 26 CDR *** Am I hooked?

04 23 16 29 LMP Yes, here, let me get it. You're hooked on the handle for the PLSS. Can you get down a little bit?

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04 23 16 36 CDR Okay.

04 23 16 37 LMP See if we can put that *** ...

04 23 16 38 CDR *** ... in all the way.

04 23 16 39 LMP ... it out.

04 23 16 41 CDR Yes.

04 23 16 43 LMP *** you had hooked the PLSS harness on, hadn't you?

04 23 16 44 CDR Yes. Okay.

04 23 16 46 LMP (Laughter)

04 23 16 48 CDR Okay, go on through it here. I'll just hook you.
*** OPS O₂. 72.

04 23 16 55 LMP *** Those go to SUIT DISCONNECT.

04 23 16 56 CDR I'll get it. Okay, you're SUIT DISCONNECT. Okay,
it's locked and lock, locked.

04 23 17 20 LMP Okay, let me take the O₂ hoses off. Okay, secure
about the PGA.

04 23 17 29 LMP *** stick it there.

04 23 17 31 CDR Okay.

04 23 17 32 LMP Okay; connect OPS. We already did that. Retrieve
the purge valve.

04 23 17 37 CDR Okay.

04 23 17 40 LMP Okay *** okay, it's closed, and it's in the LO
position.

04 23 17 50 CDR *** pin in. Okay. Purge valve in PGA, red to red.

04 23 17 57 LMP Mine's up about right.

04 23 18 01 CDR Yes. Looks okay.

[REDACTED]

04 23 18 10 CDR Okay. Purge valve's in, lock, locked.

04 23 18 19 LMP Okay; PGA diverter valve's on vertical. Okay, you repeat the OPS CONNECT.

04 23 18 27 CDR Okay.

04 23 18 28 LMP Okay. You go to - SUIT ISOLATION, go to SUIT DISCONNECT.

04 23 18 31 CDR Okay. SUIT ISOL, DISCONNECT.

04 23 18 34 LMP I'll disconnect your O₂ hoses. Okay, and we'll secure those about the PGA, here.

04 23 18 51 LMP Okay, and I'll connect the OPS O₂ hose. Okay. *** ... LO.

04 23 19 01 CDR Yes.

04 23 19 07 LMP *** Connected and locked. Okay, retrieve the purge valve. Verify closed, lock pin, and LO.

04 23 19 23 CDR Okay, it's LO. Lock pin in, and it's closed.

04 23 19 31 LMP Okay, it's in.

04 23 19 32 CDR Okay, ...

04 23 19 33 LMP It's locked.

04 23 19 49 CDR Okay.

04 23 19 54 LMP Okay, PGA diverter valve, vertical.

04 23 19 59 CDR Vertical.

04 23 20 00 LMP Okay, take a drink.

04 23 20 01 CDR Take a drink. And I think I've had enough of the LCG, huh?

04 23 20 07 LMP *** ... let's -

04 23 20 08 CDR *** Yes. Let me get it. ***

04 23 20 10 LMP That thing's caught on a nut.

[REDACTED]

04 23 20 11 CDR Yes, don't know why they have that little hook.
Oh, it's a safety wire.

04 23 20 27 CDR There you go.

04 23 21 02 LMP I'll get it. Okay; it's stowed.

04 23 21 19 LMP Okay. DESCENT WATER going CLOSED. Okay. Ready
for helmet and glove donning.

04 23 21 33 CDR Okay.

04 23 21 34 LMP Position mikes.

04 23 21 36 CDR Yes, I think we've got them today.

04 23 21 38 LMP Dave, PLSS fan, on.

04 23 21 45 CDR *** yes, yes. PLSS fan to on. PLSS fan, on;
vent flag, clear.

04 23 21 49 LMP Clear.

04 23 21 50 CDR Okay, mine's clear - -

04 23 21 51 LMP Don helmets with LEVAs. Check drink bag position.

04 23 21 59 CDR Okay. How's that look? ... ought to get to it.

04 23 22 04 CDR Okay. Get the drink valve here.

04 23 22 17 CDR And lunch.

04 23 22 28 LMP *** ... line it up.

04 23 22 30 CDR You line it up.

04 23 22 35 LMP *** you to line ... right there.

04 23 22 37 CDR Okay.

04 23 22 44 CDR Yes. It's a sound *** click *** and lock. ***

04 23 23 02 CDR *** Get your flaps back here.

04 23 23 -- CDR I've got a high frequency tone on the comm; do you?

04 23 23 18 LMP I have a - I guess I - I do. Way - way in the
background.

Day 5

3-9

[REDACTED]

04 23 23 25 CDR Yes.

04 23 23 26 LMP Yes, pretty low.

04 23 23 28 CDR Okay, you're all buttoned up. Let's get your - -

04 23 23 37 LMP Straps.

04 23 23 38 CDR - - straps here. Okay, 1; there's 2. Okay, they're secured.

04 23 23 47 LMP Here, get yours. I'll line it up for you.

04 23 24 07 LMP Hold it, Dave. Let me get your - Keep - keep coming down; I'll push this in.

04 23 24 11 CDR Okay.

04 23 24 12 LMP Okay, you're clear of the suit. Okay, it's lined up, if you can *** down all the way.

04 23 24 20 LMP *** it's locked.

04 23 24 21 CDR Okay.

04 23 24 23 LMP LEVA's not locked though. You'll have to rotate your helmet after I get the LEVA locked.

04 23 24 42 CDR Okay.

04 23 24 44 LMP *** lined up?

04 23 24 45 CDR Yes. It's okay.

04 23 24 51 LMP *** ... first.

04 23 24 52 CDR *** Okay.

04 23 24 54 LMP *** Okay, I'm going to get your straps for the tool harness.

04 23 25 16 CDR Yes.

04 23 25 17 LMP *** big one *** and the left one.

04 23 25 23 CDR Okay.

04 23 25 24 LMP LCG cold as required.

[REDACTED]

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04 23 25 27 CDR It sure is.

04 23 25 36 LMP Okay, I'll go around and - -

04 23 25 37 CDR Okay.

04 23 25 38 LMP ... *** Okay, LCG pump coming open.

04 23 25 42 CDR Okay. *** ...

04 23 25 52 CDR Okay. ***B(16) ECS: LCG PUMP is open, and disconnect the LM water hose, and connect PLSS water hose.

04 23 26 05 LMP Okay, in work.

04 23 26 20 LMP Okay, mine's connected, Dave.

04 23 26 24 CDR Okay, mine's connected. Okay. *** stow LM hoses.

04 23 26 29 LMP *** in work.

04 23 26 33 CDR Okay, I'll put mine up here on the handhook, away right there by the ISS. That works good.

04 23 26 45 LMP *** mine are stowed.

04 23 27 10 CDR Okay, mine are stowed. *** verify the following.

04 23 27 19 LMP *** turn around.

04 23 27 21 CDR *** Where we getting any flow from, I wonder?

04 23 27 24 LMP Aft.

04 23 27 33 CDR Oh, yes. Just straight through the cabin.

04 23 27 35 LMP That's right.

04 23 27 37 CDR Okay. Ver - Helmet and visor alined and adjusted.

04 23 27 41 LMP *** Verify.

04 23 27 42 CDR Okay, O₂ connectors, three of them locked.

04 23 27 46 LMP Yes, and I'll put bootees on.

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04 23 27 49 CDR Yes.

04 23 27 50 LMP *** Okay, they're all three locked.

04 23 27 57 CDR Okay. Purge valves, one, locked.

04 23 28 01 LMP *** locked.

04 23 28 02 CDR H₂O connector, locked.

04 23 28 03 LMP Okay, it's locked.

04 23 28 05 CDR Comm connector, locked.

04 23 28 06 LMP Locked.

04 23 28 07 CDR PGA diverter valve to vertical.

04 23 28 08 LMP Vertical.

04 23 28 10 CDR Okay; you read to me.

04 23 28 11 LMP Okay, helmet and visor alined and adjusted.

04 23 28 14 CDR Okay, it's verified.

04 23 28 15 CMP O₂ connectors, three, locked.

04 23 28 18 CDR Okay. One, two, *** down, three, and the bootee's down.

04 23 28 26 LMP Okay, purge valves, one, locked.

04 23 28 30 CDR *** purge valve is on and locked.

04 23 28 32 LMP Okay, water connectors, one, locked.

04 23 28 33 CDR Locked.

04 23 28 34 LMP Comm connectors - -

04 23 28 37 CDR On and locked.

04 23 28 38 LMP PGA diverter valve, vertical.

04 23 28 39 CDR Diverter valve is vertical.

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04 23 28 41 LMP Okay, verify EVAs circuit breaker configuration.

04 23 29 03 CDR Okay, *** mine are verified.

04 23 29 08 LMP Stand by. I'll check mine.

04 23 29 16 CDR Yes.

04 23 29 17 LMP Okay, mine are verified.

04 23 29 19 CDR Okay. Don EV gloves.

04 23 29 22 LMP Okay; in work.

04 23 29 50 CDR *** your's on yet?

04 23 29 51 LMP Yes, yes. I was waiting for you.

04 23 29 53 CDR Okay, just a second.

04 23 29 -- CDR *** ... for just a sec.

04 23 31 31 CDR *** have to turn around and give me a hand here.

04 23 31 35 LMP Okay.

04 23 31 50 CDR Hold the glove.

04 23 31 51 LMP *** you're not in engage position.

04 23 31 52 CDR Yes, I know, but - -

04 23 31 53 LMP Okay.

04 23 31 54 CDR - - I can't even get -

04 23 31 57 LMP Let me do it.

04 23 32 06 CDR Okay.

04 23 32 11 LMP Okay; push. Okay?

04 23 32 17 CDR Okay. Good. Okay, you verify mine, I'll verify yours. You're locked and locked.

04 23 32 26 LMP *** locked.

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04 23 32 42 LMP Okay.

04 23 32 45 CDR *** roll up our cuffs and go to work. Yes (laughter).

04 23 32 47 CDR Okay, *** PGA biting, PLSS O₂, ON/OFF. No, it's not. PLSS diverter valve *** to MIN; verify.

04 23 33 06 LMP Verified.

04 23 33 08 CDR Okay. That's - mine's verified. PLSS pump to on, right.

04 23 33 12 LMP Okay, my pump's going on now.

04 23 33 14 CDR Mine's on. PRESS REG A and B to EGRESS.

04 23 33 18 LMP A and B to EGRESS.

04 23 33 21 CDR Okay. Now we run through the pressure integrity check. Okay, PLSS O₂ to on.

04 23 33 37 LMP *** O₂ is on. Okay. Pressure's coming up.

04 23 33 48 CDR Okay. My O₂ is on.

04 23 33 52 CDR My pressure's coming up. Okay. I got a PRESS flag.

04 23 34 31 LMP My pressure's off the *** peg; *** gage.

04 23 34 34 CDR Okay.

04 23 34 36 CDR And, mine's off the peg.

04 23 34 55 CDR *** pressure flag's clear at about 3.2.

04 23 35 16 CDR Okay, I'm stabilized at about 3.8. And the O₂ flag is clear.

04 23 35 22 LMP *** Same here.

04 23 35 24 CDR Okay. Now we got to do that tricky little maneuver with the PLSS O₂.

04 23 35 29 LMP *** off.

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04 23 35 30 CDR *** Okay; coming off, now.

04 23 35 32 LMP Okay; mine's off.

04 23 35 33 CDR Okay; mine's off.

04 23 35 35 CDR MARK a minute, Houston.

04 23 35 39 CC Roger.

04 23 36 08 CDR *** you can really tell the pump's running, can't you?

04 23 36 10 LMP Uh-huh. Just like an airplane: wa-whan. Just like its take-off.

04 23 36 15 LMP Yes.

04 23 36 32 LMP This should be about a minute, Dave, right there. And I'm reading 3.7.

04 23 36 35 CDR Yes.

04 23 36 36 LMP They'll give us a mark.

04 23 36 39 CC That's good.

04 23 36 42 CDR Okay. That's a minute, and I'm reading 3.7. Okay. PLSS O₂, ON.

04 23 36 47 LMP O₂ coming on.

04 23 36 48 CDR Okay. Verify the - Okay, I got a tone. And verify the O₂ flag is clear.

04 23 36 57 CDR Okay, Houston. I guess here at Hadley Base, we're standing by for a GO for the DEPRESS.

04 23 37 06 CC Roger, Falcon. You're GO for DEPRESS. Let's take a look at Hadley.

04 23 37 12 CDR Good show. Okay, Jim. You ready with the circuit breakers?

04 23 37 15 LMP Yes.

04 23 37 16 CDR CB(16) ECS: CABIN REPRESS, oper.

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[REDACTED]

04 23 37 18 LMP CABIN REPRESS, open.

04 23 37 22 CDR CB(16), COMM: TV, close.

04 23 37 24 LMP COMM: TV, closed.

04 23 37 27 CDR Okay, CABIN REPRESS VALVE to CLOSE.

04 23 37 29 LMP CABIN REPRESS, CLOSED.

04 23 37 33 CDR Okay. And you can come around to the dump valve.

04 23 37 35 LMP Okay.

04 23 37 42 CDR *** Okay, I got a tone.

04 23 37 43 LMP So - So - -

04 23 37 44 CDR Do you have a tone?

04 23 37 45 LMP So do I.

04 23 37 46 CDR Yes. Gone.

04 23 37 48 LMP *** gone.

04 23 37 50 CDR Can you get out all right?

04 23 37 51 LMP Yes.

04 23 37 52 CDR See if I can get out of your way a little bit.

04 23 37 53 LMP Oh, is that what's blocking me?

04 23 37 54 CDR Yes. Move back in the corner.

04 23 37 55 LMP Okay.

04 23 37 56 CDR Okay; let me get turned around here a little bit.
Okay, now, I'm a little bit farther out of the
way for you.

04 23 38 11 LMP Okay, I'm ready to go down.

04 23 38 13 CDR Okay.

04 23 38 16 LMP I'm at the dump valve.

[REDACTED]

04 23 38 17 CDR Okay, let me get a hold of the cabin pressure here.

04 23 38 19 CDR Okay, OPEN and then AUTO at 3 and a half. Okay.

04 23 38 22 LMP ...

04 23 38 23 CDR Okay, we're down to open; 4 and a half, 4 -

04 23 38 31 CDR MARK, 3.5.

04 23 38 32 LMP Back to AUTO.

04 23 38 36 CDR Okay. Verify cuff gage has not dropped below 4.6. I'm looking at 5.1.

04 23 38 42 LMP Okay. Same here. Roger.

04 23 38 44 CDR Okay, verify cabin at 3.5, and it is at 3.5. LM suit circuit lockup at 4.3, and it's at about 4.5. A PGA greater than 4.6 and decaying, and that's a verify on mine. And something about the clock here. And - got it. Okay overhead or forward dump valve to OPEN.

04 23 39 10 LMP Okay. I'm going OPEN.

04 23 39 11 CDR Okay, verify tone on, water flag A, at about 1.2 to 1.7. Okay; we're down to 2.5, 2.0.

04 23 39 26 CDR Gee, I can see condensation in here.

04 23 39 30 LMP Oh, you can?

04 23 39 31 CDR Yes. Little - little fog.

04 23 39 33 LMP Ha.

04 23 39 34 CDR Okay; 1.5.

04 23 39 35 LMP Okay, I've got a water tone.

04 23 39 38 CDR Okay. And I have a water and a tone. Okay; down to 1.0.

04 23 39 52 CDR Okay, when it gets all the way down, I'll partially open the forward hatch, so you can come back up.

[REDACTED]

04 23 39 56 LMP Okay. I'll just leave the dump valve in OPEN.
Okay.

04 23 40 01 CDR Now, if you can slip back over to the right a tad
there.

04 23 40 03 LMP Yes.

04 23 40 15 LMP Jettison bag sure fills up in - -

04 23 40 19 CDR *** ... right there, old buddy.

04 23 40 20 LMP I got to swing around so I can get your antenna
too. *** you can move over to the left. I want
to swing around to the left.

04 23 40 29 CDR Okay, let me get the jettison bag out of the way
here.

04 23 40 32 LMP Okay.

04 23 40 33 CDR The world's biggest jettison bag.

04 23 40 43 LMP Okay.

04 23 40 44 CDR Okay, hold on. Let me get the cabin down so I
can open it partial here.

04 23 41 08 LMP *** down there, okay?

04 23 41 09 CDR Yes. Okay; it's open. *** it's going to sure
close.

04 23 41 17 CC Roger, Dave. And we've got that mark.

04 23 41 18 LMP Gee, we're blowing mo - moisture - -

04 23 41 22 LMP We're blowing ice crystals out the front hatch.
It's really beautiful. You should see the tra-
jectory on them (laughter).

04 23 41 27 CDR I can't keep it open because of the pre- - the
pressure. Could you hold it open, Jim?

04 23 41 34 CC I bet they're flat, aren't they, Jim? The
trajectories.

[REDACTED]

04 23 41 36 CDR Hold it open there.

04 23 41 38 LMP Very flat, Joe.

04 23 41 45 CDR Oh, me! Hold it - low -

04 23 41 46 LMP Yes.

04 23 41 47 CDR Go on back over to where you were.

04 23 41 48 LMP ... that closed. What's that on our - getting caught on our feet? Is that that Velcro? Strap?

04 23 41 59 LMP *** get back in my corner here.

04 23 42 01 CDR Yes, you really have to.

04 23 42 02 LMP More room. Let me turn around to the right.

04 23 42 17 CDR Can't keep it open. There. Okay.

04 23 42 43 LMP Listen, maybe I can *** Can you hold it open?

04 23 42 46 CDR I got it open. But - *** wish I had a mirror.

04 23 43 02 CDR Feel like I'm caught on something.

04 23 43 04 LMP I think it's the Velcro straps on the floor.

04 23 43 06 CDR Ouch, my back.

04 23 43 10 LMP Okay, I can't tell.

04 23 43 16 CDR Okay, PLSS primary water, open. *** ... do that?

04 23 43 25 LMP Yes. *** get around to it.

04 23 43 31 CDR Yes, I'm - I'm going to have to move the - look around and - -

04 23 43 35 LMP Let me turn around here. ... see what it might be -

04 23 43 49 LMP Feel like I'm caught.

04 23 44 05 LMP I'm hung up on something.

[REDACTED]

04 23 44 06 CDR Yes.

04 23 44 07 LMP You see what I'm hung up on?

04 23 44 08 CDR No.

04 23 44 09 IMP Okay, I'm swinging around now. Let me check you.

04 23 44 19 CDR See anything hung?

04 23 44 20 LMP One of the things - is your hoses. Here.

04 23 44 23 CDR The hoses?

04 23 44 25 LMP Okay. Oh, I think - the strap, I think the hoses were - *** Let me adjust that strap.

04 23 44 34 CDR Okay.

04 23 44 35 LMP Your right side. *** up on the ho - hoses. Stand by.

04 23 44 43 CDR Okay.

04 23 44 44 LMP Did you get your water on?

04 23 44 46 CDR No, I never got it. Let me get it. *** I got it on.

04 23 44 59 LMP *** try and get around and get mine.

04 23 45 04 CDR Only thing we never did was to tie this jettison bag up.

04 23 45 25 CDR Doing all right?

04 23 45 38 CDR Don't work too hard.

04 23 45 39 LMP Yes, I think I'm fine.

04 23 46 01 CDR Is it on?

04 23 46 03 LMP Yes. It's on. The only question is whether it's on - completely all the way. I think it is. *** know as soon as the cooling comes in.

04 23 46 28 CDR If I could get this jettison bag out of the way.

[REDACTED]

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04 23 46 39 CDR If I pass this over, *** put this on the engine cover?

04 23 46 46 LMP *** Well, I -

04 23 46 52 CDR Get it?

04 23 46 55 LMP *** just a little farther to the right. Okay. Okay, there. Let me just - -

04 23 46 56 CC 15, this is Houston. Your water looks good to us.

04 23 47 00 LMP Oh, good. Thanks, Joe.

04 23 47 02 LMP I'll hold it here, Dave, until you move down.

04 23 47 04 CDR Okay.

04 23 47 07 LMP Before you get out, let me get that - your antenna.

04 23 47 08 CDR Yes. You can get that as I get through the door.

04 23 47 10 LMP Yes.

04 23 47 22 CDR I can start *** ... here.

04 23 47 39 CDR *** how we missed that. *** ... on the midstep.

04 23 47 52 LMP *** my water flag's clear. *** cooling. *** MIN cooling. You might want to go to INTERMEDIATE.

04 23 47 58 CDR Yes.

04 23 48 27 LMP Did you go to INTERMEDIATE?

04 23 48 28 CDR Yes.

04 23 48 29 LMP ..., did it?

04 23 48 31 CDR *** clear yet.

04 23 48 35 CC *** you should be clear in a minute.

04 23 48 36 CDR Yes, it just went. I just looked at it. Must take the right pair of eyes.

04 23 49 09 CDR See what's next on the agenda here.

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[REDACTED]

04 23 49 14 LMP SEP light's on.

04 23 49 19 CDR Lower EV visor. Okay.

04 23 49 21 LMP Yes.

04 23 49 22 CDR Okay. I'm beginning to get a little bit now.

04 23 49 26 LMP Get your visor?

04 23 49 27 CDR I'll get it. *** I do it down in the door, so I don't scratch it - -

04 23 49 35 LMP Okay.

04 23 49 36 CDR *** Around in here.

04 23 49 38 CDR Hey, Houston. By the way, you got TV picture down there?

04 23 49 45 CC Not yet, Dave. We're working on it.

04 23 49 52 CDR *** again.

04 23 50 16 CC Dave, this is Houston. Is the MESA deployed?

04 23 50 20 LMP (Laughter) That might have something to do with it, huh, Joe?

04 23 50 24 CDR Not yet. Okay. I'm ready.

04 23 50 29 LMP Okay.

04 23 50 35 CDR Okay. Move back a tad.

04 23 50 37 LMP Yes. *** There you go.

04 23 50 51 CC Dave, this is Houston. Jim's feedwater pressure's a little high. We wonder if you can - are in a position to - to see water coming from his sublimator? Over.

04 23 51 04 CDR Ha! I'm sure not, Joe. Not real - -

04 23 51 06 LMP Look, let's check it out when we get out, Joe.

04 23 51 12 CC Roger.

[REDACTED]

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04 23 51 20 LMP Okay, down a little further, Dave. The back of the PLSS is just hitting the DSKY desk.

04 23 51 26 CDR Yes, I - I was caught on the jettison bag. How's that?

04 23 51 32 LMP You're clearing the - it now.

04 23 51 35 LMP Over a little to your - little to your left. Down a little more - a little to your left.

04 23 51 41 CDR Okay, how's that?

04 23 51 45 LMP Good. Okay, let me get the antenna. Hold right there.

04 23 51 59 LMP Okay. Your antenna's deployed.

04 23 52 01 CDR Okay. Ease down here. Okay.

04 23 52 20 CDR Hey, let's try the MESA. Down it comes. MESA's down.

04 23 52 34 LMP Okay, Dave, I'm going to put the JETT bag in the hatch.

04 23 52 37 CDR Okay.

04 23 52 45 CC Okay, Dave; and superb television picture down here.

04 23 52 47 CDR Oh, that's encouraging.

04 23 52 53 LMP Here's the JETT bag, Dave?

04 23 52 55 CDR I've got it.

04 23 52 58 LMP And I'll pass you the LEC.

04 23 53 00 CDR Okay. Let's see I certainly don't want to hit that neat little round rock down there.

04 23 53 15 CDR Well, the JETT bag got pretty dirty.

04 23 53 38 CC *** Houston, requesting INTERMEDIATE cooling.

04 23 53 45 LMP Stand by, Joe.

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04 23 54 01 CDR That okay, Jim?

04 23 54 07 LMP This should be your portion.

04 23 54 10 CDR Say again? Yes. Okay.

04 23 54 25 CDR Let's see here. *** up with string.

04 23 54 39 LMP Tied it too tight.

04 23 54 40 CDR Oh, yes. Okay.

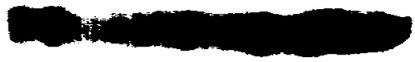
04 23 54 52 CDR Throw it down on the Rover side. Okay, it's down.
Okay. Ease on down the ladder here.

04 23 55 41 CDR Okay - -

04 23 55 42 CC Dave, an extraordinary television picture here.

04 23 55 48 CDR Okay, Houston. As I stand out here in the wonders
of the unknown at Hadley, I sort of realize there's
a fundamental truth to our nature: Man must
explore.

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EVA-2 FINAL PREPARATION

05 21 32 06 LMP *** ON.

05 21 32 07 CDR VHF antenna, EVA.

05 21 32 09 LMP Okay.

05 21 32 10 CDR UPLINK SQUELCH, ENABLE.

05 21 32 12 LMP SQUELCH, ENABLE.

05 21 32 13 CDR Okay; my comm panel, over here. S-BAND, T/R to T/R; ICS to T/R; RELAY is OFF; MODE to VOX; VOX SENS*** to max; VHF A, T/R, and B, RECEIVE. ***ay; CB(16) COMM: SE AUDIO, open; and you connect to the PLSS comm.

05 21 33 04 CDR ***PLSS PTT, MAINTAIN, right; verify. And MODE A; wheel, counterclockwise. ***ay. Tone, on; vent flag, P; press flag, O; O₂, MOMENTARY; PLSS O₂ pressure gage greater than 85. What have you got?

05 21 33 27 CDR Okay, a comm check with me and Houston.

05 21 33 44 CDR *** about your ***

05 21 33 54 CDR PLSS MODE A?

05 21 34 10 CDR I'll cycle it back. And your SE AUDIO, closed?

05 21 34 21 CDR You're not triggering. Are you reading me okay? *** your VOX isn't coming through at all.

05 21 34 36 CDR How about PTT? ***

05 21 34 46 CDR Okay, let's go back to VHF A TRANSMITTER to VOICE. A RECEIVER, ON; B TRANSMITTER to OFF; B RECEIVER, ON. Okay, give me a call now.

05 21 35 06 CDR No? Okay, Houston. Don't seem to have any side tone or any transmission out of the LMP's PLSS on A.

05 21 35 26 CC Roger, Dave. We copy - copy your comment loud and clear. We're receiving you clearly. We

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agree, we don't have anything from Jim yet, and we're looking at it now.

05 21 36 35 CDR Okay, Hous - -

05 21 36 36 CC Dave and Jim, this is Houston. We'd like for you first to verify the RCU connector to the PLSS.

05 21 36 44 CDR Okay, we'll verify that. Stand by. It's *** but we'll *** it again.

05 21 36 53 CDR (Laughter) Joe, he's - Jim's reading you okay. So it must be connected.

05 21 37 15 CC Dave and Jim, could you go back to the audio portion of your cue card there, audio LMP, and check those few steps for us, please?

05 21 37 23 CDR All right. Okay. S-BAND to T/R; ICS, T/R; RELAY, ON; MODE to VOX; VOX SENSITIVITY, max; VHF A to T/R; B to RECEIVE. Okay, and we've verified the A and B TRANSMITTER and RECEIVER; TELEMETRY, BIOMED, OFF.

05 21 38 01 CDR Okay; no luck, Houston. Maybe - might go into the circuit breaker? Why don't you cycle your circuit breaker?

05 21 38 16 CC Dave, I guess we'll go *** verify the powerdown circuit breaker configuration, please.

05 21 38 27 CDR Okay; Jim says you're coming in very weak, Joe. We'll verify the powerdown circuit breakers.

05 21 38 46 CDR Okay. Mine's verified. Jim, how's yours? Okay. Both verified. Houston, both of those are verified.

05 21 39 04 CC Thank you, Dave. We're thinking.

05 21 39 16 CC Dave and Jim, could you check the suit connector, please?

05 21 39 19 CDR (Laughter) Okay. Jim's reading you so the suit connector must be connected. *** only one way, Joe; he can't transmit, but he can receive.

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Day 6

4-3

[REDACTED]

05 21 39 31 CC Roger - Roger, Dave. Roger. We - we agree with that; but we assume also that he's receiving us very weakly. Is that correct?

05 21 39 40 CDR That's correct. Okay; why don't *** cycle that, Jim? Roger.

05 21 39 53 CC Falcon. Requesting that you unstow Jim's PLSS antenna, please.

05 21 39 58 CDR Okay. Here ***

05 21 40 00 LMP *** ...

05 21 40 10 CDR Okay, Joe. That was the problem. I - I'm (laughter) - I'm afraid to tell you, but Jim's antenna is broken, and it was broken yesterday when we got in. When we first started out on the operation, there was a big nick out of the antenna, which we subsequently taped. And now, just below that nick, it's broken off. And I don't know how it got there, but when we first looked at the OPS - antenna had about half of it nicked out. And we did tape that yesterday.

05 21 40 55 CDR Okay. There we go. Now - now try it.

05 21 41 00 LMP I'm reading you loud and clear.

05 21 41 01 CDR Okay - -

05 21 41 02 CC Roger, Dave. We copy that.

05 21 41 04 CDR Okay; looks like we'll have to do a little tape job - -

05 21 41 06 CC Okay, Jim. We got your call then.

05 21 41 09 LMP Yes; okay.

05 21 41 10 CDR I guess you didn't - Joe, what I'm doing now is holding Jim's antenna together. I guess I'll have to think - -

05 21 41 20 CC Roger, Dave. And whe - when you hold it together, we can read him loud and clear, so that's the problem. I guess we need a tape job on that antenna.

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05 21 41 26 CDR Yes. I hope we can - hope I can get it taped for you.

05 21 41 31 LMP In other words, you want to tape it and leave it erect.

05 21 41 33 CDR Uh - -

05 21 41 34 LMP Mean leave it erect, you mean leave it up.

05 21 41 36 CDR Yes. Bring your volume down some. Keeps going - -

05 21 41 39 LMP Okay, uh - -

05 21 41 41 CDR Okay; let me *** tape out. See if I can't do ***

05 21 41 50 LMP *** a taping operation this morning.

05 21 41 56 CC Roger, Jim. And we're reading you 5 by, babe, when - when that thing's connected. Sounds like that's the problem.

05 21 42 02 LMP Yes, no doubt.

05 21 42 03 CDR Okay. Okay. Just stand there now. Yes, I know it, but I don't know how we're going to do that, because it's -

05 21 42 18 CC Jim, could you go to OFF on your MODE select switch while you're taping?

05 21 42 23 CDR Okay. He - he's off, Joe. I think - -

05 21 42 32 CC Okay, Dave. And we're standing by for progress as to how that goes.

05 21 42 36 CDR Okay, Joe. I think we're going to take the top inch off of the antenna and use it as a splice.

05 21 42 47 CC That's the old splint trick, you mean.

05 21 42 49 CDR Yes, we'll give that a try, because, unfortunately, the antenna's broken right off at the root.

05 21 43 05 LMP Yes.

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[REDACTED]

05 21 43 33 CDR Fine; right there.

05 21 44 03 CC Dave and Jim, we're scratching our heads on that down here; and, as you know, all we need really is a - is a small metal-to-metal connection between the broken piece and the root of the antenna coming out. Dave, you may want to tape the antenna over across the top of the PLSS if you think that'll be mechanically more secure than taping it straight up. We'll rely on you to decide on that one.

05 21 44 32 CDR Okay, Joe. Let's let Jim come back up on comm and lay the antenna across here, and let's see how it - how it works. Okay, come on back to - -

05 21 44 45 CC Okay; and - and - and, Dave, while you - -

05 21 44 49 CDR Wait - wait a minute.

05 21 44 50 CC - - have the tape out there, from the sound of things, maybe you'd better put some of it in your pocket for later.

05 21 44 54 CDR Okay, now - Stand by a minute, Joe. Okay, put a call, Jim.

05 21 45 00 CC Roger.

05 21 45 01 CDR Now you got to -

05 21 45 05 LMP *** Joe.

05 21 45 12 CDR Okay, Jim. Go ahead and turn it back off, here.

05 21 45 14 CC Okay, Jim. I got one word, there. Don't forget your MODE switch.

05 21 45 18 CDR Yes, we're - we're okay. Think of something here.

05 21 46 14 LMP *** dropped the tape.

05 21 47 19 CDR Okay, Joe. It looks like the - the best we're probably going to do here is to be able to tape it up so we have the contact, and then leave the PLSS antenna down rather than erecting it. I'm afraid if we erect it, why, there's - there's not

[REDACTED]

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much room to put tape in there, and it may fall off, and then we'd be out of business.

05 21 47 41 CC Roger, Dave. We agree with that. And, Dave and Jim, you should be advised that there's a very good reason to believe that when you get out on the surface near the LCRU, Jim, you'll be able to transmit as well as receive. Over - even without the antenna. Over.

05 21 47 59 CDR Okay, that sounds good.

05 21 49 47 CDR *** Jim. *** go through it again. Can you connect it and go to A?

05 21 49 57 LMP All right.

05 21 50 00 CDR Oh! Too loud.

05 21 50 01 LMP Yes.

05 21 50 02 CDR Okay. You're loud and clear.

05 21 50 04 LMP Houston, how do you read the LMP?

05 21 50 10 CC LMP, you're loud and clear.

05 21 50 11 LMP Okay, very good.

05 21 50 13 CDR Okay, you're still too loud; you got a squeal.

05 21 50 16 LMP I'll turn it down a little bit. How's that?

05 21 50 18 CDR That fixed it.

05 21 51 09 CDR Okay, I'm in B, I have a press flag and a - C; O₂, MOMENTARY. ***sure gage, and how do you read, Jim?

05 21 51 18 LMP I read you loud and clear.

05 21 51 19 CDR Okay, you give a check with Houston?

05 21 51 22 LMP Houston, how do you read? LMP?

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Day 6

4-7

[REDACTED]

05 21 51 27 CC Dave, we read - Dave and Jim, we read you both loud and clear.

05 21 51 31 LMP Okay; they read me loud and clear.

05 21 51 35 CDR Okay; PLSS mode for you to B and me to A.

05 21 51 37 CC Roger. And go on to the next step.

05 21 51 44 CDR Okay; how do you read, Jim?

05 21 51 45 LMP Loud and clear.

05 21 51 47 CDR Okay, you're loud and clear to me; and, Houston, how do you read the CDR?

05 21 51 54 CC Roger. You're both 5 by.

05 21 51 56 CDR Okay. Let's both go to AR.

05 21 52 00 LMP ***R.

05 21 52 01 CDR Okay, AR. You're loud and clear to me; how me to you?

05 21 52 03 LMP Same.

05 21 52 04 CDR Okay, Houston. How do you read the LMP and the CDR again? How's your TM?

05 21 52 15 CC Okay, Dave. We're loud and - loud and clear on both, and we're GO for the next step.

05 21 52 21 CDR Okay. My PLSS O₂ quantity is 90 percent. How about yours, Jim?

05 21 52 27 LMP Reading 92.

05 21 52 28 CDR Okay. CB(16) ECS: LCG PUMP, closed.

05 21 52 31 LMP Closed.

05 21 52 32 CDR Okay. LCG, clo - COLD, as required. CB(16) ECS: CABIN REPRESS, close; verify?

05 21 52 38 LMP Verified.

[REDACTED]

05 21 52 39 CDR SUIT FAN DELTA-P, open?

05 21 52 41 LMP Open.

05 21 52 42 CDR SUIT FAN 2, open?

05 21 52 43 LMP Open.

05 21 52 44 CDR Okay. Verify ECS caution and H₂O SEP component lights on about a minute. And there they come. Oh. Got a tone there; okay. SUIT GAS DIVERTER, PULL-EGRESS; verify?

05 21 52 59 LMP That's verified.

05 21 53 00 CDR CABIN GAS RETURN, EGRESS; verify?

05 21 53 03 LMP That's verified.

05 21 53 04 CDR SUIT CIRCUIT RELIEF, AUTO; verify?

05 21 53 06 LMP That's verified.

05 21 53 08 CDR Okay. OPS connect; LMP first. SUIT ISOLATION to SUIT DISCONNECT?

05 21 53 13 LMP SUIT ***

05 21 53 15 CDR Okay. Why don't you slip around here?

05 21 53 26 CDR *** your OPS. That water's cold, isn't it? Okay. OPS O₂ hose to PGA, blue to blue.

05 21 54 11 LMP *** turn off the LCG PUMP.

05 21 54 21 LMP (Laughter) Okay. That's closed and locked. What's the next step?

05 21 54 24 CDR ...

05 21 54 26 LMP ... plugged again. Put it in the same place. The PLSS stowage handle.

05 21 54 34 CDR Okay. Retrieve purge valve, verify closed and lock pin in and LOW. Install the purge valve in *** red to red.

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Day 6

4-9

[REDACTED]

05 21 54 44 LMP Okay.

05 21 55 05 CDR Okay; purge valve (yawn) - Okay; purge valve is in, and marked, and locked.

05 21 55 13 LMP Okay; the diverter valve's gone vertical. Okay; repeat on you.

05 21 55 16 CDR Okay. You're going to have to - Yes, SUIT DISCONNECT.

05 21 55 20 LMP DISCONNECT.

05 21 55 21 CDR Okay. My - my O₂ hose has sort of drifted up there.

05 21 55 23 LMP Okay. Okay. Okay, I'll disconnect your hoses.

05 21 55 42 LMP And we'll connect the *** O₂ hose. And locked.

05 21 55 55 CDR Okay.

05 21 55 56 LMP Okay. The purge valve. *** LOW. Okay, all locked, and the pin's in.

05 21 56 53 LMP Okay. It's *** locked.

05 21 57 00 CDR Okay. PGA diverter valve to vertical. Take a little drink.

05 21 57 16 CDR Did you turn the DESCENT WATER off?

05 21 57 22 LMP Oh, ... Hot stuff.

05 21 57 39 CC And, Dave, that DESCENT WATER was turned off on your PLSS recharge exercise.

05 21 57 44 LMP Roger. We - we figured that out. It's - it's working okay.

05 21 57 50 CDR And WATER, CLOSED.

05 21 57 51 CC Roger.

05 21 57 52 LMP Stow that hose properly.

05 21 57 53 CDR Yes, man. Put it in the holster and all.

[REDACTED]

05 21 57 55 LMF Okay.

05 21 57 56 CDR Cable stowed.

05 21 58 13 LMF Okay, stowed.

05 21 58 19 CDR Okay, helmet and glove donning.

05 21 58 33 CDR Okay, position mikes, both; PLSS FAN to ON, right; vent flag, clear. Okay, mine is coming on. Good tone; vent flag's clear.

05 21 58 54 CDR Okay, your vent flag's clear. Let's get your LEVA. Here's - yes.

05 21 59 07 LMP *** flaps ***

05 21 59 09 CDR Yes.

05 21 59 27 CDR Let me get your water. And your fruit stick.

05 21 59 43 LMP *** line it up.

05 21 59 44 CDR Yes, you line it up; I'll push it.

05 21 59 47 LMP Okay; it's lined up.

05 21 59 49 CDR Okay. Here. Let me get the - ***

05 22 00 22 LMP I've got it (laughter).

05 22 00 21 CDR There, closed and locked. Get your back flap.

05 22 00 49 CDR Okay, front flap. My turn.

05 22 01 06 LMP Okay; you watch my water spigot there.

05 22 01 08 CDR Yes.

05 22 01 13 LMP Okay. You have to push it some.

05 22 01 21 CDR Yes. Okay?

05 22 01 23 LMP That was easy.

05 22 01 24 CDR Yes. Get the back flap first?

05 22 01 25 LMP The LEVAs. No.

Day 6

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05 22 01 26 CDR Yes.

05 22 01 28 LMP You'll have to rotate the helmet, too. Shift it just a little bit. No, too much. Shift it back, just a little bit more, a little more to the right - little more - little more. That's - good. Back a little to the left. That's right on.

05 22 01 44 CDR Okay.

05 22 02 00 LMP Okay.

05 22 02 03 CDR Okay; secure the self-doffing straps. Once - and two.

05 22 02 28 LMP Left - and right.

05 22 02 35 CDR Okay. Okay. LCG is cold, yes. That's for sure. Okay. CB(16) ECS: LCG PUMP, open.

05 22 02 46 LMP Okay.

05 22 02 54 CDR Get back to your little corner.

05 22 02 56 LMP LCG PUMP coming open. It's open now.

05 22 03 00 CDR Okay. Disconnect IM water hoses and connect the PLSS water hoses.

05 22 03 06 LMP Okay. in work

[REDACTED]

05 22 05 14 CDR Okay. You got your - hoses stowed?

05 22 05 20 LMP Hoses are stowed.

05 22 05 21 CDR Okay. Do a 180 here, and we'll check all the connectors.

05 22 05 23 LMP Okay.

05 22 05 29 CDR Okay, read to me.

05 22 05 31 LMP Okay. Helmet and visor alined and adjusted?

05 22 05 34 CDR Roger.

05 22 05 35 LMP O₂ connectors, three, locked?

05 22 05 39 CDR Okay. Locked, locked, and locked.

05 22 05 45 LMP Purge valves, one, locked.

05 22 05 47 CDR Okay; let me put the bootees on here. Okay; purge valve is locked.

05 22 05 53 LMP Water connector, locked.

05 22 05 54 CDR Water connector's locked.

05 22 05 55 LMP Comm connector?

05 22 05 57 CDR Comm connector's locked.

05 22 05 58 LMP PGA diverter valve, vertical.

05 22 06 00 CDR Vertical. Okay. Helmet and visor, alined and adjusted?

05 22 06 04 LMP It is.

05 22 06 06 CDR Okay. O₂ connectors, three, locked?

05 22 06 21 LMP Okay; three are locked.

05 22 06 22 CDR Purge valves, one, locked?

05 22 06 25 LMP *** valve is locked.

Day 6

4-13

[REDACTED]

05 22 06 26 CDR Water connector, locked?

05 22 06 27 LMP Water connector is locked.

05 22 06 28 CDR Comm connector, locked?

05 22 06 31 LMP Comm connector is locked.

05 22 06 33 CDR And diverter valve, vertical.

05 22 06 35 LMP Diverter valve is vertical.

05 22 06 36 CDR Okay. Let's take another look at the circuit breaker configuration.

05 22 06 40 LMP Okay.

05 22 06 42 CDR White dots out plus EVA decals.

05 22 07 04 LMP *** mine are configured.

05 22 07 06 CDR And mine are configured. Okay? Don E - EV gloves.

05 22 07 09 LMP In work.

05 22 07 53 CDR That old graphite makes the hands slide in pretty easy, doesn't it?

05 22 07 58 LMP (Laughter) It doesn't do too good on the PLSS connector, though, does it? It's a little bit -

05 22 08 22 CDR Okay, I got two on and locked. Come over and check mine when you get through.

05 22 08 31 LMP Still - working.

05 22 08 34 CDR Okay. Hey, call if you want a hand.

05 22 08 44 LMP Just a little stiff. Good enough?

05 22 08 53 CDR Okay; yes.

05 22 08 55 LMP They usually lock?

05 22 08 59 CDR Okay. Go check like he said, there. Okay, and a lock - and a lock. Okay?

[REDACTED]

05 22 09 19 LMP Okay. Cuff's up.

05 22 09 22 CDR Okay. PGA diverter to min; verify?

05 22 09 29 LMP That's verified.

05 22 09 31 CDR Okay, and PLSS PUMP, ON, to the right.

05 22 09 33 LMP PUMP going ON.

05 22 09 34 CDR Okay, mine's running.

05 22 09 36 LMP Mine is, too.

05 22 09 37 CDR Okay, PRESS REG A and B to EGRESS.

05 22 09 40 LMP A and B going to EGRESS.

05 22 09 43 CDR And we need a pressure integrity check. So next step is PLSS O₂ to on.

05 22 09 48 LMP O₂.

05 22 09 50 CDR I'll get it.

05 22 09 57 LMP My PLSS O₂ is on.

05 22 10 00 CDR And mine's on. Okay, and the press flag should clear at 3.1 to 3.4. *** coming up.

05 22 10 16 LMP Mine's clear.

05 22 10 21 CDR Jim, did you pressurize that quick?

05 22 10 24 LMP No, I'm sorry; no, I didn't clear the tone.

05 22 10 25 CDR There's your tone; yes, mine too.

05 22 10 57 CDR Okay, I'm off the tank.

05 22 10 59 LMP Yes, my flag's cleared.

05 22 11 13 CDR My flag's clear.

05 22 11 23 CDR Okay, I'm stable at about 3.3. How about you?

05 22 11 27 LMP Same here.

Day 6

4-15

[REDACTED]

05 22 11 29 CDR Okay, if I can get this old - O₂ valve. Let's turn them off and get a little check.

05 22 11 41 CC Okay, Falcon. We're marking a minute.

05 22 11 44 CDR Okay, mine's off.

05 22 11 49 LMP Mine's off.

05 22 11 50 CDR Okay.

05 22 12 04 CDR And, Houston, we'll take your call when the minute's up.

05 22 12 11 CC Roger.

05 22 12 47 CC Okay, Falcon -

05 22 12 49 CC MARK, 1 minute. Mickey's big hand went above his head.

05 22 12 50 LMP Okay, I'm reading 3.7. Okay, 3.7.

05 22 12 57 CDR Okay; O₂ back on.

05 22 12 59 CC Outstanding.

05 22 13 07 LMP Okay; O₂ is on.

05 22 13 08 CDR Okay. And verify the O₂ flag is clear. Mine is clear.

05 22 13 13 LMP Mine's clear.

05 22 13 14 CDR Okay, Houston. How do things look to you down there?

05 22 13 21 CC Okay, Falcon, you're GO for depress.

05 22 13 23 CDR Roger. GO for depress. Okay, Jim, CB(16) ECS: CABIN REPRESS, open.

05 22 13 29 LMP Okay. CABIN REPRESS is open.

05 22 13 31 CDR CABIN REPRESS VALVE to CLOSE.

[REDACTED]

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05 22 13 33 LMP CABIN REPRESS - CLOSED. CLOSED.

05 22 13 39 CDR Get it?

05 22 13 40 LMP Yes.

05 22 13 41 CDR Okay, over ... I've got a little tone. Okay, forward dump valve, OPEN and then AUTO, at - at 3.5. So - -

05 22 13 55 LMP Okay.

05 22 13 56 CDR Get my eyeball on the cabin pressure; I've got it. You can open it.

05 22 14 04 LMP Okay, I'm going OPEN.

05 22 14 06 CDR Okay.

05 22 14 07 LMP OPEN.

05 22 14 08 CDR 5.0; 4.5; 4.0 -

05 22 14 14 CDR MARK; 3.5.

05 22 14 15 LMP Okay, back to AUTO.

05 22 14 20 CDR Okay. Verify cabin at 3.5.

05 22 14 22 CC MARK; 3.5.

05 22 14 23 CDR Okay, cabin's at 3.5. Suit circuits locked up at about 4.4. My PGA is coming through 5 and decaying, and ... my watch.

05 22 14 36 LMP Okay.

05 22 14 37 CDR All righty. Forward dump valve to OPEN.

05 22 14 42 LMP Okay, going OPEN.

05 22 14 43 CDR Okay. Verify tone on and H₂O flag at about 1.2 to 1.7. Okay, 2.5; 2.0; easy does it; 1.5.

05 22 15 33 CDR 2.5. What's your cuff gage?

05 22 15 48 LMP I'm reading 5.1.

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4-17

[REDACTED]

05 22 15 50 CDR Yes, so am I.

05 22 16 05 CDR And we're about down to .2. Still reading about 5.1.

05 22 16 27 CDR Are you 5.1, also?

05 22 16 32 LMP Coming down to about 5.

05 22 16 34 CDR Yes.

05 22 16 35 LMP We'll breathe it down.

05 22 16 43 CDR Take awhile at this rate.

05 22 16 46 CC And, Falcon, the PLSSs look right on.

05 22 16 48 CDR Okay. Thank you.

05 22 17 02 CC Jim, your PLSS water recharge cured that problem we had yesterday completely, it looks like.

05 22 17 08 LMP Good.

05 22 17 11 CDR Yes, it was worth the effort then.

05 22 17 16 LMP These tones are a little disturbing.

05 22 17 26 CDR Okay. We'll partially open the forward hatch. Maybe I can get that if you'll slip over there - up tight about as far as you can go. Careful not to get hooked. *** Okay.

05 22 18 01 CDR Okay. Got a tone.

05 22 18 27 CDR Can you reach around and hold the hatch so it doesn't blow shut, Jim?

05 22 18 30 LMP I got it. No sweat.

05 22 18 32 CDR It's a lit - little easier today.

05 22 18 35 LMP Getting in practice.

05 22 18 36 CDR Yes. Okay. Forward hatch is partially open, and final prep for egress: PLSS primary water, open.

[REDACTED]

05 22 18 48 LMF Ohh!

05 22 18 53 CDR Let's see. Let me see if I can get around the hatch here and give you some more room.

05 22 18 58 LMF Well, maybe I can get my arm back there. I've got my arm back there. No sweat, Dave.

05 22 19 07 CDR Oh, good.

05 22 19 10 LMF Under control.

05 22 19 17 CDR Okay. Mine's open.

05 22 19 32 CDR Doing okay?

05 22 19 35 LMF That's enough. I think it's on. Yes, it's on.

05 22 19 42 CDR Okay. I'll tell you, my gloves feel a lot better today.

05 22 19 46 LMF (Laughter) Stretched them a little bit yesterday, Dave.

05 22 19 49 CDR Yes, I think you're right. Okay. Rest until cooling sufficient, after we get the water going. And verify the CWEA status; we might do that. ECS and PREAMPS. Okay. And I've got a tone and a clear WATER flag. Got that?

05 22 20 41 LMF Your WATER flag's clear, huh?

05 22 20 43 CDR Yes.

05 22 20 45 LMF Mine hasn't cleared yet.

05 22 21 30 CDR Okay. Let me get that tape up by your left elbow.

05 22 21 34 LMF Yes. Here; why don't you take both?

05 22 21 36 CDR Yes, I will; in case I drop one. Stick it right onto my cuff checklist.

05 22 22 05 LMF Okay; my water flag has finally cleared.

05 22 22 08 CDR Okay.

Day 6

4-19

[REDACTED]

05 22 22 19 CDR Okay, Houston. How's everything look to you down there?

05 22 22 34 CC *** by, Dave.

05 22 22 35 CDR Okay.

05 22 22 46 CC Okay, Dave. Be advised you're GO for EVA.

05 22 22 49 CDR Okay. Thank you. Hey, Jim, let me get the old hatch open here if you can -

05 22 22 54 LMP Okay. *** Turn the other way, Dave.

05 22 22 59 CDR Okay.

05 22 23 13 CDR Doing all right?

05 22 23 26 LMP Okay; I'm around.

05 22 23 29 CDR Okay.

05 22 23 30 LMP Get the hatch open a little farther today.

05 22 23 32 CDR Oh, yes; that's much better. Okay, I'm going to come around this way today. Little easier.

05 22 23 42 LMP Just made it.

05 22 23 44 CDR Okay.

05 22 23 54 CDR Okay.

05 22 23 59 LMP Whoa, Dave, hold.

05 22 24 00 CDR Okay.

05 22 24 01 LMP Okay; now you can get down. You were hung up on my RCU.

05 22 24 09 CDR Okay. How does that look to you? Okay?

05 22 24 11 LMP Yes, that looks like you're pretty well cleared there. Pretty well centered. Okay, get your antenna right now if you like.

[REDACTED]

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05 22 24 19 CDR No, let me get up. There.

05 22 24 25 LMP Hold right there?

05 22 24 29 CDR Yes. Why don't I hold here and you can get it.

05 22 24 31 LMP Okay; your antenna's up.

05 22 24 33 CDR Okay, you might check the - The water gun came out again.

05 22 24 36 LMP It sure did.

05 22 24 37 CDR Okay.

05 22 24 46 LMP *** hold there, I'll get the - -

05 22 24 47 CDR Yes.

05 22 24 48 LMP - - BSLSS bag and all our - gear.

05 22 24 50 CDR Yes, do that. Okay, Houston. I'm out on the first rung of the ladder, and we'll take care of the jettison procedures here.

05 22 25 06 CC Okay, Dave. According to our calculations here, you'll just about fill Hadley Rille with water.

05 22 25 15 CDR (Laughter) Yes, I'm sorry to say. Okay. That's - that a boy. ***

05 22 25 31 CDR One can's down.

05 22 25 49 CDR I'm sorry, Jim, just - just take the last one, that a b - cop.

05 22 25 53 LMP Oop! Can you do it?

05 22 25 55 CDR That's good. I got it. Okay. Canister going down. Okay, toss it right here. That a boy. Okay; other can is down. A JETT bag. I mean, the BSLSS bag.

05 22 26 14 LMP Yes.

05 22 26 26 CDR Okay.

05 22 26 27 LMP ... will pick her up.

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Day 6

4-21

[REDACTED]

05 22 26 28 CDR Oh, I've got it. Okay; it's down. And if you can hand me -

05 22 26 38 LMP Stand by.

05 22 27 07 CDR Easy does it; that's it. I - -

05 22 27 08 LMP Got her?

05 22 27 09 CDR Yes.

05 22 27 10 LMP Good.

05 22 27 17 CDR Okay, down the ladder to the plains of Hadley.

05 22 27 46 CDR It's really just like we left it yesterday.

05 22 27 49 LMP Good.

05 22 27 51 CC Jim, this is Houston with a request.

05 22 27 52 LMP Go ahead, Joe.

05 22 27 57 CC Roger, Jim. We're seeing some excursions in your DELTA-P, the glycol pump 1. We'd like for you to pull the AUTO TRANSFER circuit breaker on that glycol pump, and select PUMP number 2. Over.

05 22 28 12 LMP Okay; stand by. Okay, I'm pulling AUTO TRANSFER now and I'm selecting PUMP 2. Is that affirm?

05 22 28 24 CC That's affirm; thank you.

[REDACTED]



EVA-3 FINAL PREPARATION

06 18 51 01 CDR PLSS antenna, EVA.

06 18 51 07 LMP ***VA.

06 18 51 08 CDR UPLINK SQUELCH, ENABLE?

06 18 51 10 LMP ***ABLE.

06 18 51 11 CDR Okay. My comm panel: Okay; S-BAND, T/R; ICS to T/R; RELAY, OFF; MODE, VOX; VOX SENSITIVITY, max; VHF A, T/R and B, RECEIVE. Okay; CB(16) COMM: SE AUDIO, open; and collect [sic] - You connect to the ***

06 18 51 52 CDR *** closed; PLSS PTT, MAINTAIN, right; PLSS MODE to A; wheel, counterclockwise.

06 18 52 02 LMP Okay; I'm A.

06 18 52 03 CDR Okay; PLSS O₂ pressure gage greater than 85.

06 18 52 08 LMP Verified; reading 94.

06 18 52 10 CDR Okay; you're 5 square to me; check with Houston.

06 18 52 14 LMP Houston, how do you read the LMP?

06 18 52 20 CC LMP, you're loud and clear.

06 18 52 21 LMP You're the same.

06 18 52 23 CDR Okay; CB(11) COMM: CDR AUDI - AUDIO, open and connect to the ***

06 18 53 32 CDR Okay. CDR's to B; PLSS O₂ pressure gage is reading 91 percent, and - How do you read me, Jim?

06 18 53 42 LMP Oh, I read you loud and clear.

06 18 53 43 CDR Okay; you make a comm check with Houston? *** make a comm check with Houston?

06 18 53 52 LMP Houston, how do you read the LMP?

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06 18 53 53 CC And Houst - Houston reads - Jim, both you and Dave are loud and clear.

06 18 53 57 LMP Okay.

06 18 53 59 CDR Okay, PLSS MODE: LMP to B and CDR to A. Okay. Okay, I'm on A. How do you read?

06 18 54 07 LMP Loud and clear.

06 18 54 08 CDR Okay, Houston, how do you read the CDR on A?

06 18 54 14 CC CDR, you're 5 by.

06 18 54 15 CDR PLSS MODE, both, to AR. Tone on. Okay; how do you read me on AR?

06 18 54 24 LMP Read you loud and clear.

06 18 54 25 CDR Okay, Houston, how do you read the CDR on - on AR?

06 18 54 29 CC Dave, you're loud and clear.

06 18 54 30 CDR Okay, you're 5 by; and how's the TM? Okay, you make a check with Houston.

06 18 54 41 LMP Joe, how do you read the LMP?

06 18 54 46 CC Okay, Jim, you're 5 by and the TM's good.

06 18 54 50 LMP Okay.

06 18 54 51 CDR Okay. CB(16) ECS: LCG PUMP, closed, which it is; COLD, as required. CB(16) ECS: CABIN REPRESS, close; verify?

06 18 54 59 LMP Verified.

06 18 55 00 CDR SUIT FAN DELTA-F, open?

06 18 55 01 LMP Open.

06 18 55 02 CDR SUIT FAN 2, open?

06 18 55 03 LMP Open.

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Day 7

~~CONFIDENTIAL~~

5-3

06 18 55 04 CDR Okay, verify ECS caution, H₂O SEP COMPONENT lights; try in a minute. Okay; there they come. SUIT GAS DIVERTER, PULL/EGRESS; verify?

06 18 55 13 LMP Verified.

06 18 55 14 CDR CABIN GAS RETURN, EGRESS; verify?

06 18 55 17 LMP That's verified.

06 18 55 18 CDR SUIT CIRCUIT RELIEF, AUTO; verify?

06 18 55 21 LMP That's verified.

06 18 55 22 CDR OPS connect: SUIT ISOLATION to SUIT DISCONNECT. Disconnect the LM O₂ hoses and secure about the PGA. Okay. *** come back around here.

06 18 55 44 CDR Pretty good for - -

06 18 55 45 LMP Why don't I take care of you and you take care of me?

06 18 55 47 CDR Yes. I think you ought to.

06 18 55 49 LMP Okay, you want me to put you on SUIT DISCONNECT?

06 18 55 51 CDR Not yet. Why don't you come on around?

06 18 56 06 CDR Okay, you're on SUIT DISCONNECT? Yes.

06 18 56 23 LMP *** that about the PGA, Dave. *** put those under one of my belts?

06 18 56 28 CDR Yes. *** Turn ***

06 18 56 31 LMP Okay. *** There you go.

06 18 56 33 CDR Get it?

06 18 56 55 CDR Okay; OPS O₂ hose is closed and locked. The purge valve - Okay, it's closed, locked LOW and the pin's in.

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Day 7

06 18 57 13 CDR Closed and locked. Get your PGA diverter valve to vertical. Okay; now you can get me. No, wait a minute.

06 18 57 29 LMP Okay; we'll go to SUIT DISCONNECT on you.

06 18 57 32 CDR Yes.

06 18 57 34 LMP *** your straps. Okay, we'll connect to OPS.

06 18 58 21 LMP It's connected and it's locked. Okay, Dave?

06 18 58 23 CDR Purge valve, LOW.

06 18 58 41 LMP Okay; it's connected and locked. Okay, and your PGA diverter valve should be vertical.

06 18 58 48 CDR Right.

06 18 58 49 LMP Okay.

06 18 58 51 CDR Okay, last drink.

06 18 59 45 CDR Okay.

06 18 59 46 LMP Mount that back as far as we possibly can.

06 18 59 48 CDR There.

06 18 59 49 LMP Take the loop out of it.

06 19 00 05 CDR That's going to come out with ETB. Permanent ... here.

06 19 00 21 CDR Okay. DESCENT WATER VALVE, CLOSED.

06 19 00 24 LMP There's WATER going CLOSED now.

06 19 00 27 CDR Okay, position our mikes. And helmet and glove donning. PLSS FAN to CN - to the right. And flags should clear. Mine clears.

06 19 00 45 LMP It's clear.

06 19 00 47 CDR Don helmets and LEVAs; check the drink bag position. Okay; let me get yours here. *** alined?

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Day 7

5-5

[REDACTED]

06 19 00 55 LMP That's alined.

06 19 01 57 CDR There we go. Closed and locked.

06 19 02 10 LMP Okay; LEVAs.

06 19 02 22 CDR Front flap secure. Okay. You're locked.

06 19 02 51 LMP *** looks good, kid. Locked.

06 19 02 53 CDR How about that?

06 19 03 18 LMP Okay.

06 19 03 19 CDR Okay?

06 19 03 20 LMP Secure tool harness self-doff straps to LEVAs.

06 19 03 22 CDR Okay, let me get yours. Your right one - left one.
Okay. Both of them.

06 19 04 04 CDR Okay?

06 19 04 09 LMP Dave, that's pretty cold.

06 19 04 11 CDR Yes. Okay. See if you can get back in your
corner.

06 19 04 12 LMP Okay.

06 19 04 25 CDR Okay. CB(16) ECS: LCG PUMP, open.

06 19 04 27 LMP Open.

06 19 04 29 CDR Disconnect the LM water hose and connect the PLSS
water hose.

06 19 04 32 LMP Okay, in work.

06 19 05 04 LMP Mine's connected and locked.

06 19 05 06 CDR Okay, mine's connected and locked. Says, "Connect
PLSS" - Okay, stow LM hoses.

06 19 05 23 CDR I'll have to wait until you turn around here.

06 19 05 50 LMP Get them back as far as you can.

[REDACTED]

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Day 7

06 19 05 51 CDR Yes.

06 19 05 55 LMP Water gun still secure?

06 19 05 57 CDR Yes.

06 19 06 09 CDR Phew! Okay, there.

06 19 06 14 CDR Okay, verify the following. Turn around, and we'll check all that stuff.

06 19 06 28 LMP Okay. *** I'll read to you.

06 19 06 30 CDR Okay.

06 19 06 31 LMP Helmet and visor alined and adjusted?

06 19 06 34 CDR Okay, they're alined and adjusted and locked.

06 19 06 37 LMP O₂ connectors, three?

06 19 06 38 CDR Okay. Locked. And that one's locked and the bootee's on. That one's locked and the bootee's on.

06 19 06 51 LMP Okay. Purge valve?

06 19 06 52 CDR Purge valve's locked, closed.

06 19 06 57 LMP Water connector?

06 19 06 59 CDR Locked.

06 19 07 00 LMP Comm connector?

06 19 07 02 CDR Locked.

06 19 07 03 LMP And diverter valve, vertical.

06 19 07 04 CDR Vertical. Okay, helmet and visor, alined and adjusted?

06 19 07 10 LMP Okay, it is.

06 19 07 11 CDR O₂ connectors, three, locked?

06 19 07 30 LMP Locked. Let me get the bootee *** bootee's on all those connectors.

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Day 7

5-7

[REDACTED]

06 19 07 48 CDR Yes, you're right.

06 19 07 49 LMP Okay, and, Dave - -

06 19 07 50 CDR Purge - purge valve, locked?

06 19 07 55 LMP It's locked.

06 19 07 56 CDR Water connector, locked?

06 19 07 58 LMP Locked.

06 19 07 59 CDR Comm connector, locked?

06 19 08 03 LMP Comm connector is locked.

06 19 08 05 CDR PGA diverter valve, vertical.

06 19 08 14 LMP Stand by a minute, Dave.

06 19 08 15 CDR Okay.

06 19 08 27 LMP Okay, you're locked. And it's vertical.

06 19 08 30 CDR Okay, verify EV - C - CB configuration. And then, David, put on the gloves.

06 19 08 49 CDR Here's your other glove over here on your left, Jim.

06 19 08 50 LMP Okay. Thanks, Dave.

06 19 08 51 CDR Fell down.

06 19 09 00 LMP Okay, my circuit breakers are verified.

06 19 09 12 CDR Yes, and mine are verified. Glove donning time.

06 19 09 18 LMP Final test.

06 19 09 21 CDR Yes.

06 19 10 21 LMP Mine are locked.

06 19 10 24 CDR Stand by.

06 19 10 52 CDR And mine are locked.

[REDACTED]

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Day 7

06 19 10 54 CC Dave, this is Houston. How do those gloves feel today?

06 19 11 02 CDR (Laughter) Gee, I don't know how to answer that, Joe. Sure be nice when I get through with the drill and I can take off the overgloves.

06 19 11 15 CC Roger. Wondered if you're going to shoot a little pool today with Colorado Fats, there.

06 19 11 19 CDR Joe, today's the day for a little pool.

06 19 11 27 CC I was thinking the same thing.

06 19 11 29 CDR Okay, let's verify the locks and the gloves.

06 19 11 33 LMP Yes.

06 19 11 44 CDR Okay, I'll verify yours. Okay, your's are locked - and locked. Okay. Covers over. Okay.

06 19 12 15 CDR PLSS - Okay, PLSS diverter on MIN, verify. PLSS diverter on MIN, Jim?

06 19 12 24 LMP Verified.

06 18 12 28 CDR Okay, verified. PLSS pump, on, to the right?

06 19 12 31 LMP Pump coming on.

06 19 12 33 CDR Mine's running and -

06 19 12 35 LMP Same.

06 19 12 36 CDR PRESS REG A and B to EGRESS?

06 19 12 38 LMP A and B are EGRESS.

06 19 12 41 CDR Okay. The PLSS O₂, ON, we'll do a pressure integrity check here. Find that little valve down there.

06 19 12 52 LMP My O₂ is coming on.

06 19 12 58 CDR And my O₂ is on. And the PRESS flag should clear 3.1 to 3.4. Cuff gage could come - should come

CONFIDENTIAL

up 3.7 to 4.0. And I'm coming up. Okay, I'm off the peg.

06 19 14 14 LMP Okay, I'm reading 3.8.

06 19 14 18 CDR Okay. I'm coming. Here we go - 3.6, .7, .8.

06 19 14 32 CDR Okay, I'm stabilized. My O₂ flag is clear. If you can get a hold of that little valve again, let's turn them off and get an integrity check.

06 19 14 41 LMP Okay.

06 19 14 45 CDR Mine's off now.

06 19 14 46 CC And, Houston marks 1 minute, and you've got good pumps.

06 19 14 49 LMP And mine's off.

06 19 14 51 CDR Okay, thank you, Joe. Give us a call after your minute.

06 19 15 48 CC One minute -

06 19 15 49 CC MARK.

06 19 15 50 CDR Okay. I'm reading 3.75.

06 19 15 52 LMP I'm reading 3.7.

06 19 15 54 CDR *** that. Okay, O₂ back on.

06 19 15 59 LMP Coming back on.

06 19 16 03 CDR Okay, verify the O₂ flag is clear.

06 19 16 07 LMP Mine's clear.

06 19 16 08 CDR Okay, let me turn my card. Can you go forward, Jim?

06 19 16 12 LMP Yes.

06 19 16 21 CC And *** we're ready for depress. Two magnificent suits.

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06 19 16 25 CDR Good. Bad place to have to change that card.

06 19 16 41 CDR Okay. Got a GO for the depress. CB(16) ECS: CABIN REPRESS to open.

06 19 16 48 LMP Stand by.

06 19 16 58 LMP Open.

06 19 16 59 CDR Okay, CABIN REPRESS valve to CLOSE.

06 19 17 02 LMP CABIN REPRESS going CLOSED - now.

06 19 17 06 CDR Okay. And the over - the forward dump valve OPEN then AUTO at 3 and 1/2.

06 19 17 13 LMP Okay, stand by.

06 19 17 23 CDR Okay, I got my eyeball on the pressure gage; go ahead.

06 19 17 26 LMP Okay. Going open now.

06 19 17 30 CDR Okay. 4.5, 4.0 -

06 19 17 36 CDR MARK, 3.5.

06 19 17 37 LMP Okay. AUTO.

06 19 17 42 CDR Okay.

06 19 17 43 CC Houston marks it.

06 19 17 44 CDR Verify cuff gage doesn't drop below 4.6; I'm looking at 5.1.

06 19 17 48 LMP I'm looking at *** - -

06 19 17 49 CDR Okay.

06 19 17 53 LMP - - 5.5. Note.

06 19 17 55 CDR LM suit pressure locked up at 4.5. Okay. Something about the watch.

06 19 18 04 CDR And overhead - forward dump valve to OPEN.

06 19 18 07 LMP Okay, I'm going OPEN. It's OPEN.

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Day 7

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5-11

06 19 18 09 CDR Okay. Stand by for a tone and the water flag at 1.2 to 1.7. Cabin is down to about 2.2.

06 19 18 29 CDR Are you coming back around?

06 19 18 30 LMP No. Don't think I will, not right now.

06 19 18 32 CDR Yes. Why don't you wait until we get down a little bit? Cabin is still 1.0.

06 19 18 47 LMP *** have a water flag.

06 19 18 51 CDR Okay.

06 19 18 56 CDR5 on the cabin.

06 19 19 48 CDR Okay. If you can move forward, Jim, I can get back in here and -

06 19 19 52 LMP Okay.

06 19 19 54 CDR I'm working towards you.

06 19 20 00 LMP Okay, I'm in my corner.

06 19 20 01 CDR Good. I'll get in mine.

06 19 20 18 CDR Okay, see if I can -

06 19 20 20 LMP Make it?

06 19 20 21 CDR No. Not yet.

06 19 20 36 CDR Okay, I got to let the cabin go down some more.

06 19 21 23 CDR Okay, try it again here. There we go.

06 19 21 33 LMP There go our - space pellets.

06 19 21 38 CDR Okay. Forward hatch handle - dump valve to AUTO Can you get that one?

06 19 21 47 LMP I'll move back. Stand by.

06 19 21 58 CDR Don't close the door.

06 19 22 00 LMP Can you hold it there while I get around?

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06 19 22 02 CDR Yes. I got it now.

06 19 22 09 LMP Okay, it's back to AUTO.

06 19 22 10 CDR Okay. Okay.

06 19 22 25 CDR Oh, wait a minute. You got to leave it in OPEN.
The card's all arranged different here.

06 19 22 30 LMP ... thought.

06 19 22 32 CDR Yes. Sorry about that.

06 19 22 39 CC Houston confirms. Leave it OPEN.

06 19 22 40 LMP OPEN?

06 19 22 41 CDR Yes, Roger. Okay, now. PLSS PRIMARY WATER to
OPEN.

06 19 22 50 LMP That's in work.

06 19 22 51 CDR Okay.

06 19 23 13 LMP Okay, mine's OPEN.

06 19 23 16 CDR Mine's OPEN.

06 19 23 20 CDR The H₂O flag should clear in 2 to 4 minutes.

06 19 24 49 CDR Okay, my water flag's clear.

06 19 24 52 LMP Mine is too.

06 19 25 10 CDR Okay, verify PGA 3.7 to 4.6; and mine's at about
4.2.

06 19 25 16 LMP And mine's 4.1.

06 19 25 19 CDR Okay, caution lamps - PREAMPS and ECS.

06 19 25 28 CDR H₂O SEP COMPONENT light's on - Lower EV visor -
On we go. How's the PLSS look to you down there,
Houston?

06 19 25 48 CC They both look good, Hadley Base. And, Dave, you
can have your diverter valve.

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Day 7

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5-13

06 19 25 52 CDR Oh, thank you, Joe. Okay, Jim, I'm going to get over here and open the door.

06 19 25 59 LMP ...

06 19 26 11 CDR Do you see what I'm hung on, Jim?

06 19 26 12 LMP Just a minute. You hit a switch here.

06 19 26 18 CC And, Jim, diverter valve is yours as well.

06 19 26 19 LMP Okay, stand by. See if I can turn around here, Dave.

06 19 26 25 CDR Okay.

06 19 26 37 LMP Right behind me.

06 19 26 38 CDR Say again?

06 19 26 40 CDR If you can turn right - -

06 19 26 42 LMP I'm turning left.

06 19 26 44 CDR Okay. That's right, doesn't matter.

06 19 26 54 LMP *** turn that way. Try the other way.

06 19 26 06 LMP *** pushing against you?

06 19 27 07 CDR Yes, you sure are.

06 19 27 12 LMP *** turn the other way then.

06 19 27 13 CDR Go back in your corner; maybe I'm unhooked now. Are you back in your corner?

06 19 27 18 LMP Yes. I'm back here as far as I can.

06 19 27 22 CDR Okay. I'm clear. Open the door. Oop. Door won't open all the way.

06 19 27 36 LMP *** my foot, I guess.

06 19 27 38 CDR Yes. *** hitting your PLSS.

06 19 27 42 LMP Stand up over here.

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06 19 27 44 CDR There, okay.

06 19 27 46 LMP Before you go out though, let me turn around so I can watch you.

06 19 27 56 CDR Okay.

06 19 28 11 CDR How are you doing?

06 19 28 12 LMP Oh, I'm okay. Where are you?

06 19 28 14 CDR Oh, I've just got my feet out.

06 19 28 17 LMP Okay, let me turn around then.

06 19 28 19 CDR Well, I'm not sure you can. I'm going out. I'm all right. Then you can turn around easier when I get to - to where you get my antenna.

06 19 28 28 LMP Oh, okay. I'll - I'll just stay over here in the corner then.

06 19 28 31 CDR Okay.

06 19 28 41 LMP In fact, if you want, Dave - shoot, I'll get your antenna when we get down the surface.

06 19 28 44 CDR Yes.

06 19 29 04 CDR Okay, I'm out.

06 19 29 07 LMP Okay, and I'll turn around.

06 19 29 18 CDR You might - See the little cover on the outside hatch handle? You might cover that; it's open.

06 19 29 25 LMP Okay. Stay there on the porch until I get all the gear out to you.

06 19 29 33 CDR Oh, yes.

06 19 29 34 LMP Like the JETT bag and -

06 19 29 35 CDR Yes.

06 19 29 58 CDR How you doing? Go easy.

06 19 30 03 LMP Doggone comm cord of yours was hung up on me.

Day 7

~~CONFIDENTIAL~~

5-15

06 19 30 07 CDR Oh.

06 19 30 14 LMP Okay, I'm going to get the JETT bag.

06 19 30 17 CDR Okay.

06 19 30 19 CC Jim, this is Houston. Could you verify for us, please, that one of the two dump valves is OPEN?

06 19 30 23 LMP Yes, the forward one is OPEN, Joe.

06 19 30 30 CC Sounds good, Jim. Thank you.

06 19 30 33 CDR Okay. Send her out.

06 19 30 34 LMP *** out and then I'll get you the ETB.

06 19 30 40 CDR That's the world's biggest JETT bag.

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LIFT-OFF MINUS 17 TO POSTDOCKING

07 03 21 36 CDR Okay, we're coming down to 15 minutes.

07 03 21 49 CDR Don't need that one now.

07 03 22 25 LMP Okay, you want to read to me?

07 03 22 26 CDR Okay. BAT 2, 4, OFF/RESET, barber pole.

07 03 22 30 LMP Okay, 2 and 4, OFF, barber pole.

07 03 22 32 CDR DESCENT BATs, DEAD FACE, barber pole.

07 03 22 34 LMP DEAD FACE, barber pole.

07 03 22 36 CDR Okay, if they are, CB DESCENT ECA and DESCENT ECA CONTROL, open.

07 03 22 41 LMP Okay, mine are both open.

07 03 22 43 CDR And mine are both open. Okay, CB(11) and (16), ASCENT ECA CONTROL, open.

07 03 22 52 LMP Okay, my ASCENT ECA CONTROL is open.

07 03 22 55 CDR And so's mine. Verify CBs.

07 03 22 58 LMP Okay.

07 03 24 02 CDR Okay, checked and doublechecked.

07 03 24 05 LMP Okay.

07 03 25 04 LMP Okay, mine are verified.

07 03 25 06 CDR Okay.

07 03 25 07 LMP Standing by for lift-off minus 12. We can verify that state vector - transfer -

07 03 25 12 CDR Okay.

07 03 25 32 CDR Okay, that looks pretty good.

07 03 25 35 LMP Okay.

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07 03 25 39 CDR Yes, good.

07 03 25 41 LMP Okay. Standing by for 10 minutes.

07 03 25 46 CDR Right.

07 03 27 16 CDR Okay, Houston; Falcon. We're ready to pressurize the APS, if you're ready to watch.

07 03 27 25 LMP MASTER ARM, ON.

07 03 27 26 CDR Okay, ON.

07 03 27 27 LMP ASCENT HELIUM SELECT, TANK 1.

07 03 27 30 CDR Okay, going to TANK 1. Okay.

07 03 27 35 LMP ASCENT HELIUM PRESSURE to FIRE.

07 03 27 37 CDR Yes, see if they're ready.

07 03 27 40 CDR Houston, Falcon.

07 03 27 45 CC Okay, Falcon. There we have you. We had a little net - net problem. I have a PIPA bias update for you.

07 03 27 50 CDR Well, stand by. You ready to watch the APS pressurize?

07 03 27 59 CC Okay, let's let her go.

07 03 28 00 CDR Okay, here comes TANK 1. And we'll stand by for your call for TANK 2.

07 03 28 11 CDR Okay.

07 03 28 12 LMP ASCENT HELIUM SELECT, TANK 2.

07 03 28 13 CDR TANK 2.

07 03 28 14 LMP HELIUM MONITOR, ASCENT PRESS 2.

07 03 28 20 CDR Okay, ASCENT PRESS 2. Standing by.

07 03 28 22 LMP Standing by.

07 03 28 24 CC Okay. Go with TANK 2, when ready.

CONFIDENTIAL

[REDACTED]

07 03 28 26 CDR Okay. TANK 2 coming now.

07 03 28 29 LMP I heard it.

07 03 28 30 CDR Okay.

07 03 28 31 LMP Okay, MASTER ARM, OFF.

07 03 28 32 CDR Okay, MASTER ARM coming OFF.

07 03 28 34 LMP Standing by on the ASM FEEDS.

07 03 28 37 CC Looks good down here.

07 03 28 38 CDR Okay, thank you. Looks good up here. Okay, system ASM FEED number 2, open.

07 03 28 44 LMP Open and gray.

07 03 28 45 CC And, Dave, you're GO for the direct rendezvous. Both guidance systems look good; ...

07 03 28 49 CDR Roger. GO for direct on the PGNS. Thank you.

07 03 28 52 LMP Open and gray.

07 03 28 53 CDR Open and gray. Okay, systems - Okay, manifold pressure, what did it do?

07 03 28 57 LMP It went up a little bit.

07 03 28 58 CDR It did, huh? Okay, SYSTEM A MAIN SHUTOFF VALVE, CLOSED and barber pole.

07 03 29 01 LMP CLOSED - barber pole.

07 03 29 02 CDR Okay, SYSTEM B ASCENT FEED 2, open; talkback gray.

07 03 29 05 LMP Open and gray. It was just a little bitty rise.

07 03 29 08 CDR And, SYSTEM B SHUTOFF VALVE, CLOSED and barber pole?

07 03 29 10 LMP CLOSED and barber pole.

07 03 29 12 CDR Okay, GO on the PGNS. There's a PIPA bias you wanted to update ...

[REDACTED]

CONFIDENTIAL

Day 8

07 03 29 21 CC Falcon, are you still with us?

07 03 29 23 CDR Roger.

07 03 29 27 CC Okay. We have a couple of numbers I need to read for you, Dave.

07 03 29 35 CDR Okay, pencil's out. Go ahead.

07 03 29 40 CC Okay. PIPA bias is Y-PIPA: VERB 21 NOUN 01, 1454 ENTER; and the data is 04366 ENTER. ... NOUN 01, address is 1452 ENTER; data 04672 ENTER.

07 03 30 08 LMP Okay. Here's the readback on that, Ed. VERB 21 NOUN 01, 1454 ENTER; 04366. And then VERB 21 NOUN 01, 1452 ENTER; 04672.

07 03 30 25 CC That's a good readback. And when you have your Timeline Book out, I'd like to change some range/range rate numbers because of this ellipticity of the command module ...

07 03 30 35 CDR Wait, let me talk to him. Okay, Ed. Do you want those PIPA biases loaded now?

07 03 30 42 CC That's affirm.

07 03 30 43 CDR All right.

07 03 30 44 LMP Okay, Dave, let me read to you.

07 03 30 47 CDR Okay, go.

07 03 30 48 LMP VERB 21 NOUN 01.

07 03 30 49 CDR Right.

07 03 30 50 LMP 1454 - -

07 03 30 52 CDR ENTER.

07 03 30 53 LMP - - ENTER; 04366.

07 03 30 56 CDR 04366.

07 03 30 58 LMP Right.

CONFIDENTIAL

[REDACTED]

07 03 30 59 CDR Okay, ENTER.

07 03 31 00 LMP Okay. VERB 21 NOUN 01. 1452 ENTER.

07 03 31 06 CDR Okay.

07 03 31 07 LMP And 04672.

07 03 31 13 CDR Okay.

07 03 31 14 LMP Okay, we - -

07 03 31 15 CDR Timeline Book, he wants to write something in the Timeline Book. You got a minute? Go ahead and - -

07 03 31 17 LMP Yes, but they're range and range rates.

07 03 31 19 CDR Oh - yes.

07 03 31 20 LMP And I don't think that's going to be a big deal, I think - -

07 03 31 22 CDR No - Well, go ahead and take them, we got a minute - -

07 03 31 24 LMP Get that at 5 minutes there.

07 03 31 25 CDR Yes.

07 03 31 27 LMP Okay, Ed. What are the changes in the Timeline Book?

07 03 31 32 CC Okay. The range and range rate at insertion: range rate is 137; range - minus - Sorry, the range is 137; range rate, minus 431; at plus 5 minutes, range, 117; range rate, minus 398; and, at 10 minutes, range is 98; range rate, minus 355.

07 03 32 10 LMP Okay, I copied that data.

07 03 32 16 CC Good enough.

07 03 32 18 CDR Okay. Okay, we - Oh, yes - -

07 03 32 26 LMP Got the - -

07 03 32 27 CDR Go.

[REDACTED]

07 03 32 28 LMP - - RENDEZVOUS RADAR, AC, closed.

07 03 32 31 CMP Falcon, Endeavour on VHF. How do you read?

07 03 32 36 CDR Okay, Endeavour. The Falcon down here; 5 square. How do you read us?

07 03 32 46 CMP Okay, Falcon; Endeavour. How do you read us now, 5 by?

07 03 32 52 CDR No, not yet.

07 03 32 53 CC Loud and clear.

07 03 33 00 CDR Okay, want to go through the APS start card?

07 03 33 03 LMP Yes. I will, Dave, in just a second. I'm just checking E - EPS.

07 03 33 06 CDR Say again.

07 03 33 07 LMP Okay, APS - -

07 03 33 09 CC Falcon, Houston. We'd like to change your 053 number to plus 01722.

07 03 33 20 LMP Copy. The 053 to plus 01722. Okay, APS start card, Dave.

07 03 33 28 CDR Okay, go.

07 03 33 29 LMP 16: DISPLAY/ENGINE OVERRIDE/LOGIC is closed.

07 03 33 32 CDR Okay.

07 03 33 33 LMP Your STAB/CONTROL circuits should be all closed except AEA and DECA POWER.

07 03 33 37 CDR Okay, AEA and DECA POWER.

07 03 33 39 LMP Okay; and mine are okay. RATE SCALE, 25 DEGREES PER SECOND.

07 03 33 40 CDR 25.

07 03 33 41 LMP ATTITUDE/TRANSLATION, 4 JETS.

07 03 33 42 CDR 4.

Day 8

6-7

[REDACTED]

07 03 33 43 LMP BALANCE COUPLE, ON.
07 03 33 44 CDR ON.
07 03 33 45 LMP DEAD BAND, MIN.
07 03 33 46 CDR MIN.
07 03 33 47 LMP ABORT and ABORT STAGE, reset.
07 03 33 48 CDR Reset.
07 03 33 49 LMP ATTITUDE CONTROL, three, to MODE CONTROL.
07 03 33 50 CDR Three to MODE.
07 03 33 51 LMP MODE CONTROL, PGNS and AGS, to AUTO.
07 03 33 52 CDR Both to AUTO.
07 03 33 53 LMP Stop pushbuttons, both reset.
07 03 33 54 CDR Reset.
07 03 33 55 LMP TTCA, both to JETs.
07 03 33 56 CDR JETs.
07 03 33 57 LMP Stand by - -
07 03 33 58 CDR Okay.
07 03 33 59 LMP - - for 2 minutes.
07 03 34 02 CC Falcon, Houston. Can you make your VHF check, so we can hand over the network, please?
07 03 34 06 CDR Roger. We tried and got no response, and I'll stand by. We should be hot mike to the Endeavour.
07 03 34 19 CDR Endeavour, Falcon. How do you read? Okay, Houston. We've got trouble on the VHF checks, as he approaches the mountains back there. We usually don't get him until he's almost overhead, because of the interfer - -

[REDACTED]

07 03 34 36 CMP Okay, Falcon. There you are. I've got you now.

07 03 34 38 CDR On, okay.

07 03 34 39 CC ...

07 03 34 40 CMP Reading you 5 square on VHF there, Dave.

07 03 34 43 CDR Okay.

07 03 34 44 CC Understand VHF check ...

07 03 34 46 CDR Roger. VHF check is GO, Ed. Falcon here.

07 03 34 55 CC Endeavour, Houston. We're going to hand you over now.

07 03 34 58 CMP Endeavour, Roger.

07 03 35 12 LMP Okay, Dave; standing by for 2 minutes.

07 03 35 14 CDR Okay. And we'll get the ABORT STAGE at 10; the ENGINE ARM at ASCENT after that; and the PRO at 5.

07 03 35 20 LMP Right.

07 03 35 21 CDR And back it up with a START. Okay; go VOX. Go VOX.

07 03 35 27 LMP VCX.

07 03 35 28 CDR ***ay, Houston; Falcon. How do you read on VOX?

07 03 35 40 CDR Yes, sir, we sure have. Ready to do some flying.

07 03 35 47 LMP Stand by for 1 minute. Guidance steering is in.

07 03 36 23 CDR Okay. MA - MASTER ARM is ON; I have two lights.

07 03 36 54 LMP DAC is on.

07 03 37 16 LMP ABORT STAGE; ENGINE ARM to ASCENT. 99 PRO.

07 03 37 23 CDR *** lift-off. Automatic. Yaw round. Pitch over.

07 03 37 41 CDR Stable, about 306.

07 03 37 51 CDR Okay; good smooth ride, Ed.

[REDACTED]

07 03 38 03 LMP I look good at 30.

07 03 38 22 CDR *** Yawing right 40. Okay, AUTO start and normal shutdown.

07 03 38 36 CDR Okay, looks good up here. It sounds like the wind whistling, doesn't it?

07 03 38 53 LMP Boy, what a view of the rille, huh? Boulder tracks coming down into it?

07 03 39 23 CDR Right there on the ball.

07 03 39 51 LMP *** on profile.

07 03 40 28 CDR *** The only thing unusual I noticed is the RCS oxidizer manifold pressure oscillates every time the jets fire. That's backing up to the ***

07 03 42 23 CDR *** radar lockup.

07 03 42 24 LMP Five minutes.

07 03 43 03 CDR Roger. Understand.

07 03 43 33 CDR *** We're going to be radar *** now.

07 03 43 36 LMP *** 1000 to go. ASCENT *** 500.

07 03 44 09 CDR Roger. Understand. Trim the AGS. ***

07 03 44 11 LMP *** closed.

07 03 44 22 CDR Roger. In plane only on the AGS.

07 03 44 24 LMP ***

07 03 44 27 CDR ARM is OFF. Okay; we'll shut down on the PGNS. Okay; auto shutdown. *** AGS 500.

07 03 44 49 CDR 502.

07 03 44 59 LMP AGS MASTER ALARM.

07 03 45 07 CDR Hey, we got a MASTER ALARM on the AGS, but we trimmed the AGS.

[REDACTED]

07 03 45 16 CDR Stand by for a tweak or a trim.

07 03 45 21 LMP This is self-test, okay?

07 03 45 27 CDR PGNS has us in a 40.6 by 8.9.

07 03 45 44 CDR Okay?

07 03 46 00 LMP *** We copy.

07 03 46 01 CDR Okay. Understand. AGS still looks good.

07 03 46 20 CDR Roger. No tweak. Thank you.

07 03 46 34 CDR Okay, understand. 127, Al. *** reading?

07 03 46 44 CDR Okay, we're pitching up the radar track attitude. We didn't get a lockon on the way up. We'll give you a call as soon as we get locked up.

07 03 47 16 CDR And, Houston, we're watching the roll angle.

07 03 47 29 CDR Okay; 42 by 9.

07 03 47 45 CDR *** holding, Jim?

07 03 48 12 LMP *** ICS/PT***

07 03 48 18 CDR I'm on ICS/PTT.

07 03 48 21 LMP And you can get INVERTER 1, open; I'm on INVERTER 2.

07 03 48 24 CDR Okay; INVERTER 1 coming open.

07 03 48 30 LMP Ready to get your LOGIC POWER.

07 03 48 32 CDR LOGIC POWER A is coming open.

07 03 48 33 LMP CABIN FAN, closed.

07 03 48 34 CDR CABIN FAN's coming - -

07 03 48 35 CME *** locked on now.

07 03 48 37 CDR Roger. We're locking up now.

Day 8

6-11

[REDACTED]

07 03 48 39 CMP Roger. Got good signal strength on you.

07 03 48 41 CDR Okay; good show. And I have no visual yet.

07 03 48 45 CMP Roger.

07 03 48 47 CDR Okay, the radar's on. The PGNS are on.

07 03 48 54 CMP VHF range has us at 117 now. 117.

07 03 48 57 CDR Okay.

07 03 48 58 LMP I have a visual on him now, Dave.

07 03 48 59 CDR Do you?

07 03 49 00 LMP Yes.

07 03 49 01 CDR Oh, eyeballing.

07 03 49 02 CC Endeavour, Houston. We're ready to up-link you.

07 03 49 04 CMP Go ahead. You've got POO and ACCEPT.

07 03 49 09 CDR Okay, I got him.

07 03 49 18 CMP What kind of range is radar giving you, Dave?

07 03 49 22 CDR Stand by, Al.

07 03 49 37 CDR Well, once - once I get over there, I lose him.
No, that's not right. Are you sure that was him?

07 03 49 46 CC And, Falcon, this is Houston. We will not up-link
a state vector to you; your PGNS and AGS are both
good. *** independent.

07 03 49 55 CDR Falcon, Roger. Well, I've got no visual on him,
Jim, at all.

07 03 50 03 LMP I've lost him, too, now.

07 03 50 31 CDR No visual at all. Surprising. Okay, that looks
pretty fair. I'd say the needles are pretty good,
Jim.

[REDACTED]

07 03 50 42 LMP Needles are good.

07 03 50 43 CDR Yes.

07 03 50 44 LMP Okay, I'm going to - -

07 03 50 45 CDR Go automatic update.

07 03 50 46 LMP - - go ahead and automatic update.

07 03 51 22 LMP Okay, first one. Going to be. .37. Take that one. Okay, second one. Okay, take that one.

07 03 51 56 CC Endeavour, Houston. The computer's yours.

07 03 51 57 CMP Roger.

07 03 52 08 CC Okay, Falcon; Houston. I have a MSFN TPI for you and some words.

07 03 52 15 LMP Go ahead; I'm ready to copy the TPI, Ed.

07 03 52 22 CC It's an off-nominal TPI and angle. DELTA- V_x , 66.3; DELTA- V_y , plus 7.8; DELTA- V_z , minus 31.2; total, 73.7. TPF DELTA-V will be 26.0. You're going to be pointed almost along the line of sight for TPI. You can omit the roll maneuver for TPI, your choice. And you will undoubtedly break lock.

07 03 53 01 LMP Okay; on the pad, I have plus 66.3, plus 7.8, minus 31.2, and total for 73.7, and 26.0 for TPF. You copied the other part - -

07 03 53 16 CDR Yes.

07 03 53 17 LMP - - didn't you, Dave?

07 03 53 18 CC That's affirm. And the approach at TPF is going to be right along the local horizontal.

07 03 53 24 CDR Okay; thanks for the information, Houston. I think, if the radar's working good and we get a good solution, we'll probably stay heads up and go ahead and accept the breaklock.

07 03 53 37 CC Roger. And, Endeavour; Houston. The same goes for you. Your attitude, if you were going to have to make the burn, would be along the line of sight as well.

07 03 53 51 CMP Endeavour, Roger.

07 03 53 54 CDR And, Houston; Falcon. I have a visual on the Endeavour now. The COAS is exactly boresighted, the radar needles are boresighted, and the PGNS needles are boresighted, and the AGS needles are boresighted, so we're looking pretty good.

07 03 54 12 CC Very good, Dave.

07 03 54 25 CC And, Falcon; Houston. As far as we can tell, your AGS is completely GO. We see no reason for the master alarm yet.

07 03 54 32 CDR Understand.

07 03 54 41 LMP I'm going to go to RANGE/RANGE RATE on the tape-meter, Dave.

07 03 54 45 CDR Oh, I'm sorry. How's the auto updating working?

07 03 54 48 LMP Working fine; have two of each.

07 03 54 50 CDR Okay, good.

07 03 55 05 CDR Okay, Endeavour; Falcon. I'm looking at about 94 miles and 355 feet per second.

07 03 55 13 CMP Roger. I'm looking at 94 miles also.

07 03 55 16 CDR Okay, good show. And the PGNS state vector agrees with that.

07 03 55 42 CC And, Falcon; Houston. You're GO for an APS TPI. You have 180 feet available.

07 03 55 47 CDR Huh! Roger. Understand. GO for the APS TPI. Thank you.

07 03 56 18 LMP Okay, I've got five marks.

07 03 56 37 CMP Falcon, Endeavour. You got your lights on, Jim?

07 03 56 42 CDR Yes, they - they're on, Al.

07 03 56 44 CMP Okay.

07 03 57 00 CDR Okay; next thing we need's the - Houston, Falcon. GO.

07 03 57 07 CC Be advised that your direct rendezvous TPI charts are NO GO because of this elliptical rendezvous. Your midcourse charts are good.

07 03 57 18 CDR Okay. Understand. The TPI chart's NO GO, and the midcourse charts are good.

07 03 57 46 LMP I'm not going to put these values in, if you're going to do it heads up, Dave.

07 03 57 53 CDR Let's see what kind of pitch attitude we get.

07 03 57 55 LMP Okay.

07 03 58 01 LMP I'll take the polar plot out.

07 03 58 03 CDR Yes.

07 03 59 04 CDR Okay. Coming up on the - Oh, we don't need the 10-minute range. It won't do us any good, will it?

07 03 59 07 LMP No.

07 03 59 08 CDR Huh! Right. Right. I even remembered it.

07 03 59 23 LMP I got a total of eight marks.

07 04 00 33 LMP Well, AGS agrees with the ground solution for the total, but not for the various components.

07 04 00 38 CDR Really?

07 04 01 03 CDR Okay, Endeavour, do you have your tracking light on?

07 04 01 07 CMP Roger. Tracking light's on.

07 04 01 10 CDR Okay.

Day 8

6-15

[REDACTED]

07 04 01 13 LMP I have him right in my window, Dave. Right where he should be.

07 04 01 16 CDR Well, I'm not - yes, I don't see him, though. He's supposed to - -

07 04 01 19 CMP I don't see your tracking lights.

07 04 01 23 LMP ...

07 04 01 24 CDR Yes.

07 04 01 26 LMP I'm reading Al very weakly. Maybe that's because my - -

07 04 01 28 CDR Well, he's loud and clear to me.

07 04 01 31 LMP Okay. My VHF was turned down a little bit.

07 04 01 36 CDR Well, I think that's a star, that bright thing you have, because -

07 04 01 40 LMP Well, it'd have to be the command module; that's right where he should be if you're boresighted.

07 04 01 42 CDR No. That's been sitting there all the time. I think the command module's moving down. We - we've got to be going around, and we're holding about the same pitch attitude, ORDEAL-wise, and ORB rate, and that bright thing, which I think is a planet, is moving up on us. I'm pretty sure that's one of the planets, Jim.

07 04 02 02 LMP Okay, then I don't see him.

07 04 02 03 CDR Yes, I - I saw another object right in the - in the COAS there before we went into darkness.

07 04 02 12 CMP Falcon, Endeavour. I don't have your light.

07 04 02 16 LMP I'll cycle the switch.

07 04 02 17 CDR It's working. Don't cycle the switch.

07 04 02 19 LMP Can you see it out there?

[REDACTED]

07 04 02 20 CDR Yes, sir. Light's working fine, Al.

07 04 02 26 CMP Okay.

07 04 02 29 CDR I can see it on the handrail here, Jim.

07 04 02 31 LMP Oh!

07 04 03 07 CDR Houston, Falcon. What's your LOS time?

07 04 03 27 CC Falcon, Houston. LOS in 12 minutes.

07 04 03 30 CDR Roger; 12 minutes. Okay.

07 04 03 34 CMP Yes, I got your light now, Dave.

07 04 03 36 CDR Okay. Very good.

07 04 04 16 LMP AGS out-of-plane agrees with the ground solution exactly.

07 04 04 19 CDR Very good. That's pretty good for the old AGS.

07 04 04 25 LMP AGS Z-solution's increasing a little bit. It's coming up in the right direction.

07 04 04 30 CMP Okay, Falcon; Endeavour. I'm getting some large updates on you there, Dave, on the first mark.

07 04 04 36 CDR Okay. This the first time you've had a chance to look at us through the sextant?

07 04 04 48 CMP That's right.

07 04 04 50 CDR Okay. I would expect them to be fairly large, then.

07 04 04 53 CMP Yes. That's right. VHF's going okay. First optics is - is off. I bypassed two of them. I'll take the third one.

07 04 05 02 CDR Sounds like a good plan.

07 04 05 11 CC Falcon, Houston.

07 04 05 13 CDR Houston, Falcon. Go.

[REDACTED]

07 04 05 18 CC Roger. We need to tweak up your PIPAs a little bit more, Dave, before TPI.

07 04 05 23 CDR Okay, fine. Pencil's out; go ahead.

07 04 05 29 CC Address 1452, 05210; address 1456, 03170. And those are both VERB 21 NOUN 01.

07 04 05 49 LMP Okay; we copy a VERB 21 NOUN 01; 1452 should be 05210, and 1456 should be 03170.

07 04 06 04 CC Good readback.

07 04 06 05 LMP 03170.

07 04 06 21 LMP I hear the John Young music right here.

07 04 06 23 CDR Yes, I do too. Very interesting. I thought that was only on the back side. I guess that's a VHF thing.

07 04 06 40 CDR Oop! Sorry. Yes, why don't we have a lock on that thing? This zero g takes a little getting used to. Your camera's still on, by the way.

07 04 06 54 LMP No, I turned it off. It was out of film.

07 04 06 57 CDR I mean it - the electricity's still on. You might want to save it.

07 04 07 16 LMP There is a little bit of crud floating around, isn't there?

07 04 07 19 CDR Yes, a little bit. Wonder where all that came from.

07 04 07 33 CMP Okay, Dave. The first update was the only large one. The rest of them are all falling in.

07 04 07 37 CDR Okay, very good.

07 04 07 50 CDR Okay, I'm getting a recycle, Jim. Why don't you - -

07 04 07 53 LMP Okay.

07 04 07 54 CDR - - pick up a solution there?

[REDACTED]

07 04 08 23 CDR Okay; 31.7.

07 04 08 24 LMP Okay.

07 04 08 34 CDR NOUN 58 is 38.5. Co! That's low. 72.9, 25.6.

07 04 08 42 LMP Okay, I have it.

07 04 08 43 CDR Okay. NOUN 81 is plus 70.6, plus 5.9, minus 16.9.

07 04 08 52 LMP That's exactly what the AGS has at this point.

07 04 08 55 CDR Ground had what - 66.7?

07 04 08 59 LMP 66.3 for X, plus 7.8 - minus 31 is the big difference in Z.

07 04 09 07 CDR Okay, Houston, Falcon. We're seeing a fairly large difference in Z between the onboard solutions and the ground solutions, but I guess that can be expected at the recycle.

07 04 09 20 CC I'm checking it for you now, Dave. Your FGNS ... well.

07 04 09 24 CDR Roger. And I - I think we can expect a fairly large Z at the recycle.

07 04 09 30 CC ... back some words ...

07 04 09 34 CDR Roger. Okay.

07 04 09 51 CDR Okay. Let's see how we're doing on the old - plot here.

07 04 10 10 CC Falcon, Houston. We're going to watch it for a few more minutes, and see how they converge with the other solution.

07 04 10 15 CDR Roger.

07 04 10 44 LMP Right on. How about that?

07 04 10 53 CDR Beautiful.

~~CONFIDENTIAL~~

07 04 10 55 CMF Okay, Dave. I've got a recycle solution for you.

07 04 10 58 CDR Okay, Al. We're ready to copy. Go ahead.

07 04 10 59 LMP ...

07 04 11 01 CMF Roger. Minus 69.4, minus 6.2, plus 12.0.

07 04 11 09 CDR Okay. That's pretty good for a recycle. We were plus 70.6, plus 5.9, and minus 16.9.

07 04 11 16 CC Endeavour, Houston. I need OMNI Alfa.

07 04 11 21 CMF OMNI Alfa.

07 04 12 17 CC Falcon, Houston.

07 04 12 19 CDR Houston, Falcon. Go.

07 04 12 23 CC Roger. FDO thinks you had a good solution, but not a great solution before. He's now saying that the Z-component will be - should converge to about a minus 19. And if it does, your approach angle will be more nominal - rather than along the horizontal.

07 04 12 40 CDR Okay. That sounds like we're all converging to the same spot. Thank you.

07 04 12 47 CC We agree, Dave.

07 04 12 49 LMP In that case, you might want to do the rollaround, huh? *

07 04 12 54 CDR What's the - Yes, let's see what the angles look like.

07 04 13 02 CDR Look - No, he's talking about the approach on TPF.

07 04 13 04 LMP Yes, I know that.

07 04 13 06 CDR Oh, yes. If his DELTA- V_z comes in like this, yes, we probably will.

07 04 13 11 LMP See, it's more nominal. The values are coming up to nominal values, Dave.

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07 04 13 14 CDR Yes. Take a look at the polar plot again here.

07 04 13 48 LMP Boy, AGS is just locked in to what PGNS has, it's not changing.

07 04 13 50 CDR Is that right?

07 04 13 51 LMP Great.

07 04 14 12 CDR Okay, Houston, Falcon. Our polar plot's showing us pretty nominal. I guess we'll probably stay with the nominal procedures on the TPI.

07 04 14 26 CC Roger, Falcon. We have you a minute to LOS. Your solutions look good in both computers. We'll see you on the other side. And be advised, we did monitor your lift-off, and we can confirm you lifted off.

07 04 14 39 LMP Hey, great!

07 04 14 40 CDR Wow, very good; that's nice to know. Thank you much.

07 04 14 43 LMP I'm glad the TV worked.

07 04 14 47 CDR Save the tapes for us, will you?

07 04 14 51 CC Say again, please.

07 04 14 53 CDR Save the TV tapes for us, will you, please?

07 04 14 58 CC Will do, and you're 30 seconds from LOS, Falcon.

07 04 15 02 CDR Roger; see you around the corner.

07 04 15 07 CC Roger, Roger, Dave.

07 04 15 21 LMP Okay, we're having LOS.

07 04 15 23 CDE Okay?

07 04 15 51 CDR Why don't we have our helmet and gloves on? Oh, we got to dock.

07 04 15 53 CMP Endeavour, ... See you on the other side.

07 04 16 08 LMP Why don't we have our helmets and gloves on?

07 04 16 12 CDR You don't have to have your glove on - but you can have your helmet on just to keep the crud out of your eyes, probably.

07 04 16 16 LMP Yes. But we don't have anything in the procedures, do we?

07 04 16 21 CDR No, I thought there was something that was op - said optional.

07 04 16 24 LMP Oh.

07 04 16 30 CDR (Chuckle) No, we can take them off.

07 04 16 32 LMP I know.

07 04 16 44 LMP Boy, that sure was a sporty lift-off!

07 04 16 46 CDR I thought it was sort of smooth.

07 04 16 47 LMP Yes, it was smooth, yes.

07 04 16 49 CDR Smooth as silk.

07 04 17 41 CDR Man, that ORDEAL is tracking right on - 39 on the tape, 39 there - 136, 136. State vector's super.

07 04 18 17 LMP I'm putting in these values so AGS will follow PGNS. You did the - -

07 04 18 21 CDR Yes.

07 04 18 22 LMP - - rollaround?

07 04 18 31 CDR Take another look at the polar plot here for - Okay, looks like it's about 29 degrees - and 37 miles.

07 04 19 03 CDR Now we're drifting in just a little bit - little bit low, but - nothing to have concern about.

07 04 19 23 LMP ... component is exactly with the ground computer now, 19.1; they come up with 19.

07 04 19 25 CDR Huh - well. Do a final comp here at 8.

07 04 19 38 CMP Okay, first ... is ...

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07 04 19 40 CDR Okay, fine.

07 04 19 42 CMP ...

07 04 19 44 CDR Did you get a bunch of good marks?

07 04 19 47 CMP Yes, sir; 19 and 18.

07 04 19 49 CDR Beautiful.

07 04 20 38 CDR Gee, I think we're not going to get our next mark until after 8 minutes, so I think I'll take it now. Get 26 good ones.

07 04 20 58 CMP ...

07 04 21 00 LMP Go ahead, Al.

07 04 21 01 CMP Okay. Minus 69.1, minus 6.1, plus 16.1.

07 04 21 07 LMP Copied. Minus 69.1, minus 6.1, and plus 16.1.

07 04 21 12 CDR Okay, you want to get these numbers, Jim? Thirty-two on the elevation angle -

07 04 21 20 LMP Okay.

07 04 21 25 CDR Okay, here's a NOUN 58.

07 04 21 29 LMP Okay, let's see, 38.3, 72.8, and 25.4; boy your Z really jumped!

07 04 21 38 CDR No, no, that's not NOUN 81.

07 04 21 39 LMP Yes, you're right. Okay.

07 04 21 40 CDR Here's NOUN 81.

07 04 21 42 LMP Okay. Let us give you the numbers first, Al. Hold on.

07 04 21 45 CDR Okay; 70.3, plus 5.9, and minus 17.7.

07 04 21 57 CMP That the way your numbers ...?

07 04 21 58 CDR That's correct.

[REDACTED]

07 04 22 03 CMP Okay, sounds good, and I'm in attitude and I only maneuvered about ... degrees.

07 04 22 08 CDR Beautiful.

07 04 22 15 CMP ... us up pretty close.

07 04 22 17 CDR Good.

07 04 22 20 LMP AGS has exactly the same numbers as the PGNS in X and Y; there's a difference of 2 in Z.

07 04 22 28 CDR Okay. I think we'll go ahead and burn the PGNS.

07 04 22 38 LMP ... maneuver now?

07 04 23 13 CDR Okay. Endeavour, did you get our numbers for the burn?

07 04 23 19 CMP Roger, Dave. I got your numbers.

07 04 23 20 CDR Okay. We'll burn PGNS on time. And we're just about to attitude.

07 04 23 59 CDR Maneuver.

07 04 24 42 CDR Huh, radar broke. Okay, let's see how it compares with the AGS.

07 04 26 07 CDR Hmm. Okay, 3 and a half minutes to go, Al.

07 04 26 13 CMP Roger. I read it.

07 04 26 17 CDR Let's see, do you have AGS to steer you in, Jim?

07 04 26 21 LMP Yes.

07 04 26 23 CDR Huh. Attitude doesn't look too swift - Huh.

07 04 26 57 LMP Should be a 3-second burn.

07 04 26 59 CDR Okay - 3-second burn. Let's run through it here.

07 04 27 04 LMP Go AGS to AGS MODE CONTROL, AUTO - -

07 04 27 06 CDR Yes.

[REDACTED]

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07 04 27 07 LMP Okay, 30 seconds - -

07 04 27 08 CDR ... ABORT STAGE - ENGINE ARM to ASCENT, manual ullage, and a PRO.

07 04 27 16 LMP And no manual ...

07 04 27 17 CDR Yes. I just remind myself of those little notes, like that.

07 04 27 41 CDR MARK - 2 minutes.

07 04 27 42 CMP ...

07 04 27 45 CDR And everything looks good over here.

07 04 28 37 LMP Coming up to 1 minute, Dave.

07 04 28 38 CDR Okay.

07 04 28 41 LMP MARK - 1 minute.

07 04 28 42 CDR Okay.

07 04 28 43 LMP AGS MODE CONTROL to AUTO.

07 04 28 45 CDR Okay, AGS to AUTO.

07 04 28 54 CDR Okay, you get the ullage at 10. I'll get the PRO.

07 04 28 58 LMP Okay.

07 04 29 07 CDR Okay, get the average g on - ABORT STAGE, push. ENGINE ARM to ASCENT. Standing by for 10 seconds.

07 04 29 30 CDR ULLAGE.

07 04 29 36 CDR PRO going.

07 04 29 41 LMP 3 - 2 - 1 -

07 04 29 44 LMP SHUTDOWN.

07 04 29 45 CDR Okay, AUTO shutdown. And AUTO ignition. - We'll trim them.

07 04 29 50 CMP Okay, you ... numbers, guys, and I'll ...

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07 04 29 52 CDR Okay. Might remember those.

07 04 29 54 LMP Oh, they can get them off the data. Backing it off.

07 04 30 07 LMP I'll write down the residuals.

07 04 30 08 CDR Okay, there you go; .2, .2, and .4.

07 04 30 12 LMP Okay.

07 04 30 19 CDR I'm going to yaw or roll quickly here, because -

07 04 31 50 CDR Okay, Al. We're starting to lock up on you.

07 04 31 52 CMP Roger.

07 04 32 30 CDR I'll get the thing going here in a minute.

07 04 33 17 CDR Okay, we're locked up at 23 miles and about 122 feet per second - 123.

07 04 33 36 CDR Okay, we have one mark, no NOUN 49s.

07 04 33 44 LMP AGS has a zero burn at Midcourse 1.

07 04 33 46 CDR Does it really? It's beautiful.

07 04 34 01 LMP I'll put the - mark the values in here.

07 04 35 11 LMP Right on the nominal line, Dave.

07 04 35 13 CDR Really?

07 04 35 14 LMP Yes.

07 04 35 25 CDR Great.

07 04 37 19 LMP That's lots of material. We going to burn it?

07 04 37 23 CDR Yes. Let's take a look at the thing here.

07 04 37 26 LMP AGS has just about - well, 1 now.

07 04 37 32 CDR Let's see. Tape meter says 18, PGNS says 18. Boy, they're almost - and a range, 109 - range rate, 109 and 109. They're right on.

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07 04 37 44 LMP State vector agrees with tape meter; almost right on.

07 04 37 47 CDR I don't know. I think - Let's see what - we might burn anything over a foot. What does that little - What does your secrecard have on it there? For the burn?

07 04 38 01 LMP I was looking for the midcourse rule - it's on - probably on.

07 04 38 04 CDR There's nothing - there's nothing there.

07 04 38 06 LMP Nothing on there, huh?

07 04 38 24 CDR How're you doing over there, Alfred?

07 04 38 27 CMP Doing just fine. Got your afternoon meal and about ...

07 04 38 32 CDR Very good. And we've never seen your tracking. Oh, yes. I see it! I see it! What do you know! I've been looking for it and I finally saw it. That's not very bright.

07 04 38 43 LMP Boy, it sure isn't.

07 04 38 45 CMP What did you see?

07 04 38 46 CDR I see your tracking light, and you're - -

07 04 38 48 CMP Oh, good.

07 04 38 49 CDR Yes, you're right down the tube.

07 04 38 50 CMP Yes, so are you. Your light is nice and bright.

07 04 38 52 CDR Is it really? Your - yours is really dim. It's about like a - maybe a fourth-magnitude star. Gee, that's really dim.

07 04 39 30 LMP AGS is up to 3 now.

07 04 39 54 CDR Okay. The RCS looks good.

07 04 40 05 LMP Mostly in X, up. Up and forward.

07 04 41 15 CDR Okay, I'm up.

07 04 41 16 LMP You could PRO for final comp at 12.

07 04 41 17 CDR Yes. Thank you.

07 04 41 21 LMP AGS has 4 now, Dave.

07 04 41 22 CDR Four? Okay, we'll burn it.

07 04 41 24 LMP Well, if the PGNS -

07 04 41 25 CMP Coming up on 20 seconds.

07 04 41 26 CDR Okay. We've got 20 seconds or so.

07 04 41 29 CMP Why don't you mark your final comp for me so we ...?

07 04 41 31 CDR All right. I sure will.

07 04 41 35 CDR Ten seconds.

07 04 41 40 CDR 3, 2, 1 -

07 04 41 44 CDR MARK.

07 04 41 46 CMP Got you.

07 04 41 47 CDR Okay.

07 04 41 48 CMP Only a 3-second difference.

07 04 41 50 CDR Well, it was a 3-second burn, so that makes sense.

07 04 41 57 LMP Oh, beautiful. Through your final comp already, huh?

07 04 42 02 CDR Yes. Okay, Al. We've got a minus 1.1, a 0 and a minus 1.1.

07 04 42 09 CMP Okay, and I've got a plus 1.5, a minus .2, and a plus 1.9.

07 04 42 14 CDR How about that? That's very nice. Think we'll burn our solution on time, since you sort of substantiate it.

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Day 8

07 04 42 23 CMP Roger. ...

07 04 42 25 CDR All right. We'll burn our solution.

07 04 42 30 CMP I'll buy that.

07 04 42 38 LMP Yes, the AGS Z solution was off.

07 04 42 40 CDR Was it?

07 04 42 41 LMP It was reading 3, yes.

07 04 43 45 LMP MARK; 1 minute to the midcourse.

07 04 43 48 CMP Roger.

07 04 44 10 LMP DSKY's blank. Average g is on. Up and forward.

07 04 44 19 CDR Okay, I like those. We are a tad low on that plot, weren't we?

07 04 44 25 LMP Yes.

07 04 44 49 CDR There you go.

07 04 44 50 LMP One, 1, and 4.

07 04 44 52 CDR And I'm going to tweak the 4, too..

07 04 44 53 CMP ... get it off ...

07 04 44 54 LMP One more cycle, here.

07 04 44 59 CDR Okay, we got it all out.

07 04 45 01 CMP Okay.

07 04 45 02 CDR Consider it done. There you go. Zero, a tenth, and 2/10ths.

07 04 45 05 LMP Okay.

07 04 45 20 LMP Oh, you're shining in the sunlight now. Boy, is that pretty.

07 04 45 30 CDR Oh, we're shining in the sunlight. Click.

07 04 46 17 CMP Boy, I can see you ... too.

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07 04 46 20 CDR Okay. We've got our first mark with no NOUN 49.

07 04 46 25 CMP Well, that's good. I can even make that for certain.

07 04 46 28 CDR Hey, are you kidding?

07 04 46 30 CMP Uh-huh. Sure can.

07 04 46 31 CDR Neat.

07 04 46 37 CMP It's unreal.

07 04 46 48 CMP You're so big, you took up all of the window.

07 04 46 51 CDR Huh, you sure you got the right thing?

07 04 46 54 CMP I must be a little right.

07 04 47 01 LMP I'm going to take my glove off. My hands can't stand it any longer. Oh, my.

07 04 47 56 LMP Oh, boy.

07 04 48 15 LMP Oh, boy

07 04 48 25 LMP My hands are a wreck.

07 04 48 28 CDR How's your AGS looking now?

07 04 48 31 LMP Oh, looks like 4 feet per second for - -

07 04 48 35 CDR Two?

07 04 48 36 LMP - - mid-midcourse.

07 04 49 05 CDR Gosh, we're in zero g again. I forgot.

07 04 49 11 LMP Yes, we've been stalled for 3 days.

07 04 49 14 CDR Yes.

07 04 49 20 LMP Come here.

07 04 49 24 CDR Yes. Boy, this thing's really got him lined up.

07 04 50 39 LMP Gee, our VERB 67 is so small. Thing's really doing good (cough).

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07 04 50 54 CMP ... ups and downs ... you.

07 04 50 57 CDR Oh, you did, huh? Yes, we're supposed to be coming up - they said originally, almost horizontal, but then, I guess, their second calculation said it'd be more like nominal, so wonder where we'll be over?

07 04 51 10 CMP Well, you'll ...

07 04 51 16 CDR Okay. You're a pretty sight as we went into sunset back there. Did you look down? We went right over Schroter's Valley.

07 04 51 22 LMP ...

07 04 51 23 CMP ...

07 04 51 27 CDR Can't wait to get up there and look and see what you've been seeing.

07 04 51 39 CMP ... P24 on that last one. I ...

07 04 51 44 CDR Your - you're what, Al?

07 04 51 46 CMP My last P24 just before lift-off.

07 04 51 49 CDR Oh, the P24 before lift-off?

07 04 51 52 CMP Yes.

07 04 51 53 CDR What's the matter with it?

07 04 51 54 CMP ... too much ...

07 04 51 58 CDR Oh. Huh!

07 04 52 00 CMP Yes, I can't ...

07 04 52 02 CDR Is that - is that right? Somebody needs - Well, we're getting all broken up here. I wonder - We're in a FORWARD ANTENNA, aren't we?

07 04 52 09 LMP Yes. We're in FORWARD.

07 04 52 10 CDR Okay. That outfit - It doesn't look like the - what it did when we left.

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[REDACTED]

07 04 52 18 CMP We lost a little weight.

07 04 52 21 CDR Yes (laughter).

07 04 52 23 LMP Yes. The LM and us too, Al.

07 04 52 27 CMP How's the old man doing?

07 04 52 30 CDR How's the what?

07 04 52 31 CMP How's the old man doing?

07 04 52 34 LMP Oh, listen. The old man's doing pretty damn good.

07 04 52 37 CMP Did you lose any weight, too?

07 04 52 41 CDR Oh, I don't know. I don't know if we lost any weight or not.

07 04 52 43 LMP Dave lost some skin here and there. It's going to take him 5 days to recover.

07 04 52 54 CDR I think we had two falls apiece, though.

07 04 53 00 CMP Hello, Butch. ... for capture.

07 04 53 15 CDR Okay. When we get up there, make sure you give us a call at capture, so we know what's going on.

07 04 53 22 CMP Yes. You going to do the ... get you a good rate?

07 04 53 30 CDR Yes. Do it just - just like we did it there in that last SIM. Okay?

07 04 53 35 CMP Okay.

07 04 53 40 LMP Okay, ... How do you think about 5 for midcourse 2?

07 04 53 51 CDR Really? Huh.

07 04 53 58 LMP I guess most of it will be in Z. Yes, it's all in Z. Forward. It is.

07 04 54 04 CDR Okay. I like forward. All in Z, huh?

07 04 54 09 LMP Uh-huh.

[REDACTED]

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07 04 54 10 CDR That's - How do we look on the curve?

07 04 54 12 LMP Let me take a plot there; 90 degrees at -

07 04 54 14 CDR No; about 80 - 88 degrees at - well, say 90 degrees at - Let's say 88 degrees at 6 miles. We're at 34,000 feet now, and that thing -

07 04 54 25 LMP Yes, we would be all right.

07 04 54 28 CDR Should be up, forward. Little far out. They told us we'd be a little far out in front. That's okay. Here plot it on there. Put that mark on there. That's good data for those fellows.

07 04 54 38 LMP Okay.

07 04 54 39 CDR Let's take 3, as a matter of fact. String them along there.

07 04 54 43 LMP Okay.

07 04 54 44 CDR Take maybe a minute between. Okay, 2 minutes until the final comp.

07 04 54 50 CMP ...

07 04 55 38 LMP Okay. We're pretty consistently plotting low here.

07 04 55 42 CDR Yes. Okay, that -

07 04 55 43 LMP I'll plot a number at 30.

07 04 55 47 CDR Okay, 1 minute until final comp, and I'll give you a mark again, Al.

07 04 56 21 LMP Still glass floating around.

07 04 56 23 CDR You're kidding.

07 04 56 24 LMP No, it wasn't glass, but I saw some just after lift-off. After insertion.

07 04 56 30 CDR Okay, about 15 seconds, Al.

07 04 56 40 CMP Okay, we ...

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[REDACTED]

07 04 56 41 CDR Okay, 3, 2, 1 -

07 04 56 45 CDR MARK. Final comp.

07 04 56 48 CMP Roger. Over.

07 04 57 00 LMP Lock.

07 04 57 02 CDR Huh!

07 04 57 04 LMP Minus 8, and a plus 6 - -

07 04 57 07 CDR Al, minus .8, plus .6, and a minus 2.6.

07 04 57 13 CMP I have plus 2.8, and minus 0.3, plus 6.2.

07 04 57 18 IMP That's quite a difference.

07 04 57 19 CDR What was your Y, Al?

07 04 57 21 CMP Minus 0.3.

07 04 57 22 LMP Okay. Plus 2.8, minus 0.3, a plus 6.2.

07 04 57 25 CMP Right.

07 04 57 27 CDR Okay. Get the AGS, Jim.

07 04 57 29 IMP Yes.

07 04 57 30 CLR The PGNS says 2 and a half forward, and - and 1 right. That sort of agrees.

07 04 57 38 IMP Okay, AGS is right between the two. Minus 4.1.

07 04 57 47 CDR Okay. I think - yes. Think we'll just stick with the PGNS. That's good enough. We're in the ball park. You're saying forward. Everybody's saying forward.

07 04 58 05 CMP Do you know ...?

07 04 58 09 CDR No. Let me think a minute. Whew.

07 04 58 20 CDR No, I think we'll stick with the PGNS. There's not that much difference.

07 04 58 22 CMP Okay. ...

[REDACTED]

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07 04 58 25 LMP Okay, I'll give them to you, Al. Minus .8, plus .6, and minus 2.6.

07 04 58 34 CMP Roger. Minus .8, plus .6, and minus 2.6.

07 04 58 38 LMP Roger.

07 04 58 45 LMP MARK; 1 minute to the burn.

07 04 59 22 LMP Okay, I'll probably bias a little heavy on the forward side.

07 04 59 48 CDR Burning now.

07 04 59 50 CMP Roger, Dave.

07 05 00 01 CDR Okay.

07 05 00 02 LMP Okay; 1, 1, and 1.

07 05 00 48 CDR Okay, your P20's tracking him right on (cough).

07 05 01 16 CMP ...

07 05 01 20 CDR Okay; fine.

07 05 01 51 CDR Fix your pin, Jim.

07 05 01 52 LMP (Laughter)

07 05 01 54 CDR Or mine or somebody's.

07 05 01 56 LMP Here's mine.

07 05 01 57 CDR Yes. Okay. The PGNS and the rendezvous radar agree.

07 05 02 30 CC Falcon, Houston. Standing by.

07 05 02 32 CDR Roger, Houston. Falcon had a good TPI, and burned a small midcourse 1 and a small midcourse 2; and presently have a visual on the command module, and all the solutions have been agreeing very well.

07 05 02 48 CC And did you write down your solutions, Dave?

07 05 02 50 CDR Yes, we got them all in.

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[REDACTED]

07 05 02 56 CC We'll ask for them later.

07 05 02 57 CDR Okay.

07 05 03 57 CME Houston, Endeavour.

07 05 04 02 CC Hello, Endeavour. Standing by.

07 05 04 04 CME Okay, TV's up to ...

07 05 04 15 CC ...

07 05 04 33 CC Endeavour, Houston. We're not tracking your ...

07 05 04 37 CME Okay.

07 05 05 25 CC We have your ..., Endeavour.

07 05 05 33 CME Roger.

07 05 05 43 CME Okay, I've got you visually there, Falcon.

07 05 05 46 CDR Okay.

07 05 06 38 LMF Very low line-of-sight rate, it's almost nothing.

07 05 06 46 CME Yes, you're looking good.

07 05 07 31 CDR We're coming up on - Oh, about a mile and a half now at 27 feet per second on the radar. Little slow but we'll just coast right on in.

07 05 07 50 CME You're very garbled, Dave. Say again.

07 05 07 53 CDR I'd say we're - about a little over a mile and 27 feet per second, a little slow but we'll leave it like this and coast on in.

07 05 08 04 CME Okay. I got you at 1.28 mile.

07 05 08 08 CDR Okay, we're right with you.

07 05 08 34 CC Endeavour, Houston. ... on the HIGH GAIN, please.

07 05 08 39 CME On AUTO.

07 05 09 12 CDR Okay, 1 mile and 27 feet per second on the radar.

[REDACTED]

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07 05 09 16 CMP Roger.

07 05 10 03 CDR All right; we'll leave it there.

07 05 10 23 CDR Well, I can see you loud and clear now. High gain and all. Yes, very good, Jim, about - 250 and 11?

07 05 10 32 LMP Yes.

07 05 10 34 CC Endeavour, Houston. Do you have the Falcon on your monitor?

07 05 10 44 CMP No, I wasn't watching it, Ed, so stand by 1.

07 05 11 05 LMP Okay, 3000 feet, braking down to 20.

07 05 11 16 CDR Sharp, isn't it, Jim?

07 05 11 17 LMP Sure is. All those particles that are shot out.

07 05 11 53 CC ... waste any time on it, Al.

07 05 12 18 LMP Okay, 1500 feet, braking down to 10.

07 05 14 09 CDR There's that Moon.

07 05 14 10 LMP Okay, 500, braking to 5.

07 05 15 18 CDR What do you see there, Endeavour?

07 05 15 28 CMP Sure see a nice looking Falcon coming home to roost.

07 05 15 31 CDR Roger.

07 05 15 43 CDR Okay, Houston. We're stationkeeping at about 120 feet or so.

07 05 15 52 CC Roger. Dave, during the command module pitcharound, we'd like for you to take a look at the V over H sensor in the SIM bay, if you can. Do you know how to spot it?

07 05 16 05 CDR The which sensor?

07 05 16 09 CC V over H.

07 05 16 12 CDR Did you happen to get that, Jim?

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[REDACTED]

07 05 16 13 LMP V over H; V over H sensor.

07 05 16 16 CDR Yes, I don't know where it is.

07 05 16 17 CMP It's - it's on the pan camera gadget.

07 05 16 20 CDR Okay, I guess we're not - Well, Al can talk us through it.

07 05 16 28 CC Okay, what we're looking for is to see if anything is in the way of the - the lens of that sensor.

07 05 16 38 CDR Okay. Is that the one that's on the rotating sensor, Al? On the -

07 05 16 42 CC If you're not familiar, I can give a page number in your LM Data Systems Book. Just take a look at it.

07 05 16 50 CDR Okay, stand by 1. Hey, Al. Is that - just on the lens that rotates?

07 05 16 56 CMP No, it's not - it's not on the lens, Dave, it's right alongside the lens on the body of the camera. And it's in ... tells us what speed to take a picture at.

07 05 17 04 CDR Okay, we'll get a picture of it.

07 05 17 06 CMP Okay.

07 05 17 12 CDR Okay. Jim, you get the picture out and let's get on with it here.

07 05 17 16 LMP Yes, I've got - I'm going to start the sequence camera now.

07 05 17 20 CDR Okay. I'll go ahead and do your pitcharound.

07 05 17 40 CDR And give me - give me a call when you start.

07 05 17 59 CDR Houston, what page is that on in the - in the LM Systems Book?

07 05 18 04 CC Okay. It's page 43 in the LM Systems Bo - Data Book.

07 05 18 10 CDR Okay.

[REDACTED]

07 05 18 11 LMP Hold that on, ... you can get it.

07 05 18 12 CDR Huh?

07 05 18 13 CC Okay. On the right-hand side, Dave, you see that one little line that says, "Mapping and pan cameras ... assembly."

07 05 18 20 CDR We haven't got it out yet. Stand by.

07 05 18 25 CC Okay.

07 05 18 29 CDR You getting into your maneuver, Al?

07 05 18 34 CMP Yes, I'll go the higher rate, Dave.

07 05 18 36 CDR Yes, why don't you start doing it so we can get - get all this done and get docked?

07 05 19 01 CMP Okay, ...

07 05 19 02 CDR Okay. Go ahead. Hey, it looks good, you're going the right way.

07 05 19 40 CC Dave, while he's pitching, I'll tell you - -

07 05 19 43 LMP Go, I'm - I have the book.

07 05 19 45 CC - - should be about the middle of the SIM bay by the mapping camera.

07 05 19 49 CDR Okay. We got the book out, Ed.

07 05 19 57 LMP Ed, what's the page number again in the Systems Book?

07 05 20 09 LMP Oh, I see it. Here. V over -

07 05 20 18 CDR A very nice maneuver, Endeavour.

07 05 20 49 CDR You got it, Jim? Let's see - Where's the V/H sensor?

07 05 20 52 LMP I don't - I don't see it labeled here.

07 05 21 04 CDR Okay. Houston, we don't see it labeled in here. Where - Is it labeled on the picture?

07 05 21 12 CC Negative. As soon as you have the picture, I'll tell you where to look.

07 05 21 14 CDR Okay, we got the picture; tell us where to look.

07 05 21 19 CC Okay, way over on the right-hand side, where it says, "Mapping and pan cameras N₂ PRESS system assembly."

07 05 21 34 CDR Over here?

07 05 21 36 CC ... right ...

07 05 21 39 LMP Talk to him.

07 05 21 40 CDR All right.

07 05 21 41 LMP The one with the covers open?

07 05 21 44 CDR Let's hustle, Jim.

07 05 21 45 CC That's affirm. Between the end of that arrow and the lens, about halfway, is a little dot that represents the V over H assembly. Now, the camera lens will be covered - rather it will be folded up so you will not be able to see it; however, that is the item you are looking for, represented by the small circle about halfway in between the end of the arrow and the lens of the camera.

07 05 22 12 LMP Okay. I - I see a - a small circular object there just - just to the right about - the handle, and I don't see anything covering it.

07 05 22 26 CC Are you talking about the diagram or in the SIM bay?

07 05 22 28 CDR No, in the SIM bay.

07 05 22 32 CC Okay. That's what we wanted to know.

07 05 22 36 CDR Yes, it's a little round, black - solder-type affair, right?

07 05 22 42 CC Yes, that's it.

07 05 22 43 CDR It's there.

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07 05 22 45 LMP I don't see anything covering it, do you, Dave?

07 05 22 49 CDR Yes, I can -

07 05 22 50 LMP Before you take - Let me get in a little closer there. ...

07 05 22 54 CDR Okay. we'll get one, Ed. Stand by.

07 05 23 13 CDR ... just a little bit farther over, Jim.

07 05 23 15 LMP Okay. How's that?

07 05 23 22 CDR It's good.

07 05 23 23 LMP Okay.

07 05 23 25 CDR Oh, excuse me. Got it?

07 05 23 28 LMP Got it.

07 05 23 29 CDR Okay. Okay, we've got the picture, Houston, and we'll proceed on with the docking.

07 05 23 37 CC ...

07 05 23 38 CMP Okay, I'll pitch back around now, Davy.

07 05 23 40 CDR Okay.

07 05 23 59 LMP Look how the skin blisters around the RCS quad.

07 05 24 02 CDR Yes, it sure does, doesn't it?

07 05 24 03 CC And, Falcon; Houston. Do you have any comments on the SIM bay, anything look out of the ordinary?

07 05 24 08 CDR No, it looks very clean. The doors are all covered, and all the booms are retracted, and it looks neat and tidy.

07 05 24 41 LMP That background really makes it confusing, doesn't it?

07 05 24 48 CDR Sure does.

07 05 25 26 CMP Okay, where'd you go?

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[REDACTED]

07 05 25 29 CDR We should be right where we were. Have you completed your maneuver?

07 05 25 32 CMP Roger.

07 05 25 34 CDR Okay, we're in the same inertial attitude. I'll come back around to you. You can stay there.

07 05 25 41 LMP Yes, we got to use some of this RCS, Dave. It's 70 percent.

07 05 27 14 CDR Got us now?

07 05 27 23 CMP There you are.

07 05 28 02 CDF Okay, Endeavour. You have the stationkeeping; we're going to pitch and yaw now.

07 05 28 08 CMP Okay.

07 05 28 11 LMP We'll want to position that antenna, too, Dave, here. Why don't you do that while I start this ...?

07 05 28 16 CDR Okay. Pitching now.

07 05 28 59 LMP Do you want to put the CCAS in the overhead window?

07 05 29 01 CDR Yes, I'll get it, just a minute.

07 05 29 04 LMP Okay, Endeavour, I'm going to yaw left 120.

07 05 29 09 CMP Okay.

07 05 29 32 CDR Did you get the radar positioned, Jim?

07 05 29 34 LMP Yes, it's positioned. When you get a chance, you can pull the circuit breakers.

07 05 29 40 CDR Okay, they - they're pulled.

07 05 29 41 LMP Okay, I'll do a VERB 44.

07 05 30 08 CDR Okay, looks like you're in good shape there, Mr. Endeavour. It's all yours.

[REDACTED]

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07 05 30 12 CMP Roger. Okay, Houston. Ready to get this ...
ARM, ON.

07 05 30 21 LMP PROGRAM alarm.

07 05 30 24 CC Stand by.

07 05 30 26 CMP Roger. I'll be turning on the LOGIC when you're
ready.

07 05 30 31 CC Okay; bring it on.

07 05 30 34 CMP LOGIC 1, LOGIC 2.

07 05 30 47 CDR Why don't you get a 503 - that's all right.

07 05 30 49 LMP Yes.

07 05 30 51 CC GO for PYRO ARM.

07 05 30 53 CMP Roger.

07 05 32 53 CDR How does it lock to you over there?

07 05 32 55 CMP Real good.

07 05 32 56 CDR Okay. Looks like you're a tad slow.

07 05 33 11 CMP I'm up to the ...

07 05 33 13 CDR Okay.

07 05 34 37 CDR Okay, Jim, he's about - oh, I guess about 8 feet.

07 05 34 41 LMP What's that, Dave?

07 05 34 44 CDR He's about 8 feet now. You'll feel in a minute.

07 05 34 46 LMP You want to take a picture?

07 05 35 24 CDR Okay.

07 05 35 49 CDR Through capture?

07 05 35 51 CMP No barber pole.

07 05 35 53 CDR Say again?

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07 05 35 54 CMP Yes, we got capture. Coming through?

07 05 35 58 CDR Okay.

07 05 36 10 CMP Okay. Ready to hit it?

07 05 36 12 CDR All set.

07 05 36 28 CMP Hard dock.

07 05 36 33 CC Roger, Roger. Copy hard dock. And, Falcon, if you'll give us 105 and 67, we should have your steerable.

07 05 36 40 CDR Roger. 105 and 67.

07 05 36 50 CDR Good show, Endeavour. It's nice to be aboard again.

07 05 36 53 CMP Welcome home.

07 05 36 54 CDR Thank you.

07 05 36 55 LMP Fine! Thank you, Al. Good to be back.

07 05 37 08 CC Falcon, Houston. Now that we have the steerable back, when you get a moment, pull the ECS AUTO TRANSFER, open, and then the GLYCOL PUMP 1, open.

07 05 37 22 CDR Roger. ECS AUTO TRANSFER is open, and I'll open the GLYCOL PUMP 1 now.

07 05 37 31 LMP Now I think you want GLYCOL PUMP 2.

07 05 37 33 CDR ... - -

07 05 37 34 CC We want to get a little data down here.

07 05 37 36 CDR Okay; do you want us to select 2, or just let it run?

07 05 37 40 CC Negative. Just wait for 30 seconds.

07 05 37 43 CDR Okay; we'll stand by for your call.

07 05 37 48 CC Thank you.

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07 05 37 49 CDR And, Houston; Falcon. Do you have an update for us for the IM weight and CSM weight?

07 05 37 56 CC Roger. Stand by.

07 05 37 58 CDR Okay. Let's get on with it.

07 05 38 00 LMP Yes.

07 05 38 01 CDR ... - -

07 05 38 02 CC LM weight, 5444.

07 05 38 09 CDR Roger. LM weight, 5444.

07 05 38 14 CC I don't have a CSM weight at the moment. ... close the GLYCOL PUMP 1 first and then the AUTO TRANSFER.

07 05 38 21 CDR Roger. Closing GLYCOL PUMP 1 now; AUTO TRANSFER now.

07 05 38 31 CC Roger. And I thank you.

07 05 38 41 LMP Okay, you want to go to DATA? You want to wait for their call?

07 05 38 44 CDR Better wait for their call. Okay, leave us go to work. We are back, babe.

07 05 39 01 CDR Okay - Hey, Al?

07 05 39 04 CMP Go ahead.

07 05 39 05 CDR Okay, I guess now you've got the attitude-holding functions, I guess, right?

07 05 39 09 CMP Right; I got it.

07 05 39 10 CDR Okay; because our mode controls are all off.

07 05 39 32 CDR Okay; I guess we could get ready to start this monumental task here.

07 05 39 37 LMP Yes, I'm going to -

07 05 39 38 CC And, Endeavour; Houston. A couple of changes to the command module - LM/command module transfer list on stowage items, when you get a break.

07 05 39 54 CMP Okay, Houston. Stand by 1.

07 05 40 07 CC And, Falcon, we'll take DATA and up-link you.

07 05 40 10 CDR You've got it.

07 05 40 13 CMP Okay, Houston; Endeavour. You might as well give me those - those updates now.

07 05 40 24 CC ...

07 05 40 33 CMP Okay; go.

07 05 40 37 CC Okay, Al. About the middle of the LM to command module transfer list, the second DECOM bag and the fourth DECOM bag ...

07 05 40 50 CMP Understand. Scratch second and fourth DECOM bags.

07 05 40 55 CC That's affirm. And the - at the bottom, write "Collection bag (3) in A-9."

07 05 41 18 CMP Understand. Add "Collection bag (3) in A-9."

07 05 41 24 CC ... And they're going to give you a - section of core stem, three sections long. You'll have to put that on the left-hand tray along A-1 and A-2, and secure it with - with either your LM tiedown rope or your ...

07 05 41 39 CMP Roger. Understand. The core tubes go along A-1, A-2, tied down on the tray.

07 05 41 46 CC ... You got it.

07 05 41 47 CDR (Laughter)

07 05 41 49 LMP What are you doing, Dave? (Laughter)

07 05 41 50 CDR (Laughter) I'm just trying to - I don't know. I'm trying - This zero g is something again. Trying to readapt. Well, how was that for a rendezvous?

07 05 42 07 LMP Beautiful. How nominal can you get, huh? Look at all that fuel you have.

07 05 42 16 CDR I screwed around there at the end like mad. I wouldn't - I wouldn't be surprised if that isn't some sort of record for RCS at the end of a mission.

07 05 42 27 CMP Dave, you want to verify that the dump valve's in AUTO?

07 05 42 32 LMP Okay.

07 05 42 33 CDR Okay, Al. That's - that is a verify. It's a verify.

07 05 42 39 CMP Okay; I'll go ahead and start equalizing the pressure.

07 05 42 42 CDR Okay, good.

07 05 42 44 LMP Okay; let - let me get the time line, find out what else - what else is coming up. You going to have one guy check it off as we transfer it?

07 05 42 57 CDR Yes, why don't we do that? Gad, there's stuff in here.

07 05 43 03 LMP Shit! Okay; where's - where's the time line?

07 05 43 08 CDR Crap all over this cockpit.

07 05 43 12 LMP ...

07 05 43 14 CC And, Falcon; Flight - or rather, Falcon, Houston. FDO's on pins and needles for your TPI solution, if you can get a moment to read it to us.

07 05 43 22 CDR Roger. We'll do it right now.

07 05 43 23 LMP ...

07 05 43 24 CDR Here, I'll do it. I'll read to them. Go ahead and clean that stuff up, Jim. The residuals are down there, too. Okay, Houston. I assume that you got the recycle before we went around the corner there.

07 05 43 45 CC That's affirm.

Day 8

[REDACTED]

6-47

07 05 43 47 CDR

Okay, on the final comp, I'll read PGNS, AGS, and CMC, if you are ready to copy them, in that order, in local-vertical coordinates.

[REDACTED]

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