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.
This document is the transcription of the Apollo 15 flight crew communications as recorded on the command module (CM) data storage equipment (DSE) and subsequently transmitted (dumped) to Manned Space Flight Network stations. Magnetic tapes containing dumped voice and onboard-recorded ground elapsed time (GET) were forwarded to the NASA Manned Spacecraft Center, Houston, Texas. Transcription of these tapes was managed by David M. Goldenbaum, Test Division, Apollo Spacecraft Program Office, to whom inquiries regarding 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 representing 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 GET in the flight plan may be updated to both the spacecraft and MCC computers but will not be updated to the telemetry downlink pulse-code-modulated bitstream or other time-recording devices. This GET updating will be performed only to correct significant changes in flight-plan time occurring as the result of delayed lift-off, midcourse corrections, or spacecraft burn-time differences (trajectory dispersions).

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

Speakers in the transcript are identified as follows:

Spacecraft:

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<td>Commander</td>
<td>David (Dave) R. Scott</td>
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<td>CMP</td>
<td>Command module pilot</td>
<td>Alfred (Al) M. Worden</td>
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<td>LMP</td>
<td>Lunar module pilot</td>
<td>James (Jim) B. Irwin</td>
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<td>SC</td>
<td>Unidentifiable crewmember</td>
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<td>MS</td>
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UNCLASSIFIED
Mission Control Centers:

CC     Capsule communicator (CAP COMM)

LCC    Launch control center

In the text, a series of three dots (...) is used to designate those portions of the communications that could not be transcribed because of garbling. One dash (-) is used to indicate a speaker's pause or a self-interruption. Two dashes (- -) are used to indicate an interruption by another speaker or a point at which a recording was abruptly terminated. 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 lunar module was called Falcon.
DAY 1

-00 00 00 10 LCC 10, 9, 8, 7, 6, 5 -
-00 00 00 04 LCC IGNITION, 3, 2, 1 -
00 00 00 01 LCC LIFT-OFF!
00 00 00 02 CDR And the clock is running.
00 00 00 04 CMP Okay. ... lift-off ...
00 00 00 12 CC Clear the tower!
00 00 00 13 CDR Roger dede [sic]. Clear the tower, and we have a roll program. ...
00 00 00 18 CC You have good thrust on all five engines.
00 00 00 21 CDR Thanks, Gordo. Roll's complete. And we have a pitch program.
00 00 00 29 CC Pitch.
00 00 00 39 CC Stand by for Mode I Bravo.
00 00 00 42 CC MARK. I Bravo.
00 00 00 44 CDR Roger. I Bravo.
00 00 00 45 CMP PROPELLANT DUMP, RCS COMMAND, Dave.
00 00 00 46 CDR Okay.
00 00 00 54 CDR Okay. Going through the air. (Laughter)
00 00 00 55 CC ... 15 ...
00 00 00 56 CMP Cabin pressure decreasing.
00 00 00 57 CDR Okay. Good.
00 00 00 58 LMP Looks good over here.
00 00 01 00 CMP High at 20,000.
00 00 01 01 LMP Dead
00 00 01 02 CMP  One minute.
00 00 01 03 LMP  Here ...
00 00 01 04 CC   ..., Houston. Everything looks perfect down here.
00 00 01 06 CDR  Okay. Looks smooth up here, Gordo. Okay, the altimeter is six zero.
00 00 01 12 CMP  Well, how about that?
00 00 01 28 LMP  Exciting!
00 00 01 30 CDR  Okay. We're through MAX q.
00 00 01 34 CMP  Okay. 1:32. Program looks good, Dave. Out at 11 miles.
00 00 01 40 CDR  Okay. Good shot. Two and 1/2g.
00 00 01 44 LMP  Roger.
00 00 01 47 CDR  Pitch profile looks good.
00 00 01 50 LMP  Roger.
00 00 01 52 CMP  1:50.
00 00 01 55 CC   Stand by for Mode I Charlie.
00 00 01 58 CC   MARK. I Charlie, now.
00 00 02 00 CDR  Roger. I Charlie.
00 00 02 02 CMP  EDS AUTO to OFF.
00 00 02 06 CDR  Okay, we're at 3g's. Stand by for inboard.
00 00 02 14 CMP  Okay. The program's looking good.
00 00 02 18 CDR  Inboard.
00 00 02 19 CC   ... Inboard.
00 00 02 30 LMP  A little high hum, there.
00 00 02 31 CMP  Yes.
Day 1

00 00 02 32 CDR Okay, 10 seconds to staging. Hang on.
00 00 02 34 CMP Okay.
00 00 02 36 CDR Five seconds.
00 00 02 43 CMP Man, you aren't kidding.
00 00 02 44 LMP Boy.
00 00 02 48 CDR Good stage.
00 00 02 49 CC ...
00 00 02 56 CC ... Houston. You have good thrust on the S-II. All five are good.
00 00 02 59 CDR Okay.
00 00 03 00 CMP Okay, Dave. You got TFF 3:26.
00 00 03 02 CDR Good show. We'll go on time.
00 00 03 12 CMP Second plane SEP.
00 00 03 15 CC ...
00 00 03 17 CDR Good show.
00 00 03 18 CMP Tower JETT.
00 00 03 19 CC We confirm the skirt SEP. You're Mode II.
00 00 03 22 CDR Roger. Mode II. Guidance initiate.
00 00 03 29 CC ...
00 00 03 37 CDR How we doing, Al?
00 00 03 38 CMP We're doing fine; 63 miles.
00 00 03 41 CDR Good.
00 00 03 48 LMP Everything looks good over here.
00 00 03 50 CDR Okay.
Just - looks just about a hundred feet per second down on the H-dot, but everything else looks fine.

Okay, I got the big fireball going by at staging. I don't know whether you saw it or not. That beauty really goes.

Yes - -

..., Houston. At 4, the guidance has converged, the CMC is GO, and everything looks good.

Okay, Gordo. Looks good up here.

Man, I got the Moon in my window.

Yes, sir. It's out there.

Thrusters are stable; the ball's stable.

We're at a $V_i$ of 11,000 and right on the money.

Good show. Let me check here at 4:30 just to make sure.

That sucker's right on - right on.

Little high on altitude. I bet you they're going to give you the ... here in a minute.

I hope so by now.

..., Houston. Five minutes. Everything looks nominal. You're GO.

Okay, Gordo; thank you. Looks good up here. Got a smooth ride so far.

...

Yes siree, looks good.

See, we're getting just a little teeny bounce. You feel it now?

Uh-huh.

Every once in a while?
00 00 05 25 CMP Yes.
00 00 05 30 CDR Very low amplitude.
00 00 05 41 CDR Okay, be watching for the S-IVB for COI.
00 00 05 44 LMP Okay.
00 00 05 45 CC ..., Houston. Times are nominal. The level sense arm will be 8 plus 34, and S-II cut-off at 9 plus 09. Over.
00 00 05 53 CDR Roger; 8 plus 34 and 9 plus 09.
00 00 05 57 CDR Okay, Jimmy; gimbal motors.
00 00 05 58 CC Stand by for S-IVB to COI.
00 00 06 00 CC MARK. You have S -
00 00 06 02 CDR Roger. S-IVB to COI. Jim?
00 00 06 04 LMP Ready. 1, 2, 3, 4.
00 00 06 11 CMP On and trimmed.
00 00 06 22 CDR Okay, we're right - right down the line.
00 00 06 26 LMP Okay.
00 00 06 27 CMP Coming up on 15,000 V_I, 260 H-dot. That's right where we ought to be, and that gives us an SCS COI.
00 00 06 32 CDR Okay. Keep your eye up for S-IVB to orbit.
00 00 06 38 CMP Yes.
00 00 06 43 CC Stand by for S-IVB to orbit capability.
00 00 06 47 CC MARK. You have it now.
00 00 06 49 CDR Roger; S-IVB to orbit.
00 00 07 01 CDR How's our cabin pressure, Jim?
00 00 07 03 LMP Holding at 6.
00 00 07 04 CDR Very good.
00 00 07 18 CMP Feels like we get a little vibration out of that thing.
00 00 07 21 CDR Well, it seems to be pretty steady though.
00 00 07 24 CMP Yes.
00 00 07 25 CDR We're about 1.7g, somewhere around there. Okay, 10 seconds to inboard.
00 00 07 34 CMP V₁'s 18,000. ... We're at 96 miles.
00 00 07 40 CDR Inboard.
00 00 07 41 CC Inboard.
00 00 07 48 CDR Okay, about 10 seconds to PU shift.
00 00 08 03 CMP Didn't even feel it. There it goes, 8:03.
00 00 08 10 CDR A little bit.
00 00 08 11 CMP Yes.
00 00 08 12 CC Houston - 15, Houston. Go ahead.
00 00 16 56 CMP The first LINE HEATER's on.
00 00 16 58 CDR Okay. Have you got the torquing angle?
00 00 17 02 CMP Mm-hum. Okay, we could do the SM RCS monitoring check and the CM --
00 00 17 06 CC 15, Houston through Canaries. Over.
00 00 17 10 CDR Go ahead, Houston; 15. What's your --
00 00 17 12 CC You're loud and clear.
00 00 17 14 CDR The S-IVB tank pressure ... above ...
00 00 17 42 IMP I know we're over the ... but ... Indian Ocean should be.
00 00 17 45 CMP Okay.
And it looks like the S-IVB is tracking very nicely.

... we were going so fast.

Huh?

I - I guess I hadn't really - hadn't - myself thought we wouldn't be - it wouldn't be visibly this fast.

Oh --

Okay. Carnarvon at 52.

Okay. I'm going to do a fuel cell purge check here, Dave.

Okay. Al, we'll put a --

Go ahead.

Huh?

Do you want to get - get going down there?

Yes.

Go slow.

Yes.

Try and clean some of this stuff off, too.

Ah, oh, eat it!

You can take mine and stick it in there, too.

Yes.

With that indicator out, I can't confirm an H₂ purge on fuel cell 2.

Really?

Can't you get the - get the H₂ -

Caution and warning tone?
No, we don't get it.

Hm.

Hm. Better discuss that with them next time we --

Yes.

-- go by.

Well, shall we gently step along?

Yes. Do you want R-12 out now, Jim? Anything Flight-Data-File-wise that you need now?

I don't need anything, Al.

Okay. I'm just going to stick these cards here in the compartment then, and --

Okay, Dave. Do you want to swing over and get the SM RCS monitoring check? Or do you want me to get that?

Oh, I can get it.

Here. I can just read it to you.

Shoot.

SM RCS PROPELLANT talkback, eight, gray.

Eight, gray.

RCS HELIUM 1 and 2 --

Whoops, stand by; we got one - one barber pole right down - we got B PROPELLANT - barber pole. That was probably a mistake. We open it, and it's gray.

You want to make a note?

Yes.

B PROPELLANT --
B SECONDARY PROPELLANT - B SEC PROPELLANT was barber pole, and it reset to gray.

Okay. Okay. SM RCS INDICATOR, HELIUM TANK TEMP.

Okay. HELIUM TANK TEMP.

RCS INDICATOR selector to A through D. Give me PACKAGE TEMP, HELIUM PRESSURE - all four.

Okay. Let me get calibrated here. You want - That's in temperatures only, huh?

No, I want TEMP, PRESSURE, ... PRESSURE, and HELIUM TANK TEMP.

Okay. 140, 4000, 200, 71.

Good.

150, 4000, 195, 70.

Good.

140, 4200, 195, 74.

Good. D.

D is 150, 4000, 190, and 72.

Okay, your MANIFOLD PRESSURE's 2 low.

Say again?

The MANIFOLD PRESSURE on D is a little low, about 2.

Oh.

Its lower - lower limit is, accord - 192.

Oh, okay, I'll give you one - Well, shoot, ... - - You can't read it. Okay. CM RCS monitoring check.

Okay.

CM RCS PROPELLANT talkback, two, gray.
00 00 25 15 CDR Two, gray.

00 00 25 16 LMP RCS INDICATOR, switch to CM 1 and 2.

00 00 25 20 CDR Okay. CM 1 - I'm waiting - Okay, you want --

00 00 25 23 LMP HELIUM TEMP, PRESSURE, and MANIFOLD PRESSURE.

00 00 25 26 CDR Okay. HELIUM TEMP's about 70 --

00 00 25 31 LMP Good.

00 00 25 32 CDR -- 4000, and 95.

00 00 25 37 LMP Okay, HELIUM should be 4100 to 4200.

00 00 25 39 CDR Okay, it's right on 4000.

00 00 25 41 LMP Okay. Okay. For 2?

00 00 25 45 CDR Two; I'm looking at 70, 4000, and about 90.

00 00 25 52 LMP Okay. Okay. I'm going to do a caution and warning operational check here.

00 00 25 59 CDR Okay.

00 00 26 06 LMP We're going to get a MASTER ALARM here.

00 00 26 16 CDR Okay, let me check.

00 00 26 18 LMP Okay, you're down in the LEB, Al?

00 00 26 20 CMP Yes.

00 00 26 21 CDR Get those --

00 00 26 22 LMP Okay, can you get the strut unlocked while you're getting those?

00 00 26 23 CDR I'm getting them right - I'm getting them right now.

00 00 26 25 LMP Okay.

00 00 26 40 CMP That was a fantastic ride!

00 00 26 42 MS (Laughter)
I'm just now beginning to understand what went on.

Yes, boy.

That S-IC really does shake!

Yes.

Are you still working on that, Al?

Got the lanyard low - stowed.

Okay. DRINKING WATER SUPPLY valve, ON.

Okay. See if I can get to it here.

Okay, it's ON.

Okay. CB: COAS/TUNNEL LIGHTING, MAIN B, closed.

Get your big foot out of the way.

Push me down.

I did. Okay. It's closed.

Okay. Unstow helmet bags, accessory bags, and tool E.

Okay. David, the helmet bags - Let's see, they're behind you, aren't they?

Yes, they're - I got to get those stupid things.

They're in U-4 - or U-1. Tool E is in L-2.

Yes. I'll get it. I don't know what this little thing is here,...

Okay, I'm going to switch around and get that window cover.

Okay. Let's see, where the heck is tool E? ... Here it is.
(Laughter) I didn't see the - the decal on the light over here.

On the light?

Yes. "This vehicle will not be placed in motion until all seat belts are properly fastened. By order of the Chief of Staff, USAF."

Oh, you didn't see that? (Laughter)

No.

It would sure be easy to knock some switches here.

Yes. It sure would be. Okay, that's a thing we got to watch pretty close, huh?

I - I might get you to get that window shade, Al, if - if you have a chance.

Oh, it's in the --

I know where it is - it's just hard for me to get over to one of them - ... below it --

I'll get it. Yes.

Is it in with the other window shade?

Yes.

Yes.

I can get it, it's right in here.

We want to put that in here so we don't get sunburned.

Good boy.

Give us the Lexan.

Yes.
00 00 28 58 CDR  ... Okay, there's tool E.
00 00 29 02 CMP  Now, let's see. You want to do that EMERGENCY
      CABIN PRESSURE thing?
00 00 29 08 LMP  Yes, let me - I've got a - I'm confirming normal
      suit and cabin pressure.
00 00 29 12 CMP  Okay.
00 00 29 13 CDR  Here's your Lexan, Jim.
00 00 29 15 LMP  Okay.
00 00 29 16 CDR  Got it?
00 00 29 17 CMP  Be very careful of that Lexan, because I - I'm going
      to need to take some pictures through it.
00 00 29 21 LMP  Yes, okay.
00 00 29 25 CDR  Make sure you get everything tied down when you get
      through using it, because we got one more little
      g-level thing to go through here.
00 00 29 32 CMP  Yes, right.
00 00 29 46 CDR  Okay. Helmets and access - helmet bags and access-
      sory bags.
00 00 29 50 CMP  Right here.
00 00 29 55 LMP  Okay. The Lexan shade is on.
00 00 29 57 CMP  And grab the TSBs while you're there, too. Dave.
00 00 30 01 CDR  Okay.
00 00 30 02 CMP  Okay, Jim. I guess we could do the --
00 00 30 06 CDR  Where are the TSBs, Al? They're not up here.
      They're down in one of those other things.
00 00 30 19 MS  ...  
00 00 30 22 CMP  Must be in U-1.
00 00 30 23 CDR  Really?
00 00 30 24 CMP    Yes.
00 00 30 27 CDR  In U-1 - I was looking in U-2?
00 00 30 30 CMP    Oh, okay.
00 00 30 32 LMP    Let's see. The \( O_2 \) FLOW is high.
00 00 30 34 CMP    What's the cabin pressure --
00 00 30 35 LMP    Oh, it - it just dropped down.
00 00 30 36 CDR    Yes. Okay.
00 00 30 37 CMP    What's - what's the cabin pressure? We still got
                   the waste stowage vent --
00 00 30 38 LMP    Yes. It's ...
00 00 30 39 CDR    It's 6.
00 00 30 40 LMP    Well, it was just high for a little bit.
00 00 30 41 CMP    Yes.
00 00 30 42 LMP    Okay. CABIN PRESSURE - EMERGENCY CABIN PRESSURE
                   valve to BOTH, Al.
00 00 30 48 CMP    Okay. EMERGENCY CABIN PRESSURE going to BOTH.
00 00 30 50 LMP    And SUIT CIRCUIT RETURN VALVE, open, Dave.
00 00 30 55 CDR    Yes, sir. It's open.
00 00 31 00 LMP    Okay. We can - I got the window cover on. We can
                   remove helmet and gloves and stow in PGA bag.
00 00 31 05 CDR    Don't we - don't we do a check first?
00 00 31 08 LMP    No, we don't. That MAIN REG check's on the next page.
00 00 31 11 CDR    Well --
00 00 31 12 LMP    As long as you're in position though, Al, let's do it.
00 00 31 13 CMP Yes.
00 00 31 14 CDR Let's do it.
00 00 31 15 LMP Okay. MAIN REG B valve, closed.
00 00 31 17 CMP MAIN REG B, closed.
00 00 31 18 LMP EMERGENCY CABIN PRESSURE, select to 1.
00 00 31 20 CMP 1.
00 00 31 21 LMP PUSH TO TEST pushbutton, push for O₂ FLOW increase.
00 00 31 23 CMP Okay.
00 00 31 30 CMP Don't see anything.
00 00 31 31 LMP There it goes --
00 00 31 32 CDR Okay. There it goes.
00 00 31 33 CMP Okay.
00 00 31 34 LMP Okay. MAIN REG B valve, OPEN.
00 00 31 35 CMP OPEN.
00 00 31 36 LMP MAIN REG A valve, closed.
00 00 31 37 CMP Closed.
00 00 31 38 LMP EMERGENCY CABIN PRESSURE, select to 2.
00 00 31 40 CMP To 2.
00 00 31 41 LMP PUSH TO TEST pushbutton, push for O₂ FLOW increase.
00 00 31 44 CMP Okay. Pushing. I got it.
00 00 31 47 LMP Okay, MAIN REG A valve, OPEN.
00 00 31 49 CMP OPEN.
00 00 31 50 LMP EMERGENCY CABIN PRESSURE, select to BOTH.
00 00 31 52 CMP  BOTH.
00 00 31 53 LMP  Okay. That's complete.
00 00 31 55 CDR  Okay.
00 00 31 56 LMP  So, we - you want to take off helmets and gloves now?
00 00 31 58 CDR  Yes.
00 00 31 59 CMP  ..., yes.
00 00 32 01 CDR  Cabin pressure look good?
00 00 32 02 LMP  Yes.
00 00 32 03 CDR  Okay. Let's get into our little home. Shall we do it?
00 00 32 23 CMP  The accessory bags inside here, Dave?
00 00 32 25 CDR  Yes.
00 00 32 26 CMP  Let's see, you're C.
00 00 32 27 CDR  Okay, thank you.
00 00 32 28 CMP  And let's see what kind of label you got on yours today. Jim, you got an R - for you today.
00 00 32 36 LMP  R, okay.
00 00 32 40 CDR  R, C, and L. Guess we can keep track of that.
00 00 32 52 LMP  It's so pretty out here, Dave, I'd almost settle for an Earth-orbit mission.
00 00 32 56 CDR  Don't you say that.
00 00 32 57 CMP  (Laughter)
00 00 33 00 CDR  Well, you'll get one, maybe someday. Who knows?
00 00 33 18 CMP  Boy. Sure doesn't take much to scratch these helmets.
00 00 33 23 CDR  No. Sure doesn't.
00 00 33 30 CMP Oh, it's quiet.
00 00 33 32 LMP Sure is.
00 00 33 34 CMP Let's see, what have we got going, just the suit fans?
00 00 34 09 LMP It's so quiet, it's kind of eerie -
00 00 34 11 CMP Yes.
00 00 34 12 LMP Almost like a space flight.
00 00 34 18 CMP (Singing)
00 00 34 19 CDR Okay. We got to snap these things ...
00 00 34 24 CMP Yes. We're supposed to try to keep them up there where we can get them ...
00 00 34 29 CDR You give me a hand here, will you?
00 00 34 30 CMP Yes, we'll give you one.
00 00 34 32 LMP ... onboard ...
00 00 34 40 CDR ... convenient place ...
00 00 34 45 CMP Yes.
00 00 34 47 LMP ...
00 00 34 53 CMP ...
00 00 35 08 LMP You want to ... them all?
00 00 35 10 CDR I guess --
00 00 35 11 CMP ... all ... put them up.
00 00 35 20 CMP I'll never do this again.
00 00 35 28 CDR I'll bet you would (laughter).
00 00 35 30 CMP Oh, what a joy! (Laughter) Oh, what a joy!
00 00 35 34 CDR You don't ... to mind it.
What a joy! Too much ...

Let's see. If you're going to do that, hand me the checklist --

Okay. What do we - what do we need, Dave? Why don't you read it out to me now? ...

DAC.

Got magazine Able.

Able. Okay.

Okay, which lens?

Power cable, 18-millimeter lens.

18-millimeter lens. Okay, 18 lens.

Right-angle mirror.

Right-angle mirror.

Assemble and mount in the left-hand window ...

Left hand ... Okay, ... need to get out of here ...

Here's the mirror.

... the power cable.

Okay, Dave, when you get a chance, you want to monitor SECONDARY ACCUMULATOR QUANTITY.

Now - do you want to get the Hasselblad out?

Oh, yes. Yes, we want --

It's got a MAG.

Well, better cross it out. ...

MAG M. Oh, it is crossed out?

... EL. Oh, okay. Spotmeter. Stow in the IMP TSB. I guess you better get the TSBs out ... --
00 00 37 08 CMP Yes.
00 00 37 10 CDR And the TSBs are up behind Jim.
00 00 37 12 CMP Yes. Yes. They're behind you, Jim.
00 00 37 15 LMP What, the TSBs?
00 00 37 16 CMP Yes.
00 00 37 17 LMP Up over here?
00 00 37 22 CMP Guess that's all we need out of here for now. ...
00 00 38 04 LMP Boy, you really get a Coriolis effect by looking at that ... in here.
00 00 38 08 CDR Yes; that's why I say, just go slow, because it will all go away here in a few hours. Won't even notice it. ... - -
00 00 38 14 LMP ... always felt we'd parted some company, didn't you?
00 00 38 17 CMP Yes.
00 00 38 18 CDR No, but it's nice to just go slow.
00 00 38 20 CMP Yes. Oh, yes, it's - -
00 00 38 21 LMP Are you ready for some TSBs?
00 00 38 23 CMP Yes, you need yours most of all.
00 00 38 25 LMP I - I need mine?
00 00 38 26 CMP Yes, because you need to put these two cameras in it.
00 00 38 29 LMP Okay.
00 00 38 43 LMP Okay. You want to hand me the camera, Al?
00 00 38 46 CMP Okay, Jim, that's the - Yes, here you go.
00 00 38 49 LMP Is that for my UV work?
00 00 38 51 CMP Your EL with magazine M in it.
00 00 38 54 LMP For the UV?
Yes. Okay. And here's your spotmeter.

Spotmeter go in here, too?

Yes. Got it? Okay. I'll get the TV camera out.

Okay, I'm going to do the - Dave, are you ready for that leak --

Yes.

-- that secondary RAD leak check?

Yes, sir.

Okay. If you'll - put the SECONDARY GLYCOL TO RAD valve, NORMAL, for 30 seconds.

Have, you got tool E?

Yes. Yes, it's right up in front of you there, Dave.

Oh, thank you. Jimmy? Can you reach here?

No. And it's starting to get dark.

Really? I've got to get going on the P52.

Yes.

Okay. I can't get that, Jim, until Al closes the door there.

Yes; okay.

I'll do this ECS Postinsertion Configuration.

Okay.

Okay. GLYCOL RESERVOIR BYPASS valve to OPEN.

Okay, OPEN.

GLYCOL RESERVOIR OUT valve, CLOSE.

CLOSED.
GLYCOL RESERVOIR IN valve, CLOSED.

And the PRIM quantity, let me check it - 25 to 50 at - It's good.

Okay.

Al, let's - Can you reach the PRIM ACCUMULATOR FILL valve?

Yes.

Okay, put it ON.

Here, Jim, can you reach the cable? ...

Yes. I've got it now.

Okay.

You working on that one, Dave?

Sure am.

Can you get to it there, Dave?

Haven't yet. No. Can you get to it?

Well, what do you need? PRIMARY ACCUM?

Yes.

Yes, sure. Which way do you want it?

Well, it was the PRIMARY ACCUMULATOR FILL valve -

PRIMARY ACCUMULATOR FILL; okay.

Put it ON. I'll tel. when to - put it back --

Turn it ON?

Okay --
00 00 41 36 CMP   It's ON.
00 00 41 37 LMP   -- you can turn it back OFF.
00 00 41 38 CMP   Okay, it's OFF. Is that all?
00 00 41 40 CDR   Yes. Why don't you get the secondary while you're there? Jim, do you have that?
00 00 41 43 LMP   Yes. SECONDARY GLYCOL TO RAD valve, NORMAL, Al, if you're in that position. Let me know when you - when you get it in NORMAL.
00 00 41 50 CMP   Yes, I can't quite reach that.
00 00 41 51 CDR   Okay.
00 00 41 52 MS    ...
00 00 41 54 CMP   Can you get it there, or --
00 00 41 55 CDR   Yes.
00 00 41 56 CMP   If you'll wait a minute, I'll be able to get it.
00 00 41 57 CDR   I can get it. Thank you.
00 00 41 58 CMP   Okay.
00 00 42 00 LMP   Let me know when you get it to NORMAL.
00 00 42 04 CDR   Okay, going NORMAL now, Jim.
00 00 42 06 LMP   Okay.
00 00 42 07 CDR   It's in NORMAL.
00 00 42 15 CMP   Okay, Jim. Here are the lines to the TV.
00 00 42 20 LMP   Wish I had a place to set that thing.
00 00 42 22 CMP   Yes. ...
00 00 42 23 LMP   Okay. ... the monitor.
00 00 42 26 CDR   Okay. How long you want this thing in NORMAL?
Oh, I'll give you a hack here.

Oh.

Okay -

MARK. It's - SECONDARY, looks okay.

Okay, I'm back to BYPASS.

Okay.

Is that right?

Right. BYPASS.

Dave, can I hand you the monitor over there?

What - Oh, yes --

For the TV.

Let me - Let's see, I got ECS RAD FLOW CONTROL to POWER; PRIM GLYCOL TO RAD valve, NORMAL.

GLYCOL TO RAD valve, NORMAL. ...?

I got that. ECS RAD FLOW CONTROL, POWER.

Oh. Okay, it's NORMAL.

Okay. You've got PRIM GLYCOL TO RAD valve, NORMAL --

Okay.

-- RAD HEATER going to PRIM 1.

Okay.

ECS RAD talkback is grey. GLYCOL EVAP TEMP IN going AUTO.

Okay, who can give me a checklist so I can do these optics?

Here you go.
Okay, I --

POTABLE WATER HEATER to MAIN A. Okay. ECS Post-insertion Configuration complete.

Okay.

Give you this monitor, Dave.

Okay.

What else you got on there, Jim? Oh, the TSBs.

Yes, do you want a TSB?

I'll get them out. Do you want to put one up on the --

That'll do. ... --

Down there, Al. You --

... Okay.

Okay. I've got an EPS monitoring check here; secondary glycol loop check, and we've got the cameras out already.

Al, you want to check that?

I'm going to go through a secondary glycol loop check here.

Okay.

Hey, Al?

Yes.

See that little - see that funny little switch they put on here?

Oh, really?
00 00 44 47 CDR  It came off.
00 00 44 48 CMP  How about ... --
00 00 44 49 CDR  Well --
00 00 44 50 CMP  I've got a pocket down here.
00 00 44 51 CDR  I got a pocket, no sweat, I just don't want to forget it and have it floating around.
00 00 44 54 CMP  Yes.
00 00 44 56 IMP  SECONDARY GLYCOL PUMP --
00 00 44 57 CMP  Okay. Optics eyepieces are in, G/N OPTICS POWER going on. OPTICS, ZERO OFF, then ZERO. Okay.
00 00 45 22 CDR  Okay, that's 15 seconds. The OPTICS ZERO, OFF -- MODE, MANUAL. ... Here we go.
00 00 45 51 IMP  Hallelujah!
00 00 45 54 CDR  Getting stars?
00 00 45 55 CMP  Yes, sir!
00 00 45 56 CDR  Oh, okay.
00 00 45 59 CMP  Whoops. A good mark there.
00 00 46 06 CDR  Okay.
00 00 46 07 CMP  Who gave you permission to write ... out here? ... Okay. ...
00 00 46 21 CMP  Yes. That's true. Oh, dear. ...
00 00 46 29 CDR  Okay. Okay, old PICAPAR, let's see what you can do.
00 00 46 35 CMP  Okay; 33. Antares. ... Okay. And ...
00 00 47 01 CDR  ...
Boy, at night, you might – might as well be in the simulator (laughter).

Yes, except for the physiological change.

Yes. Okay, the EPS monitoring check is complete, Dave.

Okay.

Except for the battery relay bus read-out down there in SYSTEMS TEST meter 5-B.

You can pick that up.

Yes.

Yes.

Okay. It doesn't look too good ... down in there.

EPS monitoring check now.

Okay. Did – did you do your fuel cell purge check, or ...

No, I couldn't do the H₂.

Oh.

Doublecheck ... Forty-one. Okay, Dabih.

Forty-one, right.

... Five in. ...

Forty-one is what?

Dabih.

Dabih. ... okay?

Yes. I got it.

Okay, EPS monitoring check's complete.

Okay. Let's see how we did. (Cleared throat)
Well, pretty good.

... all four ...

About another 3 minutes for AOS.

Okay. I'll tell you what I'd like to do here ... the pass.

Do?

Check out the RCS real quick.

Here's the torquing angles, David.

Okay. ...

Go back to zero, and I think I have to get the optics back out. Right? Did you stow the optics, Jim?

Okay. Here, do you want to torque at 40? What do we torque at rendezvous?

Yes, did - did you stow the optics eyepiece, Jim?

Should we torque about 50?

Yes.

Okay. Good deal.

Okay. You got the numbers written down?

Yes.

Very good, Dave.

Okay.

Very good ...

Okay, Al, and you might - Why don't you come up here and let me show you what the jets look like when we fire the ...
00 00 50 14 CMP Oh, okay. Yes. Let me - let me check out a quick star here.
00 00 50 17 CDR Well, we got to do - I want to do this before AOS.
00 00 50 23 CMP Okay.
00 00 50 32 CMP Well, let me climb up here. ...
00 00 50 34 CDR Oh, I'm sorry. Okay. It's - it's good.
00 00 50 38 CMP Yes. I ...
00 00 50 40 CDR Yes.
00 00 50 45 CMP Well -
00 00 50 51 CDR Okay. You can probably look out my window.
00 00 50 54 CMP Oh, yes. Very good --
00 00 50 56 CDR I lost my watch.
00 00 50 57 CMP Jim, you got my --
00 00 50 58 LMP Yes.
00 00 50 59 CMP -- stopwatch?
00 00 51 00 LMP I'm looking for one.
00 00 51 05 CMP Did you see that?
00 00 51 06 LMP Yes, I saw a flash.
00 00 51 07 CDR Saw a flash? You did? Couldn't hear it - I didn't hear it. Huh, I'll be darned!
00 00 51 16 CMP Could sure see a flash.
00 00 51 17 CDR Yes. Saw a flash, but I didn't hear it. Gosh, I used to hear them all the time. Huh!
00 00 51 26 CMP You know, it's amazing what ... outside that window ...
00 00 51 34 LMP Well, yes --
00 00 51 35 CDR That's because you got your ... lights on in here.
00 00 51 37 CMP Yes.
00 00 51 43 CDR Okay, ... here.
00 00 51 47 LMP Okay, the secondary glycol loop check's complete.
00 00 51 50 CDR Okay.
00 00 51 57 CC 15, Houston through Carnarvon. Over.
00 00 52 00 CDR Roger, Houston; 15. You're loud and clear.
00 00 52 04 CC You're loud and clear also.
00 00 52 07 CDR Okay; the insertion checks are coming along --
00 00 57 54 CMP We should have MAG --
00 00 57 55 CC 15, Houston. About 15 seconds to LOS. Estimating United States at 1:30 GET.
00 00 58 06 CDR Roger. 1:30.
00 00 58 09 LMP Al, my doggone checklist says MAG M ought to be on here for the UV.
00 00 58 14 CDR MAG N?
00 00 58 15 LMP MAG M, man.
00 00 58 16 CMP Yes, that's right --
00 00 58 17 LMP Yes --
00 00 58 18 CMP That - that --
00 00 58 19 LMP ...
00 00 58 20 CMP -- has the color stuff there, too.
00 00 58 21 LMP Oh.
00 00 58 22 CDR -- ... take a picture ... --
00 00 58 23  LMP  Yes. ... better get two of these. ...
00 00 58 26  CMP  Davy?
00 00 58 27  CDR  Yes.
00 00 58 28  CMP  You want to put that on there?
00 00 58 30  CDR  ... monitor?
00 00 58 31  CMP  Yes.
00 00 58 33  CDR  Yes. I don't know what we're going to do with this thing. I guess Jim has to hold this during TLI. Or something like that.
00 00 58 44  LMP  Why - why can't I put it on the bracket?
00 00 58 47  CMP  You can.
00 00 58 48  CDR  ... Okay. Where's the bracket?
00 00 58 56  CMP  It's down in - A-1.
00 00 59 00  CDR  Okay.
00 00 59 03  LMP  Bracket's in A-1.
00 00 59 04  CDR  Okay. ... get it.
00 00 59 20  CMP  Man, that was some fantastic ride! Gaa!
00 00 59 26  CDR  Something you're not likely to forget for a while.
00 00 59 32  LMP  And when you get a chance, Al, I need the - the UV bracket.
00 00 59 36  CMP  Okay.
00 00 59 46  CMP  The UV bracket, and the UV ... , and the UV lenses.
00 00 59 50  LMP  Yes.
00 00 59 51  CMP  Yes.
00 00 59 54  LMP  Am I supposed to be ... you, Al?
00 00 59 56 CMP No.
00 00 59 57 LMP Okay.
00 01 00 02 CMP Here's the UV lenses.
00 01 00 18 CMP Here's the UV bracket.
00 01 00 25 CDR Camera checkout. Can I have the ... up here, Jim?
00 01 00 32 LMP Yes.
00 01 00 33 CDR Yes.
00 01 00 34 LMP Okay, Al. Where'd it go? Let me trade you. Hold the lens for me. While you're holding the lens - If you'll hold that, I'll get you the bracket.
00 01 00 42 CMP Okay. I'm holding it.
00 01 00 58 CMP Okay. ... UV bracket.
00 01 01 06 LMP Could you put this - here, I guess - can you put this lens away? Up there, or do you want me to keep it up here?
00 01 01 12 CMP ... You'll - you'll need it if you take any color pictures. ... lots of ... already. What's the matter, Davy?
00 01 01 30 CDR (Laughter) You got to have the pyro arm circuit breakers in to turn the RCS command on.
00 01 01 36 CMP How about that?
00 01 01 38 LMP We're going to keep you honest.
00 01 01 40 CMP Okay, where do you want it?
00 01 01 41 LMP I'll take the --
00 01 01 42 CMP Oh!
00 01 01 43 LMP I'll take the lens now.
00 01 01 44 CMP Hum. Okay. ...
...  
Okay, your pitch rate.  
Why don't you --  
Good ...  
Okay, pitch?  
Yes. Pitch, roll; roll, pitch. Good ...  
Good.  
And quad D going open.  
...  
Let me know when you all are --  
in the way.  
-- ready for your TSBs, and I'll hand them to you.  
Okay. Hey, you can give me mine, Jim. He's taking yours.  
Then when you get a change --  
Okay, ... TV bracket.  
-- you can give it back.  
Okay, Al, here's your TSB.  
Okay. ...  
Dave, here's yours.  
Gee, thanks a lot, Jim.  
Any time.  
... but the University of Michigan was well represented.
Day 1

00 01 03 11 LMP Is that right? (Laughter)
00 01 03 14 CDR Yes. Couple of little calling cards here.
00 01 03 16 LMP You know, I keep going up to the top of the vehicle.
00 01 03 18 CDR Well, that's a common phenomenon.
00 01 03 20 LMP Up toward that hatch.
00 01 03 21 CDR Everybody always has.
00 01 03 22 CMP ... funny.
00 01 03 24 CDR That's exactly right. We did that for 10 days and never figured out why.
00 01 03 38 LMP Shoot! ... somebody ... this hatch. ... 
00 01 03 45 CDR Al, I'm going to give you the ... to put back up there.
00 01 03 47 CMP Okay.
00 01 03 48 CDR So we don't lose track, here.
00 01 03 51 CMP That's the name of the game for the next 12 days, gang. Put it back.
00 01 03 56 CDR ... 
00 01 04 14 CDR Okay. Let's see, Al. Do you have the -
00 01 04 17 CMP What? The TV lens? Where's the TV?
00 01 04 20 CDR Right on the couch.
00 01 04 23 CMP ... back here and see if I can bump into it.
00 01 04 26 CDR Okay.
00 01 04 27 LMP Do you have the right settings on it? Want me to read them to you?
00 01 04 29 CMP Yes, what are they?
00 01 04 34 LMP I don't know why we've been putting that TV up so early.
Just to get it out of the way.

Okay. We want ALC to peak. And f/44.

Peak - and average.

ALC to peak.

No, wait a minute; f/44.

Okay, f/44.

Yes.

Guess we - we might as well leave the - the lens cover on until we're ready to use it.

Dave, did you do - do that SCS attitude reference - reference check?

I'm doing it right now.

Okay.

Sunrise in about 16 minutes.

Okay, f-stop at 44, with about - ...

Get the - Judge that -

Okay.

-- ground direction.

-- ... f-stop, 30, and the focus at - at infinity. ...

That's right.

I'll take those. I guess it doesn't really matter ...

Yes.

Okay, Jim, if you want to stick that in the -

... back you up.

And I'll plug it in.
Okay. Attitude reference check.

Hey, Jim. You got the SPS monitoring check all right? ECS monitoring check? EPS?

Yes. I've taken care of all those checks, Davy. ... come up to the - docking probe.

Yes.

After that SCS reference.

Okay, Jimmy, you're all hooked up.

Okay. If I can just get my bracket in here. Pointed in the right dir - -

Do we need anything else out of A-1, before I close it?

When you get a chance, Al, out of R-12, I think I need that - probably need - ...

Just like that cardboard - for the window.

You - you want - you want to pull R-12 out?

Yes, that whole brack - that temporary sto - that bracket? Yes. Yes, I think I'll probably stow the cardboard in there.

Okay. We really don't have a place to put this if you got the TV up ...

That's what you got a Flight Plan volume for.

Whoops.

How you doing, Jim?

All right - -

What do we have in there?

Flight Plan, Malfunctions, and all that jazz is in there.
Okay.

The card - is my cardboard window shade in there, or something else?

We didn't find it here ...

Thank you.

Probably ... supposed to be with the cue cards.

Okay, I didn't find it.

I don't know. Our Flight Data File boxes up here, they're almost empty.

Maybe they just happened to fall open.

No, there's just very little in here.

That's all we need, is that Flight Plan. I talked to Ted Guillory ... all we really need. Up there is Volume I?

Yes. I've already ... all through these containers.

Oh.

Well, we got all our data - got all that -

It just doesn't take up a whole container. All those checklists ...

... There I need MAG N.

You need MAG N. (Cleared throat) Okay, coming up.

Where are the rest of the cue cards?

I think we got the ... in the pocket.

Do we?

Yes, I think so.

... reversed hoses here ...

CONFIDENTIAL
00 01 11 41 LMP ...  
00 01 11 51 LMP ...  
00 01 11 52 CMP Hmm, ORDEAL.  
00 01 11 54 CDR ORDEAL?  
00 01 11 56 CMP Yes, man. ... seems like it can be just a hell of a ...  
00 01 11 59 CDR Well, don't hurry.  
00 01 12 00 CMP Yes, let me - get my coffee here.  
00 01 12 04 CDR Yes.  
00 01 12 10 LMP Did you finish that check, Dave?  
00 01 12 14 CDR Yes, the attitude reference check is complete.  
00 01 12 22 CMP Goddam ...  
00 01 12 25 CDR The what?  
00 01 12 26 CMP ... the whole spacecraft.  
00 01 12 41 CMP Yes, the red one.  
00 01 12 44 CDR Here's MAG M, Jim.  
00 01 12 48 LMP Okay. ...  
00 01 12 50 CMP Okay, coming down to ORDEAL, David.  
00 01 13 11 CMP Oh! ... can't - we can't do this - ... I can see ... hoses ...  
00 01 13 15 CDR Al, don't ... -  
00 01 13 16 CMP Okay, there we go, Dave.  
00 01 13 17 CDR No, that's all right.  
00 01 13 18 CMP I just got my hoses ... If you - if you can - -  
00 01 13 24 CDR Yes, I can get it.
..., Dave. There we go.

Good. We got it.

Okay. Got it?

Yes. Thank you.

Need some help?

Okay.

Well, this is going to be a backroom brawl.

What?

It's always your fault, Dave.

...

Got to be ...

But it's all of that?

... get myself hooked up on everything here.

Hey, Al, if you get a chance on this - Did you find my cardboard window covering?

No.

Data Card Kit?

Which part of the Data Card Kit?

Well, I don't know. I don't know.

Here, let me look some more.

Yes. I don't even see where the cue-card part of the Data Card Kit is.

Uh-huh.

...

... Data Card Kit.
Okay. ...
UV Card Book ...
Okay. I guess I don't need it.
... Okay.
Whoop!
Bet that ought to be ...
(Coughing) Hey, you know, I got your meal, Al?
Do what?
... chow.
Oh, yes. Yes.
Hey, I think I'm pretty well caught up with the UV photography here.
Good, Jim.
Getting around with the --
Goody, goody. Read over the procedures.
Want me to read them to you?
No, why don't you read them to yourself?
Well, that's what I'm doing.
..., Jim.
I - I - Did you get the - Oh, you're looking for the cue cards, is that right?
Yes, I'm just trying to get them all sorted out.
And --
...
Who has the tape?
Just a second, Jim, and I'll get it.

I can reach it. Have to push these back - Watch your foot!

Oh!

(Laughter)

Man, you hit my foot; it really --

Did it really bug you?

Yes.

I don't think we need the Data Card Kit out right now.

May - maybe we could - Is there a good place to stow this down there?

Uh, I - I think you'd be better off if you stuck it right back in the window pouch, there.

Is this just for this pass, Jim?

Shade.

Yes.

Uh --

Are you going to --

Yes.

-- take it down?

I think - Yes, that's probably --

When?

-- that's probably true. The next pass is at about ... 

Yes, I'll have the cardboard up for it.

Yes.
00 01 18 02 LMP  I need the - probably the ...
00 01 18 04 CMP  I guess we could put - we put that back up before we do TLI, don't we?
00 01 18 07 CDR  Yes.
00 01 18 09 CMP  You need what, Jim?
00 01 18 11 LMP  Yes --
00 01 18 12 CDR  Oh, look at the horizon.
00 01 18 13 CMP  Okay, you guys, let that thing be - let it be.
00 01 18 15 LMP  Oh, boy!
00 01 18 16 CDR  Come on up here and look at this. ... switches.
00 01 18 22 CMP  Okay; all right. All right, have you got - have you got ... This is unreal to watch.
00 01 18 31 CDR  You've got to watch this, boy. This is one of the beauties that few people ever --
00 01 18 36 CMP  Ah!
00 01 18 37 CDR  -- get to see.
00 01 18 38 LMP  ... Ooo!
00 01 18 39 CMP  Gaa.
00 01 18 40 CDR  ... Look at the clouds.
00 01 18 41 LMP  Yes.
00 01 18 42 CDR  Just watch it, there. Watch this for a few minutes. ...
00 01 18 47 CMP  Look at that. You can see lightning. Looks like streaks of lightning around there?
00 01 18 54 CDR  See the little light thing out there?
00 01 18 57 LMP  ... Oh, yes.
Oh, yes. I didn't see that.

I didn't either.

Ooo, like - Oh, that - that's fantastic.

That's a - -

Yes.

That's a satellite.

Hey, you're right! That's got to be.

Yes.

Sure it's a sat - satellite, not a - a planet?

That's a satellite, Jim.

Well, look.

Come on. ... planets are like -

Son of a gun.

I'm backwards.

Huh, I guess it is a planet. It's sure bright, though, isn't it?

Yes. ... rest.

It's sure bright, but it's a planet.

Is it going to be black like this all the way out?

Look at those clouds.

Yes.

Yes, ...

I've got something like ...
00 01 19 54 LMP ... see a damn 'thing.
00 01 19 55 CMP ...
00 01 19 56 CDR No.
00 01 19 57 CMP ...
00 01 20 00 CDR By golly, it's getting bright and early.
00 01 20 02 LMP I've got ... 8. ... about like this.
00 01 20 14 LMP ...
00 01 20 20 CMP That Earth is a big mother.
00 01 20 23 CDR Yes, it looks pretty big, but I think it's probably going to be small.
00 01 20 25 LMP (Laughter)
00 01 20 26 CMP Yes (laughter).
00 01 20 28 CDR I hope it does.
00 01 20 30 CMP (Cough) Yes, that must be a planet, Dave, because --
00 01 20 36 CDR You were right.
00 01 20 37 CMP -- it's staying in inertial, and we're going ORB RATE now.
00 01 20 42 CDR ...
00 01 20 44 CMP ...
00 01 20 47 LMP Boy! Get your sunglasses.
00 01 20 49 CDR Yes, it's bright, isn't it?
00 01 20 50 LMP Boy, oh, boy!
00 01 20 55 CMP Yes. ... Let's see, I'm going to start getting up around ...
I can. ...
I hear you. ...
Too much trouble for me to get - for you to get ...
(Cleared throat)
Looks like Aquarius coming up back there.
Yes. How about your rendezvous window, Jim?
It's fine. Yes.
Okay. ... load it with ...
Yes.
... You think you need a ... there, Jim?
I've got it, man. It shouldn't.
I couldn't prove it to you.
... Oh, I see ...
Beautiful!
...
Check that.
...
I've got to get that ... to dock.
So you're going to ...
...
Which reminds me, I've got my own docking checklist.
Oh, you did?
Got your ...?
What's the matter with this other one?
Well, the one - the one I found, it's the one that doesn't have any, you know, any references in it.

(Laughter)

You never got the other one changed?

There ain't no way I could do that.

Okay.

... okay.

...

...

We'll be watching you.

Hand controller, not a ... control. Okay.

Okay. Why don't ... the program?

(Cleared throat)

...

What do we have to do?

Where are we stowing the tape?

Just ... it.

We should be stowing it back where it goes.

Here's the tape, Al. Where are you putting it, down there?

Okay. ...  

Well, we got 8 more minutes.

Are you ready for the UV, Jim?

Yes, ... It says 1:35.
00 01 23 05 CDR  Yes.
00 01 23 07 LMP  I - I guess - I guess I might as well wait until then.
00 01 23 10 CDR  Yes, I think you should. Let's do everything right on the money.
00 01 23 14 CMP  The UV is on time ...
00 01 23 17 LMP  Yes, sir.
00 01 23 18 CDR  When do we shut it off? Do you shut it off ...?
00 01 23 21 CMP  Yes. I agree with you.
00 01 23 22 CDR  I just want to --
00 01 23 23 LMP  Do you want to wait until we get --
00 01 23 25 CDR  ...
00 01 23 27 LMP  -- AOS before we do the docking probe, don't you?
00 01 23 29 CDR  Oh, I don't know.
00 01 23 30 CMP  (Cough)
00 01 23 31 LMP  Do you want to go through it now?
00 01 23 33 CDR  Yes, let's go through it.
00 01 23 34 LMP  Okay, CB DOCKING PROBE, two, close. Two, verify.
00 01 23 36 CDR  Two, verify.
00 01 23 37 LMP  DOCKING PROBE EXTEND/RELEASE to EXTEND/RELEASE until full probe extension.
00 01 23 41 CDR  Okay, ready.
00 01 23 43 CMP  Okay, here it goes. You've got it, man.
00 01 23 46 LMP  Yes.
00 01 23 47 CMP  Pretty good. Okay, got a barber pole to gray.

CONFIDENTIAL
00 01 23 50 LMP  Okay. DOCKING PROBE EXTEND/RELEASE to RETRACT. Talkback gray.
00 01 23 53 CMP  RETRACT. Talk back gray.
00 01 23 55 LMP  Okay.
00 01 23 56 CDR  Okay, let's get ... here.
00 01 24 01 LMP  There are a lot of clouds out there, huh?
00 01 24 03 CDR  Sure are. ... 
00 01 24 18 CDR  Hey, Al, you got the - the Hasselblad down there?
00 01 24 21 CMP  Yes, it's in the TSB. The Hassel - Well, the Hasselblad's set up for the UV window.
00 01 24 25 LMP  Yes.
00 01 24 26 CDR  The spotmeter. Did you get ...?
00 01 24 27 CMP  Yes.
00 01 24 28 LMP  Yes. Yes, it's --
00 01 24 29 CMP  Sure did.
00 01 24 30 CDR  The TV is all ready.
00 01 24 31 LMP  Yes.
00 01 24 34 CMP  ... 
00 01 24 37 CDR  ... the pad. You got your updates. PYRO ARM ...
00 01 24 45 LMP  ...
00 01 24 47 CMP  ... the TLI Prep Book.
00 01 24 48 LMP  Yes, ...
00 01 24 49 CDR  Hey, now, do you have the TLI card in your pocket?
00 01 24 52 CMP  No, I have it.
00 01 24 54 LMP  No use in finding mine. I did look.
00 01 24 56  CDR  Okay.
00 01 24 59  LMP  ...
00 01 25 01  CDR  It must be in my ...
00 01 25 03  CMP  It must be in your ...
00 01 25 05  CDR  Oh, yes? You get a better ... (laughter).
00 01 25 12  CMP  You carried my lunch; I carried your card.
00 01 25 16  LMP  Did you really get it?
00 01 25 17  CMP  Sure.
00 01 25 20  CDR  ... S-IVB/TLI.
00 01 25 22  LMP  ...
00 01 25 33  CMP  ...
00 01 25 34  CDR  Yes, I -
00 01 25 36  CMP  Well, I got a ... here ... a little culture.
00 01 25 48  LMP  When we get past this cloud bank, I think I might take some of these UV pictures.
00 01 25 53  CMP  They want some clouds for the UV.
00 01 25 55  LMP  Yes, I know. But I didn't want --
00 01 25 57  CMP  Oh.
00 01 25 58  LMP  -- solid clouds.
00 01 25 59  CMP  What are you all looking at out there? Can you tell?
00 01 26 01  CDR  Oh -
00 01 26 03  LMP  You mean what part of the world?
00 01 26 07  CMP  No - about where the camera's pointing. ... They didn't care what time, but we need to correlate it. ...
00 01 26 33 CMP  (Cleared throat)
00 01 26 39 LMP ...
00 01 26 43 CMP Hey, look. There's ... out there, I think.
00 01 26 44 CDR Where?
00 01 26 45 CMP Huh?
00 01 26 46 CDR Yes.
00 01 26 47 CMP ...
00 01 26 48 CDR Yes.
00 01 26 49 LMP Oh, yes.
00 01 26 50 CDR Hey, man.
00 01 26 51 CMP Can you see ... over there?
00 01 26 52 CDR Oh, that must be it.
00 01 26 53 LMP Yes.
00 01 26 54 CDR Man. That must be it.
00 01 26 55 CMP ...
00 01 26 56 LMP I'll take some UV pictures of it.
00 01 26 57 CMP Okay.
00 01 26 58 CDR That's good, Jim. Good deal.
00 01 26 59 CMP Except I don't think we know the right time. ...
00 01 27 02 CDR Yes.
00 01 27 03 LMP Oh, you can see some of that pattern. ...
00 01 27 06 CDR ... far-reaching pattern.
00 01 27 08 CMP Hey, yes. We know where it is.
00 01 27 15 CDR ...
00 01 27 28 CMP ... Is that the right thing?
00 01 27 40 CMP This thing is really, really weird.
00 01 27 47 LMP ... I didn't even notice the S-IVB flashes, but you can see them now.
00 01 27 52 CDR Yes. The S-IVB --
00 01 27 54 CMP Yes, I noticed them. (Cleared throat)
00 01 28 02 CDR Well, let's see. I guess somebody's got to be ready to copy pads.
00 01 28 07 CMP Yes.
00 01 28 08 CDR Jim, I guess you're going to be busy with the --
00 01 28 11 LMP No, no, I'll be doing that. It won't take long to do this.
00 01 28 13 CDR All right. I'll get the pyro arm check when we get the comm back.
00 01 28 19 LMP ...
00 01 28 22 CDR Al, why don't you get the --
00 01 28 24 CMP Yes.
00 01 28 25 CDR Why don't you get this thing ...?
00 01 28 27 CMP ...
00 01 28 28 CDR ...
00 01 28 29 CMP Okay.
00 01 28 30 CDR Okay.
00 01 28 31 CMP Do you - do you want me to ... the ...
00 01 28 35 CDR Yes. Yes, I've already scratched mine ...
00 01 28 50 CMP Get the ... quantity --
00 01 28 54 CDR The glycol pump? Get the glycol pump?
00 01 28 59 CMP  (Cleared throat)
00 01 29 11 CC  15, Houston. Over.
00 01 29 13 CDR  Hello, Houston; 15.
00 01 29 15 CC   Would you put the -- You're loud and clear, Dave. Would you put the IU UP TEL --

TIME SKIP

00 01 53 35 LMP   -- ..., INJECT.
00 01 53 36 CDR   INJECT.
00 01 53 37 LMP   EDS POWER, on, up.
00 01 53 42 CDR   Okay. Well, I checked the DELTA-V on the EMS; and, I guess, you might as well just hold on until we get all the way around here - until we get the ... again. There's nothing else really to do.
00 01 53 57 LMP   Okay. You got EDS POWER, on, up?
00 01 53 58 CDR   No, hold --
00 01 53 59 LMP   You want me to hold off?
00 01 54 00 CDR   Yes.
00 01 54 01 LMP   Okay. ...
00 01 54 02 CDR   Really not much more to check. GDC aline; I'll wait until we get a little bit farther down the road to do that.
00 01 54 10 LMP   Okay. Where is my kitchen timer, Al?
00 01 54 13 CMP   Down below. You want it?
00 01 54 15 LMP   Yes, I guess I ought to put it to use when I start cycling on the cryo fans here shortly. You know, we - actually, we have plenty of time. I could put that 105 lens on again and take a colored picture.
00 01 54 33 CMP Yes.
00 01 54 34 CDR Colored picture? ...
00 01 54 36 LMP ... there's a requirement to do it.
00 01 54 38 CDR Yes.
00 01 54 39 LMP ... - with the 105 lens.
00 01 54 41 CDR Good idea. Why not do it?
00 01 54 43 LMP It's - it's not the same place, but -
00 01 54 47 CMP Yes, yes - Well, there's no - no - If you want to take a color picture, they - what they want is a color picture to back up the scene you're seeing in the UV. So, if you can't get a color picture of that area, there's no sense taking it. But you might go ahead and take some pictures with the 80 millimeter. There's nothing wrong with that. On the - ...
00 01 55 22 CDR Have you got the Update Book out, Jim?
00 01 55 25 LMP No, I don't.
00 01 55 26 CMP Did you log - you didn't log the UV pictures in here, did you?
00 01 55 29 LMP Yes.
00 01 55 30 CMP Where did you log them?
00 01 55 31 LMP Oh, on - in the photo procedures here. ... -
00 01 55 32 CMP No, we want to log them on the - on the ...
00 01 55 58 CMP Photo Log - 70 millimeter, MAG N, was it?
00 01 56 05 LMP Yes, MAG N.
00 01 57 27 CDR Ohh! ...
00 01 58 13 LMP (Laughter) Get the - get the ... out.
00 01 58 17 CMP (Laughter) Yes, I reckon. How's old Davy?
Oh, we're muttering along, flying across the sea.

Do you have yourself strapped in the seat there, Dave?

Yes. I do that most of the time, I think.

Yes, I like to do --

It's a lot more comfortable. ... relative position.

Because, otherwise, you're fighting the panel all the time.

Yes. My problem.

Why?

We could take these lifevests ...

Yes, we could.

Should we stow the lifevests?

Yes. ...

Get that in there somewhere?
... Not nearly as loud at 5 psi.

Yes.

Get your lifevest put away, Jim?

Yes.

... things on?

Okay.

Got your ...?

Yes, I ... Can't get it quite as tight as ...

Where would you keep the Update Book?

R-3 is a pretty handy place for all those books up there.

Do we have a strap?

Velcro ...

Is there a snap up there?

No, ...

I think I see it now.

Ah, it'll be dark pretty soon. We'll get to see the never-never land. There's no horizon.

We got to have some place to put the ...

Well, we could unhook it. Maybe --

Matter of fact, why don't we get everything stowed for TLI? ... couple helmets - Why don't you put it down in the LEB somewhere, and we'll just leave them there until after TLI --
The helmets?
Yes.
Yes.
Let's - let's just leave them until we get docked and start getting up into the tunnel --
Yes.
-- put them on.
Okay.
Could just stick these PGA bags in there.
Yes.
Whoops! Did I do it again?
I don't know, did you?
You're pretty consistent down there, Al.
I can't imagine you did that twice in a row.

... 
Huh?

... 

The emergency cabin regulator check book.
... 
Huh?

...

Must have been.

We're getting a good check at that, Al.

... Watch your big feet.
00 02 06 54  LMP  Are we going to eat before TLI?
00 02 06 57  CMP  You're kidding.
00 02 07 00  CDR  No, ...
00 02 07 06  LMP  We need an emergency ...
00 02 07 12  CMP  Sort of an early time.
00 02 07 42  CMP  Okay, give me your helmet back there, Dave, and I'll stash it away.
00 02 07 46  CDR  Okay.
00 02 08 03  LMP  Gets dark fast, doesn't it?
00 02 08 04  CDR  Yes, it does. Yes, you see never-never land out there?
00 02 08 06  CMP  ...
00 02 08 16  LMP  Yes. No - no horizon at all.
00 02 08 25  CMP  Anything else you want ...?
00 02 08 27  CDR  No, that's all right.
00 02 08 28  LMP  Let's just take a look at this ... Sort of interesting.
00 02 08 33  CMP  ...
00 02 08 35  CDR  Yes.
00 02 08 36  CMP  ...
00 02 08 50  CMP  ...
00 02 09 00  CDR  What, that over there?
00 02 09 04  CMP  ...
00 02 09 06  CDR  ...

CONFIDENTIAL
Boy, that's - Look at that planet, how orange it is out there, Dave? Directly ahead.

Yes, it is. Isn't it? How come we saw the same planet in the sunlight, Jim? Huh? Tell me that.

It wasn't the same one.

Huh? Tell me that.

Oh, you're - you're still saying it's a satellite, huh?

Well, I - I don't know what I'm saying now, because you convinced me it's a planet. But now, it's in the same position it was --

Yes?

-- when we had sunrise as we go into sunset. So that tells me something.

Two hours 10 minutes and 7 seconds. Turn the lights out. ... never-never ... Now I can put the COAS on it. And for the COAS, ... It's right on it. It's depressed - just about 18 degrees.

... Here we are. Here we are at ORB rate. Time's going to be 10 - 2:10. Okay, I'm going to mark it. ... Get a writing pad. Two hours and 11 minutes exactly.

MARK. Two hours and 11 minutes. COAS is on - 7 degrees depressed below our image - our attitude towards the Earth.

... that flash out there ...

Oh, that's the S-IVB.

... the S-IVB ...

Okay.
Well, you know, that's got to be Saturn. Saturn is over by Scorpio.

Yes, it could be.

Yes, and Antares ...

...

Look at all the ...

..., Al. The Earth?

Yes.

Okay, let's see. We got everything stowed now?

Anybody want to eat anything now?

I'm going to wait until we get everything squared away after docking.

... docking ...

What did you say?

... Al ... How about yours?

Okay. Is your suit dry today, Jim?

Well, you haven't smelled too much urine, have you?

No.

Okay, it must have worked then.

Good.

Well, I'll tell you, I used it three or four times ...

(laughter).

Did you really?

Yes. Three times before launch and once in orbit.

God, you really ...
I really drank the Gatorade yesterday.

Twenty-six minutes to go before ignition.

Yes, I have ignition at 2:50:31.

You want to wait until we get AOS and then start through it?

We should have gotten ...

What?

...

We changed ...

We have?

(Cough)

Getting ready to go to sleep?

No, lot of work to do ...

(Laughter) Yes. About time.

Yes, it is.

I've been feeling a little more full in the head all the time.

Yes.

And -

You mean it gets more and more?

Well, for - it's up - everybody's a little different. For me, it gets a little more and more after the first - like 7 or 8 hours. And then it stabilizes, and you don't even notice it after the first night. I didn't. Ever - everybody's a little different. Your - your body adjusts - adjusts to the whole thing.
... feel tired quicker because we don't have anything to push against. Seems like ... --

No.

-- suddenly you don't have anything ...

No, I didn't feel any muscle fatigue. ... Well, Jim, why don't we go through this thing now? We're going to be ...

TRANSLUNAR to INJECT.

... Verify.

That's a verify.

EDS POWER, on, up.

EDS POWER, on, up.

Perform EMS DELTA-V test and null bias check.

Complete.

Set DELTA-V.

Set to 10401.1.

10401.1.

Okay.

EMS FUNCTION, DELTA-V.

DELTA-V.

GDC ALIGN.

Okay, I'm ... check that.

... your ... box, it's real loose.

Oo-wee! That is.

...
00 02 19 21 CMP  ... 
00 02 19 30 LMP  ... get that ... right. 
00 02 19 54 CDR  Three degrees on the GDC at 2 hours. 
00 02 20 00 LMP  What was it? What? 
00 02 20 05 CDR  Take 3 and a half degrees for 2 hours. 
00 02 20 08 CMP  Three and a half in 2 hours ... 
00 02 20 10 CDR  Yes. 
00 02 20 27 CMP  ... 
00 02 20 29 CDR  Ah. Yes, pitch and - 
00 02 20 36 CDR  What was the pitch? But that makes sense because we're ... in pitch. 
00 02 20 41 CMP  Yes. 
00 02 20 43 CDR  Okay. The GDC's alined. 
00 02 20 46 LMP  Okay. Check the - check the DAP. 
00 02 20 55 CDR  31102. 
00 02 20 58 LMP  Good. 
00 02 20 59 CDR  01111. 
00 02 21 00 LMP  Good. Okay, key VERB 83, at ORDEAL. 
00 02 21 16 LMP  You want to set ORDEAL, 90 and EARTH. 
00 02 21 19 CDR  It's 90 and EARTH, and it's tracking very nicely. 
00 02 21 22 LMP  Okay. SEQUENCE PYRO ARM, two, to on, up. 
00 02 21 25 CDR  PYRO ARM, two, on, up. Two on, up. Okay. 
00 02 21 36 CMP  You didn't get P31 after you get -- 
00 02 21 40 LMP  Might be a ...
Get started.

Yes.

Do you want to wait?

Yes. Let's do.

... on the angle ... a good shape.

... to put that on and watch it?

Mm-hmm.

Turn it?

Yes.

It looks to me like you could turn it first.

No, do it yourself. It's running ...

Yes. Right on the money.

I just don't believe we're here.

Yes. It's the greatest, for sure.

...

That's for sure.

You think we'll ...?

It's not bad up here in zero g either, is it?

No, hell no, it's not too bad at all.

Don't even feel supper.

Did you - did you this morning?

Yes.

I can't imagine why people - some people suffer.
00 02 23 37 CMP ...  
00 02 23 38 CDR Make sure you take your timer down, Jim, before we start the burn.  
00 02 23 43 LMP Ah --  
00 02 23 44 CMP How about putting it up in there? Okay. Set it right before ...  
00 02 23 50 CDR As a matter of fact, get - get all that stuff secured. The S-IVB hasn't got much, but when we get down to the SPS stuff, why it's got a pretty good kick.  
00 02 23 57 CMP Yes.  
00 02 23 58 LMP Sure. Well, it ought to be all right on the girth shelf, won't it?  
00 02 24 04 CDR I guess.  
00 02 24 12 CMP Well, the seat's kind of tight right underneath there.  
00 02 24 14 CDR Huh?  
00 02 24 15 CMP Just passed through the ...; we're in good shape.  
00 02 24 23 CDR Yes, should be right here.  
00 02 24 25 CMP/LMP There it is.  
00 02 24 27 CDR Yes.  
00 02 24 35 CDR Roger, Houston; 15 here, 5 by.  
00 02 24 39 CC Five by also.  
00 02 24 41 CDR Okay.  
00 02 30 45 CMP FUNCTION DELTA-V is on.  
00 02 30 48 CDR Mm-hmm. Don't bump your head on those lights ...  
00 02 30 55 CMP Yes, right.
Put your head back here in that little old cubbyhole.

Think that will help?

It might.

... It's daylight. Think we can see this pretty burn?

Yes, I'm sure we will.

You ready?

Yes.

809 ... 58.

Sunrise at 2:48.

58, VERB 48.

(Cleared throat)

Okay. LAUNCH VEHICLE GUIDANCE, IU.

Verified.

Okay. We're standing by for time base 6.

Okay.

What's EPS?

Burn time - 5:55. And, when you get the shutdown, you got a 2-second thruster $V_i$. Right?

Right.

... degrees per second rate. The first one is at 59. Make sure you got that. 45 degrees pitch and yaw.

That's 48 deg - degrees.

... degrees per second roll. The S-IVB guidance function ... Okay.
Do we have Hawaii all the way through the burn?
I don't think so.
No, we haven't. ... No, we have --
AOS at 2:5 ...
We go through a keyhole --
LOS at --
No. We have LOS at 49:52 for ... minutes.
No, we get them back at 2:55.
Ooh.
(Cleared throat)
Yes, well, we tried it the other day.
Yes.
I hope so.
If you did, you can change your DELTA-V ... 20 feet per second.
There's ullage.
Yes.
I bet you it's from the S-IVB.
(Cleared throat)
Huh?
You're running about an 80-amp load.
... what that was?
...
We're down to .5 on the cabin.
00 02 36 43  CDR   Get that waste vent closed.
00 02 36 47  CMP   When do we close that?
00 02 36 48  CDR   When we get ready to dock, and the cabin's up to 5 pounds.
00 02 36 52  CMP   I thought we were supposed to leave some pressure for that.
00 02 36 57  LMP   I think we do.
00 02 36 58  CMP   Right after --
00 02 36 59  CDR   Right after TLI?
00 02 37 00  LMP/CMP  Yes.
00 02 37 01  CMP   I think we do it.
00 02 37 04  LMP   Right after WASTE STOWAGE VENT, CLOSED.
00 02 37 14  SC   (Cleared throat)
00 02 37 57  CDR   There's ARIA.
00 02 38 00  LMP   Keep - keep looking.
00 02 38 02  CMP   ...
00 02 38 29  AA   ...
00 02 38 31  CDR   You don't have the S-band squelch on, do you?
00 02 38 35  LMP   Yes, yes, I thought it was --
00 02 38 36  AA   ...
00 02 38 37  CDR   ... we ought to be able to get that ...
00 02 38 39  AA   ...
00 02 38 40  CDR   Oh, that's pretty - that is loud. Isn't it?
00 02 38 42  LMP   Yes.
00 02 38 45  CC   Apollo 15, this is Houston through ARIA. Over.
Roger, Houston; 15. You're about 1 by 1 through ARIA.

Roger. You're about 3 by; clear enough to understand.

What'd he say?

He said we're clear enough --

... -- ..., I think.

Roger. We got somebody else on the loop with us, too.

... ...

... ...

-- ... UP-LINK ACTIVITY light.

Okay.

... ...

It's a familiar sound, and I can't remember what I - what it is.

Just a minute ... --

You can't change the frequency there. You might hook up -

It seems to ...

It's a bull's-eye.

Why don't we hook up the speakers, and let's do some checking. ...

Don't count too far.

S-II SEP light.

Yes.
00 02 40 29 CMP  It just came on, Dave.
00 02 40 30 CDR  We have the S-II SEP light.
00 02 40 33 LMP  You stand --
00 02 40 34 CC   ... SEP LIGHT.
00 02 40 37 CDR  Okay.
00 02 40 43 LMP  The UP-LINK ACTIVITY light went out.
00 02 40 45 CDR  Okay.
00 02 41 05 AA    ...
00 02 41 08 LMP  Okay. Monitor launch-vehicle tank-pressure sequence.
00 02 41 11 CDR  Very well. It should come on now. Come on, baby.
00 02 41 34 CDR  Here it comes. Come on.
00 02 41 44 CMP  It might fool you ... 
00 02 41 46 CDR  Yes.
00 02 41 49 AA    ...
00 02 41 53 CDR  And coming up on 52 minutes.
00 02 41 57 LMP  Okay. ORDEAL PDAI 1 to ORB RATE; 2 to INERTIAL.
00 02 42 05 CDR  Okay, stand by 1. Okay, Houston. It looks like we have a slow repress start. We're up to about -22 or 23 on the fuel pressure. Okay; ORB RATE, INERTIAL.
00 02 42 17 LMP  Okay; ORDEAL MODE, HOLD/FAST.
00 02 42 20 CDR  HOLD/FAST. Go on.
00 02 42 22 LMP  All right.
00 02 42 23 CC    ... getting a normal repress. We're --
<table>
<thead>
<tr>
<th>Time</th>
<th>Call Sign</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 02 42 26</td>
<td>CDR</td>
<td>Okay; normal repress. Go, Jim.</td>
</tr>
<tr>
<td>00 02 42 30</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 42 34</td>
<td>CDR</td>
<td>Okay; 300 on the LUNAR.</td>
</tr>
<tr>
<td>00 02 42 36</td>
<td>LMP</td>
<td>And RH ---</td>
</tr>
<tr>
<td>00 02 42 37</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 42 39</td>
<td>CDR</td>
<td>Armed.</td>
</tr>
<tr>
<td>00 02 42 40</td>
<td>LMP</td>
<td>UP TELEMETRY, CM and IU, both to BLOCK.</td>
</tr>
<tr>
<td>00 02 42 43</td>
<td>CDR</td>
<td>BLOCK's on.</td>
</tr>
<tr>
<td>00 02 42 44</td>
<td>LMP</td>
<td>Standing by for 56 minutes.</td>
</tr>
<tr>
<td>00 02 42 48</td>
<td>CDR</td>
<td>At 54, we go 25 degrees.</td>
</tr>
<tr>
<td>00 02 42 51</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 42 53</td>
<td>LMP</td>
<td>What - what was that on repress that you ... normal?</td>
</tr>
<tr>
<td>00 02 42 57</td>
<td>CDR</td>
<td>It's - it's just something that's a little slow in here.</td>
</tr>
<tr>
<td>00 02 42 59</td>
<td>LMP</td>
<td>Oh.</td>
</tr>
<tr>
<td>00 02 43 00</td>
<td>CDR</td>
<td>It's normally quite fast. ... At 54 minutes, we want to be at 25 degrees.</td>
</tr>
<tr>
<td>00 02 43 11</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 43 36</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 43 39</td>
<td>CDR</td>
<td>Wonder who all that is?</td>
</tr>
<tr>
<td>00 02 43 40</td>
<td>CMP</td>
<td>Yes, I wonder?</td>
</tr>
<tr>
<td>00 02 43 42</td>
<td>SC</td>
<td>(Cleared throat)</td>
</tr>
<tr>
<td>00 02 43 45</td>
<td>AA</td>
<td>...</td>
</tr>
<tr>
<td>00 02 44 05</td>
<td>AA</td>
<td>...</td>
</tr>
</tbody>
</table>
| 00 02 44 22 | AA | ...
00 02 44 30 AA  
00 02 44 44 AA  
00 02 44 52 AA  
00 02 45 01 CDR  
00 02 45 04 LMP  
00 02 45 08 CDR  
00 02 45 10 LMP  
00 02 45 19 AA  
00 02 45 59 CDR  
00 02 46 00 LMP  
00 02 46 04 LMP  
00 02 46 10 CC  
00 02 46 11 CDR  
00 02 46 20 CMP  
00 02 46 21 CC  
00 02 46 28 CDR  
00 02 46 36 LMP  
00 02 46 38 CDR  
00 02 46 42 LMP  
00 02 46 46 CMP  
00 02 46 49 CDR  
00 02 47 13 CMP  
00 02 47 15 LMP  

...  
...
...
Coming up on 55 minutes.
...
Okay. Coming up ...
Okay; at 56, slew FDAI 1 to pitch at 17.
...
Okay. ... 
Seventeen.
Okay; at 56:45, it should be 14 degrees. 
... through ARIA number 2. Over.
-- ... talking to him. Houston, 15; say again. 
We lost him, Dave.
15, Houston. You're way down in the static, but I can hear you transmit. Over.
Okay; we'll pick you up at the keyhole. 56:45, you ought to be ORDEAL, OPERATE. Right? 
Yes, OPERATE/SLOW.
What angle? 14 degrees? 
Fourteen degrees.
...
Minus.
Daylight? 
Yes.
Why don't they have a picture like that in the simulator?

Two hours and 48 minutes.

... BLANK. ...

TVC SERVO - SCS TVC SERVO POWER 1 to AC 1/MAIN A.

Average g is on.

Two, off.

Roger; average g.

-- ... yet.

TAPE RECORDER's going HIGH BIT RATE.

THRUST mode, NORMAL.

Put it in between the camera, Al. No, don't force it.

... Jim.

Can you get it up there?

Okay. Get ready, gang.

Okay, 8 seconds. Three -

Fire is on. We have ignition.

Roger; ignition.

Okay. We're pitching now.

... full, high.

...

Okay. Yes.

...

Its tracking's real good.
Load's about a half a g. ORDEAL ... should be tracking with it.

Well, it had a little surge right at this ...

Picked up right there.

Okay. S-IVB pressure is 40 and 30, and we had a little surge at about 1 minute.

You feel a very slight amount of bumping ...

Yes, it does.

Could have been vibration.

Or trouble.

Yaw's tracking at about 1 degree.

ORDEAL's right on the money.

Track is GO. ...

Coming over the Hawaiian Islands.

Pressures are steady. ORDEAL's tracking.

Okay, Houston; 15. We're about halfway through. Pressures are steady at 40 and 30, and ORDEAL is tracking right on through.

..., 15. At 3 ...

Roger.

DELTA-V<sub>CG</sub>.

My countdown's going to be off probably 2 seconds here. Let's start my watch and ... it again. I want to be sure the engines ... start.

You can feel it, can't you?
00 02 53 38 CMP Yes.
00 02 53 41 LMP Converter's started.
00 02 53 42 CMP Pitchover's -
00 02 53 43 LMP I get the little surge before the bang.
00 02 53 47 CDR Okay, we're on P45.
00 02 53 50 CMP Pressure's looking good. ORDEAL's tracking. A quarter g - a half g. ...
00 02 54 00 LMP That computer has ... DSKY ...
00 02 54 04 CMP That computer ...
00 02 54 06 CDR Really?
00 02 54 14 CMP 31,925.
00 02 54 37 LMP ... pressure.
00 02 54 39 CDR Okay.
00 02 54 41 LMP ... Houston.
00 02 54 56 CDR Hey, Houston. We have about a minute to go. We're tracking 39 and 30 on the pressures, and ORDEAL's about 0.
00 02 55 04 CC 15, Houston; Roger. Looks good here.
00 02 55 06 CMP O₂ flow, high.
00 02 55 14 CDR That should be on for cut-off.
00 02 55 17 LMP Yes, that's right.
00 02 55 19 CC ...
00 02 55 29 CC ...
00 02 55 32 CMP I'll give you a countdown to 55.
Go ahead. ... Go to ...
Okay. Here's the countdown.
Okay.
10, 9, 8, 7, 6, 5, 4, 3 - -
Okay -
SHUTDOWN, 5 plus 51. Okay. Cameras - -
... stuff down here.
Okay. Al, get the data there.
Yes.
Check S-IVB tank pressures.
Okay. S-IVB tank pressure's about 32, coming
down, on the oxidizer; and about 28, coming down,
on the fuel.
Roger.
SCS TVC SERVO POWER went OFF - went OFF. PCM
BIT RATE going LOW.
FDAI 1 to INERTIAL.
Yes.
RHC number 2, locked.
INERTIAL and locked. Okay, when Al gets through
with ...
Okay, it's time to switch around.
Okay.
...
Okay, Gordo. Got some data for you, if you're
ready to copy.
15, Houston. We're getting a lot of static for some reason. Say again, please.

Roger, Gordo. I've got the cut-off data for you, if you're ready to copy.

Go ahead.

Okay. We cut off on a $V_\text{F}$ of 35,614. TFC was plus 02; $V_G$ was plus 145; $\text{DELTA-}V_G$ was minus 14.9. And I've got the H-dot now, if you want it. H-dot was 4353, and altitude was 167.4.

15, Houston. Most of your readback is blocked by static. Let's wait a little while and try it again.

Okay, Gordo. Okay, you got all your data, Al?

Yes. The EMS is off.


Okay, when the COMP ACTIVITY light's out, you're just supposed to ..., Al.

... switchy, switchy.

I need a VERB 66.

Okay.

Then when you all get down in the LEB, get that waste storage vent valve closed.

Yes ...

TIME SKIP

Coming up.

Okay.

I have a GDC ALIGN.
00 03 21 33  CDR  Okay.  That's a pretty good ...
00 03 21 35  LMP  ...
00 03 21 39  CDR  Okay.
00 03 21 41  CMP  GDC ALIGN's complete?
00 03 21 42  CDR  Yes.
00 03 21 43  CMP  Okay, EMS FUNCTION, DELTA-V.  That's a verify.
00 03 21 45  CDR  Verified.
00 03 21 46  CMP  EMS MODE, NORMAL.
00 03 21 47  CDR  NORMAL.
00 03 21 48  CMP  Okay, got the DET set at 59:30.
00 03 21 49  CDR  Right.
00 03 21 50  CMP  Start that whenever you want.
00 03 21 51  CDR  Okay.  ...
00 03 21 53  CMP  Okay.
00 03 21 55  CDR  Okay, Houston; 15.  30 seconds.  Okay.  We're counting, Jim.
00 03 22 05  CMP  Okay.  At 50, we'll go to BMAGs, ATT 1/RATE 2; CMC, AUTO; and come off in CMC.  There is ATT 1/RATE 2; CMC, AUTO, at 58, we'll get plus-X.
00 03 22 31  CMP  One, 2, 3.  Okay.
00 03 22 32  CDR  Okay.
00 03 22 33  CMP  Okay.
00 03 22 34  CDR  Now get your valves, D.  They look good.
00 03 22 35  CMP  Okay.  Engine valves going to SCS.
00 03 22 36  CDR  ... eight, gray.
Okay. I'm going to pitch over.

Okay.

Here we go.

Okay, Houston. We got a good SEP.

Got PRIM PROPELLANT B, SECONDARY, and Delta PRIM and SECONDARY - went barber pole, and they're both gray now. ...

... panel?

Yes. There goes the panels, right out to the side. Right outside.

Yes, I see them now.

Yes.

See it?

Yes.

It's spinning out there. You see the --

What a view! You see the S-IVB?

Not yet.

... We're at 270, now. Oh, ooops. Where is it. ... --

Right over Florida.

Okay. Good shape, man ... --

Are we?

You look good, good, good, good. Good job. Right in there, babe. Yes, that's good. Oh, look at that.

Take pictures with the cameras.

Yes.
... on the TV.

No, forget the TV. The TV looks okay. Get the camera over here and take some pictures.

--- Houston. Would you give us OMNI Bravo?

OMNI Bravo.

Okay, I'm going to give it a little plus-X.

Okay.

Going to CMC first.

Got a T - good TV picture, Dave?

Yes: ... just a little off to the side, Al?

Hum? ... Okay.

Don't want to get too far away, now.

One, 2, 3, 4.

... TV picture is ...

To the right.

Back on CMC.

Okay. ...?

Yes.

Okay, Houston. It looks like we've got a good LM in there, and we're rolling now, and the opening rates are stopped. You should have the TV.

Roger. We haven't got the picture up here yet. Stand by, and I'll give you a check on that.

Okay.

I can shift that camera if you want, Dave.

No. It would just be ... the orientation the LM has for the attitude.
00 03 25 47 CMP Yes, that is a big bang when you come off of there, isn't it?
00 03 25 50 CDR Yes.
00 03 25 58 LMP Guess we're - what, 50 feet?
00 03 26 04 CMP Take it at f/8.
00 03 26 06 CDR All I've got to look at it is the TV picture.
00 03 26 24 CC -- Houston.
00 03 26 26 CMP Go, Houston.
00 03 26 27 CC Goldstone is receiving the carrier, but we're not getting any signal on the carrier for the TV. Over.
00 03 26 34 CDR Okay, we've got a good picture on the monitor up here. You got the TV switch in the right spot, Jim?
00 03 26 40 LMP Well, it's not in TRANSMIT.
00 03 26 43 CDR What?
00 03 26 44 LMP This switch here should probably go to TRANSMIT.
00 03 26 46 CDR Well, put it -
00 03 26 48 LMP Let's try ... 
00 03 26 51 CMP Check those ... 
00 03 26 53 LMP Do what? How about S-BAND AUX TV to TV?
00 03 26 57 CDR Yes, sir. ... 
00 03 27 08 CDR Hey, we need HIGH GAIN, don't we?
00 03 27 10 LMP You have. I've got ... use HIGH GAIN ... --
00 03 27 11 CMP HIGH GAIN.
00 03 27 12 LMP -- ... 
00 03 27 15 CDR Okay.
00 03 27 16  CC  15, Houston. We're getting a picture now, and the LM is coming in in the lower right-hand corner of our field of view.

00 03 27 26  CDR  Okay. Slew antenna to verify oper - Do you want to do all that, Jim? That's your - Yes, go ahead; take your pictures.

00 03 27 33  LMP  Well --

00 03 27 34  CDR  Of course, ... your pictures. Take your pictures. ...

00 03 27 45  CMP  It was a lot slower than I thought it would be.

00 03 27 46  CDR  Strange.

00 03 27 47  CMP  Yes:

00 03 28 02  CMP  ...

00 03 28 05  LMP  As long as they're getting the picture on the OMNI, I guess there's no hurry to - that we get the high gain up.

00 03 28 13  CDR  Okay, Houston. It looks like we've got a good high-gain antenna. Do you want us to give you the high gain or stay on the OMNI?

00 03 28 20  CC  *** by.

00 03 28 29  LMP  There's sure a lot of crap flying out --

00 03 28 31  CC  *** take the high gain, Dave.

00 03 28 33  CDR  Roger. Going HIGH GAIN.

00 03 28 58  CDR  Okay, Houston. We're in AUTO and MEDIUM. Looks like we got a good lock.

00 03 29 03  CC  Roger. And we're getting a very good picture here.

00 03 29 05  CDR  Okay.

00 03 29 06  CC  ...

00 03 29 07  CMP  Get the DAC going.
*** on the right-hand side of the field of view.

Shall I put the TV ... long, Dave.

Huh! I think it looks good, Jim.

I can adjust it and get it in center.

No, it's ... How're you doing?

How many pictures --

*** Houston. Request WIDE BEAM width, please.

WIDE BEAM.

I find I'm working the stick a lot more than I thought I would.

Yes.

Just play it cool. We've got plenty of time.

Yes.

Play it cool.

Six on your camera would be right where you'd want it.

Okay.

...

Okay. I would say we were - what, Jim? 20 feet? 15? 10?

I have 15 feet on the camera.

Did we forget anything on that checklist, Dave?

...

Okay. We're sliding in there, David.

Okay. I think we're about a couple feet away.

Yes.
What do you want to do?
Put it at 12 frames per second.
Okay, I'd go now if --

*** Houston. The centering on the picture is good now, and we're getting an excellent quality picture.

Very good. We're almost there. I'll be watching above the ... over here.

Okay.
Okay.
..., Jim.
Feel it.
Got it?
About there.
...
Help you?
...
Capture. FREE.
Okay?
Read the checklist, Jim.

Okay; let's go down the checklist. You get ... Okay. On capture, changing FREE, to damp, aline pitch and yaw -

Still got a little pitch rate going.
...
Huh?
You're fine. Just aline pitch and yaw.
Okay.

They're all aligned and damped out?

... on the chart. ...

Okay. Looks like we're damped.

Okay; ready?

We're off at a little bit of an angle.

Here. I can hold this a minute. ...

Okay, Dave.

Yes. ... Ready to retract?

Okay.

Your rate's going? Don't mess around.

Hard dock, Houston. Hard dock.

Great!

Man alive!

Boy! (Laughter)

I should have told you about that. I forgot about it.

Yes. I'm --

I didn't think we were - it was going to ... that much.

Okay. Let's --

I was expecting it.

Okay; DOCKING PROBE, EXTEND/RETRACT, and talkback's gray.

Gray.
00 03 34 07 LMP  SEQUENCE PYRO ARM, two, to SAFE.
00 03 34 10 CMP  PYRO ARM, SAFE.
00 03 34 11 LMP  SEQUENCE LOGIC, two, OFF.
00 03 34 13 CMP  LOGIC, OFF.
00 03 34 14 LMP  EDS POWER, OFF.
00 03 34 16 CMP  EDS POWER's OFF.
00 03 34 18 LMP  CB EDS, three, open.
00 03 34 21 CMP  EDS, three, open.
00 03 34 24 LMP  DOCKING PROBE EXTEND/RELEASE to OFF.
00 03 34 27 CMP  OFF.
00 03 34 28 LMP  DOCKING PROBE RETRACT, two, OFF.
00 03 34 30 CMP  Two, OFF.
00 03 34 31 LMP  CB DOCKING PROBE, two, open.
00 03 34 34 CMP  DOCKING PROBE, open. TAPE RECORDER's going off.

TIME SKIP

00 04 11 55 LMP  Okay; I'll cycle the cryo fans.
00 04 11 59 CDR  Is that ON and OFF?
00 04 12 01 LMP  Yes, ON for a minute.
00 04 12 03 CDR  That's right, we got a change for that.
00 04 12 04 CMP  You don't need the checklist. You got that silly bunch of junk. Garbage, rather.
00 04 12 15 CDR  Okay; load RCS DAP. Al, you want to load your DAP?
00 04 12 20 LMP  Oh, let's see. We need to load --
00 04 12 21 CMP Yes.
00 04 12 22 CDR ...
00 04 12 31 CDR And Xlllll.
00 04 12 33 CMP Yes.
00 04 12 35 CDR Load NOUN 22 attitude. Monitor APS maneuver, ...
00 04 12 40 LMP Okay; what's the attitude?
00 04 12 42 CDR 090?
00 04 12 46 CMP Yes.
00 04 12 47 CDR 257. Okay. ...
00 04 12 51 CMP I don't think you can --
00 04 12 52 CDR Okay; 354.6. Okay; VERB 60 ENTER.
00 04 13 01 CMP VERB 60?
00 04 13 02 CDR Sixty.
00 04 13 04 CMP Okay.
00 04 13 05 CDR VERB 63 ENTER.
00 04 13 07 CMP Okay.
00 04 13 08 CDR GDC ALIGN.
00 04 14 08 CMP GDC's alined.
00 04 14 09 LMP Okay; DET, RESET.
00 04 14 14 CMP Whoops! RESET.
00 04 14 16 LMP CB, SEQUENCE ARM, two, closed.
00 04 14 18 CMP ARM is closed.
00 04 14 19 LMP Okay. Cue MSFN, because we'll be getting the LOGICs on the ARM pretty soon.
00 04 14 24 CMP Okay. Houston, 15.
Roger, Gordo. We're ready to get the PYRO ARMs and LOGICs on now.

Okay; LOGICs coming on. LOGIC 1. LOGIC 2.

Roger. Okay?

SEQUENCE PYRO ARM, two, go to ARM.

PYRO ARM coming on. They're on.

Okay; TVC SERVO POWER number 1 to AC 1/MAIN A.

AC 1/MAIN A.

RHC and THC armed.

RHC and THC armed.

Okay; call P47.

Yes. Okay. Let me put a belt on here to just strap myself down a little bit.

Yes. That's a good idea.

Yes, we're going to be right on that time, at 4:16.

Got much left to do?

Here it is.

... - -

Yack!

You hold that side, and I ... - -

Can you see it?
00 04 16 07  CDR  ... this side.  ... Here ... get these to your side.
00 04 16 16  CMP  Yes.
00 04 16 29  CMP  ...
00 04 16 31  CDR  Okay, Jimmy.
00 04 16 32  LMP  Okay; call P47.
00 04 16 39  CMP  Okay.
00 04 16 41  LMP  EMS MODE, NORMAL.
00 04 16 43  CMP  NORMAL?
00 04 16 49  LMP  Okay.  And whenever we get P47 eliminated there, we're ready for S-IVB/LM SEP, on, up.
00 04 16 54  CMP  Okay.
00 04 16 55  LMP  Start the DAC.
00 04 16 56  CMP  What?
00 04 16 57  CDR  The DAC.  Yes.
00 04 16 58  CMP  How about the settings on the DAC?
00 04 16 59  CDR  ... okay; we won't need ...
00 04 17 01  CMP  All right.
00 04 17 03  CDR  Jim, let's turn the page here ... see what we're going to do.
00 04 17 06  LMP  Oh, okay.
00 04 17 07  CDR  Now you're going to go over and start the DET.
00 04 17 09  CMP  Right.
00 04 17 10  CDR  CMC MODE - We do SEP; start the DET; CMC MODE, AUTO; and, at 5 seconds, thrust minus-X for 3 seconds.
00 04 17 18  CMP  Okay.  Coming up ...?
5 seconds.

Yes, 5 seconds. ...

I'll hit the SEP, and you get the DET started.

Okay; when you're - when you're - on my mark, you hit the SEP and I'll hit the DET. Ready?

I don't think I am.

Okay.

Okay.

Want to do it on the minute?

Yes, do it on the minute.

All right.

Okay, Houston, we'll SEP at 4:18.

... Stand by.

Boy, look at that.

Five - 5 seconds.

Okay. Okay.

We got a SEP.

We're in AUTO.

Five seconds -

How much now?

One foot - -

Three seconds. ... Okay.

Yes.

We've done it.

Okay, Houston. We got a good SEP.
Okay; you can PRO on that display.

Okay.

You have to go into POO. Then when the activity light's out, you can key VERB 66. Okay, Al, you ready to clean it up?

Yes.

SEQUENCE PYRO ARM, two, to SAFE.

SAFE.

SEQUENCE LOGIC, two, OFF.

LOGIC's OFF.

CB SEQUENCE ARM, two, open.

ARM is open.

Okay; Al, check and see if it's clear.

Okay. I can't see a thing except the LM there.

I can't either, Dave.

Okay.

You got SEQUENCE ARM, two, open?

ARM is open.

CB S-IVB/LM SEP, two, open. That's my side, not yours.

Yes.

Now verify 0₂ TANK ISOLATION valve move to gray.

Hey, I can see the Rover, Jim.

Can you?

Yes.

You mean it's there?
00 04 19 30 CDR  Yes, man.
00 04 19 31 LMP  Is it really?  Okay.
00 04 19 37 CDR  Okay.  Keep it moving.
00 04 19 41 CMP  What, Jim?
00 04 19 42 LMP  Give me your checklist.
00 04 19 44 CMP  Oh, yes, I can't get this doggone thing ...
00 04 19 48 CDR  Just put it down there and let's keep it going.
00 04 19 50 CMP  Okay.
00 04 19 55 LMP  Okay - Read to me. I've got to get down in the
       SIM bay. ...
00 04 20 00 CMP  Here, I can probably do that easier than you can.
00 04 20 02 LMP  Let me take - Why don't we configure our helmets
       and gloves off?
00 04 20 05 CDR  Huh --
00 04 20 06 CMP  Yes, why not?
00 04 20 07 CDR  Well, we do a maneuver here, don't we?
00 04 20 08 CMP  Yes.  We've got to do a maneuver to the S-IVB.
00 04 20 09 CDR  Let's get through this thing.
00 04 20 11 CMP  We're already doing attitude.
00 04 20 13 LMP  Okay.
00 04 20 14 CMP  That should take only a VERB 49, since we've
       already loaded it.
00 04 20 17 CDR  O₂ tank 3 ISOLATION valve talkback gray.
00 04 20 19 LMP  That's verified.
00 04 20 21 CDR  Okay, MAP, PAN, and SM/AC POWER should be OFF.
       I'll get them.  You're in all of that junk --
Day 1

00 04 20 27 LMP
00 04 20 29 CDR
00 04 20 32 LMP
00 04 20 35 CDR
00 04 20 36 LMP
00 04 20 37 CDR
00 04 20 38 LMP
00 04 20 45 CDR
00 04 20 49 CMP
00 04 20 51 LMP
00 04 20 58 CDR
00 04 21 03 LMP
00 04 21 07 CDR
00 04 21 17 LMP
00 04 21 26 CDR
00 04 21 28 LMP

00 09 27 26 CDR
00 09 27 33 LMP
00 09 27 59 CDR
00 09 28 16 CDR
00 09 28 42 CDR

No. Well, now -

You've got all that junk on; I don't want you to scratch your helmet.

Okay. Yes, take care of my helmet for me.

You've got to.

Yes.

So you can see.

That's right. Here, if you're going to get down, I'll read to you.

Okay.

I'm going to take my helmet off.

The first one is MAPPING CAMERA, ON, to OFF.

MAPPING CAMERA, ON, to OFF. Okay.

And the PAN CAMERA POWER, OFF.

PAN CAMERA POWER to OFF. Okay.

SM/AC POWER; OFF. Down on 181.

POWER to OFF.

And, Al, LAUNCH VEHICLE SPS INDICATOR switch to GPI.

TIME SKIP

Okay. GROUP 5, MAIN A and MAIN B on 226 ...

Okay. Both those are open.

Okay. Stand by.

Okay. Count.

Okay. I understand. Standing by.
Eight - 8.983.

HIGH GAIN, MEDIUM.

No. No. It's not under EMS.

What?

No, we're not. We're talking about GROUP 5, on 229.

He said GROUP 5?


229, GROUP 3.

Huh!

Okay. We'll do a - we - we note that drawing 8.9 Echo 3 doesn't seem to fit what you're doing.

Oh, okay. Okay. Shoot!

Okay. Here goes DELTA-V A now. Okay. A is up in on, and the SPS THRUST light is off.

It is? Gee! Good grief!

That's correct. It's still in the up and on position, and when I went to the on position, up, the light went out. I'll just leave it there while you think about it.
Wonder why it'll do that?
(Snicker) I can only think of one reason — that it's really in backwards. Did you cycle those switches ..., Jim?
Aah -
Yes, you did - pulled the circuit breakers out to see if the light would change any.
Yes.
I think I would've, too. But he --
... contact ... that contact - (laughter). That's amazing. No. In either position, though, the light should come on.
A is OFF, and the light remains off. Momentary.
Huh! Is the light still off?
It's a switch problem. Yes, the light's still off. I bet it was a - when we did that SEP, bet we got a little solder ball in that switch or something.
Bet we did, too.
Roger. Bravo is up and on; the light is off. Now Bravo is OFF and the light remains on [sic].
Change out the switch.
Huh?
All we got to do is change out that switch.
Yes. All we got to do is bring that bank on late, and turn it off early.
Yes, unless you get a contact in there, we wouldn't have the ignition signal, though.
(Snicker) Roger.
The good thing about it, though, is that apparently the SPS THRUST light - THRUST light works okay.
00 09 37 44  CMP  Yes.

00 09 37 45  CDR  And that's - your cue. You know, all you need, I guess, is the ignition signal - when the light's on.

00 09 38 00  CMP  Yes. Right now ... give guidance the ignition signal.

00 09 39 50  CMP  Aaah - Whooo! ...

00 09 39 54  CDR  I think you're about checked out.

00 09 39 59  CMP  I'll do one more.

00 09 40 17  CMP  O_2 FLOW.

00 09 41 12  CMP  Whooo. ... much of that crap.

00 09 41 16  CDR  You feel pretty good about those?

00 09 41 17  CMP  Yes.

00 09 41 19  CDR  Good.

00 09 41 23  LMP  He's doing all that.

00 09 41 24  CMP  You better believe it!

00 09 41 25  CDR  You want that optics calibration, don't you?

00 09 41 27  CMP  Uh-huh. What's the attitude?

00 09 41 35  CDR  Okay, the attitude is - well, wait until you get to POO and you can do a little work on it.

00 09 41 48  CDR  Okay, now, the attitude of VERB 49 to - it's 210, 339, 330. Okay. Going CMC, AUTO.

00 09 42 07  CMP  Okay.

00 09 42 20  CDR  A long way to go. 142 ... up to ... start the UVs. ...

00 09 42 39  CMP  Yes, we've got several of those.

00 09 42 55  CMP  ...
You ready for the UV stuff there, Dave? Well, I'm not quite through (yawn) with my stuff though. ... 

So you have black on one side and white on the other.

Yes, ...

Roger. It'll work. Good. It just came on. Would you believe? It came on.


Okay. Don't change it all, Al, to Bravo 1. Cycling several times through the middle.

Roger.

Okay; right in the center of the contacts with A, right between the two, I can get the light to go out. But now, when I go on up to up and on, the light comes on again. And, now I've come back to the OFF position and the light's off. So, I think you've isolated your problem.

Think so, too. That just says we're going to have to use - ban - bank B this time.

It says you're going to have to pull the circuit breakers on A.

Yes.

Before the shutdown.

Yes. Well, either that or - yes, that's right, see.

Because if it doesn't, there's no guarantee the switch is going to do you any good.

That's right. Okay, we got an ap - optics calibration here? What - what star is it?

We're at that attitude now.

Oh, okay. That's - star number 1.

Star number 1 again, huh? Okay.
Okay; we should be looking right at it.

Why do we get -

I don't - I don't know why I get an ignition. We got the light on, but that doesn't say we have an ignition signal. Threw that switch. How could that switch affect the ignition signal unless it was there from someplace else?

Yes. Hey, that's right.

The switch can't produce an ignition signal without something else producing the ignition signal. It sounds to me like the light circuit breaker switch.

Yes.

You know they took the FCSM out.

I know it.

... they really got a complicated system.

Okay. DELTA-V THRUST verified OFF. PILOT VALVES verified open, and we'll close the GROUP 5s.

Okay. We're done - 20C.

Okay, let's go to UV then. Jim, watch the Itek.

Roger. Houston. Stand by.

What are the angles in the Flight Plan? Isn't that where we're supposed to do this?

Says "OMNI D, HIGH GAIN, minus 33 and 213."

Check out 1, 2. Minus 33 and 214. 211 is what the DSKY says. Close enough.

That's real.
<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>CMP</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 10 36 38</td>
<td>Yes, ... Ooooh.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 10 36 46</td>
<td>There, David.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 10 36 52</td>
<td>All I got to say, Al, is good luck.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 10 36 56</td>
<td>Good luck with what?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DAY 2

01 08 03 06 CMP Yes. And where's the Hasselblad that's got another -
got another adapter on it? Oh, it's just this -
son of a bitch right through here.

01 08 03 42 LMP Where you going to plug that other end in, lineman?

01 08 03 44 CMP Huh?

01 08 03 45 CDR Where you going to plug that other end in? You
have a place down there?

01 08 03 50 CMP Oh, yes, yes, yes, yes, yes.

01 08 03 53 CDR Where?

01 08 03 55 LMP That's such a longer cable, though, ... Put --

01 08 03 58 CMP Yes. Hmm.

01 08 04 05 LMP The only place that plugs in is over here in the
girth bay, isn't it?

01 08 04 09 CDR Yes.

01 08 04 10 CMP Well, how the hell do we put a PCM cable in this
thing, then?

01 08 04 14 CDR But your MAG isn't on your - You haven't got a
MAG on right now.

01 08 04 18 LMP Be very --

01 08 04 19 CMP Okay.

01 08 04 20 LMP -- careful then.

01 08 04 21 CMP I have been, too.

01 08 04 25 CDR Look it over.

01 08 04 26 LMP Oh, my God.

01 08 04 31 CDR Fooling with your pocket's not ...
Another thing you've got to check in getting this thing on is maybe procedures.

That's right. You always find --

Yes.

-- operations to verify.

Okay.

Yes. You got to crank it around once.

Well, we should now make contact.

Press on.

Found ... TV ...

Which one?

There?

...

Okay.

Okay. That's all right.

Hmm!

There you go. ...

Tool.

Hmm?

Here. ... Let's see your MAG. Looks all right. Not going in that sprocket.

Yes, it looks like it's tight back here.

...

It wasn't - it wasn't before.

No, I guess it - again.
01 08 06 16  CDR   Egad.
01 08 06 21  LMP   ... I've never put that thing --
01 08 06 23  CMP   God damn it - there - I -
01 08 06 26  LMP   Must be another cable ... --
01 08 06 27  CMP   Connector right here.
01 08 06 28  LMP   There must be another cable.
01 08 06 29  CDR   Yes, there is.
01 08 06 34  LMP   You remember that fit check?
01 08 06 35  CMP   Oh, shit.
01 08 06 36  LMP   The vehicle with the --
01 08 06 38  CMP   Yes.
01 08 06 39  LMP   -- with the camera down there on the sextant?
01 08 06 40  CMP   Yes?
01 08 06 42  CDR   You remember who took --
01 08 06 43  CMP   I didn't - No, I didn't do that.
01 08 07 01  CMP   Yes, this is the EL --
01 08 07 03  CDR   Jim, don't you want to --
01 08 07 04  CMP   -- PCM.
01 08 07 05  CDR   -- use the cables we've got?
01 08 07 08  LMP   ...
01 08 07 16  LMP   Will those cables hit - hook together?
01 08 07 20  CMP   No.
01 08 07 21  LMP   Fit together.
01 08 08 27  CDR   Maybe we better do it without PCM.
Yes, it's a shame. That PCM thing. (Sigh) That's -

That's really something.

Could have sworn that goddam thing was right right here.

No, there's never been one there. The only place they've ever been --

Let me have it.

Yes.

-- was down behind the rock boxes, but you won't reach that either.

No, you just don't reach that either.

There's - there's one behind each rock box.

Yes?

But that's - that's too long for that cable, too.

That's too - Yes, that's right. Too long for the cable.

Too long for that one. ...

In there?

No.

Look behind the screen.

CDR's food locker! No. We don't have a CDR's food locker, do we?

Well, that's one of those little things I just never had - for one reason or another, never had checked out, I guess.

I thought you had.

I thought I had, too.

What?
01 08 10 47 CMP  Thought I'd looked at everything.
01 08 10 48 CDR  Not the cameras. ... camera up.
01 08 10 57 LMP  Well, maybe we better press on through.
01 08 10 59 CMP  Yes, okay. Let's do without it.
01 08 11 01 LMP  Okay. Exposure's supposed to be here on 1/500th.
01 08 11 13 LMP  ..., PCM.
01 08 11 15 CDR  How do you get PCM out of the DAC?
01 08 11 17 CMP  Okay. 1/500ths.
01 08 11 18 LMP  Twenty-four fra - frames per second?
01 08 11 20 CMP  Right; 24.
01 08 11 22 LMP  You want to shoot 5 percent of the MAG? You got MAG H on there?
01 08 11 26 CMP  MAG H. That's correct.
01 08 11 29 LMP  You want to record the percentage. I guess, right now, it's 100 percent.
01 08 11 34 CDR  Can't even see 5 percent on that thing.
01 08 11 38 CMP  Yes, it's about 95 percent.
01 08 11 41 CDR  You can time it, Al. Take 5 percent of the total, times the 24 frames per second.
01 08 11 45 LMP  Yes, you got it --
01 08 11 46 CMP  Okay.
01 08 11 47 LMP  -- for 2 seconds.
01 08 11 48 CMP  Okay. Yes.
01 08 11 49 LMP  You got it for 2 seconds.
01 08 11 50 CMP  Huh?
01 08 11 51 LMP  It calls for 2 second's worth at 24.
01 08 11 52 CMP  Two seconds?
01 08 11 53 LMP  Yes.
01 08 11 54 CMP  Oh, okay.
01 08 11 55 LMP  No, the next step is UTILITY POWER, ON.
01 08 11 58 CMP  Okay --
01 08 11 59 LMP  ...
01 08 12 00 CMP  -- UTILITY POWER is ON. Okay.
01 08 12 03 LMP  I guess you need that. Roger.
01 08 12 04 CMP  You want 2 seconds at 24 frames.
01 08 12 06 LMP  Well, let me read -- Yes, that's what it calls for.
01 08 12 08 CDR  ... That's not 5 percent. Where do you get the 5 percent?
01 08 12 17 LMP  Twenty-four ... is this here. ...
01 08 12 21 CDR  Oh, about ... seconds ... We got a bunch of brange - a bunch of changes to make here, Al.
01 08 12 27 CMP  Oh, okay.
01 08 12 28 LMP  You're not ready to run.
01 08 12 29 CMP  Okay.
01 08 12 30 LMP  What you want next is disable jets A-3, B-3, C-4, and D-4.
01 08 12 35 CMP  Okay. That gets the - the dark stuff out of the way. Okay, yes, that's --
01 08 12 40 CDR  Okay, here we go, A -
01 08 12 41 CMP  -- protective.
01 08 12 42 CDR  Read them again.
01 08 12 43 LMP  A-3.
01 08 12 44  CDR  Yes.
01 08 12 45  LMP  B-3.
01 08 12 47  CDR  A - A-3 and B-3?
01 08 12 50  LMP  Yes, Bravo 3.
01 08 12 51  CDR  B-3.
01 08 12 52  LMP  C-4?
01 08 12 56  CDR  Bravo or Delta?
01 08 12 58  LMP  No, the last one was Charlie 4.
01 08 13 01  CDR  Okay, Alfa 3, Bravo 3, Charlie 4 -
01 08 13 04  LMP  And Dog 4.
01 08 13 06  CDR  Dog 4. Okay, they're disabled.
01 08 13 09  LMP  Then we call P52.
01 08 13 11  CDR  Oh, okay. Okay.
01 08 13 17  LMP  We have to PROCEED there until we get the NOUN 70 display.
01 08 13 21  CDR  Yes.
01 08 13 22  LMP  We want all zeros in there.
01 08 13 23  CDR  Want to set all zeros in there? Okay.
01 08 13 29  LMP  And then we have some - a load for NOUN 88.
01 08 13 31  CDR  Yes, right. Okay.
01 08 13 38  LMP  Okay, NOUN 88.
01 08 13 40  CDR  Yes. Read them off.
01 08 13 41  LMP  Minus 10820.
01 08 13 46  CDR  Go.
01 08 13 47  LMP   Minus 79037.
01 08 13 51  CDR   All right.
01 08 13 52  LMP   Minus 60300.
01 08 13 59  CMP   Before we blow it, let's make sure that there's no PCM cable that'll really -
01 08 14 05  LMP   Okay, we - we got a few more steps to do here anyway. Verify the --
01 08 14 08  CMP   Houston, 15.
01 08 14 10  LMP   Wait a minute.
01 08 14 18  CMP   Okay. With the sextant photo test here, we have a call for a PCM cable, and the only ones we have on board will not reach the connectors over by the right-hand girth shelf. Do you have any suggestions on how we can get the DAC connected to the PCM?
01 08 14 42  CMP   Okay.
01 08 14 45  LMP   Okay, Al, you can verify through the sextant, if you can, that the optics are boresighted on the target.
01 08 14 53  CDR   Okay. We want to proceed on this display, right? Okay.
01 08 15 15  CDR   Okay, now I'm going down to the station there and see if I can see that -
01 08 15 58  CDR   Yes, that one's right.
01 08 16 06  CMP   Okay, Jim.
01 08 16 08  LMP   Okay, G&N POWER AC on panel 5 comes off.
01 08 16 12  CDR   Yes, you want to turn G&N POWER off?
01 08 16 15  LMP   It's off.
01 08 16 16  CDR   Okay.
And mount the DAC on the sextant.

Okay.

Then we're ready to dim interior lights; then you can turn the DAC on, 24 frames per second for 2 seconds.

Twenty-four frames per second for 2 seconds, you want? Let's wait until we get an answer from them on the PCM.

Yes.

Yes. Here's a cap comes right here. It's ...

That came out of the - that's the electrical connector for the suit.

Yes.

The cover. If you'd just find my spoon, I'd be a lot happier.

Yes.

Why don't you put that in your pocket and then put on suits when we get the PRDs up.

Yes.

Okay, Al. Another thing after this - Then you change the time and, 1/60th of a second, you take one frame at 60 - 60 seconds exposure time, one frame at 20, one frame at 5, and one frame at 1.

Okay.

Let's see. You want - Let's see. You want ...

I don't care.

... seconds ... watch.

Yes. We want to turn out as many lights as we can.

Yes, let me put the shades up then.
Okay.

Put all the shades up and turn out all the lights inside.

We came all the way out here for some poor guy, we might as well try and do his experiment right.

Is this for "Dim Light" Dunkelman?

Yes. Bob Mercer.

Oh, yes.

Try and do it right.

You sure that other cable won't work on that camera? The one for the EL?

No.

Let's try it.

Try it and see. It's -

This here?

It's always been my understanding that it wouldn't. It's not long enough anyway, I don't think.

We really can't do a thing.

See if it'll hook to the bottom one.

No, it's too short.

Certainly.

Shit, it's not even close.

Sure.

...

Sure.

You can't - can't fit them together.
<table>
<thead>
<tr>
<th>Time</th>
<th>Actor</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 08 20 03</td>
<td>CMP</td>
<td>God damn it, there's an outlet down here somewhere.</td>
</tr>
<tr>
<td>01 08 20 07</td>
<td>CDR</td>
<td>Maybe that'll go behind the - rock box, Al.</td>
</tr>
<tr>
<td>01 08 20 10</td>
<td>CMP</td>
<td>Huh?</td>
</tr>
<tr>
<td>01 08 20 11</td>
<td>CDR</td>
<td>Fit - will that fit on the camera though? Will this piece go onto the camera?</td>
</tr>
<tr>
<td>01 08 20 19</td>
<td>CMP</td>
<td>I think that's the same kind of connection as on the - on the Hasselblad.</td>
</tr>
<tr>
<td>01 08 20 23</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>01 08 20 24</td>
<td>CDR</td>
<td>There you go, behind the rock box. Jawohl. Yes.</td>
</tr>
<tr>
<td>01 08 20 29</td>
<td>CMP</td>
<td>That seems like a -</td>
</tr>
<tr>
<td>01 08 20 34</td>
<td>CDR</td>
<td>That's a hell of a thing to have to do, but I think there's one in - back there. I remember seeing it during checkout. Right there. There's one way back in there.</td>
</tr>
<tr>
<td>01 08 21 04</td>
<td>CDR</td>
<td>Well, there used to be one back here.</td>
</tr>
<tr>
<td>01 08 21 06</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>01 08 21 12</td>
<td>CDR</td>
<td>SCIENCE INSTRUMENTATION, 162.</td>
</tr>
<tr>
<td>01 08 21 15</td>
<td>LMP</td>
<td>How about that.</td>
</tr>
<tr>
<td>01 08 21 18</td>
<td>CDR</td>
<td>That's - see? It's not long enough to go there. (Laughter).</td>
</tr>
<tr>
<td>01 08 21 27</td>
<td>CMP</td>
<td>You're kidding.</td>
</tr>
<tr>
<td>01 08 21 28</td>
<td>CDR</td>
<td>Uh-uh.</td>
</tr>
<tr>
<td>01 08 21 29</td>
<td>LMP</td>
<td>How about just - Isn't there one on the other side, Dave?</td>
</tr>
<tr>
<td>01 08 21 31</td>
<td>CDR</td>
<td>Yes, but it's - There is, but if it's not long enough to go on this side, it certainly won't go on the other side. Does that look that kind like - -</td>
</tr>
<tr>
<td>01 08 21 39</td>
<td>CMP</td>
<td>That's the G&amp;N.</td>
</tr>
<tr>
<td>01 08 21 40</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
</tbody>
</table>
01 08 21 41  CDR  Does that look like the right kind of plug, anyway, Al?

01 08 21 42  CMP  Yes. Yes, it does.

01 08 21 45  CDR  Houston, 15.

01 08 21 49  CC  I guess we have to agree that the cable doesn't reach all the way over to 227, and the request down here is that you voice-record shutter opening and closing on the S - on the DSE.

01 08 22 01  CDR  Okay, I'll voice-record shutter opening and shutter closing. We'll do that. What's the number of that panel down there, Al?

01 08 22 08  CMP  162.

01 08 22 10  CDR  Okay; and be advised, we also tried to get it to panel 162 without success. It was too short for that one, too.

01 08 22 19  CMP  ... panel 162.

01 08 22 26  CDR  Well, we did everything we could.

01 08 22 30  CMP  Move the rock box for me, please.

01 08 22 34  CDR  Nothing else you can do? You tried.

01 08 22 39  CMP  Yes, I never thought about the - juice that thing down here in the LEB.

01 08 23 15  CMP  Okay, Jim, let's get on with it here.

01 08 23 18  LMF  Turn down the lights. Your first one'll be for 2 seconds.

01 08 23 28  CMP  Okay. Let me make sure I got all the right stuff set up here - 1/24th [sic] and 1/500th.

01 08 23 37  CDR  Jim, make sure your tape recorder's going. You record the starts and stops like nobody does.

01 08 23 41  CMP  That right? Yes, I will.

01 08 23 43  LMF  Tape recorder's moving.
Day 2

01 08 23 45 CMP It is moving?
01 08 23 46 LMP Yes.
01 08 23 47 CMP Okay; you ready?
01 08 23 49 LMP Yes, I'm ready. Two seconds.
01 08 23 50 CMP Okay. Okay, 2 seconds. Count now, one, 1000; two, 1000; OFF.
01 08 23 57 LMP Okay. Change to time and - 1/60th.
01 08 24 01 CMP Okay.
01 08 24 03 LMP Time and 1/60th.
01 08 24 07 CMP Okay, it's time and 1/60th.
01 08 24 09 LMP Okay, and the first one'll be 60 seconds.
01 08 24 12 CMP Okay. Have you got the clock running there?
You can - -
01 08 24 15 LMP Give me a mark, and I'll tell you when to stop it.
01 08 24 17 CMP Okay, on my mark -
01 08 24 19 CMP MARK.
01 08 24 49 CMP I think you'd be better off if you turned that off, Jim. Just - Can you see the timer without turning that light on? Yes. You going to tell me at 1 minute?
01 08 25 11 LMP Try it again with the kitchen timer.
01 08 25 13 CMP Huh?
01 08 25 14 LMP Try it again with the kitchen timer.
01 08 25 15 CMP Oh, okay.
01 08 25 16 LMP Stand by.
01 08 25 19 LMP MARK.
Okay.

That's on the kitchen timer.

Okay; let's take two of that.

Yes.

Okay - Why don't you give me a mark, and I'll start the kitchen timer.

Okay. Let me make sure I got this set up right.

That would be a - Okay.

Okay. You ready?

Yes, I'm ready.

On my mark -

MARK.

When you hear the "ding," why, you can release it.

Okay.

I must say, if that recorder's working okay, I must say that I don't think this - photography's going to come out very good because there's an awful lot of bright - great number of bright particles right out in front of the spacecraft.

Ding.

Okay.

MARK.

Now what's the next one?

The next one's 20 seconds.

Okay. Same - 1/60th?
01 08 27 08 LMP Yes.
01 08 27 10 CDR We want that one much.
01 08 27 30 LMP Standing by for your call.
01 08 27 31 CMP Okay. On my mark -
01 08 27 33 CMP MARK.
01 08 27 50 LMP Stand by.
01 08 27 53 LMP MARK.
01 08 27 54 CMP MARK. Okay.
01 08 27 55 LMP ...
01 08 27 59 CMP Okay. What's the next speed there, and time?
01 08 28 02 LMP Next one is 5 seconds.
01 08 28 05 CMP Okay. On my mark.
01 08 28 10 CMP MARK.
01 08 28 12 LMP Okay. Stand by.
01 08 28 16 LMP MARK.
01 08 28 17 CMP Okay.
01 08 28 18 LMP Okay, next one's - 1 second.
01 08 28 21 CMP Okay. One second?
01 08 28 25 LMP One second.
01 08 28 26 CMP Okay.
01 08 28 32 LMP Okay - -
01 08 28 33 CMP Hmm!
01 08 28 36 CDR Lucky.
01 08 28 37 CMP That sure does look funny.
Sounds like we got more than one frame.

Huh?

Sounded like you got more than one frame.

Yes, it did.

Do you show it time and 1/60th?

No, I'm at 1 frame per second.

You should have been on time.

All right. I'll take one on time for 1 second.

Well, how about - All the others were okay though? Yes:

Yes, all the others are okay.

Yes. Yes.

That - the last two are going to be - one's going to be maybe a couple of frames at 1 second, or one - or a couple of frames per second - yes, at 1 frame per second.

Well, why don't you just take a 5-second one then?

At 1/60th. Huh?

In other words, you want to repeat the 5 second, too?

No. No.

One frame per second's going to be a lot different from 1 second per frame.

One frame per second is a lot different than 1 - second frame.

I know it.

Yes. That's what I'm saying. Maybe we ought to repeat the 5-second exposure.
No, that should be all right. I did that on time.
Okay.
Okay.
Okay, okay, go back to 24 frames per second.
Okay. (Sneeze).
And 1/500th.
And 1/500th; oo, that's going to be a — Okay.
And then run the DAC for 2 seconds.
Okay.
And then lights up, enable jets, and do a VERB 49 to another target.
Okay.
Don't know what time it is.
I got them.
Did you get the jets enabled yet, Dave?
Coming up.
Okay, VERB 49.
Let me make sure I get the right jets, A-3, C-4, B-3, and D-4.
Right.
Okay.
Give me a VERB 49.
Okay, 239, 169, 330.
Okay, 239, 169, and 330. That's wrong.
Really?
01 08 31 26  CMP  Is that for the sextant or the UV?
01 08 31 30  CDR  We have to do another with the ...
01 08 31 42  CMP  Gee. Well, that's fair enough.
01 08 31 46  LMP  Go maneuver.
01 08 31 48  CDR  Golly, that's a -
01 08 31 54  LMP  And, Al, when we get there, we'll repeat - repeat step 3, yes.
01 08 31 59  CMP  What? With the sextant and stuff?
01 08 32 00  LMP  Yes.
01 08 32 01  CMP  Oh, I thought we were done with it.
01 08 32 02  LMP  No, no, I'm sorry. We got a whole bunch more. We've got --
01 08 32 05  CMP  Oh.
01 08 32 06  LMP  -- to do the same thing on another target.
01 08 32 07  CMP  Oh, okay, okay.
01 08 32 09  LMP  Now that you got it all put away.
01 08 32 11  CMP  Sorry about that. Speak up there, James. Okay, we got to maneuver?
01 08 32 19  LMP  Yes, we're maneuvering now. Oh, boy.
01 08 32 33  LMP  I didn't tell you to remove the stuff, Al.
01 08 32 36  CMP  Huh?
01 08 32 37  LMP  I didn't tell you to remove it. Stop.
01 08 32 39  CMP  Tough. Why, we're doing the UV next, James.
01 08 32 45  CDR  Time wise?
01 08 32 46  LMP  We're a little behind. We're at 25.
UV. By golly. You got to hustle, man. I'll be getting some of that stuff out for you.

They want you to take all the MAGs over on this thing.

Yes.

Want to get all your MAGs out and stuff like that to take over, huh?

Yes, since you're down there - why don't you?

Get the ones in --

R-13. They're almost all in R-13, Jim.

Okay. That's all over by Jim there.

I think I can help.

A-8 - There are three MAGs in A-8 you can get out, Al. You can get those; S, T, and U.

They're in A-8, huh?

Okay. Yes, that's right. Those are those - Hasselblad things, since they're in there.

You want me to take these out of R-13 now, Dave?

Yes. Let's just get them all ready.

Tie them down there on the couch some way?

Let's see. How about O, P, and Q?

No. Well, all ours are double letters, really, Al.

Yes.

So anything that's a single letter is yours. So what I'm really looking for is SS, TT, and UU.
Hmm.
Yes, and then you got to have the UV done, the TV out, and be over there for a TV pass in an hour.
That's ... Okay.
We need the jettison bag out of A-2, Al. If you're in that vicinity.
Okay.
Very strange. I don't see any SS, TT -
Well, if it just says "LM S, T, and U," that's good.
Oh, hey, in here. Yes, I guess this is it here. They didn't mark them double. I bet you this is it.
Sorry about that.
Yes, LM S, T, and U.
Yes. Can you get us the jettison bag out of A-2?
Yes.
That your UCTA down there, Jim? Leaking all over.
Is it really?
Where? I don't see it.
Well, I bumped it, and it's just - coming all over me. Okay. Now what do you want out of A-2?
Want a jettison bag.
Okay.
Thank you.
Okay. Now for the ...
Let's see. You want 13, there.
01 08 38 21 CMP Okay. Are we in attitude yet?
01 08 38 23 LMP No, not yet, Al.
01 08 38 25 CDR No, we're not there, Al. We've got a ways to go.
01 08 38 27 CMP Okay.
01 08 38 33 LMP ... I think ...
01 08 38 44 CDR Fine. That's got it. Okay, we got it. Going to be a ... got on your hands.
01 08 38 52 LMP We're not there yet. We need utility straps and retainer straps.
01 08 38 57 CDR I'll be getting those.
01 08 38 58 LMP Okay.
01 08 38 59 CMP From where?
01 08 39 01 LMP Over from R-5.
01 08 39 03 CMP Huh?
01 08 39 04 CDR You get those ...?
01 08 39 06 CMP R-5?
01 08 39 07 LMP No, we don't need -
01 08 39 08 CDR Forget it, Al.
01 08 39 09 CMP Oh, okay. Yes.
01 08 39 10 CDR Peanuts. Let's really get the big stuff.
01 08 39 22 CDR And - Got a ways to go. We want to get the LM Data Kit, in R-3. Okay, Ac --
01 08 39 34 CMP Yes, that's right here.
01 08 39 35 CDR -- Activation Checklist in R-3. Because - R-3's connected with -
The LM Data Card Kit?
Well, the whole thing. The LM Data Kit should be in there.
Oh, that's it, probably, stored back there.
Is that it?
Yes. Should be Activation Checklist.
You want this all over there, Dave?
Yes.
Activation Checklist.
Why don't we just take the Activation?
Yes, take the other thing when I'm not looking.
Yes.
Just a second.
What say? Put it back up? Yes.
...
Let's see how close we are. Let's see. ...
Yes, I can get it out for you, if you want. Here it is.
...
We got another 30 degrees to go.
All right.
...
Jim, you're absolutely unreadable. I can't make out a word you're saying, usually.
Okay. I got it, Al.
There you go. I can hear you. Got the cables?
01 08 42 29 LMP Yes. I got them.
01 08 42 30 CMP Okay. You want the bracket?
01 08 42 35 LMP No.
01 08 42 36 CMP This is going to be just hand held.
01 08 42 37 LMP Taking it over to the LM.
01 08 42 39 CMP Okay.
01 08 42 42 LMP Keep watching the monitor.
01 08 42 44 CMP Yes. Okay.
01 08 42 47 CDR Hey! How did you ever get L-2 closed, Al?
01 08 42 51 CMP L-2 closed. I didn't.
01 08 42 59 CDR Somehow -
01 08 43 04 CMP I didn't get it closed. I couldn't close it on all those cables. Could you?
01 08 43 10 CDR No. Not unless I rewind the cables.
01 08 43 12 LMP Here.
01 08 43 17 CDR Too much in here.
01 08 43 18 CMP Yes, there is.
01 08 43 44 CMP Here.
01 08 44 03 LMP Hmmm. I don't understand why I can't get A-1 closed.
01 08 44 17 CDR Huh?
01 08 44 21 LMP It's got too much in it with the strut that's in the way there. Dave, can you reach down through there and rotate that strut a little bit so that it gets - so that it's --
01 08 44 32 CDR Yes.
--- out of the way of the lid of A-1?

No, I can't. I don't know which way to rotate the darn thing here. It's got to rotate - that's right - it's got to rotate towards you.

Why don't you ... get that thing?

Mmm.

Get it ... I guess. Better than ... No, no, it won't go that way. It won't make any difference.

... Get it - get it all the way up ...

Yes.

...?

No. It doesn't bend that way.

I don't know what there is about that strut there that - that changed.

Well, something's different there.

There sure is.

The ... attitude. Why don't you do that --

Roger, OMNI Delta.

Okay. I want to get my su - want to get my suit back out of the way. You got to - you got to rotate that strut.

... What are you doing?

... through there.

Yes. Get my suit back out of the way here.

Okay.
Okay, if we're at attitude, Dave, you want to disable those jets?


Okay. They're disabled.

Okay. Call P52.

Okay. Okay.

And we want all zeros and NOUN 70.

Yes.

And the NOUN 88 - we want the same values.

Oh, we do?

Yes.

Oh, yes. Yes, that's right; 108. Okay. Same values, eh?

Yes.

Okay.

It says verify that, through the sextant, that the optics are boresighted on your target. Get G&N POWER on for you.

Okay, we can go to - Let me just make sure I got the same target.

Yes. That's the same one. All right. Up.

G&N POWER going off. Mount the DAC on the sextant.

Yes.

Okay, dim interior lights, and - You on 24 frames per second?

Okay. I am now.
Okay, you want to do --
And - and 1/500th?
Uh-huh. Yes, it'll be 1/500th.
Okay. You want it 2 seconds?
Two seconds, yes.
Okay.
Okay. Change the time to 1/60th.
Okay.
You there?
Yes.
Okay. At 60 seconds, give me a mark and I'll give you a time.
1/60th.
Okay. You in what - now what do you want it now?
Sixty seconds.
First one 60 seconds, huh?
Yes.
Okay.
MARK.
Okay.
You going to give me a mark?
Mmm-hmm.
Okay.
About 20 seconds.
01 08 49 58 LMP Stand by.
01 08 49 59 CMP Okay.
01 08 50 03 LMP MARK.
01 08 50 05 CMP Okay. I want to do that one again. Ready?
01 08 50 10 CMP MARK.
01 08 50 15 LMP Why you doing it again?
01 08 50 17 CMP Hmm?
01 08 50 18 LMP Why do you want to do it again?
01 08 50 19 CMP Oh, I was a little bit leary of that last one. I didn't like the way that shutter sounded.
01 08 51 05 LMP Stand by.
01 08 51 07 CMP Okay.
01 08 51 11 LMP MARK.
01 08 51 12 CMP Okay. Okay. Next?
01 08 51 21 LMP The next one is 20 seconds.
01 08 51 23 CMP All right. You ready?
01 08 51 25 LMP Definitely.
01 08 51 26 CMP MARK.
01 08 51 42 LMP Stand by.
01 08 51 43 CMP Okay.
01 08 51 46 LMP MARK.
01 08 51 47 CMP Okay.
01 08 51 48 LMP Okay, tell me when you're ready. The next one's 5 seconds.
01 08 51 51 CMP Okay. I'm ready.
01 08 51 53 LMP  Yes.
01 08 51 54 CMP   MARK.
01 08 51 55 LMP   Okay. Stand by.
01 08 51 59 LMP   MARK.
01 08 52 00 CMP   Okay.
01 08 52 01 LMP   Your next one's 1 second.
01 08 52 02 CMP   Okay. Okay.
01 08 52 08 LMP   Okay. Then you change to 24 frames per second.
01 08 52 11 CMP   Okay.
01 08 52 12 LMP   And 1/500th of a second.
01 08 52 16 CMP   Okay.
01 08 52 17 LMP   Then run the DAC for 2 seconds.
01 08 52 20 CMP   Okay. Done.
01 08 52 22 LMP   Okay. Enable jets.
01 08 52 25 CDR   Okay. Coming on; A-3, Charlie 4, Bravo 3, and Delta 4.
01 08 52 32 LMP   Okay. Record the MAG - percentage. Al, did we use 5 percent?
01 08 52 38 CMP   Yes, we didn't use any more than that.
01 08 52 40 CDR   Select attitude, Jim.
01 08 52 41 LMP   Okay. VERB 49 maneuver to the UV photos. ... load them.
01 08 52 51 CDR   Okay. Go ahead.
01 08 52 54 LMP   Okay. 150, 052, and 033.
01 08 53 06 CDR   150, 052, and 033.
01 08 53 12 LMP  We maneuvering?
01 08 53 16 CDR  What did you get on percentage on the MAGs, Al?
01 08 53 38 LMP  Al, percentage on the MAGs.
01 08 53 40 CMP  Well. It looks to me like it's about - we started out at about 95 percent and we're down to about 90 percent.
01 08 53 49 LMP  Okay.
01 08 53 59 CDR  ... take this ...
01 08 54 09 CMP  Okay. I'm going to put some of those cameras away here. We don't need the pictures any more here, right?
01 08 54 13 LMP  No.
01 08 54 14 CMP  Okay, Dave. Dave, you want to - stash that just for now, and -
01 08 54 19 CDR  Yes.
01 08 54 21 LMP  Still be one more left.
01 08 54 23 CDR  Oh, it'll be a long time.
01 08 54 24 CMP  Yes.

TIME SKIP

01 09 43 05 CMP  Okay. Here it is. Jettison, Jim.
01 09 43 12 LMP  I've got the drogue here, Al, if you can get the TV between my legs.
01 09 43 19 CMP  Okay.
01 09 43 24 CDR  I got the probe, Jim. Let's see, you take the JETT bag. I want to put the probe over here by the hatch.
01 09 43 32 LMP  Okay, I've got the JETT bag.
15, Houston. We'd like to have NARROW BEAM, please.

Tell them NARROW BEAM.

Okay, Karl. You got NARROW.

Thank you.

We go over there yet?

Just a second.

Not yet, Jim. We're not going anywhere yet. There.

Okay, now -

Got them lashed down?

Yes, lashed down.

Okay.

Now we need the drogue.

Yes.

It seems to me that - the best thing - Give Jim back that TV. I think we can probably put his drogue also under the couch.

Under Jim's couch?

Well, that's too crowded, but I think under - under here.

Let's see how we might make out. Okay, watch your suit.

Yes.

Change ribbons.

One moment here.

Yes. Did you -

You like AUTO? Or REACQ.
01 09 50 42 CMP AUTO's fine for what we're doing.
01 09 50 46 CDR Okay, Houston, you should have the high gain now.
01 09 50 54 CC Roger, 15. Give us NARROW BEAM, please.
01 09 50 57 CDR NARROW.
01 09 51 12 CDR Anything over there, Jim?
01 09 51 24 CDR Okay, Houston. The LMP is in the LM.
01 09 51 30 CC Houston copies.

TIME SKIP

01 12 49 55 LMP ... 
01 12 50 07 LMP Okay. Did you want me to continue checking? I figured after I - Stand by.
01 12 50 13 CDR Yes. I thought you checked them all, Jim. Sure. Check them all. Sure.
01 12 50 25 LMP I understand.
01 12 50 26 CDR Not yet.
01 12 50 32 LMP ... do this?
01 12 50 33 CDR Okay. TV.
01 12 50 38 LMP ...
01 12 51 09 LMP ... That's over ...
01 12 51 12 CDR Yes, when I read it out to you. Not before.
01 12 51 17 LMP ...
01 12 51 54 CDR Oh, yes.
01 12 51 58 LMP Okay, Karl. I've checked all the circuit breakers, and that's the only one that seems to be out of configuration.
01 12 52 43 LMP Okay, we're standing by.
01 12 52 57 LMP Yes, that's corrected.
01 12 53 02 CMP Yaw - our yaw is really ***
01 12 53 08 LMP Yes, we're in TRACK, AUTO.
01 12 53 12 CMP The yaw is ***
01 12 53 14 CDR Just let it go for a while. It's black and it's black.
01 12 53 23 LMP PITCH is minus 30, YAW is 270, and track is AUTO.
01 12 53 41 CDR ... 280.
01 12 53 42 LMP You can stop that one someplace.
01 12 53 44 CDR Okay.
01 12 54 10 LMP Okay. And right now the yaw indicator is reading about 280.
01 12 54 21 CDR Yes.
01 12 54 25 LMP The dial is 280. The thumbwheel is 270.
01 12 54 41 CMP ...
01 12 54 44 LMP Yes, go ahead.
01 12 54 47 CDR ... try to talk crazy.
01 12 56 13 CDR This is 15; I read you loud and clear.
01 12 56 22 CDR Well, nothing, other than that the pitch went to zero, and the yaw decreased just very slightly. And, of course, when you reacquired, why, I think only the pitch went back to 30.
01 12 56 35 LMP That's right. ...
01 12 56 36 CMP Take this here. ...
01 12 56 39 CDR Get it off?
<table>
<thead>
<tr>
<th>Time</th>
<th>Role</th>
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<tbody>
<tr>
<td>01 12 56 41</td>
<td>CMP</td>
<td>Yes, I ... turn this PRD in.</td>
</tr>
<tr>
<td>01 12 56 49</td>
<td>CDR</td>
<td>Get the PRD out of there while you're at it.</td>
</tr>
<tr>
<td>01 12 56 51</td>
<td>CMP</td>
<td>Out of - where is it?</td>
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<tr>
<td>01 12 56 53</td>
<td>CDR</td>
<td>It's in the pocket with yours. ... It's in your cuff - by your - top of your right hand. Ah, I got it.</td>
</tr>
<tr>
<td>01 12 57 01</td>
<td>CMP</td>
<td>Oh, okay. ...</td>
</tr>
<tr>
<td>01 12 57 07</td>
<td>CDR</td>
<td>Is this pad you copied down, Al, is that - the next midcourse, huh?</td>
</tr>
<tr>
<td>01 12 57 10</td>
<td>CMP</td>
<td>No. That's a flyby pad.</td>
</tr>
</tbody>
</table>
DAY 3

02 07 40 01 SC (Laughter)
02 07 40 03 CDR Okay, Jim. How do you cycle those?
02 07 40 05 SC (Laughter)
02 07 40 06 CDR Okay. MAP CAMERA on to ON for 2 minutes and then OFF, and I'll set the camera.
02 07 40 10 LMP Okay. We're going to ON -
02 07 40 11 CDR Okay.
02 07 40 12 LMP MARK.
02 07 40 13 CDR The clock is running. PAN CAMERA SELF TEST to on (up). Talkback barber pole, to five frames, and then gray.
02 07 40 21 LMP Okay. SELF TEST.
02 07 40 24 CDR And then five. Then you do five frames.
02 07 40 26 LMP Okay.
02 07 40 27 CMP ... he doesn't. I think you - you'll - you'll see at 5 - about 5 seconds - and then gray.
02 07 40 34 CDR Okay. Is it gray?
02 07 40 36 LMP Not yet.
02 07 40 53 CDR Still not gray?
02 07 40 55 LMP No.
02 07 41 00 CDR It is barber pole?
02 07 41 01 LMP Yes, it's barber pole.
02 07 41 02 CDR Did it go barber pole when you put it - put it on?
02 07 41 04 LMP Yes.
02 07 41 05 CMP ...
02 07 41 07 CDR Oh, I see, Al. It does five frames automatically, and then it automatically goes gray.

02 07 41 09 CMP Yes.

02 07 41 10 LMP Okay. It's gray.

02 07 41 12 CDR Good. PAN CAMERA SELF TEST to HEATERS.

02 07 41 15 CMP We still don't know whether it - what - anything about the craters.

02 07 41 18 LMP Okay, PAN CAMERA SELF TEST going to HEATERS.

02 07 41 20 CDR PAN CAMERA POWER to OFF.

02 07 41 22 LMP PAN CAMERA POWER, OFF.

02 07 41 25 CDR Okay. After mapping camera - Oh, wait a minute. Stand by for the bell.

02 07 41 30 LMP Okay.

02 07 41 32 CDR And when the bell rings, you want to go MAPPING CAMERA to OFF.

02 07 41 36 LMP Okay.

02 07 41 45 CDR Oh, boy.

02 07 41 55 LMP Too bad they didn't put this panel over on Al's side.

02 07 41 59 CDR I think it'd been a lot easier for him during the flight - or during the --

02 07 42 01 LMP Yes.

02 07 42 02 CDR -- solo time, too.

02 07 42 03 LMP Yes. Yes, it would have, too.

02 07 42 06 CDR Probably didn't have the wiring.

02 07 42 08 LMP Didn't have any room for it ...

02 07 42 10 CDR Well, they probably - the wire ... probably were all built for this, you know.
Yup, yup. There you go.

Okay, MAPPING CAMERA going OFF.

MAP CAMERA, OFF. Okay, and then for 1 minute, we time the MAPPING CAMERA, OFF. And after it's been OFF for 1 minute, MAP CAMERA goes - the MAP CAMERA, ON, goes to STANDBY, and we should get a gray talkback. And the clock is running.

You have another 49 maneuver, or you want to recoup -

... that other ... 49 maneuver ... again.

Oh, oh, it says - Well, you get the idea that the - Let's see - it says secure the high gain antenna.

Yes.

So why don't we wait?

Okay, Jim. MAP CAMERA, ON, to STANDBY.

Verified.

Talkback gray.

Verified.

Okay.

Houston, Apollo 15. That completes the man [sic] and pap [sic] camera operation. And, if you approve, we'll secure the high gain and maneuver to the UV attitude.

Nothing like rubbing it in. (Laughter)

Okay. On the way. Thank you.

What's the attitude there, Jim?

Uh - -
DAY 4

03 06 30 22 LMP — — with a ... Minus 35.
03 06 30 25 CDR Roger.
03 06 30 27 LMP You guys got all your oxygen?
03 06 30 30 CDR Yes.
03 06 30 31 LMP Okay.
03 06 30 33 CMP Minus 5 and a PRO, and a DELTA-V thrust of plus 5 ... Okay. PILOT VALVE, open. Everything else looks good.
03 06 30 47 CMP/CDR One minute.
03 06 30 59 CMP Okay. We've got ... here.
03 06 31 13 CMP Average g is on.
03 06 31 19 LMP EMS MODE, NORMAL.
03 06 31 20 CDR EMS MODE's on.
03 06 31 27 CMP And we settle down for the DELTA-V thrust.
03 06 31 29 CDR Yes.
03 06 31 33 CMP Sit back and ... — —
03 06 31 34 CDR Looks good.
03 06 31 38 CMP Clear to PRO.
03 06 31 39 CDR Okay. 99 PRO. Ought to be okay.
03 06 31 44 CMP And the DELTA-V THRUST is on.
03 06 31 46 CDR Okay.
03 06 31 47 CMP B valves.
03 06 31 48 CDR IGNITION. 1 — —
03 06 31 49 CMP IGNITION.
03 06 31 50 CDR - - 2, 3, 4, 5 - -
03 06 31 53 CMP A's coming on. Okay - -
03 06 31 54 CDR - - ... there.
03 06 31 55 CMP - - A valves. \( P_c \) is reading about 90.
03 06 31 59 CDR Okay.
03 06 32 01 CMP Looks like it's running smooth.
03 06 32 02 CDR ... Okay. The EMS and the DELTA-V and the DSKY look good. And we have tight limits. Very smooth.
03 06 32 35 CDR Okay, the DSKY and EMS look good. Still in the tight limits.
03 06 32 51 CDR A minute, and you're tracking PITCH 41.
03 06 32 56 CMP Hmm! Right on, huh? Okay, the pressure's running 95; holding steady.
03 06 33 05 CDR Okay. Keep going on tight limits.
03 06 33 17 CDR The DSKY and the EMS agree. ... watch for the loose limits?
03 06 33 24 CMP Yes. I should be able to ... loose limits.
03 06 33 27 CDR Okay.
03 06 33 30 LMP Five degrees, Dave. And the balance - unbalance is holding very well. About minus 180.
03 06 33 35 CMP Right on the center of the roll dead band.
03 06 33 37 CDR Dead on it - right on the side of the roll.
03 06 33 39 CMP ... on the roll.
03 06 33 40 CDR Not even on the side. It's only at 4 degrees.
03 06 33 51 CMP We have a PITCH 34. It'll probably stretch out after we go to the single bank insertion.
03 06 33 57 CDR Yes.
03 06 33 59 CMP  Any ... loose limits?
03 06 34 03 CDR  DSKY and EMS agree pretty well.
03 06 34 15 CMP  The DSKY and the EMS are about 12 feet per second difference - is all. That's pretty good.
03 06 34 21 CDR  Mm-hmm.
03 06 34 23 CMP  ... still no loose limits?
03 06 34 30 CDR  That view meter's not even registering.
03 06 34 50 CMP  Did you get your watch started on time, Jimmer?
03 06 34 52 LMP  We'll find out.
03 06 34 54 CMP  No, I mean, did you?
03 06 34 55 LMP  Yes.
03 06 34 57 CMP  Okay, because we need you to tell us at 6 minutes.
03 06 34 59 LMP  Yes, I will.
03 06 35 03 CDR  How are the pressures looking over there, Jim?
03 06 35 04 LMP  Beautiful. About 170 on both.
03 06 35 08 CDR  Okay.
03 06 35 09 CMP  ... about 18?
03 06 35 10 CDR  No, we're about 12 --
03 06 35 11 LMP  P_C is reading 95 and holding steady.
03 06 35 13 CMP  Are we 12 feet per second -- difference between the EMS and DELTA-V?
03 06 35 18 CDR  Somebody would chew his ass if it didn't.
03 06 35 22 LMP  P_C is creeping up just a little bit.
03 06 35 25 CMP  Okay, we're tracking PITCH 33.
03 06 35 34 CDR  Okay. Should be approaching the tight limits, Jim.
Okay, you're in tight limits now. About 2 and a half minutes to go.

Okay. We're looking good here.

Okay.

Pc's about to cross over.

Pc's holding about 90 - 96.

Okay, we've had cross over.

Okay.

It crossed a little, but not much.

Hey, listen. Your Pc went up about 2 - about - 2 percent, and it's up to about 98 now.

Okay, the EMS and the DSKY are about 10 feet per second difference. We're at tight limits. About 2 minutes to go. G&N's tracking 638.

Okay.

Five minutes.

Okay. EMS and the DSKY are within about 10 feet per second. Track at 638. Tight limits.

Okay. Give me a countdown at 6 minutes.

Okay.

You want Jim to count down at 6 minutes?

Yes.

You want me to give you a 10-second count?

Yes.

Okay.

A little dead band in there in the roll?
03 06 37 26 CDR  Mmhmm.
03 06 37 28 CMP  Okay, about 10 feet per second difference between the EMS and the DSKY, and we're looking good.
03 06 37 33 CDR  P_c's varying between about 96 and 98. Looking good though!
03 06 37 37 LMP  Countdown. 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 -
03 06 37 47 LMP  6 minutes.
03 06 37 48 CDR  Okay.
03 06 37 49 CMP  Can you reach it?
03 06 37 51 CDR  PILOT VALVE A is out. P_c is down to 94.
03 06 37 54 CMP  Okay, we'll need another countdown to the -
03 06 37 56 CDR  Yes.
03 06 37 57 CMP  Shutdown then.
03 06 37 58 CDR  Yes.
03 06 38 00 CMP  Okay. Can you reach them there, Dave?
03 06 38 01 CDR  Yes. About 20 seconds to go.
03 06 38 06 CMP  You've got 10 seconds overburn, don't forget.
03 06 38 08 CDR  Yes.
03 06 38 15 LMP  Start the countdown?
03 06 38 17 CDR  Yes, looks good.
03 06 38 19 LMP  10, 9, 8, 7, 6, 5, 4, 3, 2 -
03 06 38 27 CDR  SHUTDOWN.
03 06 38 28 CMP  Okay.
03 06 38 29 CDR  Automatic. Okay, Jim.
03 06 38 32 LMP  Okay --
03 06 38 33 CMP Oh, we log zero!
03 06 38 34 CDR Look at that.
03 06 38 35 CMP We'll burn them.
03 06 38 36 CDR -- ... Look at that, pal!
03 06 38 37 LMP Did you --
03 06 38 38 CMP Oh, I didn't --
03 06 38 39 CDR (Laughter)
03 06 38 40 LMP Ohh!
03 06 38 41 CMP -- dream any --
03 06 38 42 CDR Look at that!
03 06 38 43 CMP Jim, Jim. Let's clean it up, Jim.
03 06 38 44 LMP Okay --
03 06 38 45 CDR But whoo.
03 06 38 46 LMP Stand by for gimbal motors, Al.
03 06 38 47 CDR Fantastic!
03 06 38 51 LMP Stand by for gimbal motors.
03 06 38 52 CMP I thought I just gave you one.
03 06 38 53 LMP I don't see it.
03 06 38 54 CMP I'll try it again. All right, number one coming off.
03 06 38 59 LMP One, two --
03 06 39 02 CMP Two's --
03 06 39 04 LMP -- three, four. Okay. TVC SERVO POWER 1 and 2, OFF.
03 06 39 09 CMP OFF.
03 06 39 11 LMP MAIN BUS TIE's coming OFF.
03 06 39 12 CDR I can't believe it! I can't believe it!
03 06 39 16 LMP  Yes, sir, that was beautiful.
03 06 39 17 CDR  That was fantastic!
03 06 39 18 LMP  That was beautiful.
03 06 39 20 CDR  That is the best burn I've ever seen and I've seen 10, I mean 11. That isn't real! I've never seen one come out that good.
03 06 39 29 LMP  Well, that's just superior cunning and skill, men.
03 06 39 31 CDR  Yes. It's got to be. Certainly (laughter).
03 06 39 35 CMP  Okay, Jim. Clean up the rest.
03 06 39 37 LMP  Okay, you got all the data? Got the EMS data?
03 06 39 41 CMP  Yes, got that.
03 06 39 42 LMP  EMS FUNCTION's OFF.
03 06 39 43 CMP  Okay, OFF.
03 06 39 44 LMP  EMS MODE to STANDBY.
03 06 39 45 CMP  STANDBY.
03 06 39 46 LMP  RHC and THC; locked.
03 06 39 48 CMP  Locked.
03 06 39 49 LMP  DEADBAND, MAX.
03 06 39 50 CMP  MAX.
03 06 39 51 LMP  TRANSLATION CONTROL POWER, OFF.
03 06 39 52 CMP  OFF.
03 06 39 53 LMP  ROT CONTROL POWER DIRECT, two, OFF.
03 06 39 54 CMP  DIRECT's OFF.
03 06 39 55 LMP  BMAG MODE, three, RATE 2.
03 06 39 56 CMP  RATE 2.
03 06 39 57 LMP CB DIRECT ULLAGE, two, open.
03 06 39 59 CMP DIRECT ULLAGE, open.
03 06 40 00 LMP CB SPS PITCH 1 and YAW 1, open.
03 06 40 03 CMP PITCH 1, YAW 1, open.
03 06 40 05 LMP SPS PILOT VALVE MAIN B, open.
03 06 40 07 CMP MAIN B, open.
03 06 40 08 LMP PCM BIT RATE going LOW.

TIME SKIP

03 08 13 49 CDR -- says it's just ... -- He got word from the back room that Farouk and his boys are ecstatic. And the SIM bay stuff is all working very well.
03 08 14 06 CDR (Laughter) Good old SIM bay working up in there and he's jumping up and down. Well, the tape motion is going as planned. Even a little early. Okay.
03 08 14 36 CDR ...? No, I don't think we have time then ... have to get that ... in. ...? You'll spoil the eat period by messing with the -
03 08 15 14 CDR Okay, 10 minutes before the dump, Jim.
03 08 15 20 LMP Man, is that full.
03 08 15 20 LMP ... DOI.
03 08 15 37 CMP Hopefully, DOI is just going to be a bank B burn. Is that right?
03 08 15 41 LMP ... 
03 08 16 13 CDR Houston, Apollo 15; go.
03 08 16 32 CDR Okay. Three photos - You son of a ... bitch! He always stops.
03 08 16 56 CDR I'm going to give Karl about 6 seconds every time, before I answer.
Okay, Houston, understand. Swirls on Crisium, three-photo - photo convergent stereo, f/8, 1/250th, with the 250.

Okay. We'll tell him. You wanted to be reminded about helmets and gloves as you take your shots of Ingenuity on this time. What the hell does that mean?

Okay, thank you, Karl. We will. Huh? See around what ... problem? Oh.

Rather than the glasses? Yes.

... we going to start running our clock ... then at the 180-degree point, too, don't we?

Yes.

... much time is up ...

No. Not yet.

These 250's I guess you take with the brackets, huh? Yes? Out of which window? Center window?

You got a bunch of other ones here. This one's a 33 frames at 15-second intervals. All - all this 250 stuff is --

Yes. Okay. That's right. That's right. You asked why you brought that bracket along once, didn't you?

Just push that button underneath it, Dave.

Oh. There's a ... Look at that.

...

Anyone else have a jumney [?] bag they want dumped?

No.

1/250th.
250's already rolling.

You guys want anything to eat?

What?

... 

Yes. Eighty-five pictures, MAG M, frame number 30 which would be frame number 43.

Hey, I think I shorted someone a lemon pudding. A lemon pudding.

I've got one.

I don't think Al has. I've got one over here opened - that Al can have.

I've - I've got one in my pocket I'm going to eat. You want this one?

... 

... And let's don't be hanging stuff up now because we've got another burn coming.

Yes.

Let's get it all taken care of.

Huh? I ate mine.

Then you opened another one, huh?

I thought I had the - the fruit cocktail. Here, throw that in the bag. Thank you.

Well, can we get the - we got to - when we get through all that stuff this evening, let's get all the garbage and take it down to the food locker.

Yes. It's time to dump, isn't it?

Yes. I expect it is. That's all right, we'll close.
03 08 24 09 LMP Can I dump?
03 08 24 11 CDR Yes.
03 08 24 13 LMP Okay.
03 08 24 17 CDR Dump the waste, too.
03 08 24 31 LMP Dumped that ... dead band.
03 08 24 34 CDR The dump?
03 08 24 56 CDR ... (laughter).
03 08 25 17 CDR Hey, you got coming up - Sea of Ingenuity, Crisium, Keyhole Crater, The Bright One, and Ibn Yunus - ...
03 08 25 47 CDR That's - Oh, yes. There's a possibility of 10. And - then you do the realine. You got a lot of pictures to take. Wh - where do you want to take them?
03 08 26 03 CDR Okay. Why don't you just tell us, you know, which window, and we'll go to wherever -
03 08 26 15 CDR Oh, okay.
03 08 26 27 CDR ... five.
03 08 28 01 CMP Dave, did you say you're doing a waste water dump now?
03 08 28 03 CDR Yes.
03 08 28 20 CMP No, I've got another ... for that.
03 08 28 23 CDR I thought there was one here.
03 08 28 28 CMP I think you was going to put it on the Flight Plan. Okay. There's one here, Dave.
03 08 29 25 CDR ... that waste water's something that's got to go. Certainly have a lot of it.
03 08 29 34 LMP It's probably done.
03 08 29 35 CDR Huh?
It's probably done.

What --

How can you tell?

It's slow.

Oh, I see. The waste water dump.

Yes.

... a small ...

Got a lots of things to dump?

Here, I'll put that in the bag, Al.

There it is. You got it?

Okay, the urine dump's complete.

Oh, really? All that stuff?

... Yes.

Okay.

What'd you have the timer set up for, Dave?

Waste water dump. To make sure I checked it when it went off.

You dumping down to 15?

Yes. You might just watch it if you're there. ... Al's moving over.

He's ... of you.

Yes. Time to look for more. ...

Jim, you see my scissors up there?

Yes.

Thank you.
03 08 34 16 CDR That looks good.
03 08 34 19 LMP We got sunrise. Coming up on sunrise. Yes. Oh, gee. That's bright.
03 08 34 32 CMP See, you can just barely see the horizon.
03 08 35 14 LMP See the horizon out there, see it?
03 08 35 15 CDR Oh, look at that. Isn't that something! Hey, you got to take a picture of that.
03 08 35 24 CDR Huh? Isn't that something? Oh, boy.
03 08 35 37 CDR Golly!
03 08 35 50 LMP Okay. Believe that waste water dump's done. I'll go down and get it.
03 08 35 53 CDR I'll get it. I'm right here.
03 08 35 54 LMP Okay. ... down to 20.
03 08 35 56 CDR Okay. Yes.
03 08 36 06 LMP Yes. It looks like a snow-covered prairie. And doesn't that look like a brown to you?
03 08 36 14 CDR Now it does. Yes. Hey, that's - just got to have a picture of that.
03 08 36 25 LMP Okay.
03 08 36 32 LMP Wouldn't that make a great Christmas card?
03 08 36 34 CDR Hey, wouldn't it, though?
03 08 36 35 LMP Yes, that view right from this window. Look at that.
03 08 36 40 CDR Yes, it's almost the same over here. Huh? Where's - I can't hear you, Al.
03 08 36 49 LMP Ring sight.
03 08 36 50 CDR Yes, there's one - the only one I know of right now - I can get you one. I know where there's one. There's a ridge here, Jim. A prominent
ridge - we're coming across. That's just absolutely striking. I don't believe it. Ring sight. Yes.

No, I can't get to it now, Al. Buried. Too much junk. Hey, Al, use the edge - the corner of the camera. Let me show you. Let me show you how to aim that thing so you hit. See this thing? See? Right along this edge here. Line that up. Just take all the parallax out and line that up, and it's a straight shot.

Hey, Jim, is the waste water stopped?

Yes, I turned the dump off.

You did?

Yes.

So did I. How could you have turned --

No. Oh, I'm sorry. The urine dump.

You - you're not lis --

Oh - Oh, okay. Waste water --

Yes. You're not paying attention to me again, Jim.

-- 25 percent.

Okay.

He closed it.

You're right. Yes.

You wanted me to confirm that it had been closed.

Yes, right.

I don't see a drop anymore.

...
CDR: Huh?

LMP: Can't see that ridge you were talking about, Dave.

CDR: You're going across it. Right where the terminator comes out. No, that's the horizon. Okay. I'm ... Yes.

LMP: Isn't that a good boy, Al?

CDR: Hey, Jim, here's this little vent.

LMP: Okay.

CDR: Yes.

CMP: Jim, I don't see ...

CMP: I see. That's - Ingenuity over there on the -

CDR: Hey, Jim, what did you do with those tissues that were over here? Remember?

LMP: I didn't use any of them, Dave.

CDR: No, but - there wasn't any of those little --

LMP: Those medium ...?

CDR: What?

CDR: The very subdued rille that runs around - perpendicular to the mountain? Oh, I see what you mean. Along the edge of the - Is that on the edge of ...? Of Ingenuity, huh?

CDR: I can keep you posted here about - You take - you take photos until about 49 here.

LMP: This must be Gagarin coming up.

CDR: Yes.

LMP: Think I have better luck holding the map backwards.

LMP: That's Gagarin we're over, huh?
Do you know what Keyhole looks like? Geez. That's the kind of thing that would be good to explore.

There's that neat one with the very white ejecta pattern - out at 1 o'clock.

Do you want to ... the window?

... 

Yes.

I think we better get this - all the windows down.

Yes. I think we better leave. You know you don't have to get them all, Al. ... 

Oh, yes.

... might be AUTO.

Hey, Jim?

Yes.

You got your sunglasses?

Not quite, Al. Did you just pass me some sunglasses, Dave?

Yes.

Okay.

I think they're yours. Aren't they?

Yes.

You can see that - see the canyons on it?

Find Keyhole, Al? Good.

What's distinctive about Keyhole?

Oh, really?
I can sure see a lot - lot of blocks around this one coming up. A lot of blocks on the rim. And a slump on the - the west side of it.

Okay, the next one is target number 7, Al. It's The Bright One.

That's -

The one with slump blocks in the center of it?

The one we're just coming up on, huh?

Yes. That's it. Yes, that's Dooze [?]. Bright One. Yes, that's the one we want to get a - complete - We want two pictures of the ejecta pattern all the way along through there.

(Camera click)

Yes, there's King over there.

Hey, Jim?

Yes.

Hey, Jim, ... take care of that little map. That's the only one we got - you and I.

Yes, I understand.

Take good care of it.

No, we have another set - Well, the only one of the little ones. Yes, you're right. Don't ask for ..., huh?

By golly, old Bright Crater is a bright one, too. It's got good ray pattern. Glass all over.

(Camera click)

(Camera click)

(Camera click)
03 08 59 50 IMP  Geesh.
03 08 59 52        (Camera click)
03 08 59 57        (Camera click)
03 09 00 11        (Camera click)
03 09 00 18 IMP  O₂ FLOW HIGH.
03 09 00 37        (Camera click)
03 09 00 40        (Camera click)
03 09 02 00 CMP  Okay, let's see. Let's try to get this Rooster Tail.
03 09 02 07 LMP  The next target you have is Ibn Yunus.
03 09 02 10 CMP  Yes, but I'm going to try and see if I can get a shot of the Rooster Tail here if I can.
03 09 02 20 CMP  That won't go anywhere.
03 09 02 51 CDR  ...
03 09 03 05 CMP  You what, Jim?
03 09 03 07 LMP  ... Ibn Yunus ought to be coming up on the left side here shortly.
03 09 03 12 CMP  Yes. Should be.
03 09 03 15 LMP  Oh, look at the Earth come up - earthrise. ... all day, we ought to look at that ...
03 09 03 20 CDR  Oh, yes.
03 09 03 27 CMP  ... you don't ...
03 09 03 29 CDR  Yes.
03 09 03 32 LMP  Golly.
03 09 03 33 CMP  That ought to be good for a picture, huh?
03 09 03 35 CDR  Oh, yes. Be better when you're ...
03 09 03 38 CMP  Yes. I got part of the LM in the way there.
03 09 03 54 CMP Let me see here - let me - Yell if you see the Rooster Tail.

03 09 04 00 LMP I'm not sure what the Rooster Tail looks like, Al.

03 09 04 02 CMP That's that little secluded - dome on a - on a ca - on a small crater that Farouk was showing us the other day.

03 09 04 14 LMP Yes, I think there's one --

03 09 04 15 CMP That a --

03 09 04 16 LMP -- coming up here - that -

03 09 04 18 CMP It should be quite obvious if you see it.

03 09 04 21 LMP Well, there's kind of an occluded area to the west.

03 09 04 22 CMP It looks - it looks very much like a rooster tail.

03 09 04 28 CDR ...

03 09 04 30 CMP Yes.

03 09 04 32 LMP See the one coming up, Dave, ... in the occluded area - to the west?

03 09 04 38 CDR Is that the one ...

03 09 04 41 CMP Yes, I think it's very fresh.

03 09 04 49 LMP Should it be right on track?

03 09 04 52 CMP Yes. Right underneath.

03 09 04 56 LMP ... There's one underneath us. Big rille and ...

03 09 05 14 CDR Could that be it - the one we're just coming up on, Al?

03 09 05 22 CMP Yes. That's it. Must be it.

03 09 05 39 CMP ... a shot of it here.

03 09 05 49 CMP Yes.

03 09 06 06 CMP There's Babcock out there.
Hey, Al, can I do a VERB 64 in this P20 or will it kick it back out?

No. It'll keep it in.

Maybe I ought to get up there and do one ...

Yes. It should. It should work.

Fifteen and 12.

Fifteen and 12?

Uh-huh.

Okay. We were up to ...

... do that. ...

Getting hungry, Al?

Huh?

... seemed like the day was getting along.

We've only got 12 minutes to the burn.

Okay. ...

Okay, that's right. We're at 12 minutes.

...

Do you feel all right? You okay?

... spacecraft roll ...

Okay. ... it up to 10 degrees; ... to zero.

... 8.
03 10 29 02 LMP ... burn ...
03 10 29 03 CMP 159.
03 10 29 05 LMP ... junk.
03 10 29 13 CMP Yes. You're right. Why don't you ... These are yours.
03 10 29 33 LMP ... steady this ...
03 10 29 35 CDR No.
03 10 29 58 LMP How much time we got before the burn - 10 minutes?
03 10 30 01 CDR Ten minutes.
03 10 30 02 CMP Nine minutes.
03 10 30 04 CDR Okay. GDC's alined.
03 10 30 07 LMP Do you want to call P40? ...?
03 10 30 11 CDR Okay. P40.
03 10 30 22 LMP Okay. EMAG MODE, three, to RATE 2.
03 10 30 26 CDR RATE 2.
03 10 30 28 LMF SPACECRAFT CONTROL, CMC, in AUTO.
03 10 30 30 CDR CMC, AUTO.
03 10 30 31 LMF PRO.
03 10 30 34 CDR Okay, we'll wait a little here. Maybe we ... --
03 10 30 36 LMF You got roll aline?
03 10 30 37 CDR Yes. It's all alined. We're all ... --
03 10 30 38 LMF GDC and roll? Okay. TVC check and prep. Circuit breakers STAB CONTROL SYSTEM, all closed on panel 8.
03 10 30 43 CDR Okay. ... going in. Okay?
03 10 30 49 LMF CB SPS. Should be ll closed.
03 10 30 53  CDR  Okay, 11 closed; MAIN A is out.
03 10 30 55  LMP  Okay. You got DELTA-V_C set.
03 10 30 58  CDR  DELTA-V_C is set; 208.4.
03 10 31 01  LMP  EMS FUNCTION, DELTA-V.
03 10 31 03  CDR  DELTA-V.
03 10 31 05  LMP  MAN ATT, three, to RATE COMMAND.
03 10 31 06  CDR  RATE COMMAND.
03 10 31 07  LMP  DEAD BAND, MIN.
03 10 31 08  CDR  MIN.
03 10 31 09  LMP  RATE, LOW.
03 10 31 10  CDR  LOW.
03 10 31 11  LMP  TRANSLATION CONTROL POWER, on.
03 10 31 12  CDR  On.
03 10 31 13  LMP  SCS TVC, two, to RATE COMMAND.
03 10 31 15  CDR  SCS TVC to RATE COMMAND.
03 10 31 19  LMP  DELTA-V_CG to LM/CSM.
03 10 31 20  CDR  LM/CSM.
03 10 31 21  LMP  TVC GIMBAL DRIVE, PITCH and YAW, to AUTO.
03 10 31 23  CDR  AUTO.
03 10 31 24  LMP  ... Okay. ...
03 10 31 28  CDR  (Laughter) Going about it the hard way, maybe.
03 10 32 14  LMP  Did you ...?
03 10 32 16  CDR  Yes.
03 10 32 31  CMP  ...?
03 10 32 33  LMP  Four jets and 15 seconds.
03 10 32 35  CDR  Four jets, 15 seconds on the ullage.  Okay.
03 10 32 43  CDR  Coming up on 7 minutes.
03 10 32 50  CDR  MARK; 7 minutes.
03 10 33 09  LMP  ...
03 10 33 11  CDR  Right.  Well, we're not going to have any overburn.
03 10 33 25  CDR  Okay, Jim.  Coming up on 6 minutes.
03 10 33 27  LMP  Okay.
03 10 33 28  CDR  Start.
03 10 33 29  LMP  MAIN BUS TIES coming on.
03 10 33 34  LMP  TVC SERVO POWER 1, to AC 1/MAIN A; 2 to AC 2/MAIN B.
03 10 33 39  CDR  1 is AC 1/MAIN A and 2 is AC 2/MAIN B.
03 10 33 42  LMP  ROT CONTROL POWER, NORMAL, two, to AC.
03 10 33 45  CDR  ROT CONTROL POWER, two, NORMAL, AC.
03 10 33 47  LMP  ROT CONTROL POWER DIRECT, two, OFF.
03 10 33 49  CDR  DIRECT, two, OFF.
03 10 33 51  LMP  BMAG MODE, three to ATT 1/RATE 2.
03 10 33 53  CDR  BMAG MODE, three of them, to ATT 1/RATE 2.
03 10 33 56  LMP  SPACECRAFT CONTROL, SCS.
03 10 33 57  CDR  SCS.
03 10 33 59  LMP  RHC number 2, armed.
03 10 34 01  CDR  RHC number 2, armed.
03 10 34 03  LMP  ... at 5.
03 10 34 06  CDR  Okay.
03 10 34 32 CDR  Okay. Let's go ahead.
03 10 34 33 LMP  Okay. GIMBALS MOTORS PITCH 1 and YAW 1, on.
03 10 34 36 CDR  Coming on.
03 10 34 38 LMP  1, 2.
03 10 34 41 CDR  Okay.
03 10 34 42 LMP  Verify trim control and set.
03 10 34 44 CDR  Okay. Verify the trim and set at 1.68 and minus .55. Verified.
03 10 34 53 LMP  Verify MTVC.
03 10 34 56 CDR  MTVC.
03 10 35 06 CDR  Verified.
03 10 35 07 LMP  SPACECRAFT CONTROL, CMC.
03 10 35 08 CDR  CMC.
03 10 35 09 LMP  THC, clockwise. And verify no MTVC.
03 10 35 12 CDR  Clockwise.
03 10 35 16 LMP  Getting roll out of that.
03 10 35 19 CDR  No MTVC.
03 10 35 20 LMP  Secondary TVC check. GIMBAL MOTORS PITCH 2 and YAW 2, on.
03 10 35 24 CDR  PITCH 2 and YAW 2 coming on.
03 10 35 26 LMP  2 - on. Set GPI trim.
03 10 35 36 CDR  Okay.
03 10 35 37 LMP  Verify MTVC.
03 10 35 43 CDR  Verified.
03 10 35 44 LMP  THC neutral. Verify no MTVC.
03 10 35 48 CDR No MTVC.
03 10 35 49 LMP Verify GPI returns to zero, zero.
03 10 35 52 CDR Zero, zero.
03 10 35 53 LMP ROT CONTROL POWER, NORMAL, two, to AC/DC.
03 10 35 57 CDR AC/DC.
03 10 35 58 LMP ROT CONTROL POWER, DIRECT, two, to MAIN A/MAIN B.
03 10 36 01 CDR DIRECT, MAIN A/MAIN B.
03 10 36 02 LMP EMAG MODE, three, to RATE 2.
03 10 36 04 CDR EMAG MODE, three, to RATE 2.
03 10 36 06 LMP PRO. ...
03 10 36 08 CDR Okay. ...
03 10 36 18 LMP Okay?
03 10 36 20 CDR That's okay. Yes. Looks good.
03 10 36 22 LMP Okay. Next --
03 10 36 23 CDR Okay?
03 10 36 24 LMP -- to EMAG MODE --
03 10 36 25 CDR Ready?
03 10 36 26 LMP -- three, to - ATT 1/RATE 2.
03 10 36 28 CDR ATT 1/RATE 2. Okay?
03 10 36 34 LMP Let's see, if I remember, the next line is ENTER. Yes. Yes, we're right there. ...
03 10 36 49 CDR Yes.
03 10 36 53 LMP Okay. FDAI SCALE, 5/5.
03 10 36 55 CDR 5/5.
03 10 36 56 LMP RATE, HIGH.
03 10 36 57 CDR RATE, HIGH.
03 10 36 59 LMP Update the DET, if necessary.
03 10 37 04 CDR ... we're right on it.
03 10 37 06 LMP Okay. HELIUM VALVES are AUTO; N₂ A and B are good at 2500. Okay, ... are minus 2 - you get DELTA-V THRUST B to NORMAL.
03 10 37 23 CDR Roger.
03 10 37 31 CDR Let's get this ... here.
03 10 37 41 CMP ... probably ... and follow if you can -
03 10 37 44 LMP Right. Hey, let me do the -
03 10 37 49 CDR Okay; 2 minutes.
03 10 37 51 LMP Okay. DELTA-V THRUST B to NORMAL.
03 10 37 52 CDR DELTA-V THRUST B to NORMAL.
03 10 37 56 LMP THC, armed.
03 10 37 58 CDR THC, armed.
03 10 38 00 LMP RHC, both armed.
03 10 38 02 CDR Both armed.
03 10 38 20 LMP Stand by for minus 35.
03 10 38 24 CDR Okay, that's 35 to go.
03 10 39 09 CDR Okay, it looks like we're coming up to average g.
03 10 39 11 LMP Yes.
03 10 39 13 CDR (Cleared throat).
03 10 39 16 LMP Average g is on.
03 10 39 19 CDR Okay, standing by for a 15-second ...
03 10 39 23 CDR  NORMAL.
03 10 39 35 MS  Ullage.
03 10 39 40 CDR  Okay.  GO for the burn?
03 10 39 41 CMP  You're GO.
03 10 39 46 CDR  Ready for the PRO.
03 10 39 50 CMP  B valves.
03 10 39 51 CDR  B valves.
03 10 39 52 LMP  Okay.  The clock is running.
03 10 39 56 CMP  Oh, she goes.
03 10 39 59 CDR  Okay.
03 10 40 05 LMP  10, 9, 8, 7, 6, 5, 4, 3, 2, 1 -
03 10 40 14 CMP  Zero; THRUST off; automatic.  Gimbal motors.
03 10 40 21 LMP  Stand by, Al.  1, 2, 3, 4.
03 10 40 30 CMP  You don't trim?
03 10 40 31 CDR  Uh-huh.
03 10 40 32 CMP  CDR took us to within 1?  Good.  Now TVC - -
03 10 40 36 IMP  TVC SERVO POWER 1 and 2, OFF.
03 10 40 39 CMP  OFF.
03 10 40 40 LMP  MAIN BUS TIES coming OFF.
03 10 40 41 CMP  Roger.
03 10 40 48 CMP  ... burns to within 1 foot per second.
03 10 40 51 CDR  Okay.
03 10 40 52 LMP  Pressure's down.
03 10 40 53 CMP  Pressure's still coming ... down.
... Okay, Jim.
Okay, you got everything?
Let's clean them up.
Okay, EMS FUNCTION's off.
Off.
EMS MODE, STANDBY.
STANDBY.
RHC and THC locked.
Locked.
DEAD BAND, MAX.
MAX.
TRANSLATION CONTROL POWER, OFF.
OFF.
ROT CONTROL POWER, DIRECT, OFF.
Two - that's two OFF.
BMAG MODE, three, to RATE 2.
RATE 2.
CB, DIRECT ULLAGE, two, open.
DIRECT ULLAGE, open.
CB, SPS PITCH 1 and YAW 1, open.
PITCH 1, YAW 1, open.
PCM BIT RATE going LOW.
A and B also open.
... by 10 miles.

Let's see ... That's got to be Tsiolkovsky.

... overburned just a little bit, but the little ... was 10 seconds short.

... second burst, and we overburned just a bit.

Okay, I'm going to go down and ... up the SIM bay here.

Look at this ...

See where it says 2.5 ... 25 ...

Okay, let's see what it says here.

Okay.

You know what the ..., don't you? ...

What?

... seconds to go. Probably ... and ... 10 seconds.

That's right. We did ... over.

Yes. We did - especially when ... getting ...

... I could - I could tell ... - not ... on.

Yes.

I thought about that, you know?

Yes. Yes.

It was just right after ... 

I could - I could see your hand start to go. And I looked at the DSKY and looked up, and then I could see it was going to shut off. But I could see your hand - you were - you were waiting for it. I knew I wasn't going to be more than half a second after.

Yes. That - that's pretty close.
But you could see it - I could see when (cleared throat) when it automatically shut down before I could ...

Oh, yes.

Well, you know the ball valve actually opened up ... like that ... And I usually --

Yes.

-- can't see that. I started to watch the ... $P_c$ started ...

... shut down ...

... I know what you mean --

... Yes, I know. I keep telling them it's going to be ...

Oh yes. Right ... nothing like a ..., wouldn't you say?

Yes. Okay. ... VERB ... get it in ...

All right. What do you want to do?

... a ... ...?

Yes. Yes. ...

Yes. Oh, here comes ... That terminator is just like something out of the movies.

Yes. ... --

I mean it's just a - just a strip all the way across.

Yes, boy.

Hold your breath on this one, Jim?
03 10 45 21 LMP  What in the hell would you ...?
03 10 45 25 CDR  Yes. Yes, but I wouldn't say it ...
03 10 45 34 LMP  Oh, ...
03 10 45 38 CDR  Huh?
03 10 45 39 LMP  Do you know what we have to do yet?
03 10 45 41 CDR  Yes. ...
03 10 45 45 LMP  Gee. This is ... We're not even down in the ...
03 10 45 49 CDR  (Laughter)
03 10 45 51 LMP  Wait until we get down in the ..., then we're ...
03 10 45 54 CDR  240,000 miles and ... (laughter).
03 10 45 57 CMP  What do you want?
03 10 45 58 CDR  (Laughter)
03 10 45 59 LMP  ... you know, but ... --
03 10 46 00 CMP  You want me to put you on the surface?
03 10 46 02 CDR  (Laughter)
03 10 46 03 LMP  ... --
03 10 46 04 CDR  Why don't you, Al? (Laughter)
03 10 46 05 LMP  -- ...
03 10 46 06 CDR  That's true (laughter).
03 10 46 08 LMP  ...?
03 10 46 09 CDR  Yes, that's right (laughter).
03 10 46 11 LMP  ... --
03 10 46 12 CDR  No. I want to be safe (laughter).
03 10 46 13 LMP  ...
03 10 46 16  CDR  Yes, you're right, boy, you're right. ... --
03 10 46 24  SC   (Yawn)
03 10 46 26  CDR  ...?
03 10 46 28  LMP  That's right.
03 10 46 29  CDR  Go on to sleep, Al.
03 10 46 30  LMP  ...
03 10 46 31  CDR  ... I think you're about ready for bed.
03 10 46 55  CMP  ... P52.
03 10 46 57  CDR  No.
03 10 46 58  LMP  Yes. ... 
03 10 47 00  CMP  ...
03 10 47 01  LMP  Let's see if we can't help Al a little bit.
03 10 47 03  CDR  Sure. Let's ...
03 10 47 06  CMP  No. ...
03 10 47 10  CDR  If you're going to be operating this ... for 3 days, we ought to try and set up a system to square it away.
03 10 47 13  CMP  ...
03 10 47 15  LMP  Yes. ...
03 10 47 16  CMP  ...
03 10 47 17  LMP  ...
03 10 47 22  CMP  ..., ..., and tomorrow night ..., except most of those pictures would be in the open. ... pictures of the lunar surface. I think it'll probably ... a couple of days ...
03 10 47 37  CDR  I think so, too.
03 10 47 38  CMP  ... situation..., fill it up, and ...
03 10 47 48 CDR Yes.
03 10 47 49 CMP You really need to do that. You can't just ... 
03 10 47 58 LMP If you're at all worried about the Flight Plan, ... 
03 10 48 05 CMP Hey, that looks black. Wouldn't you say that's black? 
03 10 48 09 CDR I'd say it's a dark gray. 
03 10 48 11 LMP There's something up here that's dark gray? 
03 10 48 13 CDR Well, this looks like it's ... 
03 10 48 20 LMP Man, it already looks like we're lower. Whoo. 
03 10 48 25 CMP ... looks black over there. 
03 10 48 29 CDR Hey, that's right. It looks real dark way down there. 
03 10 48 33 CMP ... 
03 10 48 35 LMP They say then it looks like you're just going to dive. 
03 10 48 38 CDR It sure does. 
03 10 48 39 LMP ... going at 50 feet per second. 
03 10 48 41 CDR Yes, siree-bob. Hey, look at that big mound over here, son of a gun. Hey, hey, check the mound ... over here. 
03 10 48 51 LMP Oh, yes? 
03 10 48 53 CMP That's Van De Graaff. 
03 10 48 54 LMP That's bigger than Van De Graaff. 
03 10 48 55 CDR The one right under us? 
03 10 48 56 CMP No, the one just out there at 11 o'clock. 
03 10 48 58 CDR Oh, yes.
The long - elongate one. That's Van De Graaff. And just out in the distance there, off to the left is - is the Mare Ingen-u-ity.

Oh, yes. ... to the left?

(Yawn)

That's ... It's just as ...

... mountain's ..., and the ... mountain's ...

Whoo-ho-ho! Oh, ho, no. (Laughter).

He's already ... Hey, what do we - what do we have to do?

Hold on a minute.

...?

Roger. We already look low, and we got 180 degrees to go, babe.

What time do we ...?

Another 25 minutes.

Holy cow.

Hey, you can ... It's a great place to take a bunch of pictures of the - of the ... and all that. We ought to do that ...

Look at that ... down there, underneath us. About ... ... there.

...

Well, old buddy, I guess that's all very ...

Yes.

Is this ... rille that - or is this a rille?

What?

This ... flat piece we're coming up on.
Hey, no, that's that rille I was talking about before.

Yes, Al.

Yes. This one ... here. ... first time ...? Where is that crater?

We ought to get a picture of that ...

... reading?

... 08. It's close to Kepler.

It almost looks like it's a ... feature rather than a rille.

The one we're going over right now?

Yes.

Yes. Who's got the 80? Is it CMP?

I'm looking.

See out here at 10 o'clock, Dave?

Yes. I do.

That's the one we picked up on the map, we called ...

The rille?

Yes, because it just kind of - slopes on the inside; looks like most of the ... turns up even though there isn't any rille.

Okay, Al. Here's the - the 80.

I don't ... --

You'll get a much better picture from this attitude.

Is that right?
Just like a low-level flight.

... this is really ...

We must be ... here.

Oh, what's the ...? How much time we got before ...?

... showing 63 and 1 ...

... use the 250 or do you want to go to --

Let me get - let me get one here with the 250. ... 

..., Dave?

Yes, sir! ...

That was a ... continuous ...

... low.

You know, we are going ...

Look at that.

It's really ...

... --

Yes --

-- ...

-- ...

Yes.

Wouldn't that be something? ... right over there ...
03 10 54 05  CDR  Did you ever check those photo things for me, Jim?
03 10 54 07  LMP  Yes. ...?
03 10 54 09  CDR  Quite sure. Yes. There should be two that were like that.
03 10 54 15  LMP  Just a minute here.
03 10 54 22  LMP  Well, you're looking for ...
03 10 54 27  CDR  Sea of Ingenuity?
03 10 54 29  LMP  Yes; 5.6 at a 250th.
03 10 54 31  CDR  Okay.
03 10 54 32  LMP  And then at Keyhole, you look ... And The Bright One, you look to the left.
03 10 54 59  CDR  You know, I think this is ... down here. Look at ... --
03 10 55 00  CMP  ...
03 10 55 02  CDR  -- ... We'll get a couple of pictures here.
03 10 55 10  CDR  ... though.
03 10 55 30  CDR  You got a roll in there?
03 10 55 31  CMP  Yes. P ...
03 10 55 33  CDR  ...
03 10 56 07  CDR  You might say some of those craters are really ...
03 10 56 11  CMP  ... navigation is a little more difficult down at this altitude.
03 10 56 14  CDR  Huh?
03 10 56 15  CMP  Navigation is more difficult at this altitude.
03 10 56 17  CDR  ...
03 10 56 20  CMP  Low-level navigation.
03 10 56 21 CDR Oh, I don't know.
03 10 56 24 CMP Did you get yourself located?
03 10 56 27 CDR ... pretty well - set.
03 10 56 36 CDR ... 
03 10 56 39 LMP At least you can follow them, now that we're going forward.
03 10 56 44 CMP You should be coming upon Gagarin ...
03 10 56 53 CDR There's sure a good-sized one off to the north.
03 10 56 58 LMP Well, Gagarin is very shallow, oval.
03 10 57 03 CDR See that? Off to the north?
03 10 58 15 CDR Have you see it yet? Jim apparently has the right idea.
03 10 58 24 LMP Yes.
03 10 58 25 CMP ...
03 10 58 42 CDR Well, it's in the right attitude. Can you see anything over there, Jim?
03 10 58 45 LMP Yes. ... all right.
03 10 58 50 CMP It looks that way, but it sure is ...
03 10 58 52 CDR Watch the TV.
03 10 59 13 CDR Look for the ... one over on the left side.
03 10 59 15 CMP Yes.
03 10 59 16 CDR Should come over the horizon.
03 10 59 18 LMP ...
03 10 59 20 CDR ...
03 10 59 22 LMP No, I ...
Yes. That is the central peak of Tsiolkovsky, I bet you 10 dollars.

Really?

Yes.

And that is --

... --

-- sort of a big ...

... in the rim.

...?

Huh?

No.

Think there's ... in the ...?

Well, there's - Yes, there's parts of it that are very small, such as the peak.

But I guess it doesn't really strike home until you get down to something like this ... Good idea. I'll ... ...

Oh, boy. I'll never sleep ... open.

No, that's a pretty good theory, though.

Yes, I want to - I want to wade through ... - go through this.

...

Yes. Yes, ...

Okay. We got two developing ... over there.

God damn, that's just like being on a poor bus!
(Laughter) ...

Hard enough?

Dark?

Yes.

... Up on the ridge line.

I think that's shadows, isn't it?

I don't think that's shadow ...

... good idea. ...

Yes.

Oops, over here ...

What the hell is it?

Two old compasses.

Oh, good grief ...

Oh, man. That sure is a great landmark.

Isn't it?

... supposed to do that, you know where we are.

Yes. Boy, you sure got a good attitude, Dave. It ...

Isn't it beautiful!

No, I couldn't - I couldn't have picked a better one myself.

I'm trying here to figure out where those two ...

They should be -

... - Look at that - that one right there. Right there.
03 11 02 52  CDR  ... 
03 11 02 53  LMP/CMP  Whoa.
03 11 02 54  CMP  Now look out.
03 11 02 55  CDR  Oh, yes. Hey, yes. That's Mount ...
03 11 02 56  CMP  Yes, yes.
03 11 02 58  CDR  ... Say, you can really see, can't you?
03 11 03 49  CMP  Light's on.
03 11 04 14  CMP  Why don't you take you some pictures?
03 11 04 15  LMP  Okay.
03 11 04 20  CMP  Let's see, we're right at ... No, let's see. ...
03 11 04 27  CDR  We're heading just a little bit to the ri - to 
                   the left of our Flight Plan.
03 11 04 31  CMP  What?
03 11 04 32  CDR  And maybe a few deg - around the curve, there.
03 11 04 34  CMP  Curve?
03 11 04 35  CDR  Yes, don't you --
03 11 04 36  CMP  You want to show me it?
03 11 04 37  CDR  Yes. My pleasure. Look. There it is. Look.
03 11 04 43  CMP  Maybe you should ... on the end there.
03 11 04 45  CDR  Oh, nothing.
03 11 04 46  CMP  ... Everyone says ... that you're not allowed to 
                   do it, but you have to do it if ...
03 11 05 10  CMP  Does it look like anything?
03 11 05 11  CDR  Yes.
03 11 05 48  CMP  ...
03 11 05 55 CDR  Move the fans over.
03 11 05 58 CMP   Will the ...?
03 11 05 59 CDR   Yes.
03 11 06 01 CMP   Okay.
03 11 06 04 LMP   Hey, you guys really ...
03 11 06 07 CMP   Yes.
03 11 06 08 LMP   That's when you ... You can feel it.
03 11 06 10 CDR   Yes.
03 11 06 12 CMP   ... (coughing) ...
03 11 06 15 CDR   What?
03 11 06 16 CMP   ... that long.
03 11 06 18 LMP   You going to be able to look at it through your sextant? Did you -
03 11 06 22 CMP   I'm not sure.
03 11 06 24 CDR   ...
03 11 06 30 LMP   ...
03 11 06 35 CMP   Yes, do you mean we got to go up through the ...?
03 11 06 37 CDR   If you're not going to make it?
03 11 06 38 CMP   No, I - I figured you'd rather do it.
03 11 06 40 CDR   No, it's up to you. You do whatever you'd like.
03 11 06 41 CMP   No. Oh, no, I'm not going ... - -
03 11 06 44 CDR   Okay, very good.
03 11 06 45 CMP   - - ...
03 11 06 46 CDR   That's right.

CONFIDENTIAL
... you got to give a ... that you'll get over it. You - you do everything you want to do.

... 

(Laughter)

I - If I'm in your way, just ... it down.

Oh, sure.

(Laughter)

You're too hard for him. You be easy on him, or he'll ... --

Oh, yes. Very good.

Where is ..., by the way?

It's out in the middle of ... 

Is it really?

Yes.

The same crater as we were ...?

Yes.

The same patterns as ... Crater?

As a matter of fact, I could have gone through ...

Why don't you do that?

Okay.

That'd give us an idea of ... ... what you're going to be looking at. ... - you know you ...

Well, I tell you, it's not a very - it's not a very colorful crater.

..., Jim. Did you see ... over there?
03 11 07 45 LMP  Yes.
03 11 07 47 CMP  It's sure going to be ... stick to the time line. Yes, that would.
03 11 07 54 LMP  One-half hour.
03 11 07 56 CDR  ...
03 11 07 58 CMP  Hey, you ...
03 11 08 05 LMP  You got a ... space.
03 11 08 09 CMP  Yes, can't even see the horizon.
03 11 08 13 CDR  Yes.
03 11 08 14 CMP  ... in the ORB rate. ... get back to the ...
03 11 08 32 CDR  ... VERB 67.
03 11 09 50 CDR  ... we can get to this ... The - Can you move that thing?
03 11 09 58 CMP  Yes.
03 11 09 59 CDR  You really don't need ...
03 11 10 00 CMP  Yes.
03 11 10 01 CDR  Isn't that the truth? You really don't need it.
03 11 10 22 CDR  There it is.
03 11 10 28 CMP  ...
03 11 10 37 CDR  Wait a minute. ...
03 11 10 43 CMP  Yes, well, even that ... That's why we had trouble finding anything at all that we could use, because there isn't anything.
03 11 10 49 CDR  Nothing to change it over here at all. Nothing to change it, Al, ... that we could use.
03 11 10 55 CMP  How about a - Let's see, what kind of ... we use. 25.958?
Uh-huh. And we've got ...
Yes, and you got ... Five point ... here. ...
... here. ...
Huh?
... .3 ...
...
...
...
...
There'd be a lot more.
Yes.
... And I'm going to push these back in.
... to be all set up with your G&C Checklist ...
GDC ALIGN.
...
...
...
...
...
...
...
...
Got that.
I get that initial downhill impression. We're supposed to be ...
... did.
...
03 11 14 56 CMP  Darn it. Right there.
03 11 14 58 CDR  There it was, whatever it was.
03 11 15 00 CMP  Hum ....
03 11 15 04 CDR  Yes.
03 11 15 05 CMP  Good. ...
03 11 15 24 CDR  Did you get this ... on, Jim?
03 11 15 27 LMP  Yes, but I never could tell ..., when it went on.
03 11 15 31 CDR  Okay.

TIME SKIP

03 12 15 25 CMP  Okay. LASER ALTIMETER, ON.
03 12 15 27 CDR  Yes.
03 12 15 28 CDR  MARK.
03 12 15 29 CMP  Okay, let me talk to Karl here for a minute.
                  Houston, 15.
03 12 15 40 CMP  Okay, Karl. I got a few numbers for you on the extension time. We started the whole thing off at 84:06:30 and got the covers open, the mapping camera extended, and the extension was about 3 minutes instead of 4. And we deployed the gamma ray and the mass spec booms for a barber pole plus 2 seconds. The gamma ray - turned barber pole after 6 seconds, and the mass spec turned barber pole immediately. And I was suspicious of the mass spec, so we tried it again and got the same results. Turned the X-ray on at 84:15:10 and the laser altimeter on at 84:15:30.
03 12 16 30 CMP  Looks like that stuff's working fine. Tch, tch.
03 12 16 32 CDR  Great! Super!
03 12 16 34 LMP  Good enough.
That's it. Verify DSE tape motion at 84:20, and then we get the cameras ready for terminator photos.

That a boy!

Pan camera, we go - we already got our terminator photos. Did you get - Let's see, we want MAG R. That's this MAG here.

With the Hasselblad? You got the Hasselblad over there?

Yes. And, let's see, we want the Hasselblad 80 millimeter, intervalometer - -

Let's see, intervalometer's down there, Jim, in the - Let's see - It's in the camera - It's right in front of the camera compartment.

Oh, boy.

It's right there; that's it.

Okay. What do you want to do now, get the Hasselblad?

Jim, you're all right.

Well, the way to do that is just to play it straight from now on.

... I need somebody to take care of me.

...

Yes.

... an earful of that. 15, Roger. That's verified. Is that right, Dave?

Yes.

If ... orders, I can get it.

Okay.

Man, that's really good and stuck!
03 12 19 04 LMP ... all right.
03 12 19 06 CMP Pork and scalloped potatoes!
03 12 19 15 CDR You'll have what?
03 12 19 18 CMP I'm going to order pork and scalloped potatoes; I don't whether you do or not, but I am.
03 12 19 23 CDR Okay, f - 2.8, 1/250th, and infinity. Take six frames. Okay. Right out of this window here. And we're going to get the pan camera going in there, too.
03 12 19 54 CMP ...
03 12 20 00 CDR That's frame number - 14.
03 12 20 35 CMP ...
03 12 20 36 LMP That's right (laughter).
03 12 20 38 CDR We both like to hear that (laughter).
03 12 20 46 CMP Now, I'm going to show you how I'm going to handle this stuff here. Well, it looks like we just lost them. (Cleared throat).
03 12 21 14 CMP That won't be the same from now on.
03 12 21 17 CDR It won't?
03 12 21 18 CMP No. Minus 5 and 25.
03 12 21 25 CDR ...?
03 12 21 27 CMP Yes. Because we're in SIM bay attitude now.
03 12 21 31 CDR ... A and B.
03 12 21 32 CMP That's the stowed position only. It - it's minus 5 and 25 for REACQ when we come around the other side.
03 12 21 39 LMP Okay. ...?
03 12 21 41 CMP Yes.
I'll tell you, this Moon flying could be fun.

This what?

I said, "This Moon flying could be fun."

Yes, yes, yes, yes.

Hey, listen, Al, we got to get the pan camera going here, right?

Okay, T-start is the (cleared throat) --

Yes. T - T-start is the big time, and everything's hinged around T-start, so I take that time and punch it into P30 (cleared throat). And just load NOUN 33 to that time.

We're gaining 4 - plus 42 23, I guess.

Yes, I'm going to do it like that on all of them. Now, when you come up on a thing like that, EL says T-start minus 1:40 -

Yes.

Well, it's right on the DSKY there.

And the MAPPING CAMERA, IMAGE MOTION, ON. Talkback barber pole 3 to 5 seconds, then gray. That can be done anytime; that's not important. EL OFF at T-start; MAPPING CAMERA, ON, at T-start; PAN CAMERA, OPERATE, at T-start. Jesus, they got all kinds of things going on here at T-start. MOTION INCREASE - talkback barber pole plus 2 steps. I better do that mapping-camera thing.

You got 18 minutes ... - If you'll take the EL, and all you got to do is - point the - point the
Hasselblad straight down and start the intervalometer going, and start it at at minus 1:40 on the clock and stop it as zero.

03 12 23 48 LMP All right.

03 12 23 52 CMP And it would be much appreciated.

03 12 23 56 LMP ...

03 12 23 57 CMP Okay.

03 12 24 04 CDR Jim, is my spoon up there somewhere? Spoon. Yes, it should be back in there.

03 12 24 18 LMP ...

03 12 24 22 CDR Find it anywhere?

03 12 24 38 CMP (Laughter) No, I'm not. I just didn't want to get in your way, believe it or not.

03 12 24 57 CMP Ah, let's see; yes, we're ready to go over here; 84:24; at about 84:33, we better do all that business. In the meantime, grab a bite. What are we having?

03 12 25 14 CDR Pork and scalloped potatoes.

03 12 25 15 LMP It's not bad.

03 12 25 16 CDR You know, I don't know why it is, every night at this time, my nose gets stuffy.

03 12 25 18 LMP Mine does, too.

03 12 25 20 CDR Every night, my - my nose starts getting stuffy along about this time, and then it cleans up after a bit.

03 12 25 25 LMP ...

03 12 25 27 CDR Yes, give me another squirt of hot juice there - when you get a chance.

03 12 25 38 CDR Hey, Jim, you know what I do tomorrow?

03 12 25 41 LMP Can't guess.
Let's go shoot a landing. I'm ready. I'm ready to put that baby right in there, right now. I haven't had a TV flight in months.

Yes, sir, you better. You'll lose you ...

That's right.

Oooh, that one's stretched. Pork and scalloped potatoes!

Sounds good.

Just like down home.

Mm-hmm.

... (Laughter) Yes, you - you know, it really works - works just fine if you - if you pop it and just keep pulling.

Hey, Jim?

... water here ...

... I think, the first thing I'm going to do when we get back?

What's that?

Have a beautiful night in Tahiti.

Hey, you're on, buddy. You're on - you're on! ...

No, really. You ought to really think about it.

Me, too. Big airliner.

Without the aviation.

Hey, you know what they tell you when you get to the ...?

No.

...
03 12 28 53 LMP Is that right?
03 12 28 54 CDR ... They got up a special menu; it has everything that you want on it. You can eat steak and eggs ...
03 12 29 05 LMP Is that right?
03 12 29 06 CDR ... steak and eggs, or scrambled. ...
03 12 29 12 CMP You don't ... scrambled eggs, do you, Jim?
03 12 29 15 LMP Yes.
03 12 29 16 CMP ...
03 12 29 18 CDR Huh.
03 12 29 19 CMP ...
03 12 29 22 LMP All right.
03 12 29 23 CMP ...
03 12 29 24 LMP (Laughter)
03 12 29 27 CMP ..., Dave.
03 12 29 28 LMP (Laughter)
03 12 29 30 CDR You've been away too long, Jim!
03 12 29 32 LMP (Laughter)
03 12 29 35 CDR Golly.
03 12 29 38 CMP Yes. ...
03 12 29 58 CDR Is that all we get to eat?
03 12 30 01 LMP Yes, I think so. ...
03 12 30 08 CMP We ought to be about through with that food locker.
03 12 30 38 CDR ... pictures. Do we just take them from straight down?
03 12 30 42 CMP ...
03 12 30 54 CMP ... you want to ... You - you got that ...?
Okay, there's REV 3 ...
Take it out of window 4.
These will be the LM. You got all of them?
Yes.
And right at - the start of the ... You want to start looking out the window, window 4. ...
... And then you want to ... off ...
That's right. Switch them back in stereo now?
Yes. ...
... now. ...
You know, that feels funny to look down.
Yes, ...
...
What's wrong, Jim. ... doing the dishes?
...
...
...
...
I got mine right over to here.
Yes, I have them.
Okay. ...
Ah, man. ...
Looks to me like we're roll.
We're roll.
03 12 39 19  LMP  Yes.
03 12 39 22  CDR  Is - is this picture supposed to be an oblique?
03 12 39 28  CMP  It's not a - a vertical picture.
03 12 39 30  CDR  It's an oblique picture, really.
03 12 39 36  CMP  Minus 1:40?
03 12 39 41  CDR  Okay. ...
03 12 39 47  CMP  Straight down?
03 12 40 50  CMP  No, you're ...
03 12 41 03  CMP  Pretty dark.
03 12 41 25  CDR  Yes. Okay. I see where we are. Okay. ...
03 12 41 30  CMP  Yes.
03 12 41 34  CDR  Yes, but I - I seem to have it located myself here.
03 12 41 37  CMP  Oh.
03 12 41 38  CDR  I don't ..., but it's dark in here.
03 12 41 51  CMP  Nassau Bay was in the dark, I'm sorry to say.
03 12 41 55  CDR  Yes.
03 12 42 05  CMP  ...
03 12 42 43  CDR  I want to take one more for good measure --
03 12 42 46  CMP  All right.
03 12 42 47  CDR  -- but now it's getting in an area where you're getting something.
03 12 43 02  CDR  Okay.
03 12 44 11  CMP  Okay, let me turn this over here on the - Let me put this back under here - the bracket; it's a good place for it to be.
03 12 44 38  CDR  Okay. ...
Your next ... - is - ... 228.
But that's a - that's a good place for it.
Yes. Good idea. Run them back in here.
Really?
Yes.
Oh, ... ... I'm starving.
Okay.
Give me a lunch pack, and I'll eat it.
What is it?
Meatballs and sauce.
... Need any help?
Do what?
Oh, isn't that sweet?
You want me to move? You want to get over here?
... 
Meatballs and sauce.
Give me a spoon ... You got something for those?
No wonder you never lose it.
... 
One thing you're going to learn how to do is fly upside down.
(Laughter)
Yes. Yes. You'll be able to fly right-side up.
Now I can see a bunch of ...

What ...

... Put it on the ...

Okay. Let me go to the movie.

No, by golly, there are lineaments down there all over the place, going - Well, northeast - Yes, northeast, southwest. See it? Right up on the ridge. Right along all the ..., by golly. Look at that.

Look out the window, Al.

What's over there?

What? Right here. Look out the center window, right down this way. We'll be parking right over - right over the grid.

You mean right over the - the ridge here? Right along the lunar ...

As long as you ... having a - the ground track that changes every rev, you're never going to get tired of looking at new things. You know, you'll have something new to look at the whole way.

That looks dangerous.

(Laughter)

You know, I about had meatballs all over the place.

What are you waiting for 2 minutes from now?

... 

Yes. I'll ... a couple ...

I didn't mean to.

One minute to go.
You want me to get the mass spec and do what?

No, the boom out.

Oh.

Well, I was just thinking about that. I think what we need to do - is - You might take a little bath ... By golly, let's go do some around the Moon ...

One.

Huh?

... putting them on.

I figure we're far enough ahead - now. You can stop it - if you want to, you know, to live it up. Really live it up. Get clean, fresh -

... a tree stump ...

Yes.

It's got a big ... on the side.

... Check The Bright One? Boy, look at the junk coming out of it.

See this one wall here - how it's completely collapsed, straight down, and a bunch - bunch of little benches go down even farther - towards the bottom.
The way that one...

Which direction?

TIME SKIP

Your candy, Dave, is in that bag over there. Your breakfast is right here.

Thank you. You're a good guy.

Well, looks - looks like it's about the best way to do it here.

No, 33.

Is it actually a what, plus or minus - -

What?

- - 9?

Yes.

Yes; 33's not so bad, except a -

Plus or minus 9; that's a 24.

I don't know whether we can or not. Let me ...

Put a - put a 50-degree mark on the window.

Yes. I know it, I want to get ahead. We got time to do it now. I just like to get everything done we can, and I'd like to be sitting and waiting.

We should have turned that cabin fan off last night. It wouldn't have been so cool - been less noisy.

Well, I tell you, I woke up at one time - and I listened to the noise, and I thought the thing was off. I thought to myself, "Great, somebody got up and turned the cabin fan off."
I was burning up down there. I just about got up and got the hoses - ... them down there.

Boy, you should have done that before you went to bed. Get yourself some air.

Yes.

Did you get any sleep, Jim?

Yes, about like the first night.

Well, you should have got up and got the hoses then. You need your sleep, babe.

Yes.

Huh! We're moving it. I can't believe it!

The ...! That biomed is working.

Al has them.

Oh, thanks. Son of a gun.

Well, I reckon what we ought to do is the burn, and then get suited. Burn and then get suited, you know - finish up the burn. You can put on your suit; get it out of the way. Go clear out the tunnel.

Yes. It really is.

I couldn't tell whether the spacecraft was moving or whether Dave was shifting in his couch.

Yes, we must have used a fair amount.

Need some more? I can get it for you.

... any more ...

You ready?

Yes. Don't push, just let it go, Jim. Pull it out and let it - and release it. Pull the handle out.

Again?
Just pull out - now let go. That a boy. You don't - you don't push it in. Have you been pushing it in?

Sometimes it sticks.

No, it never - no, it - it - you - it counts up and - it has a little accumulator in there.

Here.

Now, just pull it out and - and let it - and leave it go.

Okay.

The accumulator builds up, and then it'll shoot you. That's where you get your measurement.

Take a shot of cold right here.

All right.

... than caught short.

Ready?

Yes.

...

...

... hot chocolate I just grabbed?

Yes, sure.

...

... this good stuff is for the kid's stamina.

That all right?

The opposite end.

There. Eat it.

Al, I'll leave some bacon squares for you.
03 22 24 49 CDR ... remembered.
03 22 24 54 CMP ...
03 22 24 55 CDR 100 hours and 13 minutes, I think we ...
03 22 24 58 CMP Hmm.
03 22 25 31 CDR You like bacon squares? I'll leave you some, too.
03 22 25 35 CMP Too much salt. Too dry and salty for a whole meal. I don't ...
03 22 27 11 CMP Ten minutes until AOS. Huh!
03 22 27 15 LMP You going to get this pad on the next rev?
03 22 27 17 CMP Mm-hmm.
03 22 27 18 CDR Al, why don't you and I switch off here when ...
03 22 27 24 LMP I'd like to take a crap if I can work it in, Dave.
03 22 27 28 CDR Okay.
03 22 27 29 LMP Tell me when.

TIME SKIP

03 23 38 42 LMP Al, can you get those?
03 23 38 44 CMP What?
03 23 38 45 LMP LOGIC POWER, two, to DEPLOY/RETRACT.
03 23 38 47 CMP Yes.
03 23 38 48 LMP I can't get in there among all the helmets.
03 23 38 49 CMP DEPLOY/RETRACT.
03 23 39 30 CDR You got another 15 degrees to go, Al.
03 23 39 32 CMP Okay.
03 23 39 33 CDR Jim, could you --
CON ' JmiII

03 23 39 35 LMP  Yes.

03 23 39 36 CDR  -- go ahead and finish what you're doing; I'm sorry.

03 23 40 01 LMP  Al, you've got to change those LOGIC POWERs, too, and go back on OFF; I'm sorry. I was thinking we had to retract the booms. They're already retracted.

03 23 40 13 CMP  Okay. I'll be glad when I get rid of you guys. I won't have to worry about those switches anymore.

03 23 40 18 CDR  You won't, huh?

03 23 40 19 CMP  Huh-uh.

03 23 40 20 CDR  Oh, that's right. You don't have any maneuvers.

03 23 40 22 CMP  No, I - I laid it on them. I said, "Those switches, as long as I'm by myself, are going to stay in DEPLOY/RETRACT all the time."

03 23 40 30 CDR  That's good. Okay, you're almost there.

03 23 40 32 CMP  Okay.

03 23 40 36 CDR  And I'll tell you what. Why don't you do your P52, and just stay down there, and I'll do a P30 --

03 23 40 42 CMP  All right --

03 23 40 43 CDR  -- since we're at the attitude --

03 23 40 44 CMP  Yes.

03 23 40 45 CDR  -- and let you do the star check.

03 23 40 46 CMP  All right. ... warning lines. Jim can pick up the checklist.

03 23 40 54 CDR  Okay, you're there.

03 23 40 55 CMP  Good.

03 23 40 56 CDR  I'll - I'll get the numbers. They recommend 25 and 26.

03 23 40 58 CMP  Right. If 25 doesn't come up, I'm going to punch it in.

03 23 41 02 CDR  What --
25
Okay. Well, you've got 16 minutes, so you're in
good shape.

Okay. Twenty-five is Acrux.

Do you want to start an EMS DELTA-V test over there --
Yes.

-- and null bias check.

Okay.

Okay.

Twenty-six; comes up the right stars.

Good.

And 26 is Spica.

Oh, yes, there's Gienah; this must be Spica.

Four balls 1.

Beautiful.

Torquing angles.

One, 2, 3 - Okay, I'll torque them on a minute.

Okay.

What's the sextant star?

Well, wait a minute. Oh, you want to do it right
here? Okay, sextant star is number 30.

Aaah.

Huh.

Take a look at your shaft and trunnion, if you can.

Yes.
03 23 43 43 CDR  What's that?  NOUN 99?
03 23 43 45 CMP  Yes.  Let's see - 90 - -
03 23 43 48 CDR  Okay, it should be 192.8 and 111. You've got 192.1 and 114.
03 23 43 53 CMP  That's pretty close.
03 23 43 54 CDR  Yes, that's at 192 - 192.8?
03 23 44 05 CDR  What are you doing?
03 23 44 07 CMP  ...
03 23 44 11 CDR  Why don't we just - Let me do a - -
03 23 44 13 CMP  Do you want to just take those numbers?
03 23 44 14 CDR  No, let me do a P - P30-P41 real quick and get you to - the right attitude.
03 23 44 19 CMP  Well, we want to do the sextent star check on their attitude anyway.
03 23 44 24 CDR  It doesn't matter.
03 23 44 25 CMP  Yes.  Well, wait - -
03 23 44 26 CDR  111 - 192.8 - -
03 23 44 27 CMP  Okay.
03 23 44 28 CDR  - - and 111.
03 23 44 38 CDR  There, I - you're in good shape.
03 23 44 45 CMP  Yes, it's there.
03 23 44 47 CDR  Okay.  Good.  Okay, why don't you clean up down there?  I'll do a 30-41.
03 23 44 55 CMP  Okay.
03 23 45 04 CDR  I want to go to PO0, okay?
03 23 45 05 CMP  Okay, you got it.
03 23 45 21 CDR
3.1, is that all?

03 23 45 23 LMP
Yes.

03 23 45 28 CMP
They're really getting down to nitpicking. Okay, I'm all cleaned up down here, Dave.

03 23 45 35 CDR
Okay.

03 23 45 45 CDR
Your TSBs are getting pretty full, aren't they?

03 23 45 48 LMP
I think there's a lot of space in the bottoms of them.

03 23 45 51 CMP
Well, if you guys leave today, I'll - I'm going to get the JETT bag out and start filling it up with that stuff.

03 23 45 55 LMP
Yes.

03 23 45 58 CDR
Okay, we're in P41. Trim it out. There, attitude looks pretty good. Okay. Why don't you come up here and do your EMS check?

03 23 46 09 CMP
Okay, Dave.

03 23 46 21 CDR
3.1. God, that's a nothing.

03 23 46 26 CMP
Yes, they're really splitting hairs.

03 23 46 29 CDR
That's all right, I wouldn't feel too comfortable at 24,000 feet on the verge of a 22,000-foot mountain.

03 23 46 39 CMP
Yes, well, this'll bring you up 10,000 feet.

03 23 46 42 CDR
Yes.

03 23 46 44 CMP
Or thereabouts.

03 23 46 48 CDR
Are you running a null bias check here?

03 23 46 49 CMP
No. I just started to set it up now when you got --

03 23 46 53 CDR
Oh. Okay.

03 23 46 54 CMP
-- the numbers in.

03 23 46 55 CDR
Did you run the DELTA-V test?
Yes. That's good. It's a minus 21.9.

We've got 10 minutes to go.

You clock's set, but for some reason it isn't set exactly right. I think that timer drifts on you.

Drifts? Yes.

Yes. I suspect it very well might.

Have we got the DAP set in there that we want?

Yes.

Four jets?

Four jets.

... start.

Okay, we got BMAG --

Yes, I've got 21101.

Let's go back to --

That gives us four jets.

Yes. Let's go check the waste --

I ch - I put that in.

You already did that?

Yes.

Okay.

That's the only thing there was to put in.

Okay. Roll, pitch, and yaw looks okay.

Okay, you want to get ROT CONTROL POWER, NORMAL, two, to AC/DC?

AC/DC.
03 23 47 57  LMP  ROT CONTROL POWER, DIRECT, two, to MAIN A, B.
03 23 47 58  CDR  MAIN A, MAIN B.
03 23 48 02  LMP  I didn't get the chance to check the DET.
03 23 48 09  CDR  Looks like it's about 3 or 4 seconds off, and I'm really not sure I understand why.
03 23 48 17  CMP  Yes, you can turn it right and the next time you look it's - Oh, ..., forgot to give you that.
03 23 48 26  CDR  That's all right. I put your film in your TSB.
03 23 48 29  CMP  Okay.
03 23 48 32  LMP  Okay BMAG MODE, three, are RATE 2.
03 23 48 34  CDR  They're in RATE 2.
03 23 48 36  LMP  And we're at CMC in AUTO?
03 23 48 38  CDR  Yes, yes.
03 23 48 39  LMP  We'll wait until the DELTA-V test is complete to do the trim?
03 23 48 47  CDR  DELTA-V test is complete, and it's .8 feet per second per 100 seconds. It's getting better.
03 23 48 54  CMP  Yes. ...
03 23 48 56  LMP  Okay, do you want to - do you want to trim?
03 23 49 03  CDR  Huh? Trim?
03 23 49 04  LMP  I said you want to set DELTA-Vc, I suppose?
03 23 49 08  CDR  Ah, let's set - Yes, better - Your 100 is probably good. DELTA-Vc should be 3.1.
03 23 49 15  CMP  Yes, let's -
03 23 49 22  CDR  You know what? That's yours.
03 23 49 31  CMP  Okay, 3.1. I've got a 103.1 set in there.
Okay. EMS FUNCTION, DELTA-V.

DELTA-V.

Okay, do you want to trim it?

Yes, we might as well. Get it all in plus-X. Okay?

Yes. Okay, push up close to ... Yes.

Okay, burn time is 20 seconds.

Okay.

Spacecraft roll alined, Al?

Alined.

SPACECRAFT CONTROL, CMC in AUTO.

CMC, AUTO.

MANUAL ATTITUDE, three, to RATE COMMAND.

RATE COMMAND.

DEADBAND, MIN.

MIN.

RATE, LOW.

LOW.

BMAG MODE, three, ATT 1/RATE 2.

ATT 1/RATE 2. Wellll -

GDC ALIGN.

What happened to your TRANSLATION CONTROL POWER?

Yes, that's what I'm wondering.

Where's the THC POWER? Well, now -

Get that down there.
03 23 50 30 CDR  Oh, down there? Okay.
03 23 50 31 LMP  Five minutes.
03 23 50 32 CDR  (Sigh)
03 23 50 33 CMP  Why - why go ATT 1/RATE 2, though?
03 23 50 34 LMP  Do it for a GDC ALIGN. That doesn't make sense.
03 23 50 37 CDR  No? No, it sure doesn't, does it?
03 23 50 39 CMP  Why the GDC ...?
03 23 50 55 LMP  And we're standing by for 5 minutes.
03 23 50 58 CMP  Okay, we're at 6 minutes.
03 23 51 21 CMP  Have you timed this thing, Dave?
03 23 51 23 CDR  Yes.
03 23 51 24 CMP  Okay.
03 23 51 35 CMP  GDC alined.
03 23 51 37 LMP  Okay. Standing by for 5 minutes.
03 23 51 39 CMP  Okay, we're at 5 minutes.
03 23 51 40 CDR  Okay, at some point you got to go ATTITUDE 1/
                  RATE 2 to have your SPS --
03 23 51 46 CMP  Right.
03 23 51 47 CDR  -- in attitude hold. Let's not call down anymore.
                  So you might as well do it now.
03 23 51 51 LMP  ... ATT 1/RATE 2, ... 42, GDC ALIGN.
03 23 51 54 CMP  I don't understand that.
03 23 51 56 CDR  I don't either.
03 23 51 57 CMP  Okay, we're in ATT 1/RATE 2, just in case we need it.
03 23 52 04 CDR  Okay, we're at 5.
Okay, TRANSLATION CONTROL POWER, on.

TRANSLATION CONTROL POWER, on.

Hand controllers, armed.

Armed.

Okay. Did you get the 85 display? I guess it's --

Yes.

-- ... I got the ... right now.

Okay. After the burn, there's not much. I think we're in good shape. I'll tell you what we might do. After the burn, let's pressurize the LM.

Yes.

And let you get suited. And it might be better if you just pull your suit out and stuck it in the corner and got all that stuff out of the tunnel. ..., we can put it here and --

Yes.

-- down under that couch, where we've been putting it.

And try to ... it back. Yes.

Yes, and I think there's enough room for you to get suited there.

Yes, I think so.

Then we can start working on that ... I'd like to do that landing site thing - the P24.

And I'll be getting all the transfer gear.

Yes, get all the transfer gear. Yes. As a matter of fact, you can start taking it over, once we get the tunnel opened up.

Yes.
Boy, I tell you, we go by that landing site awful fast. We really do. Yes, you really go zipping by. Did you get a good picture of it? No. It was a little too dark. I just - All I could do was point down, and I just picked up the rille going past the edge of the window. I was just too slow getting to it, so - I knew I didn't have much time, but I didn't know it was that fast. I didn't realize we were going to get through it that quickly. Did it look low? Yes. Yes. You know, doggone it - - The sector's right there, boy. -- ... In the LM when - when we'd do that, we'd run it several times across PDI with the window. We should have done that in the LMS with you. I didn't - I didn't -- We did. -- ... about the - No, you never came over there and watched us do it from 9 miles. Oh, I -- ... Oh, I see. Yes. Because it really moves. Yes. Really give you a feeling for it.
I never thought about the TV pass, though, to tell you the truth.

Tell them it went awful fast?

They could tell, I think (laughter).

Could you - did you have any - -

Well, all - all I could do was stick it in the window and catch - catch the rille going out of the edge of the picture, and that was it, Dave. So, all I saw was - all I saw was St. George and - and Elbow Crater.

Could you see them?

Yes. And they were gone.

Did you get a good chance to point it at the Apennines coming up, though?

Yes. Yes.

Did you see the mountains on the horizon and all that stuff?

Yes.

Well, that ought to be pretty impressive. Well, we're down to 2 minutes, Jimmy.

And don't - don't forget on that Activation Check-list that one of them has that ECS stuff, and the other's got - Make sure we have both of those. Yes.

One minute. Okay, 20-second burn ... Jim will count because your clock is sort of ...
03 23 56 30 CMP  Okay.
03 23 56 31 LMP  ...  
03 23 56 32 CMP  43.  
03 23 56 33 LMP  Roger. 
03 23 56 36 CDR  Ten seconds. Ready -
03 23 56 45 CDR  MARK; the burn time. DSKY's count?
03 23 56 51 CMP  Roger. So is the EMS. 
03 23 56 54 LMP  Here's the countdown. ... 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, and -
03 23 57 05 LMP  ZERO.
03 23 57 06 CDR  Now trim it a little bit. Yes, that's ... That's good, Al. ...  
03 23 57 10 CMP  What did they want it trimmed to?
03 23 57 12 CDR  They didn't say. Why don't you - Could you take that to 3/10ths?
03 23 57 14 LMP  They didn't want us to trim any - -
03 23 57 16 CMP  That's for retrograde ...
03 23 57 18 CDR  There you go.  
03 23 57 19 CMP  Okay.  
03 23 57 20 CDR  .1, .2, and .0.
03 23 57 23 CMP  Okay.  
03 23 57 24 CDR  Okay, we got everything?  
03 23 57 25 CMP  Whoo.  
03 23 57 26 CDR  All the data?  
03 23 57 27 CMP  Yes.  
03 23 57 29 CDR  Okay. EMS FUNCTION, OFF.
03 23 57 32  CMP  OFF.
03 23 57 33  CDR  EMS MODE, STANDBY.
03 23 57 35  CMP  STANDBY.
03 23 57 36  CDR  RHC and a THC, lock.
03 23 57 37  LMP  Lock.
03 23 57 39  CDR  TRANSLATION CONTROL POWER, OFF.
03 23 57 41  CMP  OFF.
03 23 57 44  CDR  We got a POO after that?
03 23 57 45  LMP  Yes - yes.
03 23 57 47  CDR  POO and a VERB 66.
03 23 57 49  CMP  Okay.
03 23 57 50  CDR  ROT CONTROL POWER, DIRECT, OFF.
03 23 57 52  CMP  DIRECT, OFF.
03 23 57 53  CDR  BMAG MODE, three, RATE 2.
03 23 57 54  CMP  RATE 2.
03 23 57 55  LMP  TAPE RECORDER going off.
03 23 59 08  CDR  ...?
03 23 59 09  CMP  ...
03 23 59 10  CDR  Okay, there's a maneuver to P52 high-gain attitude.  FDOI [sic] trim required; roll, pitch, and yaw.  Well, beautiful, they didn't give us that one.  Did they?  Did they give us an attitude to go to, Jim - after the burn?
03 23 59 29  LMP  No, I don't think so.  It's not on the pad.
03 23 59 45  CMP  We don't have it.  Huh.
03 23 59 57  CMP  Well, for God sakes.  They forgot it completely.

CONFIDENTIAL
Okay. They're not too with us this morning.

What - what kind of high-gain antenna angles do we get in this attitude?

Why don't you look for it --

Let's look in the book and see if that's in a clear area.

Which book? Where's the ... at?

Right up there. Do you want - want to clean up of SIM bay here, Dave?

Yes, okay. X-RAY to STANDBY.

X-RAY to STANDBY.

X-RAY - ALPHA RAY/X DOOR to ALPHA ON.

Okay, that is ALPHA ON.

Okay. GAMMA RAY, EXPERIMENT, ON.

GAMMA RAY, EXPERIMENT, ON.

GAINSTEP to shield on.

GAINSTEP to shield on.

MASS SPEC --

Wait, hold it. GAINSTEP to shield on?

Yes.

Is that the midprogression?

I don't know. What is it?

It's the SHIELD OFF, down.
04 00 00 58 CDR  What's that?
04 00 00 59 CMP  Shield on for the GAINSTEP.
04 00 01 02 CDR  Which position is that?
04 00 01 05 CMP  Center.
04 00 01 06 LMP  Okay, the shield's on.
04 00 01 07 CDR  I don't know. It doesn't say that over there.
04 00 01 08 CMP  GAINSTEP is in up.
04 00 01 10 CDR  Okay, MASS SPEC EXPERIMENT to STANDBY.
04 00 01 14 LMP  Okay, MASS SPEC EXPERIMENT is STANDBY.
04 00 01 19 CDR  PAN CAMERA to off.
04 00 01 23 LMP  PAN CAMERA - You got the mode? For the PAN
          CAMERA ... --
04 00 01 29 CMP  It's the ... POWER.
04 00 01 30 CDR  Oh, POWER - PAN CAMERA POWER to off. I'm sorry.
04 00 01 32 LMP  Verified.
04 00 01 33 CDR  All right, that's all.
04 00 01 35 LMP  Okay.
04 00 01 52 CDR  Okay, let's -
04 00 01 55 LMP  What does that look like? I said that to you.
04 00 02 06 CDR  Oh, my. Well, let's see. Getting range and no
          coverage, though. Next thing we go to is landing-
          site observation attitude at 96:55, which is 015,
          290, and 000. So that ought to be a good attitude.
          You see we come down through here and do all that.
04 00 02 31 CMP  Yes.
04 00 02 32 CDR  I guess we'd better --
04 00 02 33 CMP  Well, we don't have anything else, do we?
S-band. Says P52 HGA attitude, if DOI trim required. Well, we'll give it to him. And the next attitude we have to do - it looks stable for maneuver, because they're surely to give us a - an extra maneuver.

They didn't give us that. Here we come around here, and the next thing we have to do is burn status - maneuver to this attitude. Okay?

Yes.

So let's - let's go there.

That'll be Charlie there, huh? That's not a good - that's not a good high-gain attitude.

It's not?

But it's better than the one we've got, though.

How can you tell we're there?

Huh? Well, the landing-site observation attitude is not a good high gain.

Oh, it's not?

Huh-uh. The high -

Well, let's -

- - That's - that's corrected better than what we've got.

Well, we got OMNI now, anyway, don't we?

Yes. Now we can just sit here. You've got OMNI B here or OMNI Charlie in that other attitude.

Let's see, we have ACS at 96:30. Okay, and then we only got 20 minutes to maneuver. I guess you're right. I guess that would be better than - kind of - We only have OMNI, but that's too bad, I guess. But at least it's better than this one.

Yes.
04 00 04 16 CDR 290, 0 ... the whole 180 degrees down ...
04 00 04 29 LMP Got a long ways to go.
04 00 04 30 CDR So we might as well do it. Go to ... Okay. Next order of business is the tunnel.
04 00 04 49 LMP Al, I want to change lightweights with you. I'm going off comm.
04 00 05 15 CMP Okay, and I'd better put some biomed on.
04 00 05 17 CDR Oh, yes, that's right. Why don't -
04 00 05 33 CDR You're going to have some time - Oh, you got to get your suit on.
04 00 05 46 CDR Why don't - why don't we do the tunnel and get that stuff in here. I don't think it's going to be in the way too much, once we get your suit out of the way. Oh, do your biomed stuff, and we'll get all the transfer stuff together. Then we'll have it all, and we won't have to do any more shuffling.
04 00 06 16 CDR I - I'll get it. Jim, go ahead and get the transfer stuff. I'll - That's the wrong thing, Jim. You're in the right wall.
04 00 06 38 CDR Need any help, Jimmy? What - UCW2 [?]. Oh, that thing. Yes, okay. Where it is? I'll go get it. Oh, I know where it is; it's in A-8.
04 00 07 13 CDR Whew. (Clanking)
04 00 07 35 CDR There we go. (Clanking)
04 00 07 52 CDR What happened?
04 00 08 07 LMP ...
04 00 08 10 CDR Okay. (Clanking)
04 00 08 37 CDR Did you leave Al one jettison bag?
04 00 08 44 LMP Okay, I'll check.
04 00 08 47 CDR Okay. How many did you have to start with?
(Clanking) No, I really guess not. Okay, we'll just take one. Okay, LM Data File, huh? What should - what should be in it, Jim? Huh? Yes. I know this is in it; I saw it the other day.

No, it's - it's an extra one of ours. I had - that's a backup. Command module. I had them put on. (Laughter) It's the only kind I understand. It's not going to work (laughter). Here, I know where I'll put it, right in here. Right there.

Okay, let's check it.


Got it.

Got it.

Star charts; you have them.

Get the ...

All right. I'd like to time it...

Maybe I got a PRD, Jim.

There it is. I've got to get Al's, really. Yes.

What?

It wasn't? Why? Really? Oh, let me write this stupid thing down.
Do you know where your PRD is, Al? Yes, give me to it [sic]. I'm switching you right now.

(Clanking)

Some day they may want these readings. They're in here. They're in here at the beginning of the day, if you ever get around to it. Okay, Jim, my PRD. I thought I just handed you one. Huh?

Oh, shoot, I don't see it, Jim. No, don't check it off; we'll look for it, as we go around. Oh, is that the list you're checking? Oh, come on. Okay. Yes. Yes, I put mine on. Yes.

Yes, we're - Yes, but - Yes, okay. I've got mine in my pocket. Okay. Yes. Got that? Yes. Yes.

Okay, yes - yes. What I - We also want to take these over and bring the new ones back. CWGs.

I'm going to have mine in my pocket, in this thing when I bring it over. So I got mine. Do you want to take yours? Okay, it's in the tube, Jim.
04 00 16 48 LMP ...
04 00 16 50 CDR Yes.
04 00 16 53 LMP ...
04 00 16 58 CDR Yes. I was going to put them in my pocket, too, before I got hooked around. Here, I can stick it in this pocket up here – in my strap-on pocket. When are we going to put them over there? Okay.

04 00 17 20 LMP ...
04 00 17 22 CDR Yes, okay.
04 00 17 24 LMP ...
04 00 17 25 CDR Yes, got mine ready to snap on.
04 00 17 27 LMP ...
04 00 17 30 CDR Okay.
04 00 17 32 LMP ...
04 00 17 36 CDR Yes.
04 00 17 38 LMP ...
04 00 17 39 CDR Okay.
04 00 17 41 LMP ...
04 00 17 47 CDR We got both Activation Checklists? Sure, huh? Okay.
04 00 18 12 CDR Huh?
04 00 18 13 LMP ...
04 00 18 14 CDR Yes. Well, all right. We're going to go early.
04 00 18 20 LMP ...
04 00 18 27 (Clanking)
04 00 18 35 LMP ...
04 00 18 39 CDR I'll put it in R-3.
04 00 18 51  CDR  The what?
04 00 19 35  (Clanking)
04 00 19 54  LMP  Get all ...?
04 00 19 56  CDR  Yes.
04 00 19 57  LMP  ...
04 00 19 59  CDR  Okay.
04 00 20 05  (Clanking)
04 00 20 07  CDR  Yes.
04 00 20 08  (Clanking)
04 00 20 49  CDR  Well, I don't think we've left you with too much to do, Al. I hope not. Keep an eye on those guys down there.
04 00 21 02  CMP  ...
04 00 21 05  CDR  Huh?
04 00 21 06  CMP  ...
04 00 21 08  CDR  Yes, they really have.
04 00 21 12  CMP  ... watch the systems ...
04 00 21 17  CDR  Let them watch the systems and you do the flying, which is the way it ought to be.
04 00 21 43  (Clanking)
04 00 22 22  LMP  ... all through down there?
04 00 22 35  (Clanking)
04 00 22 42  LMP  ...
04 00 23 06  LMP  ... wait a minute ...
04 00 23 15  LMP  Yes.
04 00 23 18  CDR  Jim, here's your - thing.

CONFIDENTIAL
04 00 23 53 LMP ... 
04 00 24 55 (Clanking) 
04 00 25 12 LMP ... 
04 00 25 16 (Clanking) 
04 00 25 36 LMP ... 
04 00 25 39 (Clanking) 
04 00 26 20 CDR ... Is this your ..., Jim? 
04 00 26 29 LMP No, I've got it. ... 
04 00 26 33 CDR ... 
04 00 26 35 (Clanking) 
04 00 27 00 (Clanking) 
04 00 27 29 CDR Okay, I guess the - next thing we ought to do - when you get ready - is go through the tunnel. No, I don't need that. Systems Checklist. 
04 00 27 58 LMP I think you had the Systems Checklist, didn't you? Oh, here it is. Okay. Well, that's your job, because - Say again? 
04 00 28 15 CMF ... 
04 00 28 18 LMP Yes. 
04 00 28 34 (Clanking) 
04 00 28 42 CDR Think we ought to try and get them on the high gain? Hey, Al, you think we ought to try to get them on the high gain? 
04 00 29 36 CDR Well - 
04 00 29 37 LMP I mean - Okay. I could easily go through it, because I could tell which ones to check - skip through. ... get. 
04 00 29 50 CDR Turn around here, Jim.
Hey, we're getting them. How about that. Yes. There, got a lock.

Roger. Houston; 15 here. We had a good burn and have a burn report for you.

Okay. On time; burn time was about 18 or 19 seconds. The residuals were minus .1, plus .2, plus .2; DELTA-V<sub>C</sub> was plus .8, and the G&N has us in a 59.4 by 10.3.

(Yelling) In case you guys are wondering, I'm dumping.

Fuel cell purge, huh? Okay, fuel cell purge. Two for 2 hours. Two of them on.

(Yelling) Hey, we're going to maneuver.

Yes, must be ... low.

...?

Well, we're getting there. Slowly.

What?

We're getting there slowly.

...?

Yes. I think so.

When you almost get there, how about ...?

Okay.

...
All right.

... coming up ... to AOS ... up to - be ready for AOS.

I think I'm just about ready.

Yes. Where is the tape? Anybody know?

It's over - ...

Okay.

Oh, what the hell.

Hey, Al.

(Yelling) Yes.

(Yelling) What?

(Yelling) What?

(Yelling) What?

Did you ...?

(Yelling) No. You guys are too far ahead.

Okay. Let's see.

Ready?

You want P - Okay.

Okay.

Okay, there, Endeavour. How do you read the Falcon on --
Hey, loud and clear.
Say again?
Beautiful!
Good.
And, Al, how do you read me?
Read you loud and clear, Jim.
Ah, you're beautiful.
Hey, did you say something about Tephem? Did you want a Tephem, Dave?
Stand by.
Okay. I'll give it to you if you want.
Stand by. Configure for SIMPLEX A.
Okay.
Okay, Al. How do you read on A?
Loud and clear, Dave.
That's nice.
And, Al, how do you read me?
Loud and clear, Jim.
Very good.
Okay. Now you can give me your Tephem.
Okay.
Ready to copy?
Go.
04 02 24 20 CMP Just like SIM. All balls in the R₁. R₂ is 32251. R₃ is 26157.
04 02 24 31 CDR Okay. All balls, 32251, 26157.
04 02 24 34 CMP Great.
04 02 24 44 CMP Want a clock sync?
04 02 24 46 CDR Stand by 1.
04 02 25 32 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 43 CDR 3, 2, 1 -
04 02 25 45 CDR MARK.
04 02 25 46 CMP Okay. 98:25:45.60.
04 02 25 53 CDR Okay. 25:45.60.
04 02 25 56 CMP Roger.
04 02 26 06 CMP And I'm coming up to get the umbilical now.
04 02 26 08 CDR Read you loud and clear.
04 02 26 19 LMP Okay. Let's hope so.
04 02 26 48 CDR Okay, Endeavour. Another NOUN 65 if you're ready.
04 02 26 56 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 44 CMP Hello, Endeavour - Houston, this is Endeavour, loud and clear.
04 02 27 58 CMP  Okay, you got it. NARROW and REACQ.

TIME SKIP

04 03 29 32 CDR  Okay. Understand, Al. Get the DAP reset, and the tape meter looks like it works fine.

04 03 31 28 CMP  Okay, Falcon; Endeavour. I got the hatch in and - you want to verify your hatch closed?

04 03 31 35 CDR  Okay, that's verified. Closed and locked.

04 03 31 37 CMP  Okay, I'll do a hatch integrity check then.

04 03 31 40 CDR  Okay.

04 03 32 43 CDR  Okay, Endeavour; Falcon. Our radar checks out okay, and your B-3, OFF, and transponder, off, are no longer required.

04 03 32 49 CMP  Okay. Thank you.

04 03 32 53 LMP  And, Al, we're going B data.

04 03 33 00 CMP  Okay.

04 03 38 34 CMP  Falcon, Endeavour. Your transponder checked out okay.

04 03 38 37 CDR  Oh, very good. Thank you.

04 03 47 15 CMP  Okay, Falcon; Endeavour. We're maneuvering to SEP attitude.

04 03 47 19 CDR  Okay.

04 03 47 30 CDR  Okay, Endeavour; Falcon. Have you vented the tunnel?

04 03 47 33 CMP  Roger.

04 03 47 34 CDR  Okay; thank you.

04 03 47 53 CDR  Hear that noise with us, Al?

04 03 47 58 CMP  Okay.
Okay, Al, are you about in attitude now?
Right, Dave. About 5 degrees to go.
Okay. We're down to --
Oh, yes. We should --
-- just about everything and it's all shipshape.
Good.
Even the old broken tape meter seems to work.
That figures.
Okay, we're at attitude now.
Okay; thank you.
Okay, Falcon; Endeavour. Doing the trim maneuver.
Okay.
Okay. We're setting at attitude and I've got 10 minutes --
MARK -- to go.
Okay, we're right with you.
And we're right on the attitude.
Okay, good.
Okay, Al, at 5 minutes to go, we need a - 06 20. Okay?
Okay, you want it now?
No, let's wait down until 5 minutes. Okay?
Okay.
I'd like to give them as much time on the platform as we can.
Coming up on 5 minutes in 10 seconds.
04 04 08 46 CDR  Okay, I'll give you a mark.
04 04 08 53 CDR  3, 2, 1 -
04 04 08 55 CDR  MARK.
04 04 08 57 CMP  Okay.  35975, 10818, 35995.
04 04 09 10 CDR  Give me that last one again.
04 04 09 11 CMP  Okay.  35995.
04 04 09 17 CDR  Okay.  35915, 10818, 35995.
04 04 09 24 CMP  The last two were okay.  The first one was 35975.
04 04 09 29 CDR  Okay; 75.  I don't write too good with gloves on.
04 04 09 32 CMP  Roger.

TIME SKIP

04 04 38 58 CMP  Ten seconds.
04 04 39 00 CDR  Roger.
04 04 39 17 CDR  Okay, we're on the capture latches.  Good.
04 04 39 20 CMP  Roger.
04 04 39 34 LMP  And you're on your own.
04 04 39 40 CDR  Okay.  Good clean SEP.
04 04 40 28 CMP  Okay, Ed; if you think we can't get there for the P24.
04 04 40 40 CMP  Okay.  We'll hold this.
04 04 40 43 LMP  Okay.  Falcon's going to yaw left.
04 04 41 32 CDR  Okay.  Falcon's going to pitch up 90.
04 04 41 34 CMP  Roger.
04 04 41 57 CMP  And you got four good-looking gear.
And, Falcon; Endeavour. Looks like you got one Radar there that's - rotating quite freely.

Okay. We've got you in sight; we're looking straight at you. It's really pretty.

Roger.

Roger. We're LO bit rate and AFT OMNI.

Roger. PITCH, 155; YAW, minus 50.

Roger. HI bit rate.

And, Houston, we're ready to go with the DPS throttle check whenever you are.

Okay.

TIME SKIP

Al, we're going to DATA.

Okay, Jim. Recorder's running.

Okay, nice recovery over there.

Think I'm minus at least one fingernail, though.

Oh, gad. Where did you lose it?

On - as a matter of fact, on A-1 when I went after the sextant adapter.

Oh, my!

(Laughter) That's okay, just a little loose.

So long as you're not leaking.

I'm not, no. Okay, I'm all set up for the burn here, I've done P40, done the sextant star check, and everything's looking pretty good. And I've got 14 minutes to go.
Okay, very good. Oh, yes, I wanted to tell you a little bit about the landing site there - on the on the craters. There's a - Earthlight Crater, of course, is a lot sharper than Index. And then there's a great big one to the east of Index, which is the same size and quite sharp, and I think - you won't have any trouble as long as you see the Matthew, Mark, Luke, and Index. Index is a pretty subtle crater, and there probably won't be much shadow in the bottom of it at all, when you get there.

Yes. Okay. I - I - I know where it is, I think, well enough in location so I can look for the - for the shallow depression.

Okay. Both of those will probably have shadow in them.

Yes.

But - gee, they're real super; you can't miss.

Okay, do you want the NOUN 81 values for this burn now, or do you want to wait until after?

After.

Okay, I've gone through the primary gimbal check and turning on number 2 now.

Roger.

Gimbal drive check.

*** we feel like we're right there with you.

All looks normal.

Good show.

FDAI scale 5/5. RATE, HIGH, and looks like we're going.

Good.
Day 5

04 05 36 45 CMP Everything checks fine; 2 minutes and 12 seconds.
04 05 36 48 CDR Okay.
04 05 37 15 CMP Okay. DELTA-V THRUST B is ON. And B PILOT VALVE
is closed.
04 05 37 20 CDR Okay.
04 05 37 57 CMP One minute.
04 05 37 59 CDR Right with you on the time.
04 05 38 24 CMP Average g.
04 05 38 26 CDR Roger.
04 05 38 44 CMP ULLAGE.
04 05 38 54 CMP Thank you.
04 05 38 59 CMP THRUST, ON.
04 05 39 02 CMP THRUST, off. What a kick in the tail!
04 05 39 06 CDR Didn't I tell you?
04 05 39 07 CMP You did! Had to see it for myself.
04 05 39 10 CDR That's great, isn't it?
04 05 39 12 CMP Fantastic, man; you really move!
04 05 39 14 CDR Yes, man. That's like really flying, isn't it?
04 05 39 17 CMP Yes, sir.
04 05 41 20 CDR Did you get it all in, Al?
04 05 41 23 CMP Sure did, Dave. Right down to the gnat.
04 05 41 26 CDR Very good.
04 05 41 27 CMP Sorry about that. I had - only had 9/10ths resid-
ual in X and I - I trimmed it out. That short
burn constant made it a lot better.
04 05 41 36 CDR Good.
And I'm in a 65.2 by 54.8.

65.2, 54.8. Okay.

How about that! We have you in a 65.2 by 54.6.

Super.

Al, how do you read now?

I read you 5 square, Dave.

Okay. We had an antenna change called here and sounds like you're pretty good, so we'll just stay with you this way.

Okay.

Now.

Hello, Houston; Endeavour. Roger. Stand by 1.

Okay, Houston. The burn got off on time. Burn time, 4 seconds, $v_{gx}$ was minus 0000.9, and I trimmed that to - zero - -

Hello, Houston; Endeavour. Roger. Stand by 1.

Okay, Houston. The burn got off on time. Burn time, 4 seconds, $v_{gx}$ was minus 0000.9, and I trimmed that to - zero - -

Houston, Falcon. Go.

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

And, Houston, this is Falcon. ED batteries both check at 37 volts.

And LMP. Go ahead.

POO and DATA. And go ahead with the pad.

Yes? Okay.
Ed, if you're reading us, you ought to call us after the – the up-link. We cannot read you. We're not getting the up-link either.

Locked up yet?

No.

Here it comes; don't change it. It's coming in.

THROTTLE control, AUTO.

AUTO. Read you loud and clear, Ed. I'm ready for that update now.

Roger. 104:30:08. 54; cross range, plus 0003.3; DEDA 231, plus 56943.

Roger. Okay, your T – your THROTTLE in min? Okay. THROTTLE, min.

Okay.

THROTTLE, soft stop.

Okay.

RATE SCALE, 25 DEGREES PER SECOND.

25.

ATTITUDE/TRANSLATION, 4 JET.

4.

Check DPS, APS, RCS, ECS, EPS. Okay?

Looks all right.

Did you check the RCS? Okay. ECS look all right?

Yes.

If we should be up-linked, Dave, I'll need a – VERB 47.

Okay.
... computer, because -

Roger. Thank you.

Thirty-nine point - How's that?

(Tone)

(Laughter) ENTER.

Okay. Looks like I just screwed. Okay.

Okay. That's good.

Get - I think we ENABLE on the - S-BAND?

Okay. Houston, how do you read Falcon?

Houston, Endeavour. Loud and clear.

*** while you work, I got a couple of short goodies ***

Hey, that all sounds real good, Karl. And, as you can see, I'm right in the middle of a P52 here. We'll have the second star and gyro torquing angles in just a second.

And if you've got those torquing angles, I'll get them on the minute.

*** read them down to us, Al.

Okay, Karl, I'll read them to you. P52 stars were 01 and 36. The torquing angles were minus three balls 28, minus three balls 58, plus three balls 12. And they were torqued out at 119:05 on the minute.
DAY 6

05 01 53 08  CMP  Hello, Houston; 15 - Endeavour.

05 01 53 21  CC  Endeavour, this is Houston. How do you read?

05 01 53 23  CMP  I read you loud and clear.

05 01 55 32  CC  Endeavour, this is Houston. How do you read? And we seem to have a small comm problem. Please stand by.

05 01 55 41  CMP  Roger, Houston. Endeavour standing by, and I'm reading you 5 square. Houston, Endeavour is standing by, and I'm reading you 5 square.

05 01 55 55  CC  Roger. And I'm reading you loud and clear with a good bit of noise over the top of you.

05 01 56 01  CMP  Roger.

TIME SKIP

05 04 58 21  CMP  Ah, ha!

05 04 59 10  CMP  Hello, Houston; Endeavour. How do you read?

05 04 59 56  CMP  Hello, Houston; Endeavour.

05 05 00 26  CC  Endeavour, this is Houston. How do you read?

05 05 00 28  CMP  Okay, Houston. It looks like we're just going over the hill here. Just wanted you to know, it looks like my mission timer on the main panel is shot.

05 05 00 44  CC  Roger, Al. We read, and we would like to have COMMAND RESET and LOW BIT RATE.

05 05 00 50  CMP  Roger. COMMAND RESET; LOW BIT RATE. The - the timer's - -

05 05 00 53  CC  Probably - -

TIME SKIP
15, this is Houston. We'd like to have you go wide beam on the high gain antenna and then to narrow.

Okay, Houston, this is Endeavour. Going wide beam; going back narrow.

That's sounding better, Al. How are things going up there?

Well, going okay, Karl. Looks like I've caught up a little bit, got all the dumps out of the way, and got the libration photography. It looks like I'm going to be handicapped a little bit because of the mission timer, but we'll press on.

All right. Our understanding on the mission timer is that, even though you tried to reset it, it still refused to count up. Is that correct?

That's correct, and I thought what I'd do now is reset to zero and start.

Roger.

Well, it counts from zero, Karl. I --

And for future reference we'd like - Roger. You say it is counting, but it had - it had to start from zero to start counting again?

Yes. Well, let me pick a random number, zero, count from there. I just tried to tell you the correct time, is all.

Okay, Houston; Endeavour. Looks like we must have just run across a little funny there, Karl, because - it started okay now and is running.

Roger. Do you have a time source --

TIME SKIP
05 06 56 11 CC  Very good, Al. That came through loud and clear.

05 06 56 57 CC  Al, everybody down here is sending up bouquets to you for having done such a great job in a crowded period.

05 06 57 03 CMP  Well, thank you very much, sir.

05 06 57 09 CC  And all the systems down here are looking in good shape as you go around the corner.

05 06 57 12 CMP  Okay, Karl. Thank you.

05 06 57 22 CMP  Think I'll get something to eat.

TIME SKIP

05 07 47 44 CC  Endeavour, we'd like to have a NARROW BEAM, please.

05 07 47 50 CMP  NARROW BEAM.

TIME SKIP

05 09 48 17 CMP  Houston, Endeavour. How do you read?

05 09 48 25 CMP  Okay; reading you loud and clear, also.

05 09 49 09 CMP  Stand by 1.

TIME SKIP

05 20 41 31 CMP  -- and my PRD is 23149.

05 20 41 46 CMP  And standing by for a consumables.

05 20 42 13 CMP  Roger, Karl. Might as well get them now.

05 20 42 45 CMP  Roger, Karl. 140:00; RCS total, 61, 61, 61, 59, and 61; \( H_2 \) tanks, 70, 70, 48; \( O_2 \) tanks, 75, 78, 60.

05 20 43 37 CMP  Roger. Go ahead. I'll be doing a P52.
Well, that certainly sounds very good, Karl.

Roger, Karl.

And, Houston, if you're --

(Yawn)
DAY 7

06 03 29 55 CC Endeavour, this is Houston. How do you read?
06 03 29 57 CMP Hello, Houston; Endeavour. Loud and clear.
06 03 30 03 CC Good to hear your cheery voice. How is everything up there?
06 03 30 06 CMP Yes, just fine. It took us a little longer to lock up that time.
06 03 30 18 CC Yes, a couple of minutes, but it still wasn't bad.
06 03 30 36 CMP And, Karl, on the waste water dump, I overshot 10 percent, just a little bit, but I'm reading - I'm reading about 10 percent now.
06 03 30 48 CC How much was that?
06 03 30 50 CMP I'm reading 10 percent.
06 03 30 56 CC Roger. Reading 10 percent now. I copy that.

TIME SKIP

06 19 14 13 CMP Okay, Houston. Got it.
06 19 14 27 CMP Oh, I've just had a very nice breakfast and getting ready for today's activities.
06 19 15 13 CMP Okay. Stand by.
06 19 17 11 CMP Okay, Karl. Stand by 1.
06 19 17 51 CMP Okay, Karl, go ahead.
06 19 19 35 CMP Roger, Karl. I understand. Yes, the SPS burn is going to be a - a nominal bank B burn - bank B only burn. But to get set up for it, we want to check, after cycle cryo fans, check that the EMS is off, get two EMS circuit breakers in, check that the group 5 circuit breakers are closed, and
check that the SPS pilot valves both are open at that time. And then down where it says, "CB STABILITY CONTROL, panel 8, and SPS 10 or 12," we'll make that a 10.

06 19 20 24 CMP Okay.

06 19 20 59 CMP Roger. Understand. You want the SPS PILOT VALVES, MAIN B, closed before DELTA-V THRUST B switch to NORMAL.

TIME SKIP

06 21 09 42 CMP Okay, Houston, I got 1 minute and 45 seconds to the burn.

06 21 11 02 CMP Average g.

06 21 11 15 CMP ULLAGE.

06 21 11 37 CMP THRUST, on.

06 21 11 51 CMP THRUST, OFF.

06 21 12 56 CMP Houston, Endeavour. If you're copying the DSKY, you'll see residuals: .2, .2, and .3; so no trim.

06 21 13 14 CMP Yes, sir; it certainly does.
<table>
<thead>
<tr>
<th>Time</th>
<th>CDR</th>
<th>LMP</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 04 14 37</td>
<td>Well, very good. That's nice to know. Thank you much. Save the tapes for us, will you?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 14 53</td>
<td>Save the TV tapes for us, will you, please?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 15 01</td>
<td>Roger. See you around the corner.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 15 20</td>
<td>Okay. That's LOS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 15 22</td>
<td>Okay.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 15 49</td>
<td>Why don't we have our helmet and gloves on? When we going to dock?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 15 51</td>
<td>Jim, never mind; never mind.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 06</td>
<td>Why do we have to have it this way?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 09</td>
<td>It'd help to have your glove on - and your helmet on just to keep the Sun out of your eyes, you know.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 13</td>
<td>Yes, but we don't have anything in the procedures, do we?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 18</td>
<td>Well, I think there's something about doing it optional.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 21</td>
<td>Huh! Yes, I think that's ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 42</td>
<td>That sure was a sporty lift-off.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 16 44</td>
<td>I thought it was sort of springy. It looked - it's the soup.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 17 39</td>
<td>And it's tracking good.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 17 42</td>
<td>Our - Okay, turning elliptical.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 17 45</td>
<td>It's coming to 8.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 17 47</td>
<td>State vector's -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>07 04 18 16</td>
<td>Okay.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Now you select ...

Okay.

Careful.

Now we're to ...

... total.

Okay, AGS - C component is exactly what the ground computed it: 19.1. They came up with - 19.

Huh. Well - got a ... computer there.

Okay. Four seconds to final comp.

Okay, fine.

Final comp.

Did you get a bunch of good marks?

Yes, sir. 19 and 18.

Beautiful.

Okay, take the end of your first mark and total the answer in minutes. Let me turn that down. Twenty-six minutes.

Okay. I've got the answer now.

Go ahead, Al.

Okay, minus 69.1, minus 6.1, plus 16.1.

Copy, minus 69.1, minus 6.1, and plus 16.1.

Okay, want to get these numbers, Jim? I mean, tell me the elevation and so on.

Okay, here's a NOUN 50 in.

... okay. ...
Right. There's a ... you better jump. No, no, that's not NOUN 81.

... 

Here's NOUN 81.

Okay, Dave, I'm maneuvering.

Okay. Let us give you the numbers first, Al. Okay --

Go ahead.

Okay; 70.3; plus 5.9; and minus 17.7.

Okay, that's official burn attitude.

That's correct.

Okay, ... I'm in attitude and only ...

Beautiful.

... 

Good.

Well, I came up with exactly the same numbers as the FGNS, and X and Y, there's a difference of 2 and 3.

Okay.

I think we'll move. You got the burn attitude?

I maneuver now?

Okay, Endeavour, did you get our numbers for the burn?

Maneuver.

Roger. Copy. Okay. It's picking up ... for AGS.

We have 3 and a half minutes to go, Al.
07 04 26 11  CMP  Roger. Understand. ...
07 04 26 16  CDR  Excuse me.
07 04 26 17  LMP  Yes, Dave. Get your engine.
07 04 26 21  CDR  Yes. ...
07 04 26 57  LMP  Should be a 3-second burn.
07 04 26 58  CDR  Okay, 3-second burn. Don't start until I tell you.
07 04 27 04  LMP  Go AGS to maximum to normal. Okay, at 30 seconds, it's ENGINE ARM to ASCENT, manual ullage, and PRO. And AGS to AUTO.
07 04 27 15  CDR  I should ... Nothing in it.
07 04 27 38  LMP  MARK; 2 minutes.
07 04 27 40  CMP  ...
07 04 27 43  LMP  And everything looks good.
07 04 28 35  LMP  Mark at 1 minute, Dave.
07 04 28 36  CDR  Okay -
07 04 28 38  CDR  MARK; 1 minute.
07 04 28 40  LMP  Okay. AGS going to AUTO now.
07 04 28 43  CDR  Okay, AGS to AUTO.
07 04 28 52  CDR  Okay. You give me the time. I'll get the ullage.
07 04 28 55  LMP  Okay.
07 04 29 06  LMP  Okay.
07 04 29 07  CDR  Average g low. ABORT STAGE, push. ENGINE ARM to ASCENT. Standing by for 10 seconds.
07 04 29 28  CDR  Ullage. Trouble.
07 04 29 39  LMP  Three.
<table>
<thead>
<tr>
<th>Time</th>
<th>User</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>07 04 29 42</td>
<td>CDR</td>
<td>Okay. AUTO SHUTDOWN and AUTO IGNITION. We're trimming.</td>
</tr>
<tr>
<td>07 04 29 48</td>
<td>CMP</td>
<td>Dave? Did you remember the up-link?</td>
</tr>
<tr>
<td>07 04 29 51</td>
<td>CDR</td>
<td>Okay. In fact, I think it is.</td>
</tr>
<tr>
<td>07 04 29 54</td>
<td>LMP</td>
<td>Didn't like it worth a damn. Okay, Dave. We'll be done in a minute with this.</td>
</tr>
<tr>
<td>07 04 30 06</td>
<td>CDR</td>
<td>Okay, there you go; .2, .2, and .4.</td>
</tr>
<tr>
<td>07 04 30 18</td>
<td>LMP</td>
<td>I don't like tragedy.</td>
</tr>
<tr>
<td>07 04 31 48</td>
<td>CDR</td>
<td>Okay, Al. We're starting them over.</td>
</tr>
<tr>
<td>07 04 32 29</td>
<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>07 04 33 16</td>
<td>CDR</td>
<td>We freaked up at 23: 38 - about 100.</td>
</tr>
<tr>
<td>07 04 33 20</td>
<td>LMP</td>
<td>I think we're ...</td>
</tr>
<tr>
<td>07 04 33 34</td>
<td>CDR</td>
<td>We have one mark. Now doing 40.</td>
</tr>
<tr>
<td>07 04 33 43</td>
<td>LMP</td>
<td>Make that zero burn at this close mode.</td>
</tr>
<tr>
<td>07 04 33 45</td>
<td>CDR</td>
<td>Never touch it. Really?</td>
</tr>
<tr>
<td>07 04 33 46</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>07 04 35 10</td>
<td>LMP</td>
<td>Right on the nominal line, Dave.</td>
</tr>
<tr>
<td>07 04 35 12</td>
<td>CDR</td>
<td>Really?</td>
</tr>
<tr>
<td>07 04 35 13</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>07 04 35 24</td>
<td>CDR</td>
<td>Hey!</td>
</tr>
<tr>
<td>07 04 37 17</td>
<td>LMP</td>
<td>Watch it. Tail's going to bump it.</td>
</tr>
<tr>
<td>07 04 37 20</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>07 04 37 23</td>
<td>LMP</td>
<td>Next thing's - no - no ...</td>
</tr>
<tr>
<td>07 04 37 31</td>
<td>CDR</td>
<td>Okay. ...</td>
</tr>
<tr>
<td>07 04 37 36</td>
<td>LMP</td>
<td>You want to grab this?</td>
</tr>
</tbody>
</table>
We already picked the ...?

If he could talk, you could get him.

State vector agrees with ... I don't know. I think - Let's see what - We might borrow anything off our equipment.

Let's see.

Here's your ... pocket.

Let's see, what - ... I remember, we've got a ... to do.

How you doing over there, Albert?

Doing just fine, but it's back to end-to-end, and I've got much in motion.

Very good. And reading the procedures and checking - -

Oh, yes! Bad update! What do you know. I've been looking for it and I finally saw it, but it's not very funny.

Want to check on it?

What'd you see?

That's your tracking light. You're - -

Oh, good.

Yes, you're right down the path.

Yes, so are you. Your light is right through the money.

Is it really? Yours - yours is really dim. About like a - maybe a fourth magnitude star? Okay, let's really hit them.

Brighten it up to three.

Okay, there she is. Oop!
Especially about this problem. Make it stick.

Okay. Know what you got to do, Jim?

Yes. I'll take it. I think that's going out there. ...

burning.

You guys coming up on final comp.

Okay. We got 20 seconds or so.

Why don't you mark final comp. Get you back with us.

All right, I sure will. 10 seconds. 3, 2, 1 -

MARK.

Gotcha.

Okay.

Only 3 seconds difference between us.

Well, it's a 3-second burn, so that makes sense.

No, I don't need it. We have to go to coffee in a minute.

Yes.

Okay, Al. We've got a minus 1.1, 0, and a minus 1.1.

Okay, and I got a plus 1.5, and a minus .2, and plus 1.9.

How about that! That's very nice. Think we'll burn our solution on time. That's - it sort of took an ...

Okay, go ahead and burn your solution.

All right. We'll burn our solution.

I'll buy that.

Got the AGS and redo solution.
07 04 42 37 CDR All righty. It's reading straight, now.
07 04 43 42 LMP MARK; 1 minute to the midcourse.
07 04 43 46 CMP Roger.
07 04 44 08 LMP Houston's money?
07 04 44 12 CDR Yes, I guess they're using it.
07 04 44 15 LMP Looking forward.
07 04 44 16 CDR Here, you'll like this.
07 04 44 19 LMP ... I want to plop.
07 04 44 47 CDR There you go.
07 04 44 46 LMP ... and the pink ...
07 04 44 51 CMP Can't you get it all?
07 04 44 54 CDR One more cycle now. Okay, we got it all in.
07 04 44 58 CMP Okay.
07 04 44 59 CDR Consider it down there, Jim. It's really 2222s.
07 04 45 18 CMP Oh, you're shining in the sunlight now! Boy, is that pretty!
07 04 45 27 CDR Who's shining in the sunlight?
07 04 45 31 LMP Us, I think.
07 04 46 15 CMP Yes, I can see in the sunlight now, too.
07 04 46 18 LMP Okay. We've got our first mark. We should be up with you.
07 04 46 22 CMP I believe I can even make out the shape.
07 04 46 25 LMP Hey, that's it!
07 04 46 27 CDR No, sure can't.
07 04 46 30 LMP Hey.
07 04 46 34 CDR It's unreal.
07 04 46 45 LMP Think you can call another one up?
07 04 46 48 CDR Hmm! You sure if you got the right thing?
07 04 46 52 LMP Seems to be ...
07 04 46 57 CDR Okay. Can't put too much ... Seems to be squared away though, now.

TIME SKIP

07 07 01 09 CC ...
07 07 01 11 CMP Houston, 15. Still in the - the midst of doing a little housecleaning.
07 07 06 37 CC Endeavour, Houston. Would you ask ... 
07 07 06 43 CMP Roger, Houston. Hey, Jim.
07 07 06 55 CMP Roger, Ed. I was 1 minute late on that - on the mapping camera. We got it started at 1 - at 174:51.
07 07 07 42 CMP Hey, go to forward OMNI.
07 07 07 45 CDR Okay.
07 07 08 27 CMP Houston, 15.
07 07 08 32 CC ...
07 07 08 33 CMP Roger, Ed. One other thing: I didn't get the P52 in, either.
07 07 08 40 CC Roger. Understand ...
07 07 08 42 CMP Affirm.
07 07 08 49 CC Al, I'll keep track of your cameras for you ...
07 07 08 54 CMP Okay. If you would, that would help.
15, Houston. Give me REACQ and NARROW, please.

Okay, REACQ and NARROW.

*** the pilot valve --

TIME SKIP

Cabin reading about 5.7 over there, Dave?

Okay. I guess we ought to wait until we complete chlorination before we get the --

David.

-- the gloves and helmets off.

Hello, Houston; this is 15.

Baseband.

Yes. Of course.

Mine.

Yes, that's yours.

Let me get that.

Hey, pretty good.

Help me put the other end of this guardrail on here.

MDC guard, Al.

So the MDC guard.

Yes.

Hope it doesn't get over ...
Did you take that down?
Okay.
Got it?
I got it.
Okay, pal.
Come here and - get this.
What time is it?
32:20.
God, 4 hours; that's -
... They say go for it.
Yes, just as well. Just fiddling around and getting squared away.
That's right. I guess all I'm saying is the Flight Plan really ought to reflect that.
Yes, they had you learning the ... switch.
Yes.
Okay.
Right there, Jimmy.
Oh, Christ. I'm putting it all over your face here.
Want to use some of your soap?
Hey, you're supposed to be somehow nonaffected by the CMP.
Okay, Dick [sic].
Shit.
07 14 43 47 CMP Oh, yes, 7 hours left of my 9-hour rest period.

07 14 44 01 CDR Well, we -

07 14 44 06 LMP Not interested in what he's doing. You'd like that more than this.

07 14 44 18 CMP Huh?

07 14 44 28 CDR Your urine bag? Oh, no, I got them all cleaned out so -

07 14 44 57 LMP Yes. I've cleaned mine.

07 14 45 01 CMP Oh! Poor ... I've been - I tell you, I've been rinsing everything out with water every time I pee, and every time I go to sleep.

07 14 45 16 LMP Is that a fact?
Day 9

08 01 51 13 CMP  Houston, 15. Houston, 15.
08 01 51 15 CC  Go ahead.
08 01 51 19 CMP  Okay, Joe. I got the gyro torquing angles up, and I'll torque them out in a minute.
08 01 51 26 CC  Standing by.
08 01 53 17 LMP  I'll get out of your way, Al, so you can get down in here.
08 01 53 33 CMP  Okay.
08 01 53 38 CC  Al, we've noted the termination of your fuel cell 3 purge. At your convenience, open the X-ray and the alpha particle experiment covers, please, and turn the alpha particle back on. Over.
08 01 53 51 LMP  Okay, Joe, we'll be about another 2 or 3 minutes finishing up all the dumps, and then we'll do that.
08 01 53 59 CC  Okay. Fine. We do want you to wait until all the dumps are completed, and then open the doors and turn alpha particle on at your convenience, really.
08 01 54 10 LMP  Roger.
08 01 54 17 CDR  ... this morning.
08 01 54 19 LMP  Yes, Myrtle. I didn't use - I didn't - hadn't used Myrtle this morning. I didn't use Myrtle this morning.
08 01 54 25 CDR  I think that checklist is ... 5 minutes and then closed.
08 01 54 29 LMP  Yes, it does.
08 01 54 30 CDR  Yes, that's ... Yes. Yes. ...
08 01 54 36 LMP  Yes. Yes. I didn't use that this morning.
08 01 54 40 CDR  ... Al. ...
08 01 54 50 LMP That's true.
08 01 54 51 CDR ...
08 01 54 56 LMP Yes. You were smart.
08 01 55 19 CC Good Ship Endeavour, this is Houston. We'll see you on the other side.
08 01 55 23 CMP Okay, Joe.
08 01 55 43 LMP Okay, we got --
08 01 55 44 CDR We stow this in that jum [?] bag down there? When I took that ..., Al? Okay.
08 01 56 28 LMP How about this? Go MANUAL and WIDE. Right, Al? That what you say? Then - then go to REACQ? Just leave it in MANUAL and WIDE until we come around, right?
08 01 56 41 CMP What?
08 01 56 42 LMP MANUAL and WIDE. How about the SQUELCH ENABLE?
08 01 56 56 LMP I have the SQUELCH ENABLE on.
08 01 59 17 LMP I'll get it. This is ...
08 02 00 04 CMP Okay.
08 02 00 20 LMP Okay, all ... be done behind here.
08 02 01 02 CDR You want to - I don't care. Where is the best place for you to be?
08 02 01 08 CMP Here ...
08 02 01 09 CDR Okay. I'll just stay here in the center.
08 02 01 20 CMP ...
08 02 01 22 CDR I know. You ... put mine on.
08 02 01 25 CMP ... launch.
We might have them sorted out by then.
Old Al, he's a gentleman ...
No, don't bruise him.
Yes?
... read that ... now?
... Magic Marker ... Besides, these used to be the guys ... all versions ... all the cross-subjects of the command module. Although ... all the stuff ...
... a lot of garbage. ...
..., Jim. ... all garbage ...
Yes. ... put the garbage in here all ...
I don't --
We do? Shoot, I - I feel great today.
... gone from one ... to the two.
What do I have to do?
Photograph that ...
Oh, yes.
I should have brought that LEC hook back. It sure was handy in the LM. Trying to grab stuff with the EV gloves was like work.
5 minutes ... did you get them - did you get them back ...
You know, Dave, we had probably - we had the worst condition possible for getting up and down that front ladders. That's the problem --
... 
For getting up and down that front ladders. The gear hadn't stroked at all. And it was, you know, practically off the surface. If I didn't have
anything, if I could give a good leap, I could make it to the first rung. Most times, while carrying something, I ended pulling myself up with my arms to get to the first rung.

08 02 06 15 CMP ... the gear didn't stroke ... - -

08 02 06 16 LMP Didn't stroke at all. In fact, the front pad wasn't even on the surface. No, the pad was loose --

08 02 06 24 CMP Yes.

08 02 06 25 LMP -- free to rotate, so it wasn't even - it wasn't making a firm contact at all with the surface.

08 02 06 36 CDR ... sticking to the bottom, to me. I'll tell you, Jim, it sure is a lot easier than that damn ...

08 02 06 45 LMP Oh, yes, particularly, you know, if there is a little time. I - I could transfer the bags up and just leave them on the porch, wait for you to get up there, and you pass them, then I could grab them with that LEC hook.

08 02 06 55 CDR ... in three times to try it. ... once to transfer the LEC ...

08 02 07 02 LMP Yes.

08 02 07 48 CMP Try your scissors. You ... Your scissors are over there, on your left of your - 0₂ FLOW HI. Help me dump it.

08 02 08 07 CDR Oh, shit! ... ketchup ...

08 02 08 13 LMP Here's some, Dave. Right here.

08 02 08 15 CDR Okay. Now ...

08 02 08 36 LMP Want some more?

08 02 08 39 CDR ...

08 02 09 20 CDR ...

08 02 09 42 LMP Cabin pressure's are ...
08 02 09 44  CDR  Cabin pressure's are what?
08 02 09 45  LMP  Split at 5.
08 02 09 51  CDR  What? This vent is open ...
08 02 10 05  CDR  Myrtle was ... and the ... valve was just open ...  
back up.
08 02 10 50  LMP  ... your burn's out if you leave your flow valve  
in normal? ...
08 02 11 15  CDR  Jim, I think this little valve in your jiminy (?)  
bag is all clogged up. That's your problem. Because  
I just tried that, and it works fine - transferred  
to a new jiminy (?) bag. ... valve.
08 02 11 26  LMP  Yes, I think my valve is probably a little clogged.
08 02 11 28  CDR  Well, you got to keep it clean.
08 02 11 29  LMP  Yes.
08 02 11 59  CDR  ...
08 02 12 02  LMP  ... I don't think any ... in there.
08 02 12 58  LMP  Anyone for chewing gum this morning?
08 02 13 53  LMP  Want some chewing gum, Dave?
08 02 13 55  CDR  What?
08 02 13 56  LMP  Want any chewing gum?
08 02 13 57  CDR  ...
08 02 14 37  LMP  Do you have all the parts there, Al?
08 02 14 38  CMP  They're in here if you need them. ...
08 02 14 47  LMP  Good.
08 02 14 56  LMP  They go on here ... Take a whole piece.
08 02 15 24  LMP  ...
... stuff like that.

Watch it. This washer over here slipped.

If you had a screwdriver, I think we could push the washer on this side down a little bit, Al. This washer here's slipped up.

Okay. I've got it through now.

You've got it a little apart.

Where is the other part? I got it through the washers. Go ahead. ... be tighter than that.

Man!

I don't see it. Okay. Tightened it up to some extent ... this screwdriver. Why don't we try them out.

Tool E fit in this socket over here? It's too big?

Yes?

Okay, I think we got it. O2 FLOW HI again.

I think you almost got it. You want me to try it ...

Better put some chewing gum on it; maybe some tape. That's what we need. Put some tape around it. That will keep it from backing off.

Guess we ought to check those screens on the - on the hoses, too; they're probably - should be changed this morning.

... get the vacuum cleaner, pull all the filters out, and we'll ... --

Okay.
-- Get the vacuum cleaner ... off, lay down every bag and ... everything before we leave. ... shoes ... stow away ... In the mean time, I'll go around and ... get it ... all the little bags we have and ... all the goodies from the LM, put them in that one camera bag ... bag, and ... And ... check. It would be nice to log all ... before we start taking ...

Yes.

-- Exactly what we're ...

Yes, okay. Okay, Dave. If you hand me the tape. I think this is about as tight as we'll get this.

I can't hear you.

Little pieces of tape.

Tape?

Yes.

How big?

Oh, probably - 6 inches worth. Yes.

Yes.

Dave Scott taught me. Tape everything. Yes, I don't know what we would have done if we hadn't had the tape along. I might have been without comm on the surface.

Okay, I think your seat's fixed.

You know what we can also do, Dave, is wet wipe the MAGs. Might be even better than - wet wipe them - get a towel - damp towel here - just wipe them off.

MAGs?

Yes, rather than vacuuming.

No vacuum ... wet wipe ... towel ...
08 02 25 36 LMP  Procedure says to unstow them, vacuum, and then wet wipe. Yes.
08 02 25 41 CDR  ...
08 02 25 47 LMP  Yes, I was just going ... LM Timeline.
08 02 26 01 CDR  I think I would follow the ...
08 02 26 06 LMP  Yes.
08 02 26 07 CDR  You know why I vacuum ...
08 02 26 11 LMP  Okay.
08 02 26 12 CDR  ...
08 02 26 16 CMP  Can't we use this little square?
08 02 26 17 LMP  Yes. Yes.
08 02 26 18 CDR  Make sure you ...
08 02 26 20 CMP  Use those little square jobbies, you mean - we have around. Yes.
08 02 26 24 CDR  And I think vacuuming would be easier to get in the cracks. And I certainly think that dirt will - dirt can get in the cracks ... Maybe wipe the surface clean. ... Okay. ...
08 02 27 31 LMP  Yes. Okay.
08 02 27 33 CDR  ...
08 02 27 52 LMP  You don't have another bag we can put this - this trash in?
08 02 28 02 CDR  ...
08 02 28 04 LMP  I was wondering if we had another big feed bag that was just about empty - the food locker, we could put this in there. Better than making two transfers.
08 02 28 39 CDR  ...
08 02 29 08 LMP  ... CG
Day 9

08 02 29 10 CDR ...

08 02 29 21 LMP Well, where's the JETT bag? Let's put it in the JETT bag.

08 02 29 24 CDR We can't use the JETT bag. If we do that you've got to get the ...

08 02 29 32 LMP Okay, okay.

08 02 29 34 CDR Get your own C ...

08 02 29 35 LMP Okay.

08 02 29 58 LMP We don't put up with it.

08 02 30 17 LMP Do you want to take this down with you? Just transfer all the stuff up - out of that bag and into this one here, Al.

08 02 30 22 CMP Yes.

08 02 30 28 CDR ...

08 02 30 46 CMP ...

08 02 31 12 CDR No, that's ...

08 02 31 25 CDR Hey, I got a mapping camera pad ...

08 02 31 31 LMP Yes.

08 02 31 33 CDR ...

08 02 31 35 LMP Which one do you want to get in? This one? Okay.

08 02 31 51 LMP I'll just unplug here.

08 02 33 35 CMP ...

08 02 33 37 CDR What?

08 02 33 38 CMP I got the LM Timeline ...

08 02 33 56 LMP Yes, I have.
08 02 33 57 CDR  
...  
08 02 34 09 CDR  
Yes.  
08 02 34 10 LMP  
... cooled things off, too, huh? Beat his ass, too.  
08 02 34 15 CDR  
No, I ...  
08 02 34 18 LMP  
Oh, I don't know.  
08 02 34 20 CDR  
No, I ... something.  
08 02 37 21 CDR  
Daylight. Oh, okay. Sure will. ...  
08 02 37 35 CMP  
...  
08 02 38 41 CDR  
You know, I figure we got almost exactly a 100 hours. As a matter of fact, this ent - this orbit entry, or - entry interface, is at - 291:30 - huh - 294:43. It is now 194 and some.  
08 02 39 25 LMP  
Not as bad as ...  

TIME SKIP  

08 03 51 15 LMP  
Roger.  
08 03 51 16 CDR  
Roger. Let's go back to P00.  
08 03 51 19 LMP  
Mine, too. Is mine in work?  
08 03 51 22 CDR  
No (laughter). I got mine.  
08 03 51 26 LMP  
Yes.  
08 03 51 27 CMP  
... went that-a-way, huh? Okay. I got tape motion going, so I guess we might as well -  
08 03 51 42 LMP  
We don't need those guys.  
08 03 51 50 CDR  
Oh - beautiful. Fine.  
08 03 51 58 CMP  
... your private beverage.
Okay, Joe. And we're just sitting here in attitude all set to dim the lights and do the gegenschein.

(Laughter) Certainly, Joe (laughter).

"Anything you need, give us a call."

(Laughter) Just like we're assigned right behind...

Better check our camera time here.

153 even is where the Flight Plan calls us.

Go ahead.

Okay, in 1 minute, Al.

Yes. What frame time?

One frame, the whole minute.

Yes.

Ten seconds.

One in each hand. ... look all right? Okay?

Looks like we're 1 minute and 18 seconds down in the Flight Plan.

Bravo. I want to go get a star mark.

Okay.

Hey. Got coffee?

Yes.

Yes. ...

Okay, Jim, if you'll give us FREE.

And turn the lights off down there.

Can't get used to it. We're getting free light out there.
08 03 56 04 CMP Yes, that's some stuff, ain't it?
08 03 56 06 CDR That's really bright.
08 03 56 22 CMP Now we're trying the gegenschein, the midway point, and the Moulton point. But we got to do an attitude maneuver here in just a minute. In fact, in 3 minutes from now, to be precise, since we're getting a 3-minute exposure.
08 03 56 52 CMP Yes, we're all right for that.
08 03 57 03 CMP Here.
08 03 57 05 CDR That's - that's in some bunch of ... anyway.
08 03 57 17 CDR Well, you see the gegenschein?
08 03 57 21 CMP Well, it should be straight ahead of us, Dave.
08 03 57 30 CDR ... 
08 03 57 36 CMP No.
08 03 57 54 CDR Well, I'm not sure. I think we ought to get ... I - I - Why don't you look - I think it would be -
08 03 58 00 CMP No. If there is such a thing, there's a - there's a very definite branch off from the Milky Way. Floating almost to big B. Well, it's not long.
08 03 58 19 CDR No - no, the big hairy one.
08 03 58 28 CMP Yes, that's right. No, it's - it's a localized area, you know. But it would probably be in the shape of an oval. Well, anyway, that's the only thing - that's the only thing that came close to that, was that thing that looked like a branch off the Milky Way. Double or nothing.
08 03 59 34 CMP Okay, turn the lights up there, Jim.
08 03 59 54 CMP No. Okay, go to CMC, AUTO. Okay, now we want to maneuver to another point there: Midpoint attitude, Flight Plan.
08 04 00 05 LMP Midpoint. I understand.
08 04 00 09 CMP  Okay, plus .6900.
08 04 00 14 LMP  Let's see.
08 04 00 17 CMP  5100? And minus 021.
08 04 00 35 CMP  No, 261.
08 04 00 46 CDR  Yes. Okay.
08 04 00 48 LMP  ...
08 04 00 54 CMP  It's - it's in the ...
08 04 00 56 LMP  Oh, Jesus!
08 04 00 58 CMP  ...
08 04 01 10 LMP  Shouldn't laugh at me.
08 04 01 18 CMP  Give him my regards.
08 04 01 21 CDR  Now break down a little bit. Look, he'll stay crazy if you're acting crazy. Look, Al, he doesn't understand.
08 04 01 29 CMP  We're down in the time line. Getting slightly green, Jimmy, my boy?
08 04 01 34 LMP  No.
08 04 02 00 CDR  I got to get it into AUTO.
08 04 02 08 CMP  ... getting ...
08 04 02 12 LMP  Christ!
08 04 02 17 CMP  Yes, I know.
08 04 03 08 CDR  Now let the rate damp there for a second; hope it improves.
08 04 03 48 CDR  Okay, you're not losing face.
08 04 03 52 CMP  Yes. Right. Okay.
08 04 04 19 CMP  As I was saying -
08 04 04 22  LMP  Ah, go to hell, MDC.
08 04 04 24  CMP  What's that time on the other one? Time on the DSKY?
08 04 04 45  LMP  ...
08 04 05 37  CMP  Mm-hmm. Yes, I used them, too.
08 04 05 51  CMP  What elevation? Yes.
08 04 06 32  CMP  Yes, there's quite a few stars out there, aren't there?
08 04 06 35  LMP  Christ! ... given you?
08 04 06 38  CMP  A little darker now. Let's see. There's my star right up over there. Yes, that's -
08 04 06 49  LMP  ...
08 04 07 02  CDR  ...
08 04 07 38  CDR  Damn! You always seem to take it bad when you do an alinement.
08 04 07 45  CMP  Well, you can't be all crude and all. But that little - that - that little - that thing there is something. Might be another planet.
08 04 07 54  CDR  Why don't you ...?
08 04 07 56  CMP  Yes. Yes.
08 04 08 18  CDR  ...
08 04 08 28  CMP  Yes.
08 04 08 47  LMP  ...
08 04 08 54  CMP  Yes, trying to move ... We've got another 5 minutes to go. Anyway, we've used -
08 04 09 02  CDR  Okay. Okay, Jim, lights up.
08 04 09 14  CMP  And we got a P20 coming then.
Yes, CMC, AUTO. And this time we want maneuver to -
Yes. We have ...
We haven't ...

Well, got the housekeeping done.
We're not going to have a ...
That's a shame. ...
I can't find --

Turn the lights down and look for a few minutes, if you want.
We don't have to stop for another 10 minutes yet.
So you can go to ATTITUDE HOLD there, Jim.
Or go to CMC, AUTO.
Got it. Turn it down. Turn that damn thing down.

I want to look for a few minutes.
God damn. Is it in there?
You can see something bright down in there.
Al, could you move it?
No, it's ...

Yes.

No, can't see. I just can't see. ... lights wouldn't come down. It's a function of lighting.
No. ... got ... something else.
No, I really can't see anything, Dave. ...

Oh, shit. You're too easily impressed.

No one thinks like me.

Yes. As a matter of fact, that's what I keep saying.

Freak you.

That's not nice.

See if I can see that.

Oh, let me see. That's - that's too hard to see.

Okay.

They're not - they're not as bright as I thought they'd be, either.

They're not?

Is that right?

Yes. They're not - they're not much brighter than they are on Earth. Okay, lights up. Camera's off?

No, the guy wants that - business here. Yes.

Okay, Dave, will you put these back in B-2 for me, please?

Jim? Is that breaker off?

Yes, might as well call.

All right. I want to move these before I - ... Ow!

All right.

Too early.

...
08 04 17 45 CMP ...  
08 04 20 33 CMP Yes.  
08 04 20 45 CMP Huh? Yes. Yes, I'm a person. Right here, Jim.  
08 04 20 51 CDR ...  
08 04 20 52 CMP Well, put the TV back in -  
08 04 20 56 CDR If you will, snap that one.  
08 04 20 58 CMP It kind of gets in the way of everything else. Let me stick it down here for now.  
08 04 21 08 LMP Sure is fun with lots of people.  
08 04 21 12 CMP Stow them.  
08 04 21 54 CDR Put that one down here with mine.  
08 04 22 11 CDR What's that, Jim?  
08 04 22 13 LMP No!  
08 04 22 14 CMP Good. Very good.  
08 04 22 17 CDR Okay?  
08 04 22 18 CMP Yes. You got to - yes. We've already signed those, haven't we? We haven't signed these? It really doesn't make much difference, does it?  
08 04 22 26 CDR No.  
08 04 22 27 CMP We don't really have to sign them now I guess. We can do that anytime.  
08 04 23 10 CMP Yes, those - those covers would have been infinitely more valuable, I think.  
08 04 23 17 CDR Oh, well.  
08 04 23 21 CMP Maybe, Dave, it's just as well we didn't.  
08 04 23 27 LMP Okay.
08 04 23 30 CMP  Bastard.
08 04 23 35 CDR  ...
08 04 24 49 CDR  I've got one. Come down.
08 04 24 51 CMP  God damn. Is it - is it in there?
08 04 24 56 CDR  Oh, I've only been changing the film; one in the LM and one in there. Come on down.
08 04 25 02 CMP  I'm going to have to go all the way back to the Moon to come on some of that.
08 04 25 06 CDR  (Laughter)
08 04 26 13 CDR  ...
08 04 26 21 CMP  Yes, very good. ... that move.
08 04 26 30 CDR  ...
08 04 26 31 CMP  Yes.
08 04 26 32 CDR  What? No more film.
08 04 26 36 CMP  What?
08 04 26 37 CDR  ... I need more film ... camera ...
08 04 26 39 CMP  Can you change it?
08 04 26 42 CDR  ...
08 04 26 45 CMP  Yes, but you know the way he is.
08 04 26 49 LMP  Feel around here.
08 04 26 50 CMP  Yes, sir.
08 04 26 57 CDR  ...
08 04 27 04 CMP  Oh, no. But I don't think you are. ...
08 04 27 10 LMP  That's the reason. Yes, yes, yes.
08 04 27 20 CDR  ...

**CONFIDENTIAL**
08 04 27 22 CMP That doesn't take very long.
08 04 27 26 LMP Where you going?
08 04 27 30 CMP This guy's got more pens somewhere, because I need one to keep track of the Flight Plan, too.
08 04 27 35 LMP Here's one.
08 04 27 54 CDR ..., Al.
08 04 27 55 CMP I got one.
08 04 28 25 CMP Excuse me, Jim.
08 04 28 28 LMP Excuse me.
08 04 29 33 LMP Sure can.
08 04 29 57 CDR ...
08 04 29 59 CMP Yes, I got one. Yes.
08 04 30 01 LMP ... solution in color ...
08 04 30 19 LMP You got a MAG that hasn't been used at all?
08 04 30 32 CDR ...
08 04 30 37 CMP Huh? Just as - it may be just as well. Tell me we don't have any.
08 04 30 43 CDR We don't - we don't have any of that left.
08 04 32 10 CMP Hey, gang, they don't have another eat period for 6 hours.
08 04 32 12 CDR What?
08 04 32 13 CMP There's not another eat period in the Flight Plan for 6 hours.
08 04 32 16 CDR Six more hours? Jesus Christ!
08 04 32 21 CMP That's right. And that's just before our sleepy time.
Six hours to bed.

Yes. I don't think we need the Contingency anymore. We don't need that one. Or these. Or these.

Can I get that map you got over there?

Okay. Yes, got-

Two of them here. Have three.

Okay, David.

Most of these don't.

Yes. Got two fresh maps here. One's labeled CMP and the other is labeled nothing.

Well, we missed some spectacular terminator photos. Damn. You know, I was wondering. You want to get the terminator photos if still possible. That would have really been spectacular.

... Well, yes. The terminator's on the Flight Plan.

Yes.

Well, if we've got the film, by golly, I'd like to take a lot of terminator photos.

Yes.

No, that'd really be neat; take a bunch of terminators. And the setting should be the same regardless of where the terminator went.

...
Do you know how to change the settings from 250 to 500?

No, I mean – I mean what the comparable settings are. Like f/5, 1/50th and all that.

Terminator photos for the 250, they call out f/5.6 and 1/125th. And that's for the very-high-speed black and white. Yes. You don't have any left though, do you? No. Yes.

No. No, that's not fast enough. That's all right. Listen, I got lots of brand R left. Use it.

Yes. It sure would be nice to get a – some pictures down into the bottom of ... bottom. ...

Oh, deary.

The old Earth is real impressing down there. ... get some.

Oh, boy! God, I guess. That thing was huge.

Never did, huh?

... Never mind.

TIME SKIP

CONFIDENTIAL
Well, we ought to be able to tell in an hour.

Okay.

The what? Oh, yes. Okay?

...

We are, Jim. I got it hot for you. Don't worry, pal, we won't forget you.

I'll bet you ...

No. I think he's right here.

... sex?

Neuter? Okay, that spaghetti is mine. Hamburger wet pack. Pea soup, ham and salad, applesauce, cheese crackers. Brack!

Blach! Does it look like it, Jim?

Yes.

You say it looks like it, Jim?

No.

You got eyes, they're almost 20 - 20, so - (laughter) Okay, it's a --

I think it's time to raid you. I want to make sure they get it all down - down on the - on the file there.

Very good.

What?

That one's for you. Here. Have at it. ... turn around ... 

... here.
Well, I think I'd - stick it under the couch there. That's where I kept it before. But, of course - Huh?

... 

(Laughter)

... 


Okay, Jimmy, you got 8 minutes to go.

... 

Hey, listen. You - you - you're bugging me a little bit. If you're going - if you're going to exercise, you ought to at least have the decency to put your biomed on (laughter). There's no sense wasting all that on us. Let the doc see it.

Ooh, applesauce. Their applesauce is good stuff.

You have Cannon towels, no doubt.

Yes.

I think I've been holding this many of them before.

Oh, yes. Yes, we were in darkness about the time ... We'll be on the dark side for about 20 minutes now.

Two minutes to go, Jim.

Hey, Jim.

Okay, Jim.

... regular ... heartbeat.

Huh? Yes. After - after awhile it gets to be working, moving your legs around again, you know?
... boy, oh boy.

How do you mean?

No?

Oh, my eyes - my eyes were playing funny tricks on me for a while. ...?

So am I. Yes.

I'll think I'll see a - yes. Yes.

Oh, yes, I seem to be getting them.

Well, that's like a ...

Too early.

No. My brain is seeing them when you're not.

Hey, Dave, you any good at putting hot water in?

Oh, God, yes. Let's - Okay.

How about doing some pea soup for me when you get around to it?

Huh? Where's your spoon, Jimmy?

Is it in here?

... Jimmy's spoon.

It's in the - oh, okay. ...

You mean like these?

What spoon?

How many?

Oh! Gee, what'd I do? Try to get rid of them?

What?

You're getting ... for a ...

CONFIDENTIAL
08 06 05 57 CMP Yes.
08 06 06 02 CDR ...
08 06 06 35 CDR ...(Clears throat)
08 06 06 46 CMP Yes.
08 06 06 50 LMP ...
08 06 06 53 CMP Watch it. He'll be bitching about that.
08 06 07 42 LMP ...
08 06 07 45 CMP Yes.
08 06 07 50 LMP Give it to Al.
08 06 07 57 CMP Give me the little white tool.
08 06 08 17 CMP Thank you, Dave.
08 06 09 15 CMP ... got in the way here.
08 06 09 18 LMP ...
08 06 09 21 CMP Yes. It really is. Yes. I wish you guys would go somewhere.
08 06 09 45 LMP ...
08 06 09 47 CMP Because he doesn't want the gray to show.
08 06 09 50 LMP ...
08 06 09 51 CMP (Laughter) He'd be perfectly happy if we had pens instead of erasers.
08 06 10 15 CMP (Laughter)
08 06 10 49 LMP ...
08 06 11 22 CDR Hey, how about exporting it?
08 06 11 34 CDR ... Yes. ...
08 06 12 20 CMP ...
08 06 12 43  CDR   You guys ...?
08 06 13 15  LMP    ...
08 06 20 30  CDR    ...
08 06 20 35  CMP   ..., Dave.
08 06 20 37  CDR   Where? I don't see ...  Huh?
08 06 20 44  CMP   Right there.
08 06 20 46  CDR    ...
08 06 21 07  CDR   Yes. I can see ...
08 06 21 10  CMP   (Laughter)
08 06 33 34  CDR   Don't forget, we got ...
08 06 33 37  CMP   Yes.
08 06 35 50  LMP   What a sport.
08 06 36 06  LMP   What a sport!
08 06 36 08  CMP   ...
08 06 36 09  LMP   You are.
08 06 36 11  CMP   (Laughter) Yes. Yes.
08 06 36 29  LMP   Enough!
08 06 36 32  CMP   Yes.
08 06 36 33  CDR   Enough's enough. ...
08 06 36 39  LMP   Yes.
08 06 36 41  CDR    ... --

TIME SKIP

08 09 46 10  CDR  Boy, that's ...
We didn't put it in my safe place.

Are you at P51?

I'm not there yet. See, I cleaned that thing religiously, all every night?

No --

But we didn't --

But -- but we didn't get it last night, I don't think.

No, it's all that crap we brought in here.

Yes. Yes. Yes. Feel the difference already in air that's blowing out of the hose. It really does make a difference. Yes.

I thought it was practically suffocating.

Probably that, and the combination of going in dark.

Oh, gosh. They're sitting there in their own comfortable console.

...

...

Yes, that's right. Go ahead.

All righty. Thank you, sir, and we'll see if we can conjure one up for you.

...? Yes, I need to get him a status of the command module. Joe -- we'll give it to him when we come around next time.

That's the stuff ...

You tell me when -- You tell me when ... that flight data ...
08 09 54 28 CMP What's you doing? What's you doing? Throwing away dirty stuff? ...

08 09 54 40 LMP ...

08 09 54 44 CMP ... - You didn't put on clean tonight, did you?

08 09 54 46 LMP ...

08 09 54 47 CMP Oh. Your last one? Guess you got stuck with it, Jim. ...

08 09 55 26 CMP (Laughter) I've got a little job for you to do, Jim. Assemble camera, lens, mirror, and magazine on special window-5 bracket; rotate the lens 180, so we can take pictures of the mass spec. You do that in - about 15, 20 minutes. Well, we use the - we use the 16 millimeter. And the bracket's down in A-8. You know, that big bracket down there. You do that while I'm -

08 09 56 09 LMP I don't see it.

08 09 56 10 CMP - - while I'm doing a P52. Oops! Excuse me, Dave. ...

08 09 56 18 CDR ...

08 09 56 21 CMP Yes, I know. God dang, it's not very crowded down here!

08 09 56 39 CDR Hey, you got to this ...

08 09 56 40 CMP Okay. We'll - we'll get it. I'll get it. Keep going. I'll get it.

08 09 56 44 CDR ...

08 09 56 47 CMP I used to do it by myself. No big deal.

08 09 57 08 CMP Okay, as long as you're in the couch, how about putting me in FREE? MODE to FREE.

08 09 57 14 CDR Okay.

08 09 57 36 CMP Star 1.

08 09 58 56 CMP Star 40.
<table>
<thead>
<tr>
<th>Time</th>
<th>Role</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>08 09 58 57</td>
<td>LMP</td>
<td>Where?</td>
</tr>
<tr>
<td>08 09 58 59</td>
<td>CMP</td>
<td>Out there.</td>
</tr>
<tr>
<td>08 09 59 47</td>
<td>CDR</td>
<td>Wooo!</td>
</tr>
<tr>
<td>08 09 59 52</td>
<td>CMP</td>
<td>...</td>
</tr>
<tr>
<td>08 10 00 04</td>
<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>08 10 00 06</td>
<td>CMP</td>
<td>Huh?</td>
</tr>
<tr>
<td>08 10 00 07</td>
<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>08 10 00 09</td>
<td>CMP</td>
<td>Let's see. ... 202:00:30.</td>
</tr>
<tr>
<td>08 10 00 43</td>
<td>CMP</td>
<td>Jim wants to know if his camera ... on the mass spec stuff.</td>
</tr>
<tr>
<td>08 10 00 59</td>
<td>CMP</td>
<td>Jim, you want to get the - the mass spec boom and gamma ray boom on their way out now? Might as well go ahead and do that.</td>
</tr>
<tr>
<td>08 10 01 08</td>
<td>LMP</td>
<td>MASS SPEC BOOM, DEPLOY. ... find it?</td>
</tr>
<tr>
<td>08 10 01 11</td>
<td>CMP</td>
<td>No, just get it out.</td>
</tr>
<tr>
<td>08 10 01 13</td>
<td>LMP</td>
<td>Do you want to --</td>
</tr>
<tr>
<td>08 10 01 14</td>
<td>CMP</td>
<td>We got time for it.</td>
</tr>
<tr>
<td>08 10 01 15</td>
<td>LMP</td>
<td>-- ...</td>
</tr>
<tr>
<td>08 10 01 16</td>
<td>CMP</td>
<td>Yes. Okay, mass spec boom photography, 16 millimeter - MAG L. What MAG's on there? E is on there now?</td>
</tr>
<tr>
<td>08 10 01 37</td>
<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>08 10 01 57</td>
<td>CMP</td>
<td>Here, you've got to put this UV thing in the window, too.</td>
</tr>
<tr>
<td>08 10 02 02</td>
<td>LMP</td>
<td>I'll have to go back.</td>
</tr>
<tr>
<td>08 10 02 36</td>
<td>LMP</td>
<td>Okay. I took all this - extra film and ...</td>
</tr>
<tr>
<td>08 10 02 38</td>
<td>CDR</td>
<td>... You got plenty of places in here, right?</td>
</tr>
</tbody>
</table>
08 10 02 43 CMP Yes.
08 10 02 47 CDR ... remember ...
08 10 02 52 CMP Okay.
08 10 02 53 CDR You'll never get it all used up if you ...
08 10 02 55 CMP That's right. We'll never have time to use it all.
08 10 03 04 CDR ...
08 10 03 20 CMP Yes. Is there any further use for the vacuum cleaner and all this --
08 10 03 25 LMP ... --
08 10 03 26 CMP -- stuff hanging around here?
08 10 03 28 LMP ... Put the bag and brush in ...
08 10 03 39 CMP Okay.
08 10 03 47 LMP ...
08 10 03 48 CMP Yes.
08 10 03 53 CDR ...
08 10 04 13 CDR You've got to use it for ...
08 10 05 07 CDR What have you got in there now?
08 10 05 11 CMP Where did you --
08 10 05 12 CDR ...
08 10 05 13 CMP -- where'd you leave the filter and all that stuff?
08 10 05 16 LMP ...
08 10 05 17 CMP Okay. Might as well leave it all there, huh?
08 10 06 19 CMP I think before activities get too far away, I will take a crap.
08 10 06 24 CDR Is that so?
08 10 06 25 CMP Yes. Jim, will you unplug me, please? You guys got the comm.
08 10 06 29 LMP ...?
08 10 06 30 CMP Yes.

TIME SKIP

08 19 49 57 LMP Trade you for your cocoa.
08 19 50 17 CDR 35, 45.
08 19 51 23 CDR Okay. Okay?
08 19 51 33 CDR ... Right? ... 3.
08 19 51 51 LMP Here you go, Al. There. Okay. Good.
08 19 52 23 LMP Here's your bag, Al. Give me your juice, then, Al. I'll take the juice.
08 19 52 58 CDR I think I'll ... Okay. ... eggs ...
08 19 53 20 LMP We have sausage and eggs. How about sausage this morning.
08 19 53 24 CDR ...
08 19 53 25 LMP Sausage this morning.
08 19 53 27 CDR Scrambled eggs and sausage? That'd be good.
08 19 53 29 LMP That'd be good. Yes.
08 19 53 48 CDR ...
08 19 54 14 LMP Our favorite compartment.
08 19 54 43 CDR ... sleep, Jim?
08 19 54 45 LMP Pretty good. I just woke up once.
08 19 55 54 SC (Humming)
... down there...

Want me to try to put that separator on the dispenser down here, Dave?

Well, we haven't got any...

That's probably why we're farting so much.

What'd you say?

Probably why we're farting so much up here.

Yes, I didn't put --

All smells like hydrogen, really.

- -...

Check it here.

... What's that number.

Okay, Dave. Here's that other cocoa.

...

Too late now. Don't be an Indian giver.

If you have something there to go in the hot water, Dave, I'll stick them on for you.

Yes, I got...

What do you want, Dave?

Oh, that's all right. What do you have?

Okay, I'll see what I can dig up out here.

...

No --

...

Be easier since I'm here.
08 20 02 32 LMP Can you bring this back a little, Al? Will that go back?
08 20 02 50 LMP Yes.
02 20 03 40 LMP Anybody want any fruit? Lot of apricots and peaches.
08 20 04 02 CDR ..., Jim?
08 20 04 03 LMP Yes.
08 20 04 38 LMP How about some bacon squares?
08 20 05 02 CDR ...?
08 20 05 05 LMP Coffee.
08 20 05 21 LMP Yes. Stick it on there. Did you tighten down on it?
08 20 05 31 CDR ...
08 20 05 36 LMP Is it tightened down?
08 20 05 37 CDR Turn around.
08 20 06 20 CDR ...
08 20 07 59 CDR ... Jim ...
08 20 08 10 CDR Very simple.
08 20 09 11 LMP Ready? You really have to push it on there.
08 20 09 14 CDR ...
08 20 09 15 LMP Is it up all the way? Yes – you – you have to push pretty hard to get it on there.
08 20 09 27 CDR Think it ...
08 20 09 30 CMP I don't know ...
08 20 10 42 CDR I don't know. Something coming out of there?
08 20 10 47 LMP Yes, it's coming out there, but – looks like there's a lot of water collecting at the end of the separator. No, I just – it's got a pool there at the end.
08 20 10 58  CDR   ...  
08 20 11 12  LMP   In fact, it looks like it's leaking. It is leaking. It's leaking, Dave.
08 20 11 23  CDR   I guess it's just ... water ...
08 20 12 43  CDR   ...  
08 20 12 50  LMP   Went to bed at 9. Got up at 4.
08 20 12 55  CDR   Got up at 4!
08 20 13 03  LMP   Seven hours.
08 20 14 14  CDR   ...  
08 20 14 54  CDR   What?
08 20 16 54  CDR   ...  
08 20 17 02  LMP   When are we going to listen to music? Were you listening to - your recor - the recorder last night, Dave?
08 20 17 12  CDR   Say what?
08 20 17 13  LMP   Were you listening to your recorder last night?
08 20 17 15  CDR   ...  
08 20 17 17  LMP   Did - didn't you have some music on last night? I'd swear I heard music just before I went to sleep.
08 20 17 24  CDR   ...  
08 20 17 26  LMP   Put me to sleep anyway.
08 20 17 32  CDR   ...  
08 20 17 34  LMP   (Laughter)
08 20 17 45  CDR   ...  
08 20 19 25  CDR   ...  
08 20 20 48  LMP   Want me to put some hot water in those eggs, Dave?
08 20 21 13 CDR  ... 
08 20 21 15 LMP  About ready to go again.
08 20 21 31 CDR  ... 
08 20 21 32 LMP  Yes.
08 20 22 21 CDR  ... 
08 20 22 23 LMP  Yes.
08 20 22 24 CDR  ... 
08 20 22 26 LMP  Yes.
08 20 22 27 CDR  ... 
08 20 22 40 LMP  Okay.
08 20 22 57 LMP  Want some more?
08 20 22 58 CDR  Yes. Sure. ... 
08 20 28 05 CC  Apollo 15, this is Houston. How do you read?
08 20 28 11 CDR  Hi, Houston; 15. Loud and clear. How - us?
08 20 28 17 CC  Hi, Dave. You're coming through loud and clear. How did our consumables update get to you? Okay?
08 20 28 25 CDR  Yes, we got normal ... Okay. We got everything but the oxygen.
08 20 28 34 CC  Okay. Want me to read those three up?
08 20 28 43 CDR  Okay. Go ahead.
08 20 28 51 CC  Roger. Oxygen tanks at that same time that I gave you originally were 61, 64, 48.
08 20 29 09 CDR  Okay. 61, 64, and 48. And I have a P52 for you and a crew status report.
08 20 29 20 CC  Fire away with them.

CONFIDENTIAL
08 20 29 23  CDR  Okay. The P52: NOUN 05 was .01; NOUN 93 was plus .029, minus .025, plus .018; it was torqued out at 211:52:00.

08 20 29 48  CC  Roger.

08 20 29 52  CDR  And if you still have your pencil handy, why, the sleep came out to 7, 7 and a quarter, and 7. And the PRDs: 25026, 23182, and 08033. And go ahead with your updates.

08 20 30 18  CC  Roger. Okay, Flight Plan updates for the coming rev and - There's several of them here. And just to keep you feeling a little bit more optimistic, on the following revs, there are very few updates. Okay. At 212:40, we want to delete MAP CAMERA IMAGE MOTION, INCREASE.

08 20 30 53  CDR  Roger. Got the deletion at 212:40. Go.

08 20 30 55  CC  At 2 - Roger. At 213 plus 24, we want to delete the GAMMA RAY BOOM, DEPLOY.

08 20 31 08  CDR  Marking DEPLOY.

08 20 31 10  CC  And at that - there are three - Roger. And just below that, the MSFN verify lens tuck in and also the PAN CAMERA POWER, OFF; delete both of those.

08 20 31 23  CDR  Roger. Copy the next two deletions also. Go.

08 20 31 30  CC  At 214 plus 02. We want to change that camera configuration to the 250-millimeter lens, 250. The f-stop should be 5.6; the exposure time should be 1 over 125.

08 20 31 57  CDR  Roger. 214:02. Camera configuration: 250 millimeter lens, f/5.6 ...

08 20 32 07  CC  Correct. --

TIME SKIP

08 23 35 22  LMP  ...
What?

Yes, he'll ... Follow those numbers. As long as we're in FREE, it don't really make any difference whether you got P30 running or not, as far as P20 is concerned. Anyway, they don't care about it as long as we don't run it more than a half an hour.

No, he wanted to run the P20 through.

You want to do a P20 first.

Yes, you don't need to do that until - They - they need to have us inertial for a while. Yes. We do that calibration in this attitude. And then at -

Yes. At 55, then we can go ahead and do a P20, and - and get into attitude and then do the P30.

(Yawn) ... time for ...?

Hey; you know, it is. What time is that thing happening? Not for a while yet, I bet.

... another 3 and a half hours.

... What ... do? Let's see ... We're ... that bag ... Put them away - ...

Stand by and ... Come on. ... LOGIC ...

8700? The rest of them ...
... still too ...

Yes, I know.

Got to ... these goddam ...

... this ...

... this ...

Yes, it's not much of a lineup - from a ...

...

... What are you trying to do? ...

Well, if you want to get - well, what I really want to do is make sure we got helmets and gloves ...

Be right back.

Where you going?

I got to put your - I got to put my helmet ... my EV gloves. The rest of your helmet, Jim, will go with my helmet and your ...

Yes, put them down there. ...

... out?

... umbilical and ...

... going to do it just like you used to do it with a checklist back when ...

Try to find that checklist ... It's part of the requirement. ... do. You're going to have to punch all these goddam switches, pardner.

... for the ... switches, let me know.

Who doesn't?

...
08 23 43 28 LMP Just have to see.

08 23 44 00 CDR We'll have to stow this stuff for TEI. ... umbilical. All this stuff for the EVA configuration, ... really ... trouble.

08 23 44 20 CDR ... --

08 23 44 21 CMP Well, we are going to have to photograph the EVA, too. (Cleared throat)

08 23 44 27 CDR I know that.

08 23 44 29 CMP Okay.

08 23 44 30 LMP ..., too. ...

08 23 44 34 CDR Yes.

08 23 44 42 CMP We better not use - use your attitude. ... The rates are low. ... I think once we get ...; otherwise, maybe we could arrange a TEI ... (Laughter)

08 23 44 57 LMP Yes.

08 23 44 58 CMP Well, TEI, all we really need to do is ...

08 23 45 05 CDR Sounds like you're trying to get out of EVA ...

08 23 45 10 CMP Tomorrow, ... take a little --

08 23 45 11 CDR -- reshuffling. So, if you can go now, ... some reasonable point ... EVA prep. We can try it, anyhow; because tomorrow, when I'm trying to get things squared away for the EVA prep, by the time we can ... the EVA prepping ... It'll be late tomorrow before we even ...

08 23 46 04 LMP Yes. We can get all that stuff done ...

08 23 46 08 CDR Yes.

08 23 46 13 CMP Got lots of stuff to be ...

08 23 46 15 LMP ... for these? Oh!
08 23 46 23 CDR  ... Yes. Well, we can't really use those on this EVA. ...
08 23 46 30 LMP  Yes.
08 23 46 34 CMP  Watch it now. ... coming up ...
08 23 46 40 CDR  ... Where will we have to go with - Well, let's put it in this ...
08 23 46 48 CMP  It's getting ...
08 23 47 02 CDR  ...
08 23 47 04 LMP  What?
08 23 47 05 CDR  I said, "Why don't we ...?"
08 23 47 08 LMP  Yes.
08 23 48 01 CMP  Well, we got the pan camera figured out for the new whole show, huh?
08 23 48 04 LMP  Really?
08 23 48 08 CMP  (Laughter).
08 23 48 10 LMP  Stop laughing, you son of a gun, you ...
08 23 48 12 CMP  I - I'm happy that it's even ready to come to, it's such a complicated bunch of shit.
08 23 48 25 CMP  Okay, these return pictures should come out in the ... see what happens ...
08 23 48 57 CMP  Another - Yes. As soon as we get through this other color, you can hand me that other MAG, and I'll get set up for the Earth pictures. I think I'll keep holding it. ... your problem. Why don't --
08 23 49 12 LMP  You know, this thing's ... about 30 degrees ...
08 23 49 17 CDR  That right?
08 23 49 21 CMP  ... that thing somewhere.
08 23 49 28 LMP  ...

CONFIDENTIAL
08 23 49 41 LMP ... would you hold that thing?
08 23 49 43 CDR Damn right. Just sitting there, looking at the Moon.
08 23 50 12 CDR ...
08 23 50 19 CMP ... all right? ... What'd I do with my MAG. Here it is.
08 23 50 27 CDR Did you take that cover off?
08 23 50 29 CMP No, not lately. ...
08 23 50 30 LMP ...
08 23 50 32 CMP Huh?
08 23 50 33 LMP Take that ...
08 23 50 45 LMP ...
08 23 50 48 CMP Move it up a little.
08 23 50 51 LMP ...
08 23 51 00 CMP ... Yes, take these a little bit later.
08 23 51 11 CMP How's that?
08 23 51 13 LMP That's about the only way you can get them.
08 23 51 15 CMP ...
08 23 51 21 LMP Try to move them.
08 23 51 25 CMP What?
08 23 51 26 LMF Try to move them up one.
08 23 51 28 CMP Yes. No?
08 23 51 37 LMP Just going to leave these tied down.
08 23 51 45 CMP ... vertical?
08 23 51 57 CDR Hey, watch the ... Be sure you don't get any of the crap out of that one.
08 23 52 06  CMP  Yes.
08 23 52 07  CDR  You ...?
08 23 52 10  CMP  Yes, that was my Hasselblad pack right here.
08 23 52 12  CDR  Well, that wouldn't ...
08 23 52 18  LMP  Really need to take a Hasselblad MAG with you.
08 23 52 20  CMP  Yes, give me a Hasselblad MAG ...
08 23 52 24  LMP  ...
08 23 52 29  CMP  Yes, you're right.
08 23 52 30  LMP  ...
08 23 52 43  LMP  ...
08 23 52 46  CMP  Yes.
08 23 53 03  CMP  ...
08 23 53 08  LMP  All you really need ...
08 23 53 12  CMP  ...
08 23 53 14  LMP  Yes.
08 23 53 15  CMP  Okay.
08 23 53 25  LMP  Mine's here. ...
08 23 53 31  CMP  Here are mine, okay. ...
08 23 53 37  LMP  ...
08 23 53 40  CMP  I'll take them.
08 23 53 47  LMP  ...
08 23 53 50  CMP  How you like them? Okay?
08 23 53 52  LMP  ...
08 23 53 59  CMP  Look for yours, pal.

CONFIDENTIAL
(Laughter).

You should be proud - you should be proud of yourself, Jim.

Do you intend ignoring that question? Are you a naive ...?

I answered it. Hey, you got to get your -

God! What a posthole digger.

Chief priority. Time to do the P20. ... do it?

Oh. ...

Jim, how long has it been since weight? ... says part 1 - part 2, part 2. All the rest of you ready?

Yes.

DAC should be set for right now. Got to notify the ...

...

Y'all noticing that all that noise is gone?

What?

I don't know if ...

You ignoring that Flight Plan?

Cut it.

Aw, you ain't that bad. Catch it, son.

... won't come down. Help me?

All right, God damn you, come help me.

Boy, oh, boy.
All these MAGs ... 2 and a half by 2 millimeter. ...
... bracket.
Got a ... bracket.
That's 80 millimeter ... up there.
No. ... I gave it to you.
Hope you don't roll the ... back in there.
Can't believe it.
Ah! Okay, 2.8, 1/500th, and click one off - which I just blew.
Okay.
Hey, what time did -
Yes.
Got that one?
Yes, that at the - T-start time, yes.
Yes.
That solar corona is kind of interesting. You might watch it out the window there. You - you can really - you can really see it.
That's right.
Are you going ... from here?
Well, ENTER. That doesn't work right. Oh, you're trying to ENTER on NOUN 18.
DAY 10

09 00 00 00 CDR  Oh, my. I've got to have a NOUN.
09 00 00 09 CMP  NOUN 18 is attitude. Gimbal angles. There's time.
09 00 00 19 CDR  Well, ...
09 00 00 20 CMP  You loaded - you loaded gimbal angles, to drive to, for some reason.
09 00 00 25 CDR  ...
09 00 00 27 CMP  Is it going there? You changed the gimbal angles in - in P20.
09 00 00 33 CDR  Why didn't I get a P50?
09 00 00 38 CMP  Because you were probably already - you were probably just getting to the P20 attitude.
09 00 00 41 CDR  ... each time. Why don't we both do 20? You've taken up enough pictures.
09 00 00 48 CMP  Did you ENTER on the re - Did you ENTER on it when you got to the attitude?
09 00 00 54 CDR  No.
09 00 00 55 CMP  Well, that - Okay. Call up P20 again and go through that. Okay.
09 00 01 03 CDR  I get a NOUN 18 ... NOUN 78. ... NOUN 18.
09 00 01 12 CMP  What'd you do?
09 00 01 13 CDR  ... option 5?
09 00 01 16 CMP  Yes. Option 5. Yes.
09 00 01 24 CDR  You ... another 20?
09 00 01 26 CMP  Okay? Go.
09 00 01 28 CDR  5.1. ...?
09 00 01 29 CMP  Yes - -
09 00 01  30  CDR  -- ...?  5.2?
09 00 01  31  CMP  That's good.
09 00 01  32  CDR  ...
09 00 01  37  CMP  Oh, it wasn't to the attitude yet, Dave. No won-
der. You're in - you're in HOLD over there.
09 00 01  46  CDR  Sure enough.
09 00 01  48  CMP  Oh! Blew it!
09 00 01  53  CDR  Well, all I know is I got that needle.
09 00 01  54  CMP  Sure. We're in LOW RATE.
09 00 01  58  CDR  ... needle ...
09 00 02  09  LMP  All I know is --
09 00 02  10  CDR  Can I load P30 now?
09 00 02  11  CMP  No.
09 00 02  12  CDR  ...
09 00 02  13  CMP  No. Not when we're in maneuver. They won't let you in.
09 00 02  22  CDR  So that's what I did wrong.
09 00 02  24  CMP  Yes. That's why you - that's why you loaded --
09 00 02  25  CDR  I heard --
09 00 02  26  CMP  -- the NOUN 18.
09 00 02  27  CDR  Well, I thought you said --
09 00 02  28  CMP  It'll come up in a major mode but you won't get --
09 00 02  29  CDR  Oh, I thought --
09 00 02  30  CMP  -- You won't get a time display. Yes. You can't; it shuts off the power to display, like a NOUN 18.
09 00 03  01  CMP  That T-start is right now, too.
... 

216.

216:03. That's right.

We have 15 minutes.

No, we're at 216:03 right now.

... We'll never complete ...

Yes, we will. That's been all - Well, let's see. Let's get the stick and put in a higher rate in the DAP. Jim?

Get the stick?

Yes.

What the hell's that ... lll. Okay.

Okay. I think that does it. I should have played a 3 while I was at it. Huh.

What?

I should have put in a 3 and really zapped it around.

Three ...

Yes.

Three is a what? ...?

Three is 2 degrees per second. We better do it.

...

I don't know if I can hit the stick again, only -

How about the boom? Is that extended?

We got the boom now?
09 00 04 44 CDR  I don't know.
09 00 04 46 CMP  Well, what's the Flight Plan say?
09 00 04 51 CDR  Yes, better not.
09 00 04 52 CMP  Better not. Yes.
09 00 04 54 CDR  You want the ..., don't you? ...
09 00 04 58 CMP  Yes, we're almost there.
09 00 05 00 CDR  Okay.
09 00 05 01 CMP  Yes, we don't have to start here until - Got 5 minutes left - 80 - 8:55.
09 00 05 11 CDR  Why is that coming up? Why didn't it come down?
09 00 05 14 LMP  Because the mission timer starts. ... Flight Plan ...
09 00 05 18 CMP  Yes, because - yes, because of that one.
09 00 05 20 CDR  ...?
09 00 05 21 CMP  No, this is the mission timer. That - this was - this - Yes?
09 00 05 26 CDR  Mission timer, do you set the start and T-stop ...?
09 00 05 29 CMP  That's right. No. We're not doing it because we're using P30 instead.
09 00 05 33 CDR  Be cool if we set the mission timer anyway.
09 00 05 35 CMP  Oh, yes. Sure.
09 00 05 37 CDR  And use our GET?
09 00 05 38 CMP  You can get it off the DSKY. Hell, the goddam thing's already stopped twice - on its own.
09 00 05 45 CDR  What? This one stopped twice?
09 00 05 46 CMP  Yes.
09 00 05 47 CDR  Really?
09 00 05 48 CMP Yes.
09 00 06 03 CMP You can't read that DET from over here.
09 00 06 06 CDR What?
09 00 06 07 CMP You can't read it from over here to begin with.
09 00 06 14 LMP I got a good idea.
09 00 06 16 CDR ... fails if you move.
09 00 06 21 CMP Well, you - you got the date.
09 00 06 24 CDR ...
09 00 06 26 CMP Yes. You tried G&N and comp fail?
09 00 06 30 CDR Yes.
09 00 06 31 CMP You tried G&N and comp fail? You're screwed anyway.
09 00 06 36 CDR Better start getting our ... TEI.
09 00 06 43 CMP Well, I think that's - kind of pushing the rules.
09 00 06 56 LMP Y'all are getting freaked up.
09 00 06 58 CMP Yes. We might.
09 00 07 05 CDR Need a piece of tape. Ought to be a piece of tape around here somewhere.
09 00 07 13 LMP Yes.
09 00 07 14 CDR Okay.
09 00 07 15 CMP Are you there?
09 00 07 16 CDR Okay.
09 00 07 17 CMP Yes, call up P30 and put those numbers in the -
09 00 07 45 CDR Yes ... zero.
09 00 07 47 CMP I'd just - Yes, I'd just leave all those in there or just load it zero. Okay. ... Doesn't make any difference.
09 00 08 12  CDR  Got 417.
09 00 08 16  LMP  ... FREE? You want to let it be for a while?
09 00 08 20  CMP  Yes, we should. On, no, wait. No, that's okay. Those maniacs can wait on Dave. It won't damp.
09 00 08 28  CDR  Huh?
09 00 08 29  CMP  It won't damp because we're in ORB RATE.
09 00 08 31  CDR  You want to go FREE?
09 00 08 32  CMP  Yes. Okay. Okay, now - look at those times and remember them, Dave.
09 00 08 43  CDR  Okay.
09 00 08 44  CMP  It starts - Well, the first one's at 5 minutes and then we go 6:40 and every 10 seconds after that. Okay?
09 00 08 51  CDR  You ... for that?
09 00 08 52  CMP  Yes.
09 00 08 55  CDR  Got it.
09 00 08 56  CMP  Okay, you ready? Okay.
09 00 08 59  CDR  MARK. One cycle.
09 00 09 35  CDR  Oh!
09 00 09 40  CMP  Now turn out all the MDC lights, and just let - watch the DSKY LEB - if - if you can find one down there.
09 00 09 48  CDR  MARK. Forty.
09 00 09 50  CMP  Yes.
09 00 10 15  CDR  Forty.
09 00 10 16  CMP  Okay.
09 00 10 24  CDR  Thirty.
<table>
<thead>
<tr>
<th>Time</th>
<th>User</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 00 10 34</td>
<td>CMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>09 00 10 35</td>
<td>CDR</td>
<td>MARK.</td>
</tr>
<tr>
<td>09 00 10 36</td>
<td>CMP</td>
<td>Okay, I got the time. You can watch, if you want.</td>
</tr>
<tr>
<td>09 00 10 41</td>
<td>CDR</td>
<td>You want a mark at 2:50?</td>
</tr>
<tr>
<td>09 00 10 42</td>
<td>CMP</td>
<td>Yes. No, I'll - I'll get it. Just watch out the window.</td>
</tr>
<tr>
<td>09 00 10 45</td>
<td>CDR</td>
<td>MARK. 2:50.</td>
</tr>
<tr>
<td>09 00 10 46</td>
<td>CMP</td>
<td>Enjoy the scenery.</td>
</tr>
<tr>
<td>09 00 11 46</td>
<td>CMP</td>
<td>If that time is good enough, boy, you wait. At 8 minutes, the Sun'll show.</td>
</tr>
<tr>
<td>09 00 11 51</td>
<td>CDR</td>
<td>Fifty-five.</td>
</tr>
<tr>
<td>09 00 11 52</td>
<td>CMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>09 00 11 53</td>
<td>CDR</td>
<td>Gal! Boy!</td>
</tr>
<tr>
<td>09 00 11 55</td>
<td>CMP</td>
<td>Isn't that something?</td>
</tr>
<tr>
<td>09 00 11 56</td>
<td>CDR</td>
<td>Woo-hoo!</td>
</tr>
<tr>
<td>09 00 11 57</td>
<td>CMP</td>
<td>Isn't that something?</td>
</tr>
<tr>
<td>09 00 11 58</td>
<td>CDR</td>
<td>Yes, man!</td>
</tr>
<tr>
<td>09 00 11 59</td>
<td>CMP</td>
<td>(Laughter)</td>
</tr>
<tr>
<td>09 00 12 00</td>
<td>CDR</td>
<td>Woo-hoo-hoo!</td>
</tr>
<tr>
<td>09 00 12 01</td>
<td>CMP</td>
<td>I thought you'd like that (laughter).</td>
</tr>
<tr>
<td>09 00 12 02</td>
<td>CDR</td>
<td>That's something again! (Laughter) Wheee!</td>
</tr>
<tr>
<td>09 00 12 04</td>
<td>CMP</td>
<td>Okay - DAC off.</td>
</tr>
<tr>
<td>09 00 12 07</td>
<td>CDR</td>
<td>That's something ...</td>
</tr>
<tr>
<td>09 00 12 09</td>
<td>LMP</td>
<td>... Cycle one frame.</td>
</tr>
<tr>
<td>09 00 12 11</td>
<td>CDR</td>
<td>Okay (laughter). Boy, I love stuff like that.</td>
</tr>
</tbody>
</table>

CONFIDENTIAL
Now that's pretty spectacular.

It sure is. That's just right between the eyeballs.

Yes. You don't expect it. Oh, yes! Okay. Okay, lift the ... away. Oh, we got - we got a little time. No - there's no big rush.

Okay, remove DAC from window, cover lens, and run at 24 frames per second.

Yes.

Shutter speed, 1/500th, for 2 seconds.

Yes.

Cover lens?

Yes.

CMC MODE, AUTO. Record the MAG.

Okay, we're down to about - oh, 60 percent of the frame, I guess.

Sixty percent?

Sixty percent of the MAG, yes.

How about your frame?

100.

Okay.

Yes.

... what?

Now, which one you want to use? Use this one?

Okay, we got 1/125th, got --

What's your MAG number? Need that.

... Yes.
Okay ... get it up there and get it going, we'll be all right. ... Why don't you run one across this way? Now hold it.

Okay, I want back ... Yes, that ought to do it. Run this one down through here.

... What?

I don't think you guys'll make it, frankly.

No (grunt).

... back it off. Oh, yes, that's right. We don't move now, anyway.

Okay.

... Did you let the ... down?

No.

... - -

Yes.

- - ...

Huh! (Sigh) Okay.

... Yes, we got it. Is that what you got on there?

... Rate's down.

... Yes. That's - that's about right, Dave.

...
09 00 18 22 CMP  Huh?
09 00 18 24 CDR  ...
09 00 18 35 CMP  Yes. Okay.
09 00 25 37 CDR  Did we do a P20?
09 00 25 38 CMP  Yes.
09 00 25 41 CDR  I thought we called P20 now, Al.
09 00 25 43 CMP  Yes, just recall P20. It should do it itself. No, if you get the UPLINK ACTIVITY light, that means it's gone outside the 10-degree dead band, in which case you have to do a VERB 58 - to get back in.

TIME SKIP

09 01 32 39 CDR  Back to normal now.
09 01 32 40 CMP  Okay. ...
09 01 32 41 CDR  Okay.
09 01 33 11 CDR  ...
09 01 33 13 CMP  No, ... 15.
09 01 33 16 CC  Endeavour, recall the 50 18 and get the attitude, please.
09 01 33 27 LMP  Well, I can do it. But -
09 01 33 40 LMP  But my needles are not close to center. The needles are not very close to center.
09 01 33 50 CDR  I can't hear you.
09 01 33 51 LMP  You can't hear me?
09 01 33 52 CDR  No.
09 01 33 54 LMP  Well, you're not on comm. Yes.
09 01 34 08 LMP  We're off about - 20 degrees in pitch.
As soon as you get the 50 18, you hit the ENTER.

...?

Yes.

Now. ...

What?

I can't hear you. Can you get SQUELCH, ENABLE on? There's so much noise in the S-band. I can't hear anything. Yes, I can hear you now.

Why'd they tell us to PRO, then? That wasn't the right thing to do, was it?

Well, we had a 50 18 - flashing. But we'd already gone past the 10 degrees, apparently. And they told us to PRO.

Dave, if you want to put this away, you can. It'd be down in - in R-13, in the camera compartment on
that side. There's a bag there — you know, the MAG bags from the LM.

09 01 39 06 CDR ...

09 01 39 07 LMF No, let's see. Okay, yes. Right in there. See that MAG bag with six in it?

09 01 39 19 CDR ... right in there ...

09 01 39 21 LMF No. We have B and A, and — and that one, and there's another one that was good in there.

09 01 39 33 LMF The others just won't drive.

09 01 41 09 LMF Not bad. Did real well, Dave.

09 01 41 43 LMF I'd better be watching the Flight Plan for this page, because there are a lot of little notes I put in there that —

09 01 41 49 SC ...

09 01 41 51 LMF Kind of hard to understand, yes.

09 01 43 18 CDR Need it now?

09 01 44 13 CDR Think you can ... tomorrow? Think you ... tomorrow?

09 01 44 19 LMF That won't be hard to do.

09 01 44 20 CMP ...

09 01 44 30 LMF A little tennis.

09 01 44 34 CDR ...

09 01 44 37 LMF I'm going to be worried, too, if I don't have that FCS ... on. I should say the FCS — (laughter). Should say the FCS. All day, Al. We'll be in those suits and won't be able to take a crap.

09 01 44 54 CMP Okay. ...

09 01 45 33 LMF I'll look it up there. The menu today — Today is —

09 01 45 45 CMP We're ready to ...
We have turkey and gravy, wet pack. Cranberry - orange - pineapple fruit cake. Vanilla pudding, which we had yesterday (laughter). And citrus beverage.

Okay. ... down below.

Yes. I can cut, if you want to put water in them. ... don't see why ... camera for terminator photos.

Okay.

... shave.

Is it? ...

... wet pack, turkey and gravy.

... minus 5 ...

Okay. We need GAMMA RAY, BOOM, RETRACT.

After about 3 minutes 15 seconds, it should be gray, and then we'll turn it off.

..., Jim. ... one whole week ...

I'll take the cheese.

... all right ...

No. No. I - there'll be plenty of time for canned.

No. No, this tube was good.

... camera went out ... right, Al?

... mapping camera ...
09 02 12 51 LMP  Y'all want to try the tube?
09 02 13 38 CMP  ... mapping camera right now. ...
09 02 13 46 LMP  Hope so.
09 02 14 08 CMP  ...
09 02 14 13 LMP  One minute to terminator photos, Dave.
09 02 14 16 CDR  ...
09 02 15 04 LMP  15, 19.
09 02 15 18 CMP  How long?
09 02 15 20 LMP  One minute and 40 seconds.
09 02 15 28 LMP  Something on my window. I don't know why they put -
09 02 15 39 LMP  Al, would you turn the LASER ALTIMETER, ON? LASER ALTIMETER, ON.
09 02 16 09 LMP  And MAPPING CAMERA, IMAGE MOTION, ON. Barber pole plus 4. Yes.
09 02 16 25 LMP  No, I just want it ON now. They don't want it -
09 02 16 33 LMP  don't want it - you to do that until after you turn it ON.
09 02 16 33 LMP  Yes, but it doesn't say IMAGE MOTION, INCREASE, until after we turn it on - turn the MAPPING CAMERA, ON.
09 02 17 24 LMP  Okay, Al. If you'll turn the MAPPING CAMERA, ON. Yes.
09 02 17 32 CMP  ... want?
09 02 17 33 LMP  And IMAGE MOTION, INCREASE to barber pole plus 4.
09 02 18 45 LMP  Yes.
09 02 19 53 LMP  See that crater out there - I don't know whether you can see it out your window, Dave. The one I mentioned looked like it had a contact right through it; one half of it was gray and the other half was white.
... It's right out here. Just east of - that good Russian crater, Svodska [sic] - Sovolska [sic].

... it's a Russian crater.

Sbodska [sic].

Sklodowska.

Sklodowska.

... Yes.

Okay, we're supposed to configure the DSE. Stop, COMMAND RESET, and REWIND.

All right.

It's on the - the REWIND, right - the RECORD ...

TIME SKIP

Good.

Got them?

Got them. Okay. Okay, and I'll go ahead and torque those out on the minute. Just give me a mark.

Okay.

Stand by, Al.

Okay.

MARK.

Okay, we'll just check it out here.

Endeavour, you're looking good at LOS minus 60 seconds. Configure the DSE for us please. And we see you've done that; thank you.
Boy, that puts that star smack in the middle. Beautiful. Okay. Are we in P20, Jim?

Yes, P20's coming up. Option --

We --

-- option 5.

We were in it before, weren't we?

Okay. Okay, we got it for TEI ascent. No, wait a minute.

Okay. It calls for GDC ALIGN. Yes, you went back in P20; I'll go CMC MODE, AUTO, huh?

Yes, go AUTO.

Okay, then GDC ALIGN.

That has to be done from your couch there.

Yes.

Can you do it?

I can do one. I'll -- probably use the checklist. It's been a long time since I've gone through one.

Minus 5 and 25.

... burn, Al? Get all your ... all set? No, you're ... open.

Yes, I guess it would ...

... TEI?

Put the optics away. ...

Well, we might as well get in our regular couches then, huh?

What?
09 03 33 00  LMF  Do you want me to switch around to regular couches there?

09 03 33 02  CDR  Yes. ...

09 03 33 07  LMF  A GDC ALIGN is required. And then a P20. I think we need to - change the deadpan [sic] - dead band.

09 03 33 25  LMF  And when we come - come around, we get the maneuver pad.

09 03 33 28  CMP  How long until the shaping burn?

09 03 33 29  LMF  Two hours.

09 03 33 31  CDR  No. ...

09 03 33 33  CMP  Well, we ought to start getting cleaned up then for it. Let's see. Yes, yes. We don't have a sheet. Okay.

09 03 33 55  LMF  ... G&C Checklist, I guess that - Where's that in the G&C Checklist? Let's see what we're doing here.

09 03 34 02  CDR  ...

09 03 34 06  LMF  Okay. Let's see what I've got here now. I'll do the - do a GDC ALIGN, huh?

09 03 37 10  CDR  Did you ... the JETT bag, Al?

09 03 37 12  CMP  Yes. ... got it here in B-1.

09 03 37 26  LMF  Hey, Al. We want to change the dead band in P20 here --

09 03 37 29  CMP  Yes.

09 03 37 30  LMF  -- 5 degrees.

09 03 37 31  CMP  Okay. Do a VERB 22 NOUN 79.

09 03 37 40  LMF  Oh, I see that. Is that all you have to do? You don't have to - while we're in a --

09 03 37 42  CMP  That's all you have to do.

09 03 37 48  LMF  Just put in this entry bit, huh?
09 03 37 49 CMP Yes.
09 03 37 50 LMP Plus 005 00?  
09 03 37 51 CMP Yes.
09 03 37 58 LMP Okay. That's entered.
09 03 38 07 CMP Okay. That should do it then.
09 03 38 35 LMP Need any help, Al?
09 03 38 36 CMP No, I can get it all right, Jim.
09 03 39 43 LMP Let's see, did we decide to throw those two urine bags and the JETT bag? I don't have to transfer those?
09 03 39 48 CMP Don't dump those yet. We're going to jettison them.
09 03 39 52 CDR Yes, we can just jettison them.
09 03 39 53 CMP Yes.
09 03 39 54 CDR When is the next dump period?
09 03 39 58 LMP Coming up in about 2 hours.
09 03 39 59 CDR Before the burn, I guess.
09 03 40 09 LMP Hmmm. After the burn.
09 03 40 23 LMP Just after the burn is the dump.
09 03 40 25 CDR Oh, really?
09 03 40 26 LMP Yes.
09 03 41 54 CMP We're in pretty good shape, Dave, except I don't know what to do with LEVA bags for the burn.
09 03 41 58 CDR With the what?
09 03 41 59 CMP With the LEVA bags.
09 03 42 00 CDR You got straps for them, to clamp - to clamp them down. No. There are three straps down on the EVA tunnel ... --
Hmm.

And strap down those - and I'd suggest that somebody reach up and strap - and strap them down.

Could be we better do that.

You got them?

Yes. They ought to put the utility straps in the -

We better get these other cameras tucked away, too. Where would you suggest putting --

Hey!

-- these cameras we got?

Why not put them all in B-1? We could stuff that JETT bag around them so they won't get banged up too much. They'd probably all fit in there.

Or you could just put them in the JETT bag?

Well, we might want to use them again.

Well, we know where they are. Yes.

What's this bag here?

What?

That's your tether kit.

Oh. Okay.

You're going to need it.

That's good. That's good.

... Everything except the PPK.

Yes. What's - what was in that PPK, by the way?

I don't see how you can get used to it with all these bags, huh?
09 03 43 37 CMP Yes.
09 03 44 05 LMP ...
09 03 44 07 CMP ...
09 03 45 39 CMP Um.
09 03 46 04 CMP Um. Um-huh --
09 03 46 10 CDR What?
09 03 46 11 CMP -- Very interesting. I don't know. I'll let you know in a minute. Oh, there we are. Christ, I thought they were -- I thought somebody'd blown it.
09 03 46 20 CDR Huh?
09 03 46 21 CMP I thought somebody'd blown it. The OPS straps weren't in the OPS strap pouch.
09 03 46 26 CDR You don't think --
09 03 46 27 CMP Yes (laughter). Huh?
09 03 46 29 CDR You don't think that ...
09 03 46 30 CMP Yes, who'd do something like that?
09 03 46 32 CDR ...
09 03 46 33 CMP (Laughter) Yes.
09 03 47 01 CMP Okay.
09 03 47 37 CDR You know, I think we better dump -- we better dump those out. We better not put them in the JETT bag.
09 03 47 44 CMP Huh?
09 03 47 45 CDR Probably ...
09 03 47 46 CMP Yes, they're apt to break.
09 03 47 53 CDR You don't have to dump. Jim will help you.
(Laughter) Yes, okay, how about gathering up as many of the utility straps as you can around. Let's see if we can get enough here to put these LEVAs down.

There's some up here in ... I can't disagree with gathering them up.

These won't work on here.

Pull on it here. Pull those out just a little.

Here, Jim. I think this is yours.

Mm. It's anybody's ...

Huh?

...

In here?

...

Which? Oh, yes.

...

Yes, that one - I cleaned it out. And that - we're going to have to use that tomorrow.

...

So you want to put that into B-1.

...

Yes.

Hey, Al? ... gamma ray and alpha ray and ... all that stuff ...

Not supposed to, Dave. They don't - they don't like it.

... they give us 2 minutes to dump.

Two minutes?
09 03 50 39 CDR  Yes, 2 minutes between dumping and turning on all that gamma, X-ray, and alpha ray stuff.

09 03 50 43 CMP  Well, the gamma - We'll turn it on.

09 03 50 46 CDR  What?

09 03 50 47 CMP  We'll turn it on.

09 03 50 49 CDR  It'll screw it up, won't it?

09 03 50 50 CMP  Well, it ain't going to screw up the experiment. It'll screw up their data. And they'll go back to the Flight Plan and look, and they'll say, "Yes, sure, they're dumping."

09 03 51 24 CMP  Where's the other needle there, Jim?

09 03 51 26 LMP  We aren't even counting ...

09 03 51 27 CMP  We don't care about that. Dave, if you can reach around there on the back of you, on that LEVA that I put on the - on the - on A-8 back there, there's another stop towards the head end - If you want, go ahead and snap it.

09 03 51 40 CDR  Over this one --

09 03 51 41 CMP  Yes, I already put a strap on it, but I couldn't reach it.

09 03 51 47 CDR  ...

09 03 51 50 CMP  (Laughter) Yes.

09 03 52 01 CDR  ...

09 03 52 02 CMP  Huh?

09 03 52 03 CDR  You may not believe it, but there's no snap --

09 03 52 05 CMP  Oh, there's no snap up there? Oh, shit! Can we tie it to something up there?

09 03 52 16 CDR  Yes.

09 03 52 17 CMP  Actually, it'll be all right with one strap probably. It won't --
09 03 52 20  CDR  ... 
09 03 52 27  CMP  No, it's not going to go anywhere.
09 03 52 38  CMP  In fact, these other snaps don't really cinch things down tightly; they just kind of hold them in place.
09 03 53 28  CDR  ...
09 03 54 06  CDR  Gee, we're running out of snaps.
09 03 54 08  CMP  Hey, I bet you we can put a couple of bags and a couple - helmets in the top of the PGA bag.
09 03 55 00  CDR  ... if you use these ... 
09 03 55 04  CMP  Okay. Yes, we'll be using it on the way home. But we can put it away for now. It's probably just as well.
09 03 55 11  CDR  Yes.
09 03 55 14  LMP  It's hot in here. You want to undo it?
09 03 55 15  CMP  Yes. That's an easy one.
09 03 55 22  CDR  ...
09 03 55 23  CMP  By the UVs and goes into A-8, though.
09 03 55 25  CDR  What?
09 03 55 26  CMP  Goddam U thing - UV thing goes in the A-8, and that's underneath all the LEVAs and everything else.
09 03 55 33  LMP  ... somewhere else ...
09 03 55 38  CMP  Excuse me, Jim.
09 03 56 15  LMP  ...
09 03 56 17  CMP  Yes, they go down here.
09 03 56 37  CMP  What else have we got?
09 03 56 39  CDR  Pardon?
(Laughter) Before - before I go tearing into those lockers again, what else have we got?

... 

Yes. Where's MAG R?

Ah, I think it's ... there.

Is it used up yet?

Yes, it is. Didn't we do it --

All right. Stash it away here then.

Here's R. Does it belong there with all that stuff?

I don't think ...

I got three hands full. How about the dark slides for our -

... 

Huh?

... use one of those?

No.

Huh?

Uh-huh.

What about the ...?

Have to pull it on. The N-pack, too.

... 

... 

Get me that cinch. I must be getting weak.

TIME SKIP
... it in the SIM bay, huh?

Okay. Waste water's down to about 20.

Okay, we'll purge. Are you going to time her?

Un-huh.

Fifty.

Up to RELIEF, huh?

Yes.

Un-huh. Up to RELIEF, right?

Eighty degrees.

... to do that on the front-side pass?

Yes.

Think we'll be okay once we get out in the -

H_2 PURGE LINE HEATERS, OFF.

All you got to do is look after the purge, huh?

Yes.

I'm going to purge.

We got this great big filter floating around. Why is that floating around?

I'm sorry, Dave. I'll throw it in the diaper bag.

Gee, Jim, we got to make another burn.

Yes.

I didn't realize we were so close to another burn. ... close.
09 05 49 47  CDR  No, I didn't either.
09 05 49 52  CMP  
09 05 49 55  CDR  Yes.
09 05 50 09  CDR  Where'd you put the second garbage can?
09 05 50 10  CMP  
09 05 50 22  CDR  Al, wait. Stick it up here. No, wait.
09 05 50 58  CDR  Did you have any tissues down here when you did your thing, Jim?
09 05 51 01  LMP  No, I didn't have any, Dave.
09 05 51 03  CDR  How did you get by?
09 05 51 05  LMP  How'd I get by? I used the --
09 05 51 06  CDR  Yes.
09 05 51 07  LMP  -- UCTA. I used the UCTA. So I had to dump it anyway.
09 05 51 15  CDR  Yes. Right over there with the camera is, we got to configure the DAC anyway. Open it up. You got to put the DAC together anyway for photographing the subsat.
09 05 51 42  CDR  What? Yes. Didn't think about that.
09 05 59 01  LMP  ... in the way.
09 05 59 04  CMP  I'll get it --
09 05 59 05  CDR  Okay, I got it.
09 05 59 06  CMP  Okay.
09 05 59 12  CDR  There. ...
09 06 18 00 CMP Oh, my. Look at this. That's a good picture.
09 06 18 06 CC Hello, Endeavour; this is Houston.
09 06 18 10 CDR Houston, Endeavour. Go.
09 06 18 15 CC Roger, Endeavour. We're requesting you verify your systems - DATA SYSTEMS, ON, and the S-band --
09 06 18 21 CNP Yes.
09 06 18 22 CDR Right here it is.
09 06 18 23 CC - - AUX switch to SCIENCE, please.
09 06 18 24 CMP Huh!
09 06 18 25 CDR Yes. That's verified, isn't it?
09 06 18 28 CMP No, DATA SYSTEMS isn't ON.
09 06 18 30 CDR Well, it wasn't in here then.
09 06 18 35 CMP It sure was and I missed it. I'm sorry.
09 06 18 40 CDR Okay; that's verified now, that the DATA SYSTEMS are ON now.
09 06 18 46 CMP Shoot!
09 06 18 48 CDR They're easy to overlook, aren't they?
09 06 18 49 CC Okay, Dave; we copy that. I've got a map update, REV 75, when you're ready to --

TIME SKIP

09 07 47 33 CMP You get the other ones. THRUST A and B to NORMAL after the PRO.
09 07 47 37 CDR Roger.
09 07 47 45 CMP One minute.
09 07 48 11 CDR And there's the average g coming up. Twenty-nine seconds.
09 07 48 18 CMP  EMS MODE, NORMAL -
09 07 48 19 CDR  NORMAL.
09 07 48 22 CMP  Twelve seconds ullage.
09 07 48 33 CMP  ULLAGE.
09 07 48 37 CDR  Ready for the PRO?
09 07 48 38 CMP  Ready for the PRO.
09 07 48 39 CDR  Okay, 99 PROing.
09 07 48 45 LMP  B valves.
09 07 48 46 CDR  There it goes.
09 07 48 48 CMP  Oop! Steady.
09 07 48 49 LMP  -- 4  5  6 --
09 07 48 50 CMP  A's on.
09 07 48 51 LMP  A valves.
09 07 48 53 CMP  Looks good.
09 07 48 57 CDR  EMS and G&N agree.
09 07 48 59 CMP  Good.
09 07 49 04 CDR  Tracking 217 now. GDC looks good.
09 07 49 11 CMP  Man alive! Watch them push.
09 07 49 13 CDR  Powering down now. Okay, we trim here in about - just short of 100.
09 07 49 18 CMP  Okay. DSKY and EMS look good, at about 50.
09 07 49 24 CDR  On the dead band?
09 07 49 26 CMP  Roger.
09 07 49 34 CMP  DSKY and EMS are running about 35.
09 07 49 45 CDR  GDC looks good.
One minute. ...

Tracking 219.

Are we going to decrease on the - flow valve, Al?

Okay, EMS and DSKY are about 50. You got about a minute to go.

Roger.

Tracking 220. EMS and DSKY look good.

Tracking 221. Looks very good.

Okay.

Twenty-five seconds to go.

Roger.

Twenty seconds to go.

Okay, here comes the count. 10, 9 --

..., Al?

-- 8, 7, 6, 5, 4, 3, 2, 1, 0 --

THRUST, OFF; automatic.

Okay, babe, your trim's to .2. Forget the Y.

Wait. Forget the Y?

No, you - X and Z, forget the Y.

Okay. We'll let .2 ... again. Okay, Jim.

Okay. I'm ready. 1, 2, 3, 4 - TVC SERVO POWER 1 and 2, OFF.

OFF.

MAIN BUS TIES coming OFF.

Right on 221. Right down the tube.
09 07 51 58 CMP  Yes. Good act.
09 07 52 02 CDR  Yes --
09 07 52 04 CMP  I'd swear ...
09 07 52 05 CDR  -- ...
09 07 52 06 LMP  Okay, Al, EMS FUNCTION, OFF.
09 07 52 08 CMP  OFF.
09 07 52 09 LMP  EMS MODE, STANDBY.
09 07 52 10 CMP  STANDBY.
09 07 52 11 LMP  RHC and THC, locked.
09 07 52 12 CDR  Locked.
09 07 52 13 LMP  DEADBAND, MAX.
09 07 52 14 CMP  MAX.
09 07 52 15 LMP  TRANSLATION CONTROL POWER, OFF.
09 07 52 16 CMP  OFF.
09 07 52 17 LMP  ROT CONTROL POWER, DIRECT, two, OFF.
09 07 52 18 CMP  DIRECT, OFF.
09 07 52 19 LMP  BMAG MODE, three, RATE 2.
09 07 52 20 CMP  RATE 2.
09 07 52 21 LMP  CB DIRECT ULLAGE, two, open.
09 07 52 22 CDR  Open.
09 07 52 23 LMP  CB SPS, PITCH 1 and YAW 1, open.
09 07 52 26 CMP  YAW 1, open.
09 07 52 27 LMP  CB SPS PILOT VALVES, MAIN B, open.
09 07 52 30 CDR  B --
MAIN A and MAIN B, both open.
Okay, CB EMS, two, open.
They're open.
Okay. PCM BIT RATE going LOW.
Cool it here for a minute.

Okay, Houston; 15. It looks like we have a good seal. How's it look down there? (Cleared throat)

Okay, thank you. Okay, 601, OPEN? 601, REPRESS O₂, OPEN.

It's OPEN.

Monitor REPRESS O₂ indicator to zero.

Okay. It looks zero now, Dave.

Okay. So, you let your umbilical flow bring every - the cabin up to 3.

Roger.

That's very nicely done. That's about - 22 minutes. Which is just about what we figured. You went back and looked at all that stuff. So that's just about right.

It's fun out there, isn't it?

Mm-hmm. Should have stayed longer.

(Laughter) You done good. You made a lot of people back there very happy.

Roll over and let me take another look again.

Well, I'll tell you what, your - your left arm or something's covering up the light over there.

The OPS is, I guess.

Really bad lights in here.

Okay, there. I can see it now.

We're at 2.4, about. So we'll just let your flow bring it up to 3. Gee, I had a great view on the TV. Did you turn the TV off, Jim?
No, I didn't --
I'll turn it off.
Can you reach it?
Yes. There. Thought I turned it off.
Can you reach the SCIENTIFIC TV switch? The S-band TV switch, Jim?
No, not yet, Dave.
Okay. Maybe I can. No.
I don't think there's any rush on that, is it?
No.
I'll get it.
Here, give me it first, Al.

TIME SKIP

We need the repress time on the cabin. ...
Yes.
Ten days and 5 hours we've been gone, Jim.
Long time. We beat your old record.
By 3 minutes.
Sure does. Went farther from home, too.
That's great.
 Didn't go as far.
Let's not count the miles.
...
10 05 14 16  CDR           Huh?
10 05 14 17  CMP           Didn't go as far, but went farther.
10 05 14 19  LMP           Yes, coming back.
10 05 14 22  CDR           And a lot more fun, too.
10 05 14 30  CMP           A lot more to it.
10 05 14 35  CDR           Big Dipper, do you know, on 9, we could have missed
                            any one thing and pressed on.
10 05 14 41  LMP           Yes.
10 05 14 42  CDR           Here, it's a lot different; you can't miss anything
                            and press on.
10 05 14 46  CMP           Well, it looks like we can't miss anything.
10 05 14 49  CDR           Very different. Very different.
10 05 15 13  CDR           This is sort of an all-or-nothing kind of operation,
                            you know it?
10 05 15 18  CMP           Yes, it really is, you know. It's really all your
                            eggs in one basket, boy. I got to thinking about
                            that after you guys left for your descent. Once
                            you start that descent, man, that - that's it --
10 05 15 40  LMP           We're all hanging out.
10 05 15 41  CMP           We're there. That's right. It's all hanging out
                            from there on.
10 05 15 46  LMP           ...
10 05 15 54  CMP           It would be better for ... to put pills in all the
                            food drawers.
10 05 15 59  CDR           (Laughter) For sure.
10 05 16 02  CMP           Make him ...  
10 05 16 03  CDR           Let's put them away somewhere.
Where will I put them? It's the last time I'm saying it, but you better not lose your pills.

You didn't see them in your TSB, did you, Jim?

What?

You didn't see the pills in your TSB when you cleaned out, did you?

No. ...

Ohh, what did I do with it?

...

It's almost back to normal times.

Where did you see them?

Down in U-1.

Do you really know what ...?

...

...

Oh! Did you notice anything loose?

Well, I thought I saw - Well, I saw a - -

Hey, do you guys ... get some orange juice? ... Let's enjoy it - let's enjoy it while we can.

...

Except for bad stuff, we can always put up with it for 1 more day.

Yes, that's right. Well - Hey, let's - ... will be our last meal. We have three meals below and breakfast ... 1 day.

And a long way to go.

Oh, hush.
Hello, Houston; this is 15. Loud and clear, and I got your first message, Karl. Sorry.

..., Al. We've got some sort of problem on the ground circuits here. ... in contact with you.

No, we're here.

Roger. Very good.

(Cough)

Al, I have a couple of questions from ... 

Oh, yes. That's right. That's great. Okay, Karl. I'll tell you what, I'll give you a call back in about 10 minutes when I'm ready.

...

No, he's got some questions on the SIM bay.

SIM bay looks pretty good.

What'd ...?

I'm coming. I'm coming, Jim. ... 

Yes, I can see through on the handles.

I didn't even see any scorching or any burning or anything down there.

...

The covering on the - on the service module, if it hadn't been covered, boy, that would have been burned and scarred and scorched and everything else.

Yes. That's right.

Yes. Yes. Excuse me 1 second, will you?

Excuse me, Jim. Let me get out of your way here.

...

Really?
10 05 22 49 CMP  Well, I guess it doesn't make any difference on this food if we take it back home anyway.

10 05 22 58 CDR  Yes, that's probably true. They can decontaminate it back there.

10 05 23 02 CMP  Sure.

10 05 23 03 CDR  You can tell them we ran out, though. Do you think this salad's good, Al?

10 05 23 11 CMP  My what?

10 05 23 12 CDR  Sandwich spread ... It's a whole half a can.

10 05 23 16 LMP  ...

10 05 23 17 CDR  Sure you can, Jim.

10 05 23 18 CMP  We have to finish after you.

10 05 23 21 LMP  Okay, I'll eat it.

10 05 23 23 CMP  That's right.

10 05 23 24 LMP  What?

10 05 23 30 CDR  If you wouldn't complain so much, we wouldn't leave you so much.

10 05 23 33 LMP  You guys didn't leave me nothing.

10 05 23 36 CMP  Freak you!

10 05 23 38 LMP  I'm thinking

10 05 23 39 CMP  (Laughter)

10 05 24 10 CDR  What kind of desserts we got there, Jim? A lemon pudding, huh?

10 05 24 16 CMP  Mmmm.

10 05 24 46 LMP  ...

10 05 24 50 CMP  Yes, you're right, mouth, and I'm going to catch it ...

10 05 24 58 LMP  I'm ready, if you can catch it.
10 05 24 59 CMP (Cleared throat) That's the only way a power bowler makes it.
10 05 25 04 LMP ...
10 05 25 14 CDR Huh? Yes, I suppose we ought to think about doing that. We can get to all that stuff now.
10 05 25 20 LMP Bright idea. ...
10 05 26 00 CDR I would.
10 05 27 56 CDR That's a pretty good sandwich.
10 05 27 59 CMP Mm-hmm.
10 05 29 27 CDR How much food we got left?
10 05 29 32 CMP I don't know, at least a couple of days.
10 05 31 04 CDR Six-foot waves in the recovery area, huh?
10 05 31 05 CMP Yes.
10 05 31 06 CDR That'll be sporty.
10 05 31 08 CMP Yes, if we can dodge and land, that's great.
10 05 31 11 LMP Yes.
10 05 31 15 CMP That's better than dead calm.
10 05 31 21 CDR It is?
10 05 31 23 LMP Yes. ...
10 05 31 25 CMP It's probably because the power's ...
10 05 31 27 LMP Hmm.
10 05 31 28 CDR That's why we had so much trouble on 9. ...
10 05 31 41 CMP Why can't we just hop on over her pretty good in that fashion, too?
10 05 31 46 CDR Yes.
10 05 31 49 LMP It's not that bad, boys.
10 05 33 27 CDR Houston, 15. Go ahead.
10 05 33 31 CC ...
10 05 33 41 CDR Okay, Karl. Thank you.
10 05 33 47 CMP Okay, Houston. Boy, oh, boy, I used to think it was a good thing to get on a flight and then they could only talk at you one at a time. Whew, boy! Now, I think it's a good thing to get back so you - you don't have to listen to that goddam radio all the time.
10 05 35 00 CMP The DAC, yes. But the Hasselblad's above your head.
10 05 35 05 CDR No, mine's - I don't think so. No, that's Jim's.
10 05 35 13 LMP What else we got?
10 05 35 28 CMP It's time for the UV stuff, huh? Let me get out of your way. You couldn't find any more pills, right?
10 05 35 36 LMP ...
10 05 35 41 CMP No, I thought I put them in your TSB. I just saw them hanging there just before we started all that stuff, and I don't know.
10 05 36 02 LMP ...

TIME SKIP

10 05 50 03 CDR Why don't you get the ...?
10 05 51 26 CMP Okay.
10 05 51 27 LMP Don't forget to ...
10 05 51 29 CMP ION - ION SOURCE to STANDBY.
10 05 51 41 CC ...
10 05 51 46 CMP Okay.
Okay. Minus 76 and 117.

Okay. We copied your comment on the SIM bay door jettison, and further questions go as follows. The white coating in the SIM bay, were - did you notice that any of them were obviously discolored or - or coated from contamination or overheating?

I saw no evidence of heating in the SIM bay. I saw no evidence of discoloration of the white surfaces. There were (cleared throat) as - as best I could tell, no particulate matter that had come to rest on any of the surfaces in the SIM bay. It looked very, very clean. And - even at a - across the top of the mapping camera were - was a ---

... and just delete the note here.

... Stand by 1 second. 247 plus 30. Also, we would like to add "MASS SPECTROMETER MULTIPLIER, HIGH; DISCRIMINATOR, LOW."

Okay, good deal.

Just completed one.

Did you do one?

Yes. I'll talk to him. Bob, we just completed one retraction for 33 seconds.

Okay, we're starting our time.

... And away we go.

... Hey, you woke up just in time to eat again, Dave.

... fresh.
To sleep in ... work ...

Okay, valve pressure is getting good and ... is ...

Surge tank pressure greater than 400?

Yes, 487. ... 

... 

Any surge?

Yes, it's 600.

... 

Yes.

... 

Yes. ... 

... 

Sure a relaxed schedule here today.

We're going along all right until we get to ...

You never do any more UV work, Al?

Yes, we get another one tomorrow.

Hand me the log there, will you? Oh, we don't have the log out, do we?

... find it.

It might be in my TSB. My ... TSB.

... 

Let's see. I have a G&C Checklist over here. But I don't have the - I don't have the other good information. I take it back; I have it. I have it.
Did you take any UV photos in - in orbit?

15, Houston. Over.

Go ahead. Go ahead, Houston.

Roger, 15. We'd like to get a PITCH of minus 40 and YAW, 90, for the HIGH GAIN ANTENNA. And then, if you change your antenna switch to HIGH GAIN without hitting the COMMAND RESET switch, we'll maintain comm that way, please.

Yes. Okay.

Apollo 15, Houston. Over.

Go ahead, Houston.

Negative. You did the right thing without us calling you. Thank you.

Whatever that was, okay.

Are we going to press on with the high gain?

Yes, yes. If you just get your ... down here, ...

Ah, mark it.

... We want to take four breathing samples and do our ... What do we have - we have about 50 left to make, don't we?

We have 50 in this one.

...  

Okay.

...  

Yes.

...  

... change that one.
10 08 13 24 CDR  Bring it in ...
10 08 13 28 LMP  You should bring that. I used the scissors to cut mine on the LM, but - Is there a file on the end of those scissors?
10 08 13 43 CMP  I don't think so. That one's ...
10 08 13 54 CDR  Not much of a file, huh?
10 08 14 00 LMP  I got a razor blade (laughter).
10 08 14 02 CDR  ...
10 08 14 12 CMP  Yes.
10 08 14 13 LMP  Yes.
10 08 14 14 CDR  ...
10 08 14 16 CMP  Okay.
10 08 14 17 LMP  Okay.
10 08 14 18 CC  15, Houston. Your rates look good to us ...
10 08 14 21 CMP  Okay, Bobby.
10 08 15 38 LMP  Maybe we better turn the heat up a little in here.
10 08 15 42 CDR  Getting cold?
10 08 15 45 LMP  My feet are a little cold. I wonder where my - my little slippers went.
10 08 15 51 CDR  ...
10 08 15 53 CMP  Open up my - open up my sack. Here's my little slipper.
10 08 15 58 CDR  ...
10 08 15 59 LMP  Get me into my slippers in here.
10 08 16 00 CMP  Are they yours?
10 08 16 01 CDR  Two-hundredths.
10 08 16 16 LMP  I'll take them.
10 08 16 21 CMP  ...
10 08 16 25 CDR  ...
10 08 16 26 LMP  Yes.
10 08 16 27 CDR  ...
10 08 16 31 LMP  Yes, I think I did.
10 08 16 32 CDR  ...
10 08 16 42 LMP  No. I think I - There is one.
10 08 16 43 CDR  Are you sure, Jim?
10 08 16 55 LMP  The last time I saw it, we - it was in B-1. You
10 08 17 04 CDR  ... know, wrapped in there with the - the JETT bag.
10 08 17 06 LMP  But it's not in there any longer.
10 08 17 10 CDR  ...
10 08 17 11 LMP  It's not in there now.
10 08 17 12 CDR  ...
10 08 17 14 LMP  I don't know, Dave. I'll have to look. I don't
10 08 17 20 CMP  ... know - I don't know who took that stuff out of B-1.
10 08 17 21 LMP  What'd you - Al, the one - the cam - we had the
10 08 17 27 CDR  500 - millimeter camera, Al?
10 08 17 30 LMP  Yes.
10 08 17 31 CDR  Remember, we pulled the cameras out ... and put them
in the JETT bag.
10 08 17 35 LMP Yes.
10 08 17 36 CDR I gave you yours, and you ...
10 08 17 39 LMP You gave me my camera at that time?
10 08 17 41 CDR Yes, ...
10 08 17 45 LMP Tell me where it is and I'll look.
10 08 17 46 CMP Yes.
10 08 18 38 LMP Did you find ...?
10 08 18 39 CMP Yes.

TIME SKIP

10 08 32 09 LMP I think this package of MAGs goes into - A-8.
10 08 32 12 CDR ...
10 08 32 17 LMP Ah, you think so, huh?
10 08 32 41 CMP Should be pictures ... we used all that film. ... It picked up a little here ...
10 08 32 55 CDR Who's going to ...?
10 08 32 58 CMP Where's your bag? ... 
10 08 33 06 CDR It's down here right now. I got to get these straightened out.
10 08 33 18 CMP ...
10 08 33 28 CMP Yes.
10 08 33 29 CDR ...
10 08 33 39 CMP I'd like - I'd like to get a MAG of that, too. Start eating it. ...
10 08 33 58 CDR ...
10 08 34 06 LMP The MAG, you mean?
Well, no matter what you do, it's got to come back tightly, before you start it.

I knew you could, but you could - you could do it ... perfect here, or you could ... Now can you get it started?

Yes.

Al, one pack of this film goes in A-8, the 70s in the LM.

Yes.

... 40. Want three of them?

Yes.

Did you get three?

Yes.

Okay.

We're going to get the other three in today. We'll have 13. We'll have to split the package up.

... We can put some MAGs in here.

Yes.

We only got this one MAG.

... that?

Right on. Why don't we just ...?

Probably, because nobody can ...

Probably.

... in there? Al. That bag is much too big to fit in there.

... but we can certainly get ...
We need one bigger than this, though.

Well, this bag probably should not have come over from the LM. I used this bag, though, to wrap up these - these MAGs. You know, neither one have been used.

I think they might be ...

What are you going to get out of here?

Carry it for me. Can't help but be better.

You got to work - work it out.

... that one ...

...

I wouldn't ...

Yes, I wouldn't ...

Yes. Tool - tool B on the - wait - wait a second.

Tool B or tool E?

Tool B.

From the LM?

Apollo 15, Houston. It's retract time.

Thank you, Bob.

What?

Hey, I forgot to cut - I didn't cut the ion off.

Cut the ion ...?

No. We should have cut the hammock straps. Should have got those, too, before we jettison them.

No, those are the LM pans. ...
Hey, Dave? Yes, you got them.

TIME SKIP

We do UV photos twice. Two more - UV photos two more times.

... your film.

It's kind of nice having some room down here, isn't it?

It sure is.

You don't want to go through this contamination control with the vacuum cleaner, do you, Dave?

I don't think we're required to do it.

Okay.

...

No, we don't...

We don't ...? ... mention down-range control. They're standing by to give some water on it anyway.

TIME SKIP

Oh, and then CDR doffing biomed harness. LMP donning. Alpha X-ray. Let's get a little SIM bay and then eat. Eat and then we do a canister change. You do a little P23 stuff. Then we'll get ready to go to bed.

Three hours to bedtime.

... sleep. ...

... 3 to 4 hours ...

... here?
Otherwise, it would have been pretty boring.

(Laughter)

Yes.

You work mighty hard.

No, a little ...

I wish I would have tried running alongside the Rover at a - the same pace, you know, to see how - -

You'd have never stayed with it, Jim. You know ...

Yes, true.

I would have liked to have, you know, to run alongside of it. It'd been neat to do a few things like that, you know.

What?
It'd been neat to try a few things like that.
Yes. I know. Yes. ...
You can take off your biomed harness, Dave.
Whooh!
He'll lose sleep for 9 hours tonight.
Good! ...
Can you see the Moon?
Oh, yes.
Can you get that? Thank you.
On a lunar eclipse - Let's see, we take a total there of -
...
No, we take some with the EL.
Yes.
Yes. We take eight with the EL.
What kind?
Color.
...
Yes, eight with color.
Here's some more Lunar Orbiter.
Is that the same?
No, you have it on two different pages.
Oh, yes.
Hey, what was this one for?
Don't you have any more?
... think we need any ...

Yes. ...

It's in the lockers.

... more?

... time to figure it out - figured out ...

Going to give them ...?

...

...

Yes, you got to reckon with him yet.

Huh?

You're going to have to reckon with him yet on those ...

Yes. ... make sure to recommend that he ...

Yes.

...

Yes.

Apollo 15, Houston. About 2 minutes to MASS SPEC BOOM, DEPLOY. And we'd like a DELTA-T on the length of time it takes to deploy it, please.

Roger, Bob.

(Laughter) They can't tell that, I don't think.

TIME SKIP

There must be a MAG around somewhere. There must be two of them.

In the bag.
Okay.

Now, all we're missing is S, per his ...

Is that MAG hooked up?

I don't know.

I've got - I've got two whole reels of color stereo.

Yes, that goes back up for ...

Why?

Why?

Why?

Let's see. Next is the ...

Huh?

Huh?

One more time. Ready?

Yes.

You got it?

Over here.

Oh, yes.

God damn.

Huh?

Al, what all is there?

We have turkey.

Turkey?
10 10 13 35 CMP Yes.
10 10 14 22 CDR Do we have something extra for lunch?
10 10 14 37 CMP Ham.
10 10 15 26 CDR As you're loading it.
10 10 15 29 CMP Oh, I - you know, I think we can do it with ...
10 10 16 03 CMP Ah, yes.
10 10 16 16 CDR Hey, I'd - I'd like to ... Yes. ...

TIME SKIP

10 10 35 08 CMP I'm just fine. Just fine.
10 10 35 24 CMP I'm so damn happy; nobody could give me any better service.
10 10 37 40 CDR What seems to be ...?
10 10 38 20 CMP Hey, what do you ...?
10 10 38 25 CDR Yes. Yes, ...
10 10 38 44 CDR ...
10 10 38 45 CMP ...
10 10 38 48 CDR ...
10 10 39 30 CMP Yes, I guess the worst thing in the world would be to try to do something like that and not be able to do it.
10 10 39 35 LMP Oh, boy, ...
10 10 39 50 CMP Tired?
10 10 39 52 CDR Yes.
10 10 40 01 CMP Well, I'll tell you, I'm sure glad we got rid of that clothesline operation ...
In fact, it's really a ball, when you get all suited up, get cooled off, and get the hatch open.

Sounds good. Sounds real good.

Oh, it's great.

The Sun would have been some better - It would have been better if it could have been a little bit higher. Because when I went down around the side of the mapping camera, it was pretty dark.

Yes.

Yes.

Boy, I hope the - I hope the TV came out all right.

Yes. ...

Did you? Okay. ...

Got them. Got them.

Okay.

Somehow they got way down in there --

Well, we didn't lose anything of value out the hatch. ... 

Everything's okay.

We lost a spring clip. We lost a paper clip --

Want me to write?

Where do you want this? In your ...?

Okay. Plus four balls 8, minus three balls 67, plus three balls 54.
10 10 59 34 CMP Wait a minute; maybe that's 34.
10 10 59 41 CDR Oh, yes.
10 10 59 42 CMP Yes.
10 11 00 23 CDR Oh, you screwed up.
10 11 01 29 CMP Yes, sir, Bob, you bet you. It sure is beautiful.
10 11 01 35 CDR You say that sure has been planned for me?
10 11 01 41 CMP Yes, ...
10 11 02 08 CDR ...
10 11 02 09 CMP The platform gets us home without a midcourse, by golly.
10 11 02 16 CDR No range error, but pressure's a little low.
10 11 02 18 CMP Hey, Jim. While you're down there, we need a canister change. Twenty-one into B. Stow 19 in A-4.
10 11 03 51 CDR Twenty-one. Yes. Twenty should be in A. Get it out of A-4.
10 11 04 21 CDR No!
10 11 04 22 CMP ... catch it.
10 11 05 03 CDR That a boy.
10 11 05 04 CMP Lock her, Dave. You can ...
10 11 05 07 CDR ...
10 11 05 09 LMP Yes, it is. I think we can ... I hate to use those pulleys.
10 11 05 16 CDR ...
10 11 05 20 CMP Yes. If you use your own tool.
10 11 05 30 LMP ...
Day 11

10 11 05 34  CDR  Who stole my ...? (Cough) Boy, ..., didn't I?
10 11 05 44  CMP  ...
10 11 07 32  CMP  What are you doing?
10 11 07 42  CMP  Thank you, Davey.

TIME SKIP

10 12 19 16  LMP  What are you doing there, man?
10 12 19 18  CDR  ...
10 12 19 21  LMP  Did you find it?
10 12 19 33  CMP  That's better.
10 12 19 36  CDR  ...
10 12 19 37  LMP  Yes, I wouldn't know the switches on it.
10 12 19 41  CDR  Houston, Apollo 15.
10 12 19 46  CC  Apollo 15, go.
10 12 19 48  CDR  Hi, Bob; got a presleep checklist for you.
10 12 19 55  CC  We're ready.
10 12 19 57  CDR  Okay.
10 12 19 58  CC  Dave, hold on. We got a...
10 12 20 16  CC  Okay, 15, we're back with you. We just had a site changeover.
10 12 20 21  CDR  Okay. Crew status is all good; no medication. And I've got the onboard read-outs, if you've got a pencil.
10 12 20 31  CC  I've got a pencil.
10 12 20 33  CDR  All righty. Starting with BAT C: 37.0, 37.0, 37.0; RCS A is 56, B is 50, 48, and 52. And I
guess everything else has been done, and you should have got your E-memory dump. We pressurized the cabin with the OPS, and when we got to about 57 or 58, the OPS was down to 800. And I reckon that's the size of it.

10 12 21 11 CC Roger, Dave. That sounds like the size of it to us. We copy all that, and there will be no vector update. Ground says your vector is just as good as theirs right now.

10 12 21 21 CDR How about that? Oh, that's pretty good. We got a good navigator.

10 12 21 27 CC And, 15, let's hold a couple of minutes while we check some data on the SIM bay and then we'll go to the MOCR one more time. And we'll be back with you in final status, I hope.

10 12 21 40 CDR (Laughter) Okay, we got - we got time. We're not quite ready to go to bed yet.

10 12 22 04 CDR (Laughter) Bob says, if he - says, okay, let me go around to the MOCR and check it and come back with your final status, I hope.

10 12 22 24 CDR But, you know, they got to old Joe, I can tell. Joe's changed. He's a changed man. They had him, boy.

10 12 22 32 LMP They did?

10 12 22 33 CDR They were all over his ass during that EVA. He was just really humping. That poor fellow - I bet he's exhausted.

10 12 22 49 CDR He probably had so damn many inputs, he didn't know which way to go.

10 12 23 04 CMP ...

10 12 23 08 CDR Huh?

10 12 23 09 CMP ... apart.

10 12 23 14 CDR Oh, he's pretty close to them. That - that group's all tied together pretty well. Yes. It was in
pretty good shape. We got all those guys out on
the field trips and sat down and talked to all of
them, and that - that group's pretty well squared
away.

10 12 23 28 CMP ...  

10 12 23 32 CDR No, they're in the back room. And the guy who
really comes up to him is Jerry Griffith.

10 12 23 40 CMP Oh, yes?

10 12 23 41 CDR He's really the experiments officer. But --

10 12 23 45 LMP Who's Jerry Griffith?

10 12 23 46 CMP Yes. (laughter).

10 12 23 47 LMP ...

10 12 23 48 CMP Yes.

10 12 23 50 CDR And - But it really goes from Gordon Swann through
Griffith to the Flight Director to Joe. And it's -
it's a straight loop because Griffith and Griffin
both understand the problem, so it - it isn't any
big deal. Except that all the other people who
aren't in the loop and don't understand were there -
all the guys up in the back row with their input -
with them.

10 12 24 12 LMP ...  

10 12 24 15 CDR Jerry Griffin said he - one of his main problems
was going to be holding the people off behind him -
you know, to let Joe do his job, and I'm sure it
was ... - especially when they can see it all on
the TV. And they're clanked --

10 12 24 29 LMP They're all there?

10 12 24 30 CDR Yes. They're all clanked up anyway. Then we go
up on top of some big frigging mountain or stand
right next to some big frigging valley, and, you
know, they can't do anything about it; they're all
bunched up like a nickel cigar.
10 12 24 40 LMP ... They ... and ...
10 12 24 44 CDR Yes.
10 12 24 45 LMP And ...
10 12 24 46 CDR Yes.
11 00 35 37 CC Roger.
11 00 37 17 CMP It's a quiet morning.
11 00 37 19 CDR Say again?
11 00 37 20 CMP It's a quiet morning.
11 00 37 21 CDR Yes.
11 00 38 47 CMP Maybe that means that they come from the Sun. Huh?
11 00 38 51 CDR Hmm.
11 00 38 57 CMP Very interesting. Or that the window shield's cutting them off.
11 00 39 02 CDR No, we had the window shields up before.
11 00 39 04 CMP Did we?
11 00 39 05 CDR Yes.
11 00 39 06 CMP Um hum.
11 00 39 07 CDR Because we had them - the cockpit all dark.
11 00 39 08 CMP Be dark. Yes.
11 00 39 09 CDR Yes, that's right. We did. The only difference now is that the Sun's behind --
11 00 39 13 CMP We're not - we're not pointed at the Sun - Yes. And the Moon's behind us. Some place behind the Sun. Isn't it?
11 00 39 23 CDR No. No, nobody's behind the Sun to us.
11 00 39 27 CMP Hey, we - You know, we're not shielded - we're not - Gee, I don't know.
11 00 39 44 CMP We may not be in orientation in PTC to be looking at the Sun either. Well, that shouldn't make any difference yet. Were we in PTC when we did it before?
11 00 39 59 CDR  
...  
11 00 40 00 CMP  
Huh?  
11 00 40 02 CDR  
I think so. Because I remember thinking, "How are they going to figure the attitude?" They'd have to get it off the - the data.  
11 00 40 11 CMP  
Yes.  
11 00 40 19 CDR  
Yes, I see. The - the Sun - will soon be behind the Earth, right?  
11 00 40 25 CMP  
Yes, should be.  
11 00 40 27 CDR  
So, if the Sun is close to being behind the Earth right now, maybe the Earth will shield it.  
11 00 40 32 CMP  
Oh, you mean warpage in the pausal tail?  
11 00 40 37 CDR  
Yes.  
11 00 40 38 CMP  
That could be. It comes out in a - in a pinwheel fashion.  
11 00 40 56 CMP  
Although I saw some last night when I went to sleep.  
11 00 41 00 CDR  
Yes, I did, too.  
11 00 41 01 LMP  
Yes.  
11 00 41 09 CDR  
That's good, Jim. Is that an hour? (Laughter)  
11 00 41 14 CMP  
(Laughter) Change the sheet.  
11 00 41 15 CDR  
Wake up, Jim (laughter).  
11 00 41 16 CMP  
(Laughter) ... Houston (laughter). You're ... --  
11 00 41 22 CDR  
... --  
11 00 41 23 CMP  
-- for minutes.  
11 00 41 24 CDR  
All you got to do is repeat that 10 times now, Jim.  
11 00 41 36 LMP  
Boy, that was fast.  
11 00 46 04 CDR  
Maybe we've been desensitized to them.
(Laughter)

Houston, 15. We're still here. It just looks like a quiet morning.

Roger. Glad you're still awake. Keep on looking for the cosmic rays.

Looking as hard as we can.

Absolutely nothing. Very amazing.

Yes.

MARK CDR. Yes, down on the left eye at about 7 o'clock; intensity about 2. Point source of light.

I guess we can get ready then. They're starting to come.

MARK LMP. Flash at 8 o'clock on the periphery; intensity 2.

MARK CDR. It was in the left eye at 6 o'clock at about a third of the way from the center out; intensity 3; point source of light.

You two guys must be shielding me.

MARK CDR. It was in the left eye about 2 o'clock; a quarter of the way in; intensity 1; point source. Yes, we're taking it all for you, Al.

You must be.

I think Dave's imagining all these.

Got to do something for the ... --

... he's gotten to the point where he's conjuring them up on me.

Dedicating my imagination to science.

Right. Protecting all those who go after you.
Wait until you see how many I'm going to see in the last minute (laughter).

Confound that curve.

MARK CMP.

Yay!

Left eye; dead center; intensity 2; point source. Only ones I can see are the ones that hit me right between the eyes like a ...

MARK CMP. Right eye; about 1 o'clock; 2/3rds of the way out; intensity 2; and a little streaking - some towards the center of the eye - about another third of the way down.

Do you have your eyelids closed?

MARK CMP. Two flashes: one at 9 o'clock in the left eye and one at 6 o'clock in the left eye; both intensity 3. Yes, my eyes are closed, Jim.

Your eyelids are closed.

Yes. Me, too.

Your eyelids aren't going to stop anything.

Don't think so. Just want to get consistent data.

MARK LMP. Flash; one at 4 o'clock, halfway out; another one at 2 o'clock on the periphery; intensity 3.

MARK CMP. Two o'clock; almost on the periphery; and intensity between 3 and 4. Bright one.

MARK CMP. Two o'clock; streak from right to left; centered about the 2 o'clock radial; about halfway out; intensity 2.

MARK LMP. It was a streak; right eye; moving from the top down toward the bottom, intensity 4.

Maybe we get adapted to it.
Hmmm! I suppose so.

You build up an immunity.

Mm-hmm.

Or maybe it's destroyed so many brain cells we don't have any ... left for it.

You know, that's right. Maybe that's it. Mmm. Our sensitivity is so dulled --

Yes.

-- that we just don't see them anymore.

A lot of people would probably agree with that.

Yes (laughter).

Mmm-hmm.

That's why we're doing them to begin with. Because people are worried about that, I guess.

Well, I wonder if we're the same distance on the trajectory as we were when we did it on the way out?

(Yawn) I don't know.

Is that the idea — to be in the same spatial relation? Yes, we could look --

MARK CMP. Right eye; dead center; point source; intensity B.

We could look at the Flight Plan when we get through. The distances are in there.

Mm-hmm. Yes. We could always figure it out.

MARK LMP. It was a streak; left eye; top to bottom; intensity 2; it was right at the periphery.

MARK LMP. Again it was a streak; it was — appeared to be in both eyes; moving from 1 o'clock toward the center; intensity 3.
11 01 22 27 LMP  MARK LMP. A flash; 2 o'clock; periphery; intensity 2.
11 01 23 27 CMP  MARK CMP. Right eye; 11 o'clock; about halfway out; point source; intensity 3.
11 01 26 06 CMP  MARK CMP. Left eye; about 10 o'clock, 2/3rds of the way out; point source; intensity 3.
11 01 28 49 LMP  MARK LMP. Flash; position 2 on the periphery; right eye; intensity 2.
11 01 28 58 LMP  MARK LMP. Same position; intensity 4; flash.

TIME SKIP

11 03 14 09 CC  Roger.
11 03 14 11 CDR  And on top of A-2, we have the ISA decontam bag, for 64 pounds.
11 03 14 23 CC  We copy.
11 03 14 25 CDR  Okay. A-3, A-4, A-5, and A-6 - as you have on your list right now.
11 03 14 34 CC  We copy.
11 03 14 36 CDR  A-7 is as you have on your list, with an addition of the LM DAC and the LM 70-millimeter camera that failed on the surface, which we thought you might like to take a look at it.
11 03 14 51 CC  All right, both those are - are added items, I take it?
11 03 14 54 CDR  That's correct.
11 03 15 04 CC  We copy.
11 03 15 06 CDR  Inside of A-7 is the EVA umbilical and bag as p - p - prescribed.
11 03 15 14 CC  Roger.
Top of A-7 is sample collection bag — Oh, stand by. Oh, shoot, we didn't scratch this out. Dad gum it.

What's that?

You don't — On top of A-1, we don't have number 2. We moved it over here to top of A-7. We've got the LM items, right? Only. Just the LM items on top of the —

Yes.

— of — of A-1? That's right. Okay, let me — let me go back and make a correction here, Karl. Look over in the left-hand column where it says top of A-1, and scratch "Sample collection bag number 2."

Okay.

And then go back to your right-hand column there. On top of A-7, we have a — a decontam bag with sample collection bag number 2 and the BSLSS bag, for a total of 48 pounds.

We copy.

Okay. The 35-millimeter bracket in the bag, we're going to put that in the —

— I clarify that — both of those bags —

That's going to go in there.

— together were 48 pounds, or do I also put over the 20 — the 23 pounds we had on A-1?

No, the total of collection bag number 2 plus the BSLSS is 48 pounds.

I understand.

And you can scratch the collection bag number 2 for 23 off of A-1.

Roger.

Okay. And then, in A-8, it's stowed as pre —
-- to have some wet packs. I think I'll finish what I have, and then I still -- Yes, I'll hit the wet packs.

You got 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 wet packs. Hey, we're in --

That's enough to keep us alive.

Oh, yes.

Do we have -- How many deals do we have to mark? Two?

Just two. Let me stick that in there, too.

Great. I think, just to clean this place out a little bit, I'm going to take some of these bacon squares and throw them.

Yes (laughter). It's probably a good idea.

As a matter of fact, we could consolidate a lot of this stuff.

Yes.

We could use these bags for garbage bags.

Yes.

You dropped yours.

God damn! Dropped it on the floor. Lord a'mighty.

Get what you want?

Yes.

Oh, a little spaghetti. I had some for breakfast; it wasn't bad. A vast spectrum.

Two meals tomorrow, breakfast, and two more meals today --

One -- two -- Uh-oh, we'll have to eat -- to eat fast, to eat it all up.
No, I don't think so (laughter). I think we're going to be there.

Do you guys think --

We've got 10 wet packs.

Ten wet packs, huh?

Yes, one for lunch, one for dinner, and -- one for tomorrow.

Want a wet pack, Jimmy?

Yes, I'll probably take one as long as you got them out.

Anybody tried the beef stew?

Yes, I have a beef stew here.

Mine was pretty good.

I'll try one.

You want to try one?

Yes.

Pretty interesting.

Have a wet pack.

Okay.

... get the drinks out here.

And right now you got a P52.

Oh, really.

Just to stir you up a little bit.

Okay. Here's the beverage.

Okay. What kind of beverage do you want here, Dave?
11 03 29 33  CDR  I can't take anything but water, grape, and cocoa. I'm through with that other stuff. Somebody ought to - -

11 03 29 37  LMP  There's one grape left.

11 03 29 38  CDR  Well, you can have it.

11 03 29 39  LMP  Getting lucky.

11 03 29 40  CDR  I don't care. I'll just drink water.

11 03 29 41  LMP  Oh, I - I'd like the grape, too.

11 03 29 43  CDR  I can't take any more. I've had 21 days of those juices, and that's all I can handle.

11 03 29 51  LMP  Yes. I'm with you, pal. I feel that way about a lot of this stuff. Well, what do you want to drink, Al? Did you get your drink?

11 03 29 59  CMF  No, not yet.

11 03 30 00  LMP  Do you want an orange?

11 03 30 02  CMF  Yes, I don't guess there's any pineapple left, is there?

11 03 30 05  LMP  There's a pineapple-orange.

11 03 30 07  CDR  Is there a pineapple-orange in there?

11 03 30 08  LMP  Yes.

11 03 30 09  CMF  Yes, that's what I'd like.

11 03 30 17  LMP  No, I take that back. There's an orange-grapefruit. There's no - no pineapple. What's your choice?

11 03 30 24  CMF  Oh, I'll have an orange.

11 03 30 25  LMF  Okay.

11 03 30 48  CDR  Is that P52 due now?

11 03 30 50  CMF  Yes.
Okay. Jim, put these back.

TIME SKIP

Apollo 15, this is Houston. We'd like to have you retract the mass spectrometer boom for 85 seconds.

Understand. Retract the mass spec boom for 85 seconds.

Yes, I will. Soon as I get the door closed here.

Roger. Get you ... then.

That's affirm, and then you'll leave it there for about 5 minutes. We'll cue you when to extend it again.

Okay.

Okay, retracting now.

...

Huh?

Screwed up.

Your stuff.

This the way it goes in?

Yes, it's getting a little tricky. Ought to get that thing in there, though.

Does it go in all the way?

Yes, put it in.

Yes.

...

That's funny. Looks like it fits in there pretty well. Oh, what's in - Okay. You're going to put the camera on anyway.
The log entry reads:

11 04 18 11  CDR    Got ... we can start.
11 04 18 13  LMP    Yes.
11 04 18 15  CDR    Okay.
11 04 18 17  CMP    Okay, we're starting. NOUN 35. Starting now.
11 04 18 50  CDR    Guess we might as well maneuver, huh?
11 04 18 54  LMP    I don't know. Why do you want to go early?
11 04 18 57  CDR    Why not? There's nothing in - the Flight Plan ... Nothing in here ... that I can see.
11 04 19 08  LMP    Well, how about - explain this.
11 04 19 12  CDR    Gamma ray gain. Got to be there by --
11 04 19 17  LMP    Not until 50 - 30 minutes from now.
11 04 19 37  CDR    Yes, that's right.
11 04 20 04  LMP    I guess we're going to dim the lights and do all this on time. Rather sit for - we can get a flashlight out.
11 04 20 14  CDR    ...
11 04 20 18  LMP    Well, we'll see. One minute. Let's see. I don't know why - cabin lights are not going to affect it anyway with that cover over it.
11 04 20 28  CDR    ...
11 04 20 40  LMP    Says we're supposed to use the PCM cable. How can we shoot - that PCM cable for the 250? The EL? It won't reach this window, will it? And we'll have the Nikon in the other window.
11 04 20 55  CDR    Didn't we have that this morning?
11 04 20 57  LMP    Well, it's ruined the other things, Dave. That's for the sextant photos.
11 04 21 22  SC    (Sneeze)
11 04 21 36  LMP    Solid 24 minutes of activity, isn't it?
11 04 21 59 LMP We got MAG N on there. And I still have a MAG way back here with a — color — Q. They suggested T, but —

11 04 22 24 SC (Yawn)

11 04 22 26 CDR ... Q ...

11 04 22 28 LMP Might as well.

11 04 22 56 CDR ...

11 04 23 04 LMP I'll look in this TSB over here.

11 04 23 06 CMP Look in — in U-1 back there.

11 04 23 58 LMP ...

11 04 24 00 CMP Roger. You messed up 190 ... — —

11 04 24 02 CC 15, this is Houston. Would you please extend the mass spec boom all the way out again?

11 04 24 08 CDR Tell him yes.

11 04 24 09 CMP Roger. In work.

11 04 24 13 CC And I have a T-start for the lunar eclipse photos when you're ready to copy.

11 04 24 19 CMP Okay. Go ahead with T-start?

11 04 24 32 CC T-start for lunar eclipse photos, 268:59:47.

11 04 24 42 CMP Understand 268:59:47.

11 04 24 48 CC That's correct, Al.

11 04 24 53 LMP Yes, my camera's still up here, Dave.

11 04 24 55 CDR Okay, good.

11 04 25 00 CMP Hey, we're going to have to rush.


11 04 25 04 CMP Okay, 59, 47, ...
11 04 25 07 CDR  How long is that from now?
11 04 25 10 CMP   Three minutes.
11 04 25 11 LMP   Well, why don't we go ahead to U - Why don't you go - -
11 04 25 13 CC    Al, we had a question on the mass spectrometer, and it may be too late. Was it possible to confirm by visual look through the window that it was retracted?
11 04 25 25 CMP   Negative, Karl. You can't determine that it's retracted. All you can determine is that it's full out.
11 04 25 33 CC    Roger. Well, when it was retracted, you wouldn't be able to see it; that's what I'm asking. Is it possible for you to take a look now and see if it slowly comes into view?
11 04 25 44 CMP   You want - -
11 04 25 45 CDR   Okay, he wants you to watch and see if it does come full out.
11 04 25 48 CMP   Roger. In other words, you're asking to confirm that it does come full out.
11 04 25 54 CDR   All right, - -
11 04 25 55 CC    That's correct.
11 04 25 56 CDR   - - look down - -
11 04 25 57 CMP   Okay.
11 04 25 58 CDR   - - and if you can't see it, it was retracted. If you can see - You can't see it then.
11 04 26 02 LMP   Yes.
11 04 26 06 CDR   ...
11 04 26 08 CMP   Sure I can. Okay, Jim, I'll go ahead maneuver you. You're the act again.
Okay.

Let's see a Flight Plan.

Well, if we can't find that other MAG, Al, we might have to use this one. Got the one MAG here of black and white from the IM. It has got to be --

Just to clarify --

-- very high speed.

-- our question, Al, the main question was just to confirm whether or not it did go out of your field of view. Did it actually move from full - from the full-extended position? Al, since you saw no change in the data when you retracted it during the test yesterday, there is a suspicion that, even though you actuated the switch, that for some reason it didn't retract.

Understand.

I see - there's one boom extended.

Okay. It's fully extended now, Karl. But it may be too late. It may have already been out by the time we looked. Is that talkback barber pole or gray?

Gray.

Yes.

It kind of oscillates back and forth, doesn't it?

Karl doesn't realize we don't want to get too much UV. He must think we watch out that window every time we extend and retract it.

Hmm.

Yes, no kidding.

TIME SKIP
11 06 08 35  CMP Percentage on the MAG?
11 06 08 39  LMP Okay.
11 06 08 40  CDR Trim and call it 75.
11 06 08 44  LMP Okay, we're moving. Stable DAC. G&N POWER coming back to AC 1. CMC MODE, AUTO, Dave? A VERB 49 maneuver to the lunar-eclipse attitude. I wonder - I guess we better be in that attitude - for the press conference. Okay. You ready -
11 06 09 10  CC 15, Houston. We'd like to get the HIGH GAIN up, PITCH, 22; YAW, 261.
11 06 09 17  LMP Say, buddy!
11 06 09 21  CMP Stand by; we're maneuvering.
11 06 09 25  CDR The numbers, Jim.
11 06 09 26  LMP Okay; 040, plus 011, plus 041.
11 06 09 42  CDR Forty, 11, and 41. Right?
11 06 09 44  LMP That's right.
11 06 09 54  CDR What time's the chronometer say?
11 06 09 55  LMP Twenty after.
11 06 09 58  CMP Yes.
11 06 10 03  CDR Okay, Houston. Are your high gain angles for the sextant photos or for the lunar-eclipse-photo attitude?
11 06 10 14  CC Sorry about that, Dave. When you complete this maneuver, they're in your Flight Plan, PITCH, minus 22; YAW, 227.
11 06 10 21  CDR Roger.
11 06 12 03  CDR Oh, yes. That's not bad. Not a bad picture. Oops!
11 06 12 18  CC 15, we'd like to have OMNI Bravo.
11 06 12 23 CDR Can you get that for him, Jim? OMNI Bravo?
11 06 12 26 LMP Oh.
11 06 12 27 CMP I'll get it. --
11 06 12 28 LMP OMNI Bravo.
11 06 12 29 CMP ... Okay.
11 06 12 40 CDR It's looking up.
11 06 12 46 CMP Let's see --
11 06 12 47 CDR Wait.
11 06 12 49 CMP Yes, let me get it.
11 06 12 53 CDR What say to open all the windows and get a little light in here, huh?
11 06 12 58 CMP Yes.
11 06 13 09 CDR There seem to be - Ah, there won't be any at the lunar-eclipse attitude, though.
11 06 13 32 LMP Turn all the floods up all the way.
11 06 13 34 CDR Yes.
11 06 13 52 CMP What time's ...?
11 06 13 54 CDR In a few minutes.
11 06 13 59 LMP Yes, at 20 after.
11 06 14 00 CDR Yes.
11 06 14 11 CDR One guy here.
11 06 14 13 LMP Let's see if this controller wants to take up.
11 06 14 17 CDR One guy here. Here, I got it, Jim. Why don't you come on down?
11 06 14 25 LMP Come down now?
Yes. Sit on my urine hose. Keep the — —

Sit on urine hose and keep it down. The controller, we can stick under the couch — for now. This moose is in the way.

(Laughter) Too much gravity.

Get over in the — put your feet on the couch and sit down.

Well, someone's going to have to get up and get the switch.

What switch?

SCIENCE — —

I'll get it.

— — TV switch.

Yes, it's got to go TRANSMIT on the TV.

Let's see if this all is going to work. No, we've got to shift it over — away from the corner. Yes, okay. Hold on to that.

Okay, it looks like we're in attitude. Al?

Right.

And we got to get the high gain going there.

Okay. It's not in the press con — shoo — it's not in here.

It's in there for the — the maneuver to the — yes, the eclipse attitude.

Let's see, you ought to try and move those hoses somewhere, Jim. Because you're going to end up having to be further back in the corner, I think. This thing needs to come — Great. I don't — Why don't you come — You get down — —
What's wrong?
Taped right now, but I think --
Yes.
Yes, it needs to come over this way more. It's not going to go any further on the other side of the bulkhead there.
Yes.
See, because I'm - I'm in the far - no. Jim, can you get down? And let's see how it's going to work.
15, Houston. Give us AUTO and NARROW on the HIGH GAIN, please.
Whew!
Roger. AUTO and NARROW.
You want the front end to come this way a little? You want the front end to come this way?
No, I guess it's all right, if I can - It - it - There.
It's reflected. I mean there's not -
Yes, that's what I made it for. Pick up behind here. No, right behind here.
Tell you one thing. I hope we can turn the lights up.
Yes. Might help.
Lights all up?
Yes. Oh, put it up it.
Al, you take that little bit and we'll put it on the patch.
Okay.
11 06 20 22  CDR  Okay. Yes, that's fine. How's that?
11 06 20 26  CMP  You got it, Jim. Fix it (laughter).
11 06 20 33  CDR  You see a patch, Al?
11 06 20 34  CMP  Yes.
11 06 20 35  CDR  Okay.
11 06 20 37  LMP  Okay, there you go.
11 06 20 38  CMP  No, I don't want it.
11 06 20 39  LMP  See there? It's going to be hitting it. By gads, I'll just hold it on the patch.
11 06 20 54  CMP  (Laughter) Maybe.
11 06 20 58  LMP  I'm in charge of light - light - light effect there --
11 06 21 00  CMP  Light, yes.
11 06 21 01  LMP  -- on the patch.
11 06 21 02  CMP  Light my own.
11 06 21 04  LMP  You want me to turn it on at the right time, Bob?
11 06 21 06  CMP  (Laughter)
11 06 21 07  LMP  Huh?
11 06 21 08  CMP  (Laughter)
11 06 21 09  CDR  No, I think that's all right. There. Maybe you ought to come over this way a little bit. You're up there, like you're hiding in a corner.
11 06 21 20  LMP  There you go.
11 06 21 21  CDR  There. No, I don't think you need that on the patch, do you?
11 06 21 24  CMP  No.
11 06 21 26 CDR You still got to look at the stupid camera.
11 06 21 27 CMP No, it doesn't - shows my face up there.
11 06 21 31 LMP What do you mean?
11 06 21 32 CDR Okay.
11 06 21 34 CMP We'll keep it available in case somebody wants to look at my face (laughter).
11 06 21 39 CDR Okay. Houston; 15. You ready down there?
11 06 21 50 LMP Well, it's in TV already. Who put it in TV?
11 06 21 53 CC Roger, 15 - -
11 06 21 54 CMP I put it in TV.
11 06 21 55 CC - - We're close to ready. Are you ready for a big press conference?
11 06 21 57 CMP That goes TRANSMIT.
11 06 21 58 CDR Oh, Roger. We're ready. Any time you want to go to TRANSMIT, let us know.
11 06 22 06 CC Okay, you can go ahead to TRANSMIT.
11 06 22 09 CDR Roger. We are. I got 3 seconds, 2 seconds, 1 second. How's that? There.
11 06 22 19 CMP Except for - move your wire, Jim.
11 06 22 22 CDR That a boy, now. See? They get it all. Okay, Houston, talk to us. We're all here. Except how does it - -
11 06 22 32 CC Hey, 15, we're getting a beautiful picture coming through.
11 06 22 34 CDR Yes.
11 06 22 36 CMP Very good.
11 06 22 37 CDR Roger. Go ahead with your questions.
11 06 22 45 CDR It's probably blank as hell.
Roger. We'll - we'll admire the beautiful picture for - for a few minutes here.

... this one.

... lens?

Yes, that's been done.

Deke just passed out from the shock, incidentally.

Do we look that scroungy? (Laughter)

Yes - yes. No, we look so good.

(Laughter)

Mmm!

He probably can't believe it.

Yes.

It's just because we haven't shaved in 2 weeks.

Is that a fact?

Yes.

Okay, fellows, I have a preliminary statement to make here. The questions you will be asked in this news conference have been submitted by newsmen here at the Manned Spacecraft Center who've been covering the flight. Some of the questions they raised have been answered in your communications with - with Mission Control, but the public at large has not necessarily heard them. The questions are being read to you exactly as submitted by the newsmen and in an order of priority specified by them.

Hum.

Question number 1. Since last week, we have shared scores of exciting moments with you. Which single moment would you most like to live again, and is there any moment which you would never like to repeat?
Well, I guess we all probably have a different idea on which would be the single most exciting moment of the flight, and maybe we'll just run through it one at a time. I guess the most impressive moment I can remember is standing up on Hadley Mountain - Hadley Delta, and looking back at the plain and seeing the LM and the rille and Mount Hadley, and the whole big picture in one - one swoop. And I think we've got some pictures for you from up there, and I believe the TV was running at the same time, and I think that was probably the most impressive sight that I've ever seen. Al?

I guess I'd have to say - sort of, two events occurred which were exciting for different reasons, and I guess they were really kind of the highlights of - of the flight for me. One was right after LOI, when we got our first look at the Moon, and it was a fantastic, spectacular sight. And the other, I guess, was when TEI burned so beautifully, and right after TEI, that was an awfully good feeling.

Okay. Well, I guess there were a great many new thrills for me, and the one that was most impressive, though, was the lift-off. It began the flight, and I knew that I was going into space after a - a few years of waiting and training. And then, as far as the event that I would not like to - to repeat again, was probably the - the time when I fell down in front of the TV when we were deploying the Rover.

Let me get your mike.

Question number 2. Near Spur Crater, you found what may be Genesis Rock, the oldest yet collected on the Moon. Tell us more about it.

Well, I think the one you're referring to was what we felt was almost entirely plagioclase or perhaps anorthosite. And it was a small fragment sitting on top of a - a dark brown larger fragment, almost like on a pedestal. And Jim and I were both quite impressed with the fact that it - it was there, apparently waiting for us. And we had hoped to find more of it, and, I'm sure, had we more time at that site, we would have been able to find more. But I think this one rock, if it is, in fact, the
beginning of the Moon, will tell us an awful lot. And we'll leave it up to the experts to analyze it, when we get back, to determine its origin.

Question number 3. Apollo 15 is already being described as one of the great events in the history of science. Aside from the crystalline rock, what other findings at Hadley-Apennine seem most important to you?

Well, I guess that, immediately, I think of the - the orientation or organization that was revealed in the side of Mount Hadley. There's 14,000 feet vertical relief of vast mountain face exposed to us. And there was layering in there that was most impressive for the total 14,000 feet, and we commented on the number of beds we could see. That really impressed me, that you could have that much organization in - on a large mountain on the Moon.

Question number 4. This is the toughest landing area we have attempted to - to reach on the Moon. Describe what it was like, flying into it.

Well, I think, to begin with, we had every confidence that we could get to the landing site. The trajectory had been modified such that we had adequate clearance over the mountains. And the first sight I had out the window was somewhere around probably 9 or 10,000 feet as we passed down below the upper elevations of Mount Hadley. And I could see Mount Hadley to my left before we pitch - pitched over and saw the - the plain at Hadley, and that was probably as impressive sight - a sight as I've seen. The landing itself, once we pitched over, was somewhat of a surprise in that the - the cratering was much more subtle that we had expected. There was a great lack of any large fragments or boulders on the surface. It was apparently quite smooth, and those rather deep craters, which we - we had anticipated using as landmarks because of their subtlety, did not appear quite as readily as we had hoped. I think we did recognize our relative position east-west.
of the rille because of the size of the rille itself. I think we were a little off on the north-south, but close enough to handle the traverses in the Rover. And I think that having a vehicle such as that — as that enables us to go into more complicated, difficult landing areas, because it's not necessary to land on an exact point. We can take advantage of our mobility and land anywhere within a certain prescribed area, which was initially our goal on this flight.

**Question number 5 for Al Worden.** In lunar orbit, you, too, carried out geologic observations; for example, you reported cinder cones. Could you discuss this and other observations from 60 miles up?

**Yes.** The comment on the cinder cones was one of color, but we noticed particularly on — on some of the lighter part of the back side that many, many of the craters that we — that we flew over were filled with what appeared to be lava. There seemed to be a great number of lava flows in the — in the mare area, particularly Mare Imbrium. Mare Imbrium seems to be a — just a — countless numbers of — of lava flows, which were all apparently very thin and — and very fluid. And you can see — you can just count number — numbers of flow fronts covering Mare Imbrium. So we got, I think, quite a distinct impression of a — of a — of a great deal of volcanism around the Moon. And, in some particular isolated area, such as the Littrow area and such as areas like probably the Aristarchus Plateau, there's a great deal of volcanism and some cinder cones and — and certainly a lot of lava flows.

**Question number 6.** Do you feel that the workload during your three lunar-surface excursions was too demanding? You appeared at times to be reaching the limit of your endurance. Any recommendations for Apollo 16?

**I think any time you set out on a task such as the one we had, you're bound to, at certain times, get a little tired, which I think we probably did. However, I — I think we came back and I don't think**
we ever reached anywhere near the limit of our physical endurance. I think Apollo 16 probably has everything in hand; it's just a matter of conditioning yourself. Jim and I have discussed it since we got back on board the Endeavour and concluded that our training is what really prepared us, and the many hours we spent during geology field trips and in simulations at the Cape in our suits, we feel, was a factor which really contributed to being able to proceed with those duration EVAs. I see no problem in the future with conducting three successive 7-hour EVAs. Neither one of us were particularly physically tired. I think the fatigue is really in the - the mental regime, in which you're concentrating very intensely for 7 hours, and you're pressing to do your best all the way through and - and keep your eyes open to make the appropriate observations and gather the samples. And I think it's really more of a mental factor than a physical factor.

11 06 32 50 CC Question number 7. You described the Lunar Rover as a bucking bronco on the Moon. Would you elaborate and assess the Rover's performance and tell us what changes you recommend for the 1972 model?

11 06 33 04 CDR (Laughter) Jim, you want to talk about that? Why don't you go ahead? Not too hard, though (laughter).

11 06 33 12 LMP Well, there were several times there when we were riding along where we'd hit a - a sizable bump and you could - you could see the - the wheels come off the ground and then float through the air and - But Dave should comment more as far as the - the driving. And it was really like a bucking bronco, that's true, because I was strapped in. As you know, Dave had to strap me in because I had some trouble with my seatbelt, but I - I really did feel like I was on a - a bucking bronco.

11 06 33 41 CDR I think I might add that it's a - it's a very stable machine, but because of the - the 1/6th gravity, it tends to float. In - in the simulations we ran in Houston, we saw the same amplitude or the same degree of bouncing but a different damping. In other words, the - the vehicle would
come off the ground, or one wheel normally would come off the ground, and it would take it somewhat longer to return to the ground than in one g. And I think it's just a matter of being - becoming accustomed to the - to driving. It's a very stable vehicle; the suspension system - system is excellent. We had to make some rather sharp avoidance turns periodically, and in - in these turns, we could tell the vehicle was quite stable. No tendency to turn over whatsoever. I think the only recommendation we'd really have would be to come up with a new idea on a seatbelt-type arrangement, and we - we've discussed that also. I think we have some suggestions we could make when we get back to ensure that you can have both crewmen securely in their seats in a short period of time. Other than that, I think the vehicle is about as optimum as you can build.

11 06 35 02 CC

Question number 8 for Dave Scott. The drill seemed to drive you up the crater walls. What was the problem, and was it worth the time?

11 06 35 13 CDR

I guess I'd anticipated that question. I think the problem was a - a striking discovery. When we went to Hadley Rille, we expected to find a regolith, or the soil, about 5 meters thick. And with that in mind, like 25 feet, I expected to have no trouble putting the heat flow probes in or drilling the - the core stem because of the expected soft soil. After about 1 meter, I ran into hard rock, and my first thought was it was an isolated rock somewhere within the - the soil. But that was not the case. Apparently, what we have is a very thin regolith or a thin soil layer above solid rock. And with this in mind, I think we brought back a core stem or a deep drill-core of the Moon of basic bedrock or foundation rock on the Hadley Plain. I think that's a very significant find. I think it will be very meaningful to the scientists when they analyze it. The perplexing problem was doing the actual drilling and extracting the core stem. If you put a drill into solid rock, it's very difficult to get it out. And there at the end, it took both Jim and I with our shoulders, pushing as hard as we could, up, to extract the drill stem. But, in the final analysis, as I look back on it, I think it is indeed worthwhile. At
the - at the time it occurred, we were both interested in moving out to the - the Northern Complex and further geology, which Jim and I are both quite interested in. And the mechanical task of doing the drill at that time seemed what - somewhat less important than seeking new - new finds in a new geological area. But, in retrospect, I think we have, in fact, brought back one of the most significant samples of the whole trip.

11 06 37 15 CC Question number 9 for Dave Scott.

11 06 37 17 CDR Gee, I don't want them all.

11 06 37 18 CC In view of your comment to geologist Leon Silver about the need for trained scientists on the Moon, do you think that Scientist-Astronaut Jack Schmitt should be included in the crew of Apollo 17, the last of the Apollos?

11 06 37 32 CDR Okay. Well, since I really had very little say-so as to which - which people get selected for which crews, I might sort of bypass it with the - with the one comment that I think the more qualified a man is on the Moon, the more results you're going to get. And I think that's one of the reasons that we put as much time as we did into the geological aspects, in hopes of - of learning enough to bring back some significant data. I think that, in any situation such as this, in any scientific endeavor, that you want the most qualified people possible. You must also remember that this is a - a highly complex operational mission. It requires a great deal of - of training and skill in order to fly these machines. I think, in particular, Jack Schmitt - Schmitt is a very highly qualified individual in both aspects. And I believe it's up to the - the management, that when they select the crews, to select the best people for the flight. That all right?

11 06 38 42 CC -- Al Worden. What runs through the mind of a man orbiting the Moon alone?

11 06 38 51 CMP Well, I guess - I guess the - the thing foremost in my mind during those 3 days was how I was going to keep up with the time line and the Flight Plan,
and how I was going to keep track of all the experiments we had going and where they were, and whether they were operating or not. And I guess that was a very, very fast 3 days for me. When I wasn't looking at the SIM bay experiments, I was looking out a window and taking pictures, and it was a pretty crammed 3 days. As a matter of fact, I - I guess I didn't really have - have much time to give any thoughts to being alone out there.

11 06 39 31 CC Question number 11, again for Al. You said, after your spacewalk, you wish you'd stayed out longer. What was it like out there between the Earth and the Moon, and why did you come in so soon?

11 06 39 45 CMP Well, let me answer the last one first. I - I guess I didn't come in soon; I came in when the job was done. And, as a matter of fact, I made an extra trip back out to take a look at the mapping camera. Now as - as far as what I felt like when I went out there, we talked a little bit about it after - after the EVA and decided it was sort of like walking on stage at your high school - dinner dance or something. We opened the hatch and it was pitch black, and as soon as we got out, the Sun was beating down on everything, and it looked like a very large floodlight on a stage. And then putting the TV camera out on the door just added a little bit more to that sort of unreal feeling that it was time to get out on the stage and do something. I think, as far as the EVA went, we - we did it just almost exactly as we'd practiced it. It took almost exactly the same amount of time; we did it the same way. And, of course, we had practiced out with the pan - with the mapping camera in the extended position, and so that - that really posed no difficulty to us.

11 06 40 55 CC Question number 12 for Dave and Jim. You - you didn't have time to get to North Complex, craters which may have been formed volcanically and where you thought some surprises might be found. Was this a significant loss?

11 06 41 12 LMP Why don't you?
Well, I'll start out and - and throw an answer there. I think if you look back at the original requirements for the landing at the Hadley-Apennines, they were primarily to inspect the Front and the rille. It was only after a - a considerable amount of study had been done and some rearrangement in the Flight Plan - the timing on the surface, that we found we had enough time to plan to go to the Northern Complex. So the Northern Complex was, in fact, an addition to the original requirement; it was a bonus. And I think, because Jim and I have spent so much time with volcanics in our terrestrial geology work, that we were quite interested in getting to the Northern Complex to see if, in fact, it was a volcanic area. But I don't believe we lost anything from the lunar surface by not going there; only we would have had an extra - a bonus had we been able to reach that point. And, with that in mind, I hope that someday somebody gets a chance to go back and take a look at the Northern Complex. Jim, you want to answer?

No, I agree with everything you said. It was just a - a little personal disappointment that we couldn't get up there, because we - we thought we'd have another beautiful view of the - the plains there and the LM, a view almost --

(Sneeze)

-- as beautiful as it -- as it was from the side of Hadley Delta.

Question number 13 for each of you. Would you, please, in your own words, tell us what you gave the American taxpayers besides a few hours of good television?

(Laughter) Well, I think - the magnitude of the scientific data we've returned will speak for the taxpayers' money. The small amount of time they had for television, I think, is rather insignificant relative to the amount of return we've gathered in the SIM bay and in the lunar samples we have aboard right now. I think these data will not only enhance the progress of science, but it'll reach the common man on the street.
directly by the - the byproducts of what we learn. I think man must extend himself, that new frontiers must be opened in order for us to - to propagate mankind, and I think this is one way in which we do it. I - I feel that the taxpayers got, probably - as a matter of fact, I hope they got more than their money's worth out of the flight. And, if you could see the size of the - the film magazines that Al brought in yesterday from those cameras, why, you'd see that we have indeed at - at least a great deal of data on film alone. Want to answer that?

Well, I really guess that - that there's not much more to add to what Dave said. He - he expressed my sentiments exactly, in that the - the knowledge that, hopefully, we've - we've added to our store of information about the Moon and about ourselves will be increased in an extent which is greater than - than the - than the capital that was spent on the flight itself. And I would certainly think that - that this whole theory adds significantly to - to man's knowledge about himself primarily and about himself in those areas where it will help future generations maybe. Jim?

I can only add that we're bringing back just a - a lot of - a lot of data and a log of material, and it's going to take many years for people to really appreciate how much was gained from - from this flight.

Question number 14. It seemed this flight had as many problems as some of the old Gemini missions. Which of these gave you the most concern; and, for Dave, did you ever feel you were back on Gemini VIII?

Well, I guess we weren't aware we had that many problems. I thought this was a rather troublefree flight, myself. We went a long way, we spent a long time doing the job, and I think, relative to the number of systems we have in all the space-craft, that we had very few problems. I can think of none that were significant that would enable me to compare it with Gemini VIII at all. We had a - I guess the first little problem we had was a - a leak in our water system, which was cleared up rather rapidly by somebody having already done
some investigation and having a procedure at hand. I believe our system is such that people have all the anticipated problems understood, and, when they have them understood, they come up with solutions which are quite meaningful and successful. And I feel like the spacecraft and the life-support systems on the Moon and everything worked exceedingly well. I - I guess really I couldn't ask for much more. How about you?

11 06 46 37 CMP Well, I really don't --

11 06 46 38 CDR No, go ahead.

11 06 46 39 LMP Go ahead. You know, really, we had very few problems. It seemed like a very tame simulation, as far as I was concerned.

11 06 46 47 CMP Certainly, there were - there were - there were irritating things that happened like some circuit breakers in the spacecraft here that gave us some trouble, and some lights that aren't working exactly right. But certainly none of the important aspects of the flight or - or none of the essential pieces of equipment has malfunctioned, and I think it's been just great. Okay, Karl, you take it from there, baby.

11 06 47 19 CC Gentlemen, we'd like to continue the press conference in a few minutes. But, in the meantime, we'd be anxious to get - start - get one of you started on the lunar-eclipse photos.

11 06 47 28 LMP Yes, turn --

11 06 47 29 CDR We got to try to do both?

11 06 47 30 CC -- three more questions.

11 06 47 31 CDR Okay --

11 06 47 32 CC Question 15.

11 06 47 35 LMP Why don't we show them the lunar eclipse?

11 06 47 37 CDR (Laughter)

11 06 47 39 LMP There's a lunar rock to show them.
— 15 — for Dave and Jim. How many times did each of you fall down on the lunar surface? Did any of these falls hurt you or give you any problems?

Let's think, how many times?

Well, I fell down twice —

Yes.

—and it was never any real problem. Actually, I could have got up very well by myself without any help.

Yes, I guess I fell down twice, too, and, as — as Jim said, it was never any really problem. It's a matter of, if you start to go — and, of course, the terrain there, I guess you could see in the television, was quite rough and irregular with occasionally rocks around, and we were pressing to try and get things done. And it was just a matter, if you just start losing your balance, to go ahead and go easy, and accept somewhat of a — a light fall. Because of the 1/6th gravity, there was never any impact when we hit. Take it easy and get up slow. And I don't think either one of us ever came anywhere near the point of being hurt, in that sense of the matter, it's just a matter of slowing you up for a minute, enabling you to regain your balance, and go ahead. And — and I have a question. Do you want to have the photos of lunar eclipse with the television now, or do you want us to get on with the — the camera photos? Because if that's the case, we have to turn the lights out.

Roger. We're going to skip down to the last question, Dave, which says your cabin must be jammed with Moon rocks, core samples, suits, and assorted hardware. Can you show us what it's like in there? And, as you show us around, you can get set up for the Moon photos and dim the lights when you like.

Oh, man.

(Laughter) Ohh!
Okay. I guess --

(Laughter)

-- to show you around, we have to unstow every-
thing. We're - we're pretty well stowed for re-
entry right now. We have all the samples stowed,
The suits are all stowed, and I guess, in order
to show you around, we'd have to do some unstowing
because under - beneath the couches right now, it's
jammed full. And I guess we'd like to do that for
you, but it's some - somewhat impractical, in that
all you could see would be some - some edges of
the white bags, and that's why we have the room
in the cabin here. Every - everything's pretty
well squared away. But, when we get back, I'm sure
you'll have an opportunity to see the many things
we have, and there's really a lot of it.

0 - okay, Dave. That's fine. And I guess one
last request is, when you get over to that window
to - and before you take the photos, could you give
us a quick picture of the Moon with the TV camera?

Sure will. Can try it.

(Humming)

Have I got any pictures? I'll cut this thing down.

(Humming)

See any magazines?

Yes --

Right here's some, Dave. I got Al's. You got
some? Procedures, cameras -

You ought to get over here.

Let me get over there.

15, the word here is to proceed. Give your photog-
raphy first priority there, and maybe we can see
the - the Moon out of the other window.

That's ... --
Okay, we're working on it.

Oh, ...

Got enough?

Hold it, Al. It's still going --

Monitor? Yes, I can get it from here. I think.

15, Houston. We hear that your attitude is very good right now; there's no need to trim the maneuver.

Okay, thank you.

Okay, Al, you got the camera all set up over there, huh?

Yes.

Do you want me to read the settings to you, just in case?

Yes.

There's a change.

Yes.

If you'll grab those ...

What do you want me to get, Dave? Get the lights? Yes, I can get them.

If you can get the lights -

Turn this up a little bit. Okay, Al, when you're ready for me, I'll read to you.

Could that be it?

Need anything down there, Dave?

No, I don't think so. See what it looks like.

Well, it's completely dark now. Just the lower part is orange.
11 06 53 04  CDR  Yes.
11 06 53 07  LMP  The top part's almost a red, a dark red, and the bottom is an orange.
11 06 53 11  CMP  Here.
11 06 53 12  CDR  There you go. Yes, you got her. Okay, Houston. I think you have a picture of her now. There she is.
11 06 53 19  CMP  Okay.
11 06 53 20  LMP  Okay. Let's check it; f/1.2?
11 06 53 23  CMP  Yes.
11 06 53 24  LMP  1/500th?
11 06 53 25  CMP  Right.
11 06 53 26  LMP  Take eight frames? Okay, I guess we'll give priority to you, huh, Al?
11 06 53 30  CDR  Okay, we - we got to get the --
11 06 53 32  CC  15, so far we have a blank screen down here.
11 06 53 35  CDR  Oh, really? I've got a good picture on the monitor.
11 06 53 41  CMP  Okay, Jim, while --
11 06 53 42  CC  Hang on for a moment, please.
11 06 53 43  LMP  Okay, we're coming up on 6 minutes here at 55 --
11 06 53 47  CMP  Besides, we're FREE here.
11 06 53 49  CDR  Boy, every time those - the jet fires ...
11 06 53 52  LMP  Okay, go - we're FREE.
11 06 53 54  CMP  Okay, Jim.
11 06 53 56  CC  It's coming through now.
11 06 53 57  CMP  Okay, Jim.
Okay, stand by. Your first one'll be a 60-second exposure time and I'll - it'll be at 55:53.

Well, that's kind of - not ... 

That's a beautiful picture with just an edge of the Moon coming out of eclipse.

I can do it anyhow.

Can you?

Roger; that's right.

Okay. Suit yourself then. I'm --

---

Anybody else like chicken stew?

Chicken stew, huh? Yes, I do. I didn't know we had any. Is that what you have up there?

Yes.

No, uh-uh.

If you want to eat here, I'll be happy to come down there.

Hey, throw me some beef steak. Well, I guess some turkey and gravy.

... 

Go back where? Yes, man, you aren't kidding.

Thought you wanted to go back to the Moon?

Don't know why.

I'll trade with you, Dave.

All right.

I'll go down there.
CDR Down here?
LMP Yes.
LMP This is our new garbage can down here, huh? Good.
LMP You want to get those readings now, Al, or after supper?
CMP I don't care.
LMP Get them now?
CMP Okay. Start out with 5-C.
LMP 5-C reading 4 - 4.2.
CMP All right; 5-D?
LMP 3.9.
CMP 6-A?
LMP You writing them down?
CMP Yes.
LMP 6-A is 4.1.
CMP Okay; 6-B?
LMP 4.2.
CMP 6-C?
LMP Greater than 5.
CMP No kidding. Huh. Okay --
CC ...
CMP -- 6-D? Houston, 15. Go ahead.
CC Roger. Remember back away, we were talking about doing some more mass spec boom tests at 275 hours, which has gone by. We're right now talking about delaying that until 276 hours, approximately, or
at least until before you start your VERB 49 maneuvers for the next set of P23s. Over.

Okay, fine. 6-D.

Is that okay on 6-C, the fact that it's --

I don't know; we'll tell them.

Okay, 6-D is 45.

Okay. And, Houston; 15. I have some command module RCS injector temperatures for you.

Ready to copy.

Okay, these are readings off the SYSTEMS TEST meter: 5-A is 4. - or 5-C is 4.2, 5-D is 3.9; 6-A is 4.1, B is 4.2, C is greater than 5, and D is 4.5.

Roger. Copy 4.2, 3.9, 4.1, 4.2, greater than, and 4.5.

Roger.

Here, put it on there, I'll give you a squirt. How many do you want?

Is that the soup?

Chicken stew.

How many do you want?

Three of them.

Ready?

Yes.

Shit.

Screw it in there?

Good.

...
Yes. Roger.
...
Yes.
Well, we have a lot of drinks for breakfast.
Okay, I ought to change the LiOH. Which one was it, Al?
Okay, 23 to B and 21 to A-5.
Okay, going into B.
23 into B.
Okay.
I wonder if any of this food is - the - the irradiated food.
Could be. ...
One way of preserving food these days is to -
... radiation.
And it preserves it. At certain times, radiation preserves it.
Okay. Canister change is complete.
Okay. Very good.
...That's wrong, Dave.
... - -

TIME SKIP

Al, you going to monitor comm? I'm going to get off the headset here.
Come forward, Al. Thank you very much. ... Just ruined the whole thing.

Oh - damn!

Oh, my God.

Freaking DAC won't come off.

You need one of these, too? That okay?

Okay. Okay.

There you go. Can I get that for you?

Thank you.

Ready for it now?

... Move over some. ...

If I were you, I'd go over to the lab and pick one up out of there - a perfect sample.

They don't have them.

They don't?

No.

Dammit, why don't you buy a set of them? ...

I might buy them.

Yes, but you'd be taking all that guff.

Feast over his favorite rock.

Right.

...

How come?

...
11 11 40 53  CMP  ... 
11 11 41 05  CMP  On the ball. 
11 11 41 12  CDR  ... 
11 11 41 30  CMP  ... to surprise ... 
11 11 41 40  CDR  ... 330 ... 
11 11 41 49  CMP  (Clears throat) You going to do anything else down there? Are you going to do anything down there? All right. 
11 11 41 58  CDR  ... 
11 11 42 02  CMP  Well, I've got a P23 to do in 3 minutes, and then we got to ... the daytime. I got to clean up and change my long johns and take my biomed off, while I got the chance. 
11 11 42 17  CDR  Okay. 
11 11 42 58  CMP  Okay. 
11 11 44 37  LMP  Dave, I hope we're going to be able to see them unload all those rocks. 
11 11 44 42  CDR  Yes, I think we should. 
11 11 44 43  LMP  Okay. 
11 11 44 44  CDR  ... time ... 
11 11 44 48  LMP  I hope so. Yes. They'll just have to hold up the - the rocks until we're there. 
11 11 44 58  CDR  ... going to have a ball ... Is that why you ...? 
11 11 45 07  LMP  Yes. 
11 11 45 12  CDR  ... 
11 11 45 15  LMP  Yes. 
11 11 45 19  CDR  ... mind working some long hours. 
11 11 45 29  LMP  How long does the medical take on the ship? 

[CONFIDENTIAL]
... ship until about what - 6 o'clock tomorrow night? We'll be taking that physical until 10 tomorrow night?

Ten their time is all I know.

Oh, that's right. It's 4 our time, which is -- On board the ship.

Yes. ...

...

... we're laughing.

...

I think we might look ...

I had it under control. I had it under control.

...

We're all having his.

Man, we're down low. The cupboard's bare. Bacon squares.

I don't know if we have enough in there for two more. Yes, I guess we do.

...

Yes, you need a reinfo - forced toe section.

I'll take that and get this - Going to use the camera.

Have a 9-hour rest period.

Make sure I'm turned on there, will you, Dave? My power on?
... What? Yes, if you want to dig it out, it's in the - I put it in that bag. Dave, could you get - Dave, could you get - There's a bag in my TSB. One of the white towel bags that has all my gear it in.

LMP Thank you. It's in here, Al.

CC Apollo 15, Houston. Over.

LMP Go ahead, Bob.

CC Roger. If one of you fellows has the time, we might like to continue on with the mass spec boom retract test.

LMP Okay. Is it something I should write down, or can I just do it real time?

CC Give it to you in real time. It's not that complicated, Jim.

LMP Okay. Go ahead.

CC Okay. We need the EXPERIMENT switch to ON down there in the ALPHA - Excuse me, the MASS SPEC, EXPERIMENT switch to ON; and the ION SOURCE, ON. Over.

LMP Okay. I understand MASS SPEC, EXPERIMENT, ON; and ION SOURCE, ON. Stand by. David, can you get a couple of switches over there? The MASS SPEC, EXPERIMENT, ON; and the ION SOURCE, ON.

LMP Okay, Bob. They're both ON.

CC Okay. And then next, you go down to the other panel, and we go DEPLOY for 20 seconds on the MASS SPEC BOOM, and then RETRACT for 40 seconds, or until we get a gray indication. Over.

LMP Understand you want DEPLOY for 20 seconds and then - on the MASS SPEC BOOM, and then RETRACT until we get gray or 40 seconds.

CC Roger. Whichever occurs first.
Okay. Okay, Dave. On that MASS SPEC BOOM, we go DEPLOY for 20 seconds. If you want, I can give you a mark.

That's okay.

They're OFF.

Go to OFF and then I'll have you - and then RETRACT it for 40 seconds —

TIME SKIP

Oh, 6:45 tomorrow.

Yes... ...

He didn't.

Cabin temp, 67.

...

Oh, shit.
Day 13

12 03 56 22 CDR    -- NORMAL.
12 03 56 23 LMP    TAPE RECORDER's on HIGH BIT RATE. Record the start.
12 03 56 29 CDR    Okay. It worked.
12 03 56 32 CMP    Yes.
12 03 57 04 CMP    10, 9, 8, 7, 6, 5, 4, 3, 2, 1 -
12 03 57 14 CMP    ZERO.
12 03 57 15 LMP    ... open.

TIME SKIP

12 06 50 17 LMP    Okay, TAPE RECORDER's on HIGH BIT RATE, RECORD, and FORWARD.
12 06 50 25 CDR    Here, my friend, is a lunar rock.
12 06 50 28 CMP    Yes. Floating around in the space of our spacecraft.
12 06 50 33 CDR    Yes. Wonder (laughter) - The sequence of panels we go through is somewhat inane.
12 06 50 41 CMP    Oh, it really is, isn't it? God!
12 06 51 13 CMP    About 8 minutes.
12 06 51 17 CDR    This is the most leisurely entry we've ever done.
12 06 51 19 LMP    Yes, I don't understand how - why we have so much time.
12 06 51 21 CMP    Stand by. ... fast.
12 06 51 23 CDR    It'll go fast.
12 06 51 25 CMP    That's because we started 4 hours earlier --
12 06 51 27 SC    (Laughter)
12 06 51 28 CMP -- than we normally do.
12 06 51 29 CDR (Laughter) That's true. This is our normal reset burn, right here.
12 06 51 39 CC Apollo 15, Houston. You're looking good. About a minute and a half to handover to ARIA.
12 06 51 45 CDR Roger.
12 06 52 00 CDR Separation really unloosened a bunch of stuff.
12 06 52 04 CMP Yes.
12 06 52 05 LMP See my nut come flying by yet?
12 06 52 07 CDR No (laughter). Nor your screw (laughter).
12 06 52 11 LMP Listen, man, I've got my screw right here.
12 06 52 59 CDR Got your camera all ready, Jim?
12 06 53 01 LMP Ready.
12 06 53 02 CMP Don't forget it.
12 06 53 03 LMP I think I'll turn it on at - probably - Oh, look out the window, and you see ions - ionization.
12 06 53 09 CDR Yes.
12 06 53 15 LMP Probably be just before blackout, I guess. Blackout at PT. Yes. Before zero phase.
12 06 53 55 CMP Looks like 5 minutes.
12 06 53 56 CDR Right on. Time is right on.
12 06 53 58 CMP Great.
12 06 54 00 CDR Can't argue with that.
12 06 54 04 CMP My dynamics - or trajectory's changing somewhere, because that light's coming from a different place now.
12 06 54 52 SC (Sneeze)
<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 06 55 15</td>
<td>CMP</td>
<td>Oh, that's the Earth down there, baby.</td>
</tr>
<tr>
<td>12 06 55 18</td>
<td>LMP</td>
<td>Can you see it?</td>
</tr>
<tr>
<td>12 06 55 19</td>
<td>CDR</td>
<td>Sure as hell can. Yes, siree, I hope to tell you.</td>
</tr>
<tr>
<td>12 06 55 23</td>
<td>LMP</td>
<td>Are we going backwards?</td>
</tr>
<tr>
<td>12 06 55 25</td>
<td>CDR</td>
<td>It's big and real.</td>
</tr>
<tr>
<td>12 06 55 26</td>
<td>LMP</td>
<td>Yes. I can see it. Just barely see it out of my window.</td>
</tr>
<tr>
<td>12 06 55 29</td>
<td>CMP</td>
<td>Yes, we're going backwards.</td>
</tr>
<tr>
<td>12 06 55 30</td>
<td>CDR</td>
<td>Encouraging.</td>
</tr>
<tr>
<td>12 06 55 35</td>
<td>CMP</td>
<td>Just check the needle on the peg here; 51 and a couple of minutes until we're down.</td>
</tr>
<tr>
<td>12 06 55 40</td>
<td>LMP</td>
<td>Is that pausing from minimum impulse?</td>
</tr>
<tr>
<td>12 06 55 45</td>
<td>CDR</td>
<td>It sure is. Man, that's just bang, bang. That's really neat.</td>
</tr>
<tr>
<td>12 06 55 51</td>
<td>CMP</td>
<td>I keep thinking that, if I hit the stick quick, that minimum impulse will be less (laughter). Did you ever get that feeling?</td>
</tr>
<tr>
<td>12 06 55 56</td>
<td>CDR</td>
<td>Yes.</td>
</tr>
<tr>
<td>12 06 55 57</td>
<td>CMP</td>
<td>There's just a little bit you want to go --</td>
</tr>
<tr>
<td>12 06 55 58</td>
<td>CDR</td>
<td>It's right then.</td>
</tr>
<tr>
<td>12 06 55 59</td>
<td>CMP</td>
<td>-- and you try to get it and you can't quite get there. Yes.</td>
</tr>
<tr>
<td>12 06 56 09</td>
<td>CMP</td>
<td>Oh, yes. Hey - Oh, man, are we moving, too! Son of a gun! Sheeeoo!</td>
</tr>
<tr>
<td>12 06 56 21</td>
<td>CDR</td>
<td>Yes, indeedy. You ought to be able to see it out the - out the hatch window.</td>
</tr>
<tr>
<td>12 06 56 25</td>
<td>CMP</td>
<td>Oh my, I sure can. Sure a lot of mountains down there. How about that!</td>
</tr>
<tr>
<td>Time</td>
<td>LMP</td>
<td>Message</td>
</tr>
<tr>
<td>-------</td>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>12 06 56 36</td>
<td>LMP</td>
<td>Shit, I think that's Alaska out there. That would be right, wouldn't it?</td>
</tr>
<tr>
<td>12 06 56 47</td>
<td>CMP</td>
<td>Yes. Keep an eye out for the Moon.</td>
</tr>
<tr>
<td>12 06 56 49</td>
<td>CDR</td>
<td>Yes, keep an eye out for the Moon.</td>
</tr>
<tr>
<td>12 06 56 50</td>
<td>CMP</td>
<td>We've done it. Oh, we've missed it.</td>
</tr>
<tr>
<td>12 06 56 53</td>
<td>CDR</td>
<td>56:37. Oh, Al --</td>
</tr>
<tr>
<td>12 06 56 54</td>
<td>CMP</td>
<td>We were too busy watching the Earth.</td>
</tr>
<tr>
<td>12 06 56 55</td>
<td>CDR</td>
<td>-- why don't you pay attention to what you're doing there.</td>
</tr>
<tr>
<td>12 06 56 57</td>
<td>CMP</td>
<td>Too busy watching the Earth.</td>
</tr>
<tr>
<td>12 06 57 05</td>
<td>CDR</td>
<td>I'm not sure there's much you could do about it any - any - to correct it anyway.</td>
</tr>
<tr>
<td>12 06 57 09</td>
<td>CMP</td>
<td>Not at this point. Here comes the needle off the peg. There it goes. Now let me get to 5. Yes, 55.</td>
</tr>
<tr>
<td>12 06 57 17</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>12 06 57 33</td>
<td>CDR</td>
<td>Neat.</td>
</tr>
<tr>
<td>12 06 57 34</td>
<td>CMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>12 06 57 35</td>
<td>LMP</td>
<td>We just passed south of Alaska.</td>
</tr>
<tr>
<td>12 06 57 37</td>
<td>CDR</td>
<td>Did we?</td>
</tr>
<tr>
<td>12 06 57 38</td>
<td>LMP</td>
<td>Yes.</td>
</tr>
<tr>
<td>12 06 57 41</td>
<td>CDR</td>
<td>Little earlier than usual.</td>
</tr>
<tr>
<td>12 06 57 48</td>
<td>CMP</td>
<td>Houston, 15; go ahead.</td>
</tr>
<tr>
<td>12 06 58 05</td>
<td>CDR</td>
<td>Okay, the needle's off the peg.</td>
</tr>
<tr>
<td>12 06 58 12</td>
<td>CMP</td>
<td>About right.</td>
</tr>
<tr>
<td>12 06 58 28</td>
<td>LMP</td>
<td>What a view! Whew!</td>
</tr>
<tr>
<td>12 06 58 37</td>
<td>CMP</td>
<td>Okay, we've got about 10 - 20 seconds to entry interface.</td>
</tr>
</tbody>
</table>
More than that. Oh, EI, yes. ... I don't think I'm going to like it.

There's RRT.

Okay.

Getting the ionization?

Yes, man.

Put your --

Yes, look at it. Good.

Yes.

Ionization?

Everything looks good.

Boy, I guess.

.01, .02, 4 -

.05G light.

Okay, GO. EMS scroll --

.05G switch --

EMS good.

.05G switch, on; EMS ROLL, on.

They're both on.

Okay.

Okay. Okay, .39.

Okay.

.5, .1.

.6.

.8, 1, 1.3, 2g's, 2g's --
12 06 59 53 CMP Accelerometer and the DSKY.
12 06 59 56 CDR Okay.
12 06 59 57 CMP Scroll look good?
12 06 59 58 CDR/CMP 3g's.
12 07 00 01 CDR Three and a half.
12 07 00 03 CMP 4.
12 07 00 04 CDR There's 4.
12 07 00 05 CMP 5.
12 07 00 07 CDR There's 5, 6 -
12 07 00 13 CMP Scroll looks good.
12 07 00 14 CDR There's 6, 6, 6 there, 6.2. Don't see anything on master alarm.
12 07 00 22 CMP Want the master alarm?
12 07 00 24 CDR Nothing.
12 07 00 25 CMP Huh?
12 07 00 26 CDR Nothing.
12 07 00 27 CMP Okay.
12 07 00 28 CDR 5.6. We roll 180. 5, 4.7 -
12 07 00 37 CMP Looking good.
12 07 00 38 CDR 180 roll, 4, 4.4, 4.2, 4.1. Rolling to 150, 117, 092 - -
12 07 00 52 CMP Okay, looking good.
12 07 00 54 CDR Plus 69, plus 51.
12 07 00 57 CMP Looking good.
12 07 00 58 CDR Plus 49.
12 07 00 59 CMP Okay.
12 07 01 00 CDR 4g's, you're right on.
12 07 01 02 CMP 4g's.
12 07 01 03 CDR Eighty-five, plus 101. Holding 4g's. Lift vector, up.
12 07 01 10 CMP Going up.
12 07 01 11 CDR We're in P67.
12 07 01 12 CMP Good.
12 07 01 18 CDR Okay. Minus 51.
12 07 01 21 CMP Okay.
12 07 01 23 CDR And at 4g's. Minus 110.
12 07 01 31 CMP Okay, we're going in.
12 07 01 34 CDR Minus 116.
12 07 01 35 CMP Okay, 450 miles and that's --
12 07 01 36 CDR Okay.
12 07 01 37 CMP -- right where we are on the scroll.
12 07 01 49 CDR Okay, at 399, we're --
12 07 01 51 CMP Okay, we're off the ...
12 07 01 52 CDR -- almost 3g's. Boy, EMS has missed here within about 5 miles.
12 07 01 55 CMP Yes, we're looking good.
12 07 01 58 CDR Seventy-one, minus 70.
12 07 02 00 CMP EMS is -
12 07 02 04 CDR Minus 70.
12 07 02 19 CMP Pretty good.
12 07 02 20  CDR  Yes.
12 07 02 23  CMP  Minus 70 --
12 07 02 24  CDR  Okay, there's 3g's.
12 07 02 26  CMP  And the scroll shows us right on the range to go.
12 07 02 30  CDR  Okay.
12 07 02 34  CMP  Couldn't be better.
12 07 02 36  CDR  Houston, Apollo 15. We're in P67. The EMS and the G&N agree within 15 miles, and everybody's in good shape.
12 07 02 51  CDR  Okay, plus 52.
12 07 02 52  CMP  Roger. That's where we are. Still pulling 3g's.
12 07 03 01  CDR  Okay, stand by.
12 07 03 04  CMP  And we're coming right straight down that scroll. Beautiful.
12 07 03 06  CDR  Good. Houston, 15. EMS and G&N agree within about 10 miles, and everybody's in fine shape.
12 07 03 28  CMP  There they are.
12 07 03 30  CDR  Okay, 32 degrees ...
12 07 03 40  CMP  Okay, 98, NOUN 18; boy, that's slick.
12 07 03 43  CDR  10,000 feet per second.
12 07 03 50  CMP  My eyes were cocked; 100 miles to go. I'm about 4 miles off; so - Looks like even the scroll's working great.
12 07 03 59  CDR  Yes. Great. Hey, now I know why you got to check the tunnel for water.
12 07 04 07  LMP  Yes, boy, I guess. Did you get wet?
12 07 04 09  CDR  Yes, man. ...
12 07 04 13 LMP Yes, it really comes barreling out of there, doesn't it? (Laughter)

12 07 04 19 CDR Okay. ... --

12 07 04 20 CMP Sixty miles to go. Okay, up.

12 07 04 24 CDR ...? 33 and 46. Boy, they really agree. 6000 ... --

12 07 04 37 CMP Getting our cross range right now.

12 07 04 44 CDR Hey, Houston; 15 in the blind. The EMS and G&N agree within about 10 miles.

12 07 04 52 CMP Gee, what makes you feel - sound so hollow?

12 07 04 55 LMP Sounds like ... is about to make a low pass on us.

12 07 04 58 CMP Yes.

12 07 04 59 CDR We're coming up to 38. Watch your steam pressure, Jim.

12 07 05 01 LMP Standing by.

12 07 05 17 CMP It's 3000.

12 07 05 18 CDR No steam pressure yet?

12 07 05 19 LMP It's going up now.

12 07 05 20 CDR Okay.

12 07 05 21 LMP Okay, steam pressure's pegged.

12 07 05 24 CMP Okay, we should get - 50K in about another 600 feet. Got 9 miles to go on EMS.

12 07 05 34 CDR Okay. Should be getting a NOUN 67 here directly.

12 07 05 47 CDR Okay, Houston; 15 in the blind. Latitude, plus 26.12; longitude, minus 158.17 --

12 07 05 54 CMP Okay, we're off the peg.

12 07 05 55 CDR -- and about a 2.2 off the peg.
12 07 05 56  LMP     Okay, CABIN PRESSURE to BOOST/ENTRY.
12 07 06 00  CMP     BOOST/ENTRY.
12 07 06 01  LMP     SEQUENCE PYRO, two, to ARM.
12 07 06 04  CMP     PYRO to ARM.
12 07 06 07  LMP     Standing by for 30.
12 07 06 09  CDR/CMP  Okay.
12 07 06 11  CMP     We're out of 40.
12 07 06 16  CDR     Okay, Houston; 15. Out of 40K, and we're showing
                     about a .7, .2, this business now. Everybody's in
                     good shape.
12 07 06 27  LMP     How's the altitude, Al?
12 07 06 29  CMP     Coming up on 30.
12 07 06 30  CDR     Okay --
12 07 06 31  CMP     Okay, 30K.
12 07 06 32  LMP     Okay, ELS LOGIC, on.
12 07 06 33  CMP     ELS LOGIC, on.
12 07 06 35  LMP     ELS, AUTO.
12 07 06 36  CMP     AUTO, on.
12 07 06 38  CDR     Okay. Stand by for --
12 07 06 39  LMP     Standing by for drogues at 24. There go the -
                     there goes the apex. There are the drogues.
12 07 06 50  CMP     Good drogue.
12 07 06 52  LMP     Okay, cabin pressure's increasing.
12 07 06 55  CMP     All right.
12 07 06 58  LMP     Standing by for mains - at 10.
12 07 07 02  CMP     Okay, we're out of 18.
Give us a call when you get to 10.

Well, coming out of 14, 13, out of 12, 11,000.

Okay.

Okay, the mains are up there.

And the mains are out, three.

Okay --

Okay.

-- Apollo 15 has good mains.

The mains are opening.

SURGE TANK O₂, off, Al.

SURGE TANK O₂ coming off.

REPRESS PACKAGE, OFF.

Let's go, Al.

REPRESS, OFF.

DIRECT O₂, OPEN.

DIRECT O₂, OPEN.

-- the bearing is 130 to - three main chutes. I have visual contact; three main chutes.

-- 8000.

Okinawa, Roger. Out.

-- PRESSURE RELIEF, two, CLOSED.

CLOSED.

CM RCS LOGIC, on, up.

... 2, Apollo 15. We're showing about a minus .6 --
12 07 08 16 CMP RCS LOGIC, on.
12 07 08 17 CDR -- on the miss distance --
12 07 08 18 LMP CM PROPELLANT to DUMP.
12 07 08 19 CDR -- Everybody's in good shape.
12 07 08 28 R Okinawa, Recovery has a recovery beacon contact, bearing 175 magnetic. On station.
12 07 08 34 OKI Okinawa here.
12 07 08 37 S-2 Okinawa, this is Swim 2. I have a visual contact bearing 010, that's approximately 1 mile. My position, 134; Okinawa 8.5 miles. Altitude is about 6000 feet to the command module.
12 07 08 52 OKI Okinawa, Roger. Out.
12 07 08 58 S-1 Okinawa, this is Swim 1. I have recovery beacon, 115 degrees magnetic, at 270, 12 miles, at time 47. Over.
12 07 09 11 OKI Okinawa, Roger. Out.
12 07 09 16 CMP Pick out the place.
12 07 09 19 CDR Okay?
12 07 09 20 CMP Okay --
12 07 09 21 P This is Photo. I have one -- there's something -- something's falling beside the command module. I could not tell what it was, though.
12 07 09 31 LMF Strut locks, four, unlocked.
12 07 09 33 R Apollo 15, Apollo 15, this is Recovery. Over.
12 07 09 38 CDR Recovery, Apollo 15. Everybody's in good shape, and we're looking at about 3500 feet.
12 07 09 43 R This is Recovery. I have a visual of 165 --
12 07 09 47 LMF Ten seconds to release.
12 07 09 48 R -- from me, about 8 miles.
Go ahead, Jim.

Stand by for purge dump.

This is Photo. It appears that one of your main chutes is streaming. I can only see two main chutes, and one appears to be streaming.

Yes. ... two chutes concurred.

They have one streaming chute.

Do we have three, Al?

We got two.

No, we're at 3000 --

Stand by for ... --

Okinawa, this is Photo 1 --

-- ...

Okay.

-- the extra fuel has been jettisoned and burned off.

Cinch up, gang.

Cinch up, gang.

Apollo 15, Apollo 15, this is Recovery. Over.

Got your VHF beacon on?

3000 --

Yes, it's --

-- Jim.

3000, Jim.

Okay, CM RCS PROPELLANT, two, OFF.

OFF.
Okay.

Two, off.

CABIN PRESSURE RELIEF VALVE to DUMP.

All right, coming to DUMP.

FLOODs to POSTLANDING.

Coming up on 2000.

How many chutes we got, Al?

We got two.

Two.

We got a streamer on one.

FLOODs to POSTLANDING.

FLOODs to POSTLANDING.

Stand by for 800.

This is Photo. Lost contact due to cloud cover.

Apollo 15, Apollo 15, this is Recovery. Over.

Roger, Recovery; 15. You're 5 square. Everybody's in good shape.

Okay, we're out at 1500, Jim.

Okay.

Roger, Apollo 15. If you hear, all units have you in sight, and we are eastbound now.

Roger.

1000 feet, Jim.

Okay --

... dump.
Day 13

12 07 11 16 LMP -- CABIN PRESSURE RELIEF to CLOSE.
12 07 11 17 OKI Apollo 15 --
12 07 11 18 CMP CLOSED.
12 07 11 19 OKI -- this is Okinawa. Request your splashdown read-out. Over.
12 07 11 21 LMP Okay, you ready for MAIN BUS TIES to come OFF.
12 07 11 26 CMP Ready for BUS TIES.
12 07 11 28 P This is Photo. Approaching ...
12 07 11 30 CMP Okay.

END OF TRANSCRIPT