APOLLO 16
COMMAND MODULE
ONBOARD VOICE
TRANSCRIPTION

Classification changed to (U)
By authority of 15C Security Classification Officer
Date 11-9-73 — 2/9/78 — [Redacted]
RECORDED ON THE DATA
STORAGE EQUIPMENT (DSE)

JUNE 1972

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

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MANNED SPACECRAFT CENTER
HOUSTON, TEXAS

INDEXING DATA
DATE
OPR

SIGNATOR
LOC

 MSNBC
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.
INTRODUCTION

This document is the transcription of the Apollo 16 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 Apollo elapsed time (AET) were forwarded to the NASA Manned Spacecraft Center, Houston, Texas. Transcription of these tapes was managed by James L. Gibbons, Test Division, Apollo Spacecraft Program Office, to whom inquiries regarding this document should be referred.

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 ground elapsed time (GET) in the Flight Plan may be updated to the spacecraft and MCC computers and to the telemetry down-link 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 AET (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:

| CDR | Commander | John W. Young |
| CMP | Command module pilot | Thomas K. (Ken) Mattingly II |
| SC | Unidentifiable crewmember |
| MS | Multiple speakers |
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 16 mission was flown April 16 to 28, 1972; lift-off occurred at 17:54:00.57 G.m.t. (12:54:00.57 p.m. e.s.t.) on April 16. The CM was designated Casper and the lunar module was called Orion.
DAY 1

-00 00 00 15 LCC 15, 14, 13, 12, 11, 10, 9, 8, 7, 6 -
-00 00 00 05 LCC IGNITION, 4, 3, 2, 1 -
00 00 00 00 LCC LIFT-OFF.
00 00 00 01 LMP Man, we're on our way!
00 00 00 06 CDR Yaw program. ... clear.
00 00 00 12 LCC Clear the tower.
00 00 00 13 CDR Roger; clear the tower.
00 00 00 14 LMP You go.
00 00 00 15 CDR ... program.
00 00 00 16 LMP Go! You --
00 00 00 17 CC ... roll. You have good thrust in all five.
00 00 00 19 CDR Roger.
00 00 00 21 CDR Pitch program.
00 00 00 22 CMP It sure ain't what I expected.
00 00 00 24 LMP Me, either. It's like a freight train.
00 00 00 26 CMP That's what everyone said. Quiet as ...
00 00 00 32 CDR Man, we're right on.
00 00 00 42 LMP Man, look at this thing go! What are the g's, John?
00 00 00 46 CDR One and a half.
00 00 00 47 LMP Okay.
00 00 00 48 CMP Through 10K. Must be coming up on a little q here.
00 00 00 57 LMP Tower [sic] system's relieving - Tower's rel - Cabin's relieving -
Stand by for Mode I Bravo -
MARK, I Bravo.
I Bravo.
Cabin's relieving.
... feet wet now, 16.
Roger.
Man, that was beauteous! ... --
... g.
MASTER ALARM.
Okay, that one's ... --
Okay, that's just ... module.
No sweat.
Okay. Okay.
Coming up on max q, Charlie.
Okay.
Okay. Trajectory is good.
Two and a half g's.
Okay; you're through max q, and everything looks good.
It does indeed. I believe this baby's gonna go up.
Stand by for Mode I Charlie.
Roger.
MARK, I Charlie.
Right.
00 00 02 03 CMP Ready?
00 00 02 04 CDR Yeah.
00 00 02 05 CMP Those are done. EDS is manual. And that - that baby is gonna unload.
00 00 02 10 CDR It sure is.
00 00 02 12 LMP Mm-hmm.
00 00 02 13 SC (Laughter)
00 00 02 18 CMP Stand by.
00 00 02 19 CDR ... inboard shutdown.
00 00 02 22 CC ... inboard. You're GO for staging.
00 00 02 24 CDR Right now, that ... only ... for staging. Watch it.
00 00 02 27 LMP Okay.
00 00 02 28 CMP All set.
00 00 02 29 LMP I'm all set.
00 00 02 30 CDR Okay, I'll count you down to it. 30, 31 ... 32. Those are good numbers, Ken?
00 00 02 41 CMP That should be.
00 00 02 42 CDR ...
00 00 02 43 LMP Hey, yeah, there's (laughter) ... --
00 00 02 44 CMP Man!
00 00 02 45 LMP Whoo!
00 00 02 46 CMP Look at that.
00 00 02 47 CDR Staging.
00 00 02 48 CMP Oh, man.
00 00 02 49 CDR Okay, ignition on the S-II.
Boy, it's beautiful. Mmm.

Is that ...?

... GO on all five on the S-II.

Wasn't even showing that (laughter).

We got -

Okay, it's -

Comm's good.

Coming back - 3 minutes.

Mmm.

Nine, 10, 11, 12 -

Want me to go on time, John?

Second ... SEP light's out. Yeah, go on time.

All right. I got the register --

... set. Here we go.

Tower jettison.

There she goes.

Roger. And we confirm your skirt SEP. You're Mode II now.

Roger. Mode II.

Okay, you're Mode II. Look --

Evaporators on?

Oh, Charlie, look at that horizon. Can you see --

Grab ...
Yeah.

Okay. Okay, what - how's the steering?

She's doing fine, John.

Yeah; 3.4.

... has converged. CMC is GO.

Roger.

Four minutes. We should be sitting at 21 degrees.

That is beautiful.

Man, I'll say --

You looking?

-- ... there.

Okay.

You're right.

I'm going to look out a little bit.

Okay, we're only pulling three-quarters of a g.

... --

16, Houston. Four minutes. Everything looks great down here.

Roger. It looks good up here, too.

Hey, Gordy, you ought to see that horizon. Just gorgeous.

... 

-- ... that's ...?

Yeah.

Look at that stuff out your left window. What the heck is that?
That's just stuff from the tower.

Going with us?

Yeah.


04:30. Steering is 19 degrees. Looking good.

Okay. Let's see - you got - How about let's clean up the rest of the things we didn't do, like attitude, the rate command.

RATE COMMAND.

And ALPHA to Pc.

Pc. Turn on our gimbal motors here at 6 minutes, Charlie.

Okay. I'm ready; about a minute to go.

Well, you even remembered the - you remembered to do the water, Charlie.

Yeah, I got the water and everything going.

We ought to give you an award for that.

Man, I was watching those gages at S-IC and they were really jumping. That steam pressure the secondary read out. Man, was that a ride!

It was that staging that's thrilling, ain't it?

You ain't kidding! I was real glad someone warned us.

16, Houston. Times are nominal, level sense will be 8 plus 37, and cut-off at 9 plus 19.

Roger.

You'll get a little buzz now.

Coming up on 6 minutes --
... by for S-IVB to COI capability.

MARK. You have it now.

Roger. Okay, Charlie.

Okay, stand by. Go ahead on the ones.

PITCH 1 is coming on -

MARK. YAW 1. Did you get it?

No, I couldn't see it. Okay. Go ahead.

PITCH 1 is on -

MARK.

Okay.

YAW 1 is on -

MARK.

Good.

PITCH 2 is on -

MARK.

Good one.

YAW 2 is on -

MARK.

Good one.

Okay.

Check your GPIs?

Yeah.

Okay. You can't see that on the fuel cells, Ken.

I just noticed that.
It's all on the batteries here.

Yeah. I saw that. That's really strange.

Yeah.

Okay. Got -

How's the trajectory?

Got a minute to go to inboard shutoff.

Man, it looks like a champ. ... get OMNI Delta.

-- by for S --

Everything's in great shape up here, you guys.

Okay, we're gonna back this guy up, and we've got --

16, Houston. You're GO for orbit. Predicted cut-off, 11 plus 49.

Roger; 11:49.

Okay, now, you're gonna shut this guy down with the hand controller if it overspeeds?

Yep. But we're going to see 20 --

That's not for long.

-- 25.6.

That's right. We want - Let's see. 25.6 is normal, so we go to 25.7 to back it up.

Right.

Eleven minutes. Look at that. Minus 60, and it says it's gonna be 69. It's got a little buzz of its own.

Yeah.

Mm-hmm. Here's another one. A little rumble.

CONFIDENTIAL
Yeah. Same frequency.
Okay, it's 11:25 --

11:20.

-- 11:20.
Okay, 25.1, 25.2, 25.3. Look at it pitch back up and kill that altitude. 25.4 --

Should have about 10 seconds - to shutdown.

1, 2, 3, - 5.5.
SHUTDOWN.

Look at that ... --
SECO.

Right on!
Oh, ... --

Look at ...

Here we are!
I'm turning off the pyro arms, you guys.
Okay. GIMBAL MOTORS. Let's go - GIMBAL MOTORS.
Okay.

Go ahead.
PITCH 1 is coming OFF.
Okay, go.

YAW 1 is coming OFF.
-- ... breaker and install the COAS. Okay, we just --

... O₂.
That's okay. I just pushed the breaker in.

Okay.

Okay, Gordy; we're on page 2-11 down through - we're getting to installing the COAS. That MA was the transducer - ECS.

..., Charlie.

Oh, look how easy it is! Okay, service module --

Charlie, did you do that?

Yeah, I did that, but I'm sorry (laughter). Okay, WASTE H2O/DUMP; FUEL CELL's going NORMAL; PURGE LINE HEATER's on.

(Laughter) Did you -

Look at those - little -

Yeah, you --

Let's see, ... got the torquing angles. You got --

And I made it up with a clean window.

Sure. Yeah.

Whoops. MA again.

No, I'm testing.

Yeah?

Yeah. Okay, going to COMMAND MODULE --

But you --

-- you get an MA?

Yeah.

Listen to that tone. Barely audible.

Yeah.
00 00 15 51 CDR  Shoot. I don't have any trouble hearing it.
HATCH GEAR BOX is LATCH; ACTUATOR HANDLE is going
to neutral ... --

00 00 15 57 CMP   Oh, John --

00 00 15 58 CDR   Excuse me there, Charlie.

00 00 15 59 CMP   I'm gonna leave the nitrogen in the - in the hatch.
We're gonna pump that when we get back. I talked
to the guys about that.

00 00 16 08 CDR   Okay.

00 00 16 09 CMP   They said that'd be okay.

00 00 16 11 CDR   Fine.

00 00 16 12 CMP   Okay, and I've got a note in the Flight Plan that
says we're to vent it later on.

00 00 16 16 LMP   Okay, we just had loss of comm.

00 00 16 19 CMP   Okay. Ohhh.

00 00 16 21 CDR   Ohhh. Is that ever nice! Look at that ... --

00 00 16 24 LMP   Look at that view out there, you guys!

00 00 16 27 SC     (Laughter)

00 00 16 28 CDR   Oh, is that ever pretty.

00 00 16 30 LMP   Hey, it's b - blacker than pitch out this window 5.

00 00 16 33 CDR   Supposed to be, Charlie. That's the rule of it.

00 00 16 35 LMP   ... Yeah.

00 00 16 36 CMP   Okay, I got your VERB 83 up there. I don't know
what you're gonna do with it. I ... just buy it
for you.

00 00 16 40 CDR   That really is nice, that VERB 83 (laughter).

00 00 16 43 LMP   Okay, I'm gonna start in on the --
Okay, I've got eight grays. That all looks like a champ. Okay, cabin pressure's good.

If you'll get me a camera, I'll take a nice picture.

I'll go get those in just a minute, babe.

Okay.

It looks like those clouds are right on top - right down there. You could reach out and touch them.

They are. We're coming up over the Africa, Charlie, and --

Where's Africa? I don't see it.

Well --

Is it - maybe I can just look --

This is just - these little old - It's clouds like this or like it --

Okay, I'm gonna unhook and stow - unstow the helmet bags.

Hang on a second. Let me get that circuit breaker for you.

..., Houston. Data is back now good, and everything looks fine as we come up 20 seconds to LOS. We'll see you at Carnarvon at 52:39.

Roger; 52:39, Gordon.

... the view there.

All right. We're just starting to come into darkness now, and the sunset is --

Look - look at that. Look out there --

-- just as beautiful as always in this space business.

(Laughter)
Roger.

Oh, would you look at all that. We could use some helmet stowage bags.

Well, I'm getting them now.

I'll get them. I'll get you the tool E down if you kind of watch your feet for a second.

I don't even know - I know - What am I kicking?

Well, in just a minute, it'll be me.

Okay.

U-1.

No, they're over here, Charlie.

No, they're over here. The helmet stowage bags?

Yeah.

You're dreaming.

No. They're in U-1.

Yeah, but here's the - -

You got - you've got both TSBs and helmet stowage bags to get out, guys.

Yeah.

That's all I need.

Okay.

John, could you move this foot?

Yeah. I don't know where I'm moving it to.

(Laughter) I must - Somehow it's ... Holy smokes, it's as bad as I thought it would be.
If you put your feet down, I'll get it out of your way somehow. Hang on a second, let me get this flashlight here and see what the heck that is. (Laughter)

In here somewhere is a tool E.

In L-2?

Yeah.

There it is.

Yeah. Is all the rest of that stuff coming out? We don't ... it.

Huh?

Take out one thing. (Laughter)

Oh, ...

I'd have sworn he was gonna unpack the whole spacecraft. (Laughter)

Okay, I'm going to lower my seat.

Okay, can you get it?

Yeah.

Okay.

(Laughter)

Hey, listen, you gonna have to just take it easy; we ain't really in no hurry.

Yeah.

Yeah, I don't - I think this is absolutely the greatest, but if you ... you torque your platform.

I'm gonna keep my platform way over standard.

Okay. Tell you what, gang. Could you tell me that our oxygen flow looks good?
00 00 25 07 CDR I couldn't tell you nothing.
00 00 25 08 LMP Yeah, it does.
00 00 25 09 CMP Okay. The flow is less than 0.2 or something like that?
00 00 25 15 LMP No, it's about 0.3.
00 00 25 16 CMP Okay, and how's the cabin pressure?
00 00 25 17 LMP Cabin pressure's holding at 5 - about 5-1/2. Okay, let me get that. We have the Canaries LOS. Let me do what I'm supposed to do here at Canaries. Getting ready to flow.
00 00 25 29 CMP Okay, the emergency regs I'm going to put on. They is on BOTH.
00 00 25 37 LMP Shift ...
00 00 25 38 CDR SIMPLEX B is off.
00 00 25 43 CMP John, can you get the SUIT CIRCUIT RETURN VALVE OPEN?
00 00 25 46 CDR Yeah, I can if I can get back to it.
00 00 25 48 CMP Okay. Okay - oh, no hurry!
00 00 25 49 CDR SUIT CIRCUIT RETURN VALVE is coming OPEN. Nyuh-nuh-nuh-nuh.
00 00 26 00 CMP You got her, huh?
00 00 26 01 CDR No.
00 00 26 02 CMP I think you all --
00 00 26 03 CDR What was that?
00 00 26 04 LMP RC --
00 00 26 05 CMP Felt like it took a little DELTA-P.
00 00 26 07 LMP Yeah. (Cough)
Here we fly in comfort though. My - is my hand controller ... --

Yeah, ... the RCS COMMAND is OFF, too.

Let me do that one more time. The aft is fine, that's for sure.

Yeah, there's some - there's some DELTA-V in here.

Well, I'm looking out the window at the flashes.

Okay, how about --

You want your old hat back?

That's all right. Have you got the SUIT CIRCUIT RETURN VALVE OPEN?

Yeah, the SUIT CIRCUIT RETURN VALVE is OPEN.

Okay, and don't want to forget our windowshade number 5 there.

Oh, yeah. Charlie --

Oh, yeah. Am I supposed to put that in right now?

-- windowshade number 5.

Okay, and I'm gonna --

Okay --

-- I'm gonna turn the flows off if you want to come out of the helmets and gloves.

Okay, could you put my seat ... --

Have you done the main reg check?

Let me see. No, we do the main regs afterwards, don't we?

Oh, okay. Oh, I don't know --

Just following my checklist here.
00 00 26 58 LMP Okay. What could make my feet want to climb up to the --

00 00 27 02 CDR Isn't that neat?

00 00 27 03 LMP Yeah. Oh, heck.

00 00 27 07 CDR You want me to get it for you, Charlie?

00 00 27 08 CMP Five on the -- --

00 00 27 09 LMP No, I got it, babe.

00 00 27 10 CMP Okay. You want this thing down, John, or like this?

00 00 27 13 CDR Just out of the way.

00 00 27 14 CMP Okay.

00 00 27 17 LMP (Laughter) I just had a --

00 00 27 18 CMP I do the main regs next, Charlie. We can go ahead and take helmets and gloves off.

00 00 27 21 LMP Okay, I'm gonna get this --

00 00 27 22 CMP And --

00 00 27 23 LMP -- window 5 so --

00 00 27 24 CMP Okay, if you'll tell me when you want to -- when you want your flow off, I'll turn it off for you.

00 00 27 29 LMP Okay. And the window 5 cover's the one in the bag?

00 00 27 32 CDR Yeah. UB ... --

00 00 27 33 CMP Yes, sir.

00 00 27 34 CDR ...

00 00 27 36 LMP You just st - stuff the bag back in there?

00 00 27 37 CMP (Laughter)

00 00 27 40 CDR Huh? Stuff what bag back in there?

00 00 27 43 LMP This UV camera ... --
Oh, for gosh sakes.

What?

I didn't know they had a bag with it.

Yeah. It's so it won't get scratched ...

(Laughter) Hey, if you pull your helmet off, it's gonna go.

Where does it go?

Straight up. (Laughter)

Did you shut your air off?

Yeah, but there's still just as much DELTA-P in ...

(laughter) It ... my nose, I couldn't even see it.

Well, pull your glove off first.

Can you - can you shut my flow off ..., Ken?

Yes, sir. Here comes your flow off, now.

Okay.

All these snaps.

Man, that do make a difference. Okay, turn it back on, Ken.

All right, just a second (laughter).

I don't know what I'm kicking down there.

(Laughter)

Achh!

(Laughter)

Ah-ha!

Look at that.
I can't believe it but I got her.

Now, I know ... --

Here I come.

-- these things.

Here I come, everybody (laughter).

Now - Well - well, be careful you don't hit the thrust [?] switch, Charlie.

Yeah, I know it. I'm trying to avoid that, John.

Course it's guarded.

I keep forgetting you have to hold things.

Well, for some reason, I want to float right up against the instrument panel. Maybe my - maybe it's my helium in my suit.

You want your old dinner bag there, Ken?

Yes, sir; thank you now.

Isn't that neat?

(Laughter)

Isn't that neat, the way stuff just floats around?

(Laughter) Ahhh.

That's got to be the world's greatest thing.

(Laughter)

I hate to tell you this, you guys. John's got to go potty.

No, this thing won't fit (laughter).

Oh, you're kidding me - I hope.

I can't get out of --
00 00 29 39 CMP I guess I'd better get on with that P52.
00 00 29 43 CDR Yeah, I guess - Have you jettisoned the covers, Ken?
00 00 29 45 CMP No. I - I was trying to move too slow, I think.
00 00 29 47 CDR Okay.
00 00 29 48 CMP I'm gonna do that next, and then I'll get this stuff. I'll do it.
00 00 29 51 CDR It's 29 minutes, so we got plenty of time.
00 00 29 53 CMP Yeah, it won't take long.
00 00 29 54 CDR What - what all is in the checklist to do between now and tonight? Anything?
00 00 29 58 LMP No. No, wait a minute. Let me get this thing. There you go. ... it back, naturally.
00 00 30 04 CDR Oh, come on. My goodness sakes.
00 00 30 07 LMP (Laughter)
00 00 30 08 CDR ... the optics coming around?
00 00 30 10 CMP I figured I was gonna - I stuck tool E in here where I've been keeping it. And it floats out. I thought I'd just started off the mission by losing tool E.
00 00 30 18 CDR Oh, well. There's still ... --
00 00 30 20 LMP Okay, let me get us back on the checklist here. Okay, you've done this main - no, we haven't done the main reg check. Okay, install command module - Okay, suit circuit return. And remove helmets and stow. And mount TSBs. I don't have that done yet. But this thing has helmet bags in U-1, but that's not really true.' They're over on your side, John, aren't they?
00 00 30 42 CDR Yeah, here's yours, Charlie.
00 00 30 44 CMP I - I think it's looking for TSBs out of yours, Charlie, and -
Okay, wait a minute, John.
Okay, just leave it.
Yeah.
It won't go nowhere.
I know it.
That's nice.
Okay, Ken. You can cut my flow off.
All right; stand by. Hey, John, if you want to put your hoses on, I'll cut this baby off again for you.
No, that's all right. I'll leave them where they're at.
Okay.
Okay, cut it back on, Ken. I've got a glove popped [?] yet.
All right, sir; you're on.
Okay. I'm sorry, but the evil winds are blowing again, you guys. (Laughter)
Ain't nothing you can do that's evil right now, babe.
You just got to ... --
You know something, I never did like this, and I like it even less in zero gravity. I don't know why anybody ain't squawking.
Okay, ... this baby. G/N POWER OPTICS going on. And ZERO OFF. Then ZERO. Oh, that light. ...
Oh, I got a - a caution and warning on the PGNS. I don't know what that was. Must have been taking it out of the - MODE is MANUAL. OPTICS COUPLING is DIRECT. SPEED, HI. Now if ... up there. The ZERO's OFF. Go max speed to the right. The first one that comes off is the sextant at 40 degrees.

I don't believe those ...

Ha-ha.

Ha-ha-ha-ha.

What's that, John?

Looky here. Well, why don't you get your - Well -

Well, darn it. I didn't hear anything come off of the telescope.

Did you see out of it?

No.

Well, keep going.

I was going all the way to the Sun. Shoot. Oh, well -

Maybe you can run it back again.

Yeah.

Maybe you ought to go the other way.

Well, I don't know. If I could --

Are you seeing anything out of the telescope?

No, sir.

Well, but that's going to take awhile. You want to turn down the lights, Ken?

Yeah. I got my lights down here. I'm going to go ahead and do a P52.
Okay, but - okay, but -

You think there is anything wrong with turning the other way if they didn't - if the cover didn't come off?

Well, I think you ought to wait and ask them.

I hate to mess up 52. Let's see - let me - let me get myself good and light adapted.

Yeah, that's the problem.

You want me to turn the lights down?

You want to turn down some of the lights?

I got my eye closed and -

I forgot, the flood's turned all the way up in here. Stars are out there, Ken, I can see them.

Well, I don't see a thing. I heard the sextant go.

Can't you go back to ZERO and try it again?

I'm going to. I'm going to ZERO and ...

We're 90 by 95, you guys.

That's neat.

Okay, you don't see anything wrong with trying to - to do a - Oh, hey, I think I do see some stars now.

There you go.

Oh, thank God. (Laughter)

It takes awhile.

Oh, boy, you do have to be light adapted, I tell you.

Yeah, yeah.

Where? I don't see them. Oh, yeah. There's some, I think ...
Hey, I can — They're off because I saw our thruster fire.

I did, too (laughter). Hey, that's a thunderstorm down there.

Was it?

Yeah. Must be that.

Yeah, those are down ... --

I'm looking in the other direction though.

Well, I'm looking on the ground --

Okay.

-- and that's -- that's a thunderstorm.

Okay, I'm going to do a 52 if that's all right.

... have to do a 52. That's a ...

Okay. I'm gonna --

I haven't got ORDEAL set up, but I got it laying here.

Can I get rid of your thing for a minute?

Sure.

Okay, there's your flow. The OPTICS ZERO is OFF --

What's the -- what's the -- what should we be doing?

-- SPEED should be LO; OFF.

I'm gonna turn the page here, and --

I tell you one thing you can do is - I'm going to stay in the dark here, so I can see.

Okay.

Would you copy these numbers for me?
00 00 35 17  LMP  Yeah, I'll get them for you. John, we're up to speed, as far as I know.

00 00 35 23  CMP  I haven't started unstowing stuff.

00 00 35 25  CDR  Okay, at 35 minutes.

00 00 35 27  LMP  Oh, we got to do the - we got to do the main reg check, and the secondary accumulator quantity.

00 00 35 36  CMP  Man, I tell you what, I - There's another thruster fire.

00 00 35 39  LMP  Okay. John, you want to go to SECONDARY GLYCOL?

00 00 35 41  CMP  Okay, would you record star 23?

00 00 35 43  LMP  Okay.

00 00 35 44  CMP  Denebola.

00 00 35 53  LMP  Okay.

00 00 35 59  CMP  I don't - I flat don't think I can see a star pattern at all.

00 00 36 03  LMP  Well, I can out the front here, out the rendezvous window.

00 00 36 06  CMP  But I got a star in the sextant.

00 00 36 08  CDR  What's the name of it?

00 00 36 10  LMP  You didn't see Denebola out the big ... --

00 00 36 12  CMP  Okay, I did not see a star pattern.

00 00 36 14  CDR  Shoot.

00 00 36 16  CMP  And I'm - I'm well adapted enough in that - but I - I'm sure that the cover's off because -

00 00 36 25  CDR  You can see some stars?

00 00 36 26  CMP  Because I see flashes, and - and occasionally I can see a star, but it's just - you know, you can't miss Denebola.
Well, let me look whenever we get a chance here.

All right. You got any question about whether it's okay to proceed with them?

Heck, no. Go, man.

Okay. Yeah.

Hey, John?

Yes, sir.

We want - we can do a secondary glycol accumulator or loop check - leak check, if you want to.

Yeah. ... Ken ... numbers ... --

Okay, hang on a second and I will. Load it ... procedure.

This is so great.

Those optics ... are superb.

Okay, the second star is number 30.

Okay.

Wouldn't you know. Just what I always wanted.

What's the number?

There it is. Menkent. That may not be in the sextant.

... what it is.

By golly, there are some stars out there. One just went by. ... went by. But I'm sure - and I see some of those - Gosh, it looks like the center of the sextant - or the telescope is where I'm seeing ... But this thing is - auto optics is just neat as I thought it was.

Man, I can't believe that. I just can't believe our view (laughter).
Golly, you're here.

I mean (laughter).

Twelve days from now, you won't believe it.

This is fan - You know, I just can't believe how much a thrill this is.

It's really swinging, isn't it?

Oh, man, I've waited --

I mean to tell you.

-- so long for this.

Just - just look! Look at that! Just hold your cottonpicking hand out there in a 70-pound pressure suit, and you ain't got nothing on.

Oh, there's --

That was a good start.

That's a good start.

There you go there, Ken, babe. Look at those torquing angles! (Laughter).

(Laughter)

Whoo, hoo, hoo!

You got those copied?

Wait, 040 --

Yeah.

-- plus --

031.

Plus 031.

Plus 045.
Plus 045. I got them. Give me the DET and I'm ready.

Okay. I'll torque them at 40.

Okay.

Might as well ...

Go. Okay, 38:40. Just for kicks, I'm going to do that over again.

Okay --

No, you don't, Ken --

No. Come on.

-- you don't need to do it again, honest.

Okay.

You're gonna get a blue million of them.

Okay, that that really feels good.

Yeah. ... of those ... EMP.

Because we're liable to have our torquing angles doubled the next time we did it.

That's right. I don't want to know it if it is --

Okay, John, get --

-- ... torture.

Give him a --

... tool E?

Give him a tool E.

Okay.

Yeah. I was going to float myself along underneath there, if you --
<table>
<thead>
<tr>
<th>Time</th>
<th>Caller</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 00 39 07</td>
<td>CDR</td>
<td>I got the ORDEAL up.</td>
</tr>
<tr>
<td>00 00 39 08</td>
<td>CMP</td>
<td>You have? Oh, you --</td>
</tr>
<tr>
<td>00 00 39 10</td>
<td>CDR</td>
<td>(Laughter)</td>
</tr>
<tr>
<td>00 00 39 11</td>
<td>CMP</td>
<td>That's ... I - in my job. It's so easy to do. Too late. (Laughter) Oh, ...</td>
</tr>
<tr>
<td>00 00 39 20</td>
<td>LMP</td>
<td>You know, I do feel like I'm standing on my head.</td>
</tr>
<tr>
<td>00 00 39 22</td>
<td>CMP</td>
<td>I don't. I feel like I've been here all my life.</td>
</tr>
<tr>
<td>00 00 39 25</td>
<td>CDR</td>
<td>Yeah, that what comes with 2000 hours under your belt.</td>
</tr>
<tr>
<td>00 00 39 28</td>
<td>LMP</td>
<td>Yeah.</td>
</tr>
<tr>
<td>00 00 39 30</td>
<td>CDR</td>
<td>Okay, now I need a flashlight to see what the angle is. Okay, when do you want to do this, Charlie?</td>
</tr>
<tr>
<td>00 00 39 36</td>
<td>LMP</td>
<td>Okay, let me see. SECONDARY ACCUMULATOR QUANTITY is at 40. Go ahead, any time for 30 seconds. I'll give you a mark. Give me a mark when you open it.</td>
</tr>
<tr>
<td>00 00 39 43</td>
<td>CDR</td>
<td>Okay, going - going to NORMAL? Right?</td>
</tr>
<tr>
<td>00 00 39 47</td>
<td>LMP</td>
<td>Yeah. Go to NORMAL.</td>
</tr>
<tr>
<td>00 00 39 48</td>
<td>CDR</td>
<td>Okay; 3, 2, 1 -</td>
</tr>
<tr>
<td>00 00 39 50</td>
<td>CDR</td>
<td>NORMAL.</td>
</tr>
<tr>
<td>00 00 39 51</td>
<td>LMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 00 39 52</td>
<td>CDR</td>
<td>It's NORMAL.</td>
</tr>
<tr>
<td>00 00 39 56</td>
<td>CMP</td>
<td>You guys are screwing with my union card.</td>
</tr>
<tr>
<td>00 00 39 58</td>
<td>CDR</td>
<td>Let me get out of your way there, ...</td>
</tr>
<tr>
<td>00 00 40 01</td>
<td>CMP</td>
<td>Okay. I'm gonna go play with the regulators. Okay?</td>
</tr>
<tr>
<td>00 00 40 04</td>
<td>CDR</td>
<td>Let's have a sandwich.</td>
</tr>
<tr>
<td>00 00 40 05</td>
<td>CMP</td>
<td>Hey, let's get this all cleaned up ... --</td>
</tr>
<tr>
<td>00 00 40 06</td>
<td>LMP</td>
<td>Yeah, let's get it cleaned up.</td>
</tr>
</tbody>
</table>
It's clean as a whistle.

Oh, I want to get these regulators checked and all that stuff that I haven't done. Okay.

Say when you want to shut it off, Charlie.

They're fine (laughter). Okay -

MARK.

Okay, going to BYPASS.

Okay, it's good.

BYPASS.

Loop's good. Okay, we should ... ECS, and then the FILL valve ... ON.

Okay. I'm turning MAIN REG B to off.

Okay.

EMERGENCY CABIN selector is going to 1. All right. How's the flow look ...?

It's 0.2.

Okay. I'm gonna hit the PRESS TO TEST.

Okay.

Did you get some flow there?

A little bit, yeah.

Okay, I may have ... in ... a little long --

I think you did. I - Okay, that's it. ... out.

Okay. Go back to normal?

Not yet. Here it comes.

All right, REGULATOR B is coming on.

Okay.
00 00 41 11 CMP  And A is coming off.
00 00 41 14 LMP  Okay.
00 00 41 15 CMP  Going to number 2. ... valve A close, number 2. Away we go.
00 00 41 26 LMP  Okay, it came up a little bit, Ken.
00 00 41 27 CMP  You want me to hold it longer?
00 00 41 28 LMP  That - No, that's fine with me.
00 00 41 29 CMP  Okay. Go back to normal?
00 00 41 30 LMP  Yeah.
00 00 41 32 CMP  Well, I'm working mine. There's BOTH.
00 00 41 35 LMP  Okay, I'm going to do - We've been up here long enough. I'm gonna do the fuel cell purge.
00 00 41 39 CDR  There's - REG A.
00 00 41 40 LMP  And check them out.
00 00 41 42 CMP  Hey, John, do you - did you do that secondary leak?
00 00 41 44 CDR  What's that?
00 00 41 45 LMP  Fuel cell - Don't panic. I'm just testing them a little bit.
00 00 41 47 CDR  Yeah, but still - you know.
00 00 41 48 LMP  Yeah.
00 00 41 49 CDR  I don't ... - -
00 00 41 50 LMP  What the heck? I said I was going to do the fuel cell - -
00 00 41 52 CDR  Yeah, I know. I knew it. I'm sorry. I don't want anything to spoil this guy now.
00 00 42 01 CMP  ... Did you do the secondary leak check?
Yeah. It passed.

Yeah, so I can get number 6.

Well, we just floated down there, Ken. It's so easy. (Laughter) Oh, gosh. This has really ruined me for this. (Laughter)

Okay, PURGE LINE HEATER is OFF.

What do I do with this tool E? Just let it sit there.

Okay, I'm going to check the cryos.

Okay, John. I'm going to pass you up some stuff from down in A-8, if that's okay.

Oh, wait - could you wait just --

Sure, man --

Sure.

-- what is it?

Go ahead.

Throw it to me.

I'll wait.

Okay, I'll - I know some of that stuff has got to be coming over to me, and I'm --

You ain't ready for it?

I ain't r - quite ready for it yet.

I - I - I've got the bracket down there for the camera. Ha, ha, ha.

Okay, check your surge tank pres - Okay, I got that. Cryo fans, off; on as required. Okay.

Oh, here's the nicest part of all in zero-g --
Fuel cell heaters. Okay, that's ... --
The container comes out of B-1 (laughter).
Okay, that ...
Yeah, (laughter) that would be the part (laughter).
... can, too, and go back in just like downtown.
John?
Yes, sir.
May I present you with a 70-millimeter Hasselblad.
(Laughter)
Oh, this is as nice as it's always been. That's all I've got to say. Just can't beat all this floating around.
But, in Gemini, you couldn't move around to enjoy it. This has got to be better than that kind of ...
Phew! Can you imagine what those guys are going to do when they get in Skylab?
Well, I ain't gonna trade with them, I'll tell you that right now.
No, but they are gonna have a ball. When they get that great big volume down there.
How are we going to drink water? That's been worrying me ever since we took off. You got to keep a count of it some way or another?
Well, I don't know. I'll check and see if ...
Okay, just be sure --

Do you have a place it ...?

No, that'd be fine. Just be sure it's snapped wherever you put it. You know, it won't - I already made that hanging mistake once (laughter).

Yeah, well, the thing is, it's - the thing around it is really tight, this snap around it.

There must be something I have to do but I don't know what it is.

(Laughter) I think it's the ... Golly, I mean to tell you. If this isn't gonna be the neatest thing that ever was.

(Laughter) Oh, my helmet.

Can't wait to get into that lellum [?].

Yeah.

The thing just ... for another 5 minutes and 44 seconds. The pressure's all right - 48 - 38 and 18, just exactly what they were at that other thing.

For you, my friend, if you'll pull out a - out of that little U compartment down there, the camera bracket.

I already did.

Oh, you - Oh.

Ha, ha, ha, ha. Well, I've got all these cameras, and I don't know what to do with them. It's really neat.

Here, I tell you what we'll do with one is raise your foot, right here, to start with. I guess we - I tell you what. You don't really need that guy right now. I can stow it back here in the --

What's the Hasselblad?
Okay, John. You're supposed to do a GDC align.
Okay.
Here, let me stow that DAC.
No, let me just stick it on the thing. It's as good a place for it as any.
It won't be in your way...

Okay. Why don't we - you want to set it while we're about it, then?
Yeah. The T -
I hadn't - I didn't set it at all yet.
T - T-8

Is that - is that APS mod - is that the APS module that's causing all those ... flashes?
... want a T-8, John?
T-8 at 10 feet, right?
Ten feet, 1/250

1/250, at 12 frames a second.

I just started the secondary coolant loop pump.
Okay.
Good, Charlie.
That's magazine AA.
Magazine - AA is what's on there. How about that? Another new ...

You're kidding me.
It's really there?

Yep.

(Laughter) Okay.

Can't believe it.

(Laughter) Okay, you got the EL, John?

The what?

You got the Hasselblad?

Yeah.

How about an f/8?

Okay, f/8.

1/250.

 Reads 250th.

And - -

And infinity?

Well, why don't you take it about 10 feet and go well, put it on infinity for the time being. We might - -

Okay, because as we come across the ..., we might see something. Yeah.

Okay, and that thing just gets stowed out here. Here, I - I put up my little - -

I can't do it; they put Velcro right here.

- - ... my goody bag.

You don't want to do that.

Oh, okay.

It can't get loose unless somebody bumps it.
Well, where did you put it?
Right there. See?
Okay.
Isn't that neat?
Okay. I've got to --
I could have nailed it right up here to this Velcro, but I don't think ... --
Well, here. I've been using this little goody bag and getting my stuff emptied out of it.
Okay, here come the TSBs, you guys.
Old TSB Charlie.
It is so white and pretty.
Kind of like our suits.
Who wants one? Ken, there's one for you.
Okay, I'll be with it in a second, as soon as I get my things put in here.
(Singing) I'll be dancing ... --
... be right in front of us on these, are there? They're all the same.
-- before I leave.
I don't think there's any difference. I think it's like - like ... Okay. Oh, ... I was gonna put this thing back once you get the CMC up.
Okay, John, here's one for you.
Oh, that's sure nice, Charlie. I'm sure glad you gave me that TSB.
I thought you'd like that.
Okay, how about the --
 Aren't - aren't I supposed to put some cameras and mags back in here? In U-1?

Yeah, I think that's ... yet, Charlie.

Okay. I'll leave it ... - -

I'm taking one last look at my sextant - my telescope here - -

Leave it at ... - -

-- before I screw up on it.

Oh, ho.

I got a star in it now.

Hee, hee. Hee, hee, hee. It got away from me. Come back here, you ... (laughter).

Gosh, this is mag - Oh, look at those pretty stars. Look at that. Oh.

Okay, GDC align is all we got left.

Okay, Charlie. I'll align the old GDC. That'll be roll 180 -

I know, I couldn't be looking at Denebola again, but -

Can you see a pattern?

Yeah, I don't recognize it. It's brighter than heck. It looked like Denebola, but --

... constellation is ...

I bet it is.

See, the horizon is beginning to light up.

Oh, and I just won me a beer.

What's that?

Well, maybe I didn't here. What's going on?
<table>
<thead>
<tr>
<th>Time</th>
<th>LMP</th>
<th>CDR</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 00 50 01</td>
<td>I'm turning up S-band volume for the --</td>
<td>00 00 50 03</td>
<td>Oh-oh --</td>
</tr>
<tr>
<td>00 00 50 04</td>
<td>-- Canaries check.</td>
<td>00 00 50 05</td>
<td>-- I wonder.</td>
</tr>
<tr>
<td>00 00 50 06</td>
<td>Okay, Charlie. We got a little roll drift in the GDC and a little yaw drift, but we don't have a heck of a lot of other, and it's - Goldang, it's been running for 50 minutes, and it's off 5 degrees in yaw - 5 degrees in yaw - and we're on RATE 2, so you don't really know. And 2 degrees in pitch - Heck, I'll take that. And - and 8 degrees in roll for 50 minutes. That's with the BMAGs ... That ain't really all that bad.</td>
<td>00 00 50 44</td>
<td>Oh, I can even see stars now with the reticle turned on. Is it - guess what I got? Antares!</td>
</tr>
<tr>
<td>00 00 50 55</td>
<td>Beautiful.</td>
<td>00 00 50 57</td>
<td>(Laughter) It even looked like Scorpio (laughter). Oh.</td>
</tr>
<tr>
<td>00 00 51 05</td>
<td>Okay, the GDC's aligned behind - to behind you at 51:05.</td>
<td>00 00 51 09</td>
<td>Mark that down.</td>
</tr>
<tr>
<td>00 00 51 10</td>
<td>So I get a - Then I have that we're on RATE 2, BMAGs.</td>
<td>00 00 51 15</td>
<td>51:05.</td>
</tr>
<tr>
<td>00 00 51 16</td>
<td>Yeah, I'm gonna do some scientific research on this thing with my little pen - unless some dingaling give me a ... pen. ...</td>
<td>00 00 51 31</td>
<td>Okay, I - Do you want to do this reference comparison - SCS attitude reference comparison check, John?</td>
</tr>
<tr>
<td>00 00 51 37</td>
<td>Yeah, but I - can we do it until after we've had some --</td>
<td>00 00 51 40</td>
<td>You've got to compile them.</td>
</tr>
</tbody>
</table>
Oh, okay. That's right. ... be sure.

Oh, you beautiful ... You little beauty. Hoo, hoo.

Okay, there's the comm coming up.

Well, I won me a six-pack.

What's that?

I said that if I went from MANUAL, that the optics would drift.

... Houston through Ca - Carnarvon. Over.

Hello there, Houston. Read you loud and clear.

Tell them where we are.

... loud and clear also.

Okay. Okay, Gordy. We're down through - on page 2-17, Ken's done the P52, and -

TIME SKIP

Can you handle this, Charlie?

Yeah. Yeah, I can handle one of them.

Want me to unstow your panel here?

No, no. Huh-uh. I don't ... --

... do that.

... as crummy in zero g as they are on the ground. ...

John?

Yeah.

Got a ... that's coming up by your sh - ... that's your shoulder. Your ... right? No, ... going the wrong way. That'll get it. Okay, and here's the UV magazine. It goes over by Charlie.
Okay. What was that? I just keep handing them to Charlie. I don't know what he's ... - -

Well, wait a minute, now. I'm getting my hands full here.

Okay. Well, the UV thing is the one that goes in - goes in that ... - -

Yeah. Okay, John. You hold the camera and pass me the UV thing.

John, you got your hands full?

Yeah. I'll take it.

Okay, I'll wait.

What do you need?

I got two TV cables here.

Oh, heck. I can take them.

All right. The rest of this stuff I'm going to just go ahead and put up in the - in - my little stowage place up here, I think - while I'm here. Don't see any reason why not. Why not? Oh, you're gonna earn your pay today. I know you do good work ...
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>00 01 00 40 CMP</td>
<td>Yeah, I guess --</td>
<td></td>
</tr>
<tr>
<td>00 01 00 41 CDR</td>
<td>But I - I don't have no gages to be alert for it, or what? Well, if they want me to take some positive action, like putting on my helmet and gloves, why - they ought to say so, don't you reckon?</td>
<td></td>
</tr>
<tr>
<td>00 01 00 52 CMP</td>
<td>Yeah, but I think we - at least, I have badgered them so much about - you know - just ... looking at something, that maybe -</td>
<td></td>
</tr>
<tr>
<td>00 01 03 33 LMP</td>
<td>Well, Ken, you might have your work cut out for you.</td>
<td></td>
</tr>
<tr>
<td>00 01 03 36 CMP</td>
<td>It sure sounds that way.</td>
<td></td>
</tr>
<tr>
<td>00 01 03 40 CDR</td>
<td>Well, shoot. Now I've got to set up ORDEAL. Can I call VERB 83?</td>
<td></td>
</tr>
<tr>
<td>00 01 03 46 CMP</td>
<td>Yes, sir. Go ahead.</td>
<td></td>
</tr>
<tr>
<td>00 01 03 48 LMP</td>
<td>Look at that sunrise coming up, you guys.</td>
<td></td>
</tr>
<tr>
<td>00 01 03 51 CDR</td>
<td>Oh, yeah?</td>
<td></td>
</tr>
<tr>
<td>00 01 03 52 LMP</td>
<td>(Laughter)</td>
<td></td>
</tr>
<tr>
<td>00 01 03 53 CC</td>
<td>... LOS ...</td>
<td></td>
</tr>
<tr>
<td>00 01 04 06 CDR</td>
<td>Roger.</td>
<td></td>
</tr>
<tr>
<td>00 01 04 07 CMP</td>
<td>Sunrise out there?</td>
<td></td>
</tr>
<tr>
<td>00 01 04 08 LMP</td>
<td>Yeah, it's coming up. See it. On the horizon.</td>
<td></td>
</tr>
<tr>
<td>00 01 04 12 CMP</td>
<td>Oh! Oh, look at that! Isn't that - Holy smokes. Have you ever seen anything like that?</td>
<td></td>
</tr>
<tr>
<td>00 01 04 25 CDR</td>
<td>... beautiful?</td>
<td></td>
</tr>
<tr>
<td>00 01 04 27 CMP</td>
<td>Oh.</td>
<td></td>
</tr>
<tr>
<td>00 01 04 28 LMP</td>
<td>That is really bright.</td>
<td></td>
</tr>
</tbody>
</table>
Man, that is - Gosh!

Hey, what does that mean to us now, is this - on this APS module.

Data ... Get ahold of the - (laughter) It doesn't need APS for - it needs its attitude control.

Yeah. It doesn't have anything to do with TLI. How do we get our LM? You got your UV shade in the window, have you, Charlie?

Yes.

Did you have any trouble getting it in?

Nope.

You said something about getting it in.

I had it in backwards.

Okay. Because that UV is - is a-coming at us. Okay, I'm gonna start unstowing some Flight Data File stuff - pad updates.

Man, I think we've had sunrise.

You're right. Look how pretty it is. Now, how do we ... --

Hey, Ken, where can we put this - the cover for the TV lens? It doesn't have a piece of Velcro.

Oh, okay. I'll - I'll put it down here with my optics cover - where I keep my optics in this little ... pouch.

Okay.

Right down here.

Right.

All the time we saved with that, I though we would ...
Well, I got an idea. We could get VERB 46, pitch it out of attitude, so it'd have to fire that APS module, and get back in.

Well -

Then it wouldn't ...

Trouble is, there's too much backing up ...

determine ...

Well, the pressurization looks good. We got to get it down. What - what he's saying really is, we got to empty some of that fuel out of there. Right?

Yeah. What do you think?

Well, like he says - it seems to me what he means is that - is that the thing's just going to deplete the helium in there.

That's ... It do seem like helium did that.

Okay, get to those procedures on that page, and tell me what they are.

Okay, that - that would be where? In what?

Flight Data File plus Dr. Spock's baby book.

(Laughter) You're kidding.

(Laughter) Oh.

Would I be allowed to take a picture out here?

(Laughter)

...

You want the spotmeter?

No, I'll just use it 250, f - f/8 and ... --

Okay.

-- at the ...
Flight Plan, volume 1, ... Data Book. Data we essentially won't need for a while.

Oh, ... That's nice.

What, John?

I got the dark slide in.

(Laughter)

Dang it.

(Laughter) Oh, you're off to a good start, leader.

Lunar orbit chart.

I got an Earth orbit chart here, but I don't think anybody really cares. Do you?

No.

There's one over there that's supposed to be ...

Okay, Charlie. I'm going to give you R-12.

Yeah, wait a minute. I got to get this --

Okay. You want me to get that? The last three times, I've been able to just walk up there and put it in.

Yeah, naturally, the flight one doesn't have a color code on it. ... 

Hey, that's a - we're not - are we up on the States yet?

No, huh-uh.

No. We're at 01:09. Where does that put us, Charlie?

Hey, your docking probe thing is out over here, your docking light.

Yeah.
Day 1

00 01 09 46 LMP Okay.
00 01 09 47 CMP Hey, come on ... --
00 01 09 48 CDR Yeah. It stays out.
00 01 09 50 LMP Okay.
00 01 09 51 CMP We couldn't be in the States, could we?
00 01 09 52 LMP Come on ... 
00 01 09 53 CDR We're at an hour and 9 minutes.
00 01 09 54 CMP Where's that? That's darn close.
00 01 09 56 CDR No, it ain't.
00 01 09 57 CMP Isn't it? Well - didn't I see some land go under-
neath us?
00 01 09 59 CDR No, you didn't.
00 01 10 02 CMP (Laughter) Okay, Charlie. ... go in there.
00 01 10 06 LMP Okay, I'll get that out of my pocket in a little bit.
00 01 10 09 CMP Okay.
00 01 10 10 CDR Where are we at, though, Charlie? Does it say?
00 01 10 13 CMP He talked to us from Carnarvon a few minutes ago.
00 01 10 15 LMP Yeah -- 
00 01 10 17 CDR We're about halfway across the Pacific.
00 01 10 20 CMP I thought I saw - maybe that was Hawaii. Huh? I thought I saw some land down there.
00 01 10 33 CDR Yeah, we're a long way from ... Is there any ship or anything that we'd be talking to between now and then?
00 01 10 39  LMP  Nope. You want to do this SCS attitude reference
        comparison check test?
00 01 10 45  CDR  Yeah.
00 01 10 46  LMP  Okay. VERB 16 NOUN 20.
00 01 10 49  CDR  Okay.
00 01 10 51  LMP  FDAI SELECT, 1.
00 01 10 56  CDR  FDAI SELECT to 1.
00 01 10 59  LMP  Um-hmm. FDAI SOURCE, ATT SET.
00 01 11 01  CDR  ATT SET. Go.
00 01 11 04  LMP  ATT SET to GDC.
00 01 11 05  CDR  ATT SET to GDC.
00 01 11 06  LMP  ATT SET dials, null FDAI 1 error needle.
00 01 11 09  CDR  Okay.
00 01 11 23  CDR  Okay. Okay, and --
00 01 11 28  LMP  Okay, key V - Null the needles. Key VERB when
        nulled. Freeze display. And then --
00 01 11 36  CDR  Okay, key - key VERB when nulled. Freeze display.
        Okay -
00 01 11 46  CDR  MARK it.
00 01 11 47  LMP  Okay, give me from the DSKY roll, pitch, and yaw.
00 01 11 53  CDR  Well, I key released it. Let me ... --
00 01 11 55  CMP  A LM chart? Oh, it's a LMP book.
00 01 11 58  LMP  Yeah, there's a lot of LM stuff in there.
00 01 11 59  CDR  (Laughter)
00 01 12 02  CMP  Man, I don't understand why I got an AOT tag. It's
        not the ... --
00 01 12 13 CDR Okay, VERB. Go.
00 01 12 14 LMP Okay.
00 01 12 15 CDR 179.79.
00 01 12 19 LMP Okay.
00 01 12 20 CDR Plus 086.86. That's on the DSKY. Plus 000.78.
00 01 12 28 LMP 000.78. Okay.
00 01 12 29 CDR Yeah.
00 01 12 30 LMP What are the thumbwheels?
00 01 12 31 CDR Thumbwheels say 178.4.
00 01 12 36 LMP Okay.
00 01 12 37 CDR Pitch is 088.2.
00 01 12 41 LMP Okay.
00 01 12 42 CDR Yaw is 356.2.
00 01 12 44 LMP What's your time?
00 01 12 47 CDR Time is - 1 hour 12 minutes and 45 seconds.
00 01 12 52 LMP Okay, that's nine at 21-minute check, and we got 1 degree on roll, got 2 degrees on - 1-1/2 degrees pitch, and about 4 degrees yaw. FDAI SELECT, 1/2, John.
00 01 13 14 CDR Okay. Well, tell me what that thing on page 2- whatchacall it says, Charlie.
00 01 13 24 LMP Dash 10.
00 01 13 33 LMP Okay. Spacecr - service module RCS control of S-IVB. LAUNCH VEHIC - If APS module failed, LAUNCH VEHICLE GUIDANCE, CMC; MANUAL ATTITUDE ROLL, MINIMUM IMPULSE.
00 01 13 45 CDR Okay.
00 01 13 46 LMP CB SECS ARM, two, close. AUTO RCS SELECT, PITCH
Day 1

00 01 13 53 CDR  CB SECS ARM, two, closed?
00 01 13 55 LMP  Yeah.
00 01 13 56 CDR  Yeah? Okay ... get the ... on this here.
00 01 14 01 LMP  Okay, then we got turn off - turn on - put A/C ROLL to MAIN B, and B/D ROLL to MAIN A. Then RCS COMMAND to on.
00 01 14 10 CDR  A/C ROLL to MAIN B, B/D ROLL to MAIN A.
00 01 14 21 CMP  Want to give me your boost cards?
00 01 14 22 CDR  Why do we do that? ...
00 01 14 23 CMP  I'm sorry.
00 01 14 24 LMP  To get - to get commands - to get roll commands. Here - here's one, Ken.
00 01 14 30 CMP  Okay, are you through with that?
00 01 14 32 LMP  Yeah, I'll just leave the landing card up here. Okay?
00 01 14 34 CMP  All righty.
00 01 14 35 CDR  Oh, shoot.
00 01 14 36 LMP  Okay, you want to take it down? I don't care.
00 01 14 38 CMP  (Laughter) I'd like a more positive approach, Charlie. John, you want to give me some of your ...
00 01 14 44 LMP  Wait a minute. Let me have the - L - the boost cards back. It's got the TLI no-go's on it.
00 01 14 50 CMP  Okay. Well, that's - this one?
00 01 14 54 LMP  Yeah.
00 01 14 55 CMP  There you go.
00 01 14 56 LMP  Okay. Okay, then after that, the booster - guy he confir - he commands the burn mode.
00 01 15 06 CMP  These two over there? ....
Says if that's successful and we get control, the LAUNCH VEHICLE GUIDANCE back to IU; we control pitch and yaw with THC, roll with RHC. Allow S-IVB to drift in pitch, gravity gradient. Control yaw within platform limits. Perform normal procedures except time base 6 minus 15 minutes, maneuver to TLI attitude and set up ORDEAL. Hold TLI attitude until ignition. Null ullage deviations with service module RCS. After ignition, RCS COMMAND, OFF. AUTO RCS SELECT, 16, MAIN A, MAIN B. MANUAL ATTITUDE, three, to RATE COMMAND. After cut-off, go back to CMC. MANUAL ATTITUDE, three, ACCEL COMMAND. RCS COMMAND, ON.

Okay. Well, that's a good thing. I'm sure glad you told me that, Charlie. That - there's the Moon.

Where?

Out the front window.

Hey, John. Would you put my DAC ... for me, please?

Yeah, ...

Okay.

It's awful stiff Velcro.

It goes right over the DSKY. Doesn't it fit there?

Oh! Oh! Oh! Oh! It goes right over the DSKY (laughter).

It - I mean, it probably really does.

... --

... on top of that little DSKY. It doesn't fit there?

Yeah, it does. And that's ... coming up.

I can't get my head down far enough. Oh, yeah, look at that. That - Ken, you ought to ... up here and look at that --
I don't have the time. I'm getting my last little chore done here. I got - I think I overdid it.

(Laughter)

(Laughter) Things are getting out of hand.

Well, let's take it f/11, at 250 —

Are getting kind of what?

You think in the middle of the day, we should go to f/11, Ken, or f/8 is still good enough?

Well, I'm just thinking. I've got a little bit of ... in that.

Well, I think f/11 for this time of day is probably the best you can do.

Okay, we got all the cards we're gonna need now? For TD&E and all that stuff, straight through.

Gosh.

I got the Flight Plan out; I got the G&C Checklist; I got the Surface Checklist available; I got the star charts, I got the TLI cards, got the TD&E card in my pocket. Anything else we'd be likely to need?

Nope.

Here's your antenna card. Why don't you just stick that up? (Laughter)

Okay, thank you ... my copy.

Thank you.

I think I'm gonna sit down and think some more about that TD&E.

Okay, there ain't nothing we can do about it if that module ain't holding attitude.
Confidential

Day 1

00 01 18 19 CMP If it won't hold in attitude, we'll go get it out of attitude.

00 01 18 21 CDR That's right.

00 01 18 22 LMP Looks like it's in attitude now.

00 01 18 24 CMP Well, it is. I just don't want that little bugger to blow up back there, and get a leak --

00 01 18 29 CDR That's exactly what I've been thinking all this time. You know, they ain't never said nothing about that.

00 01 18 34 LMP Well, they got this --

00 01 18 35 CMP They said they got that relief valve.

00 01 18 36 LMP They got the relief valve.

00 01 18 38 CDR Yeah. God willing, when the relief valve comes through, Charlie.

00 01 18 44 CMP But he said it was over the relief pressure, didn't -- already, didn't he?

00 01 18 47 CDR Something like that --

00 01 18 48 LMP He said that it was -- as far as they could tell, it was right at the relief pressure. How can --

00 01 18 52 CMP ... you talking about? We don't have double gage [?]. We didn't start --

00 01 19 02 LMP I'm gonna take this thing -- little dealy off here. The official ASPO circuit breaker putter-inner. Coming off.

00 01 19 16 CMP Okay, I've got a stowage place for it, but it's kind of hard to get to right now.

00 01 19 19 CDR Oh, yeah.

00 01 19 20 LMP You just want me to leave it on, then?

00 01 19 21 CMP If it's not in your way.

00 01 19 23 LMP No, it's not. I ... --
00 01 19 24CMP  Why don't we just leave it there until I get a chance to take it down and play with it, because I have a place for it ... in.

00 01 19 30LMP  Okay.

00 01 19 34CDR  It's right on ... should start.

00 01 19 37CMP  Apparently, it's just the regulator. But the helium supply ... --

00 01 19 41LMP  Well, they're afraid --

00 01 19 42CDR  ... off.

00 01 19 43LMP  -- I think they're gonna give - afraid they're gonna give out of gas.

00 01 19 47CMP  Well, that's what I'm afraid of, too.

00 01 19 50CDR  It won't start up.

00 01 19 53CMP  ... Get it in?

00 01 20 14CMP  What time?

00 01 20 15LMP  ... 01:20.

00 01 20 29CDR  A little knowledge is a dangerous thing. I said, "The pressure looks good up here." They said, "Well, it ain't your pressure; it's the APS."

00 01 20 36LMP  Oh.

00 01 20 56CMP  How's everything up in this old panel look?

00 01 20 59LMP  Fine, Ken.

00 01 21 00CDR  This just looks downtown, Charlie and Ken.

00 01 21 02CMP  Yeah.

00 01 21 03LMP  Well -

00 01 21 04CMP  Well.

00 01 21 05CDR  Well.
Is it ever beautiful.

It is ever beautiful.

Oh, man.

Yeah.

I thought it ...

You got it wrapped around ...

Yeah.

Hot dang.

Okay. Twist the other one, Ken, because all the ... going around your back.

Oh, I see what's happened. Yeah. The old ... Put it on one way, and ...

What makes the helium pressure - would make it go up?

The regulator failed to open.

Did - did you get a picture of all that good stuff, John? I'm sure we got --

That's 10,000 pictures of horizons and sunrises. I got a picture of the Moon out there. ... coming up.

It's gone.

Going ... --

-- ... coming up.

Supposed to be up.

Okay, here's ... that's gonna get ... as about ...

2 ...

What?

220, ... you think?
00 01 22 57  LMP  210.
00 01 22 59  CDR  All that ... right after insertion ...
00 01 23 07  LMP  You can extend the docking probe if you want to.
00 01 23 10  CDR  We gonna do that over the States?
00 01 23 12  LMP  Well, they can't tell.
00 01 23 14  CMP  Look under --
00 01 23 15  CDR  Want to hear it go "clunk?" Circuit breakers are in.
00 01 23 24  CMP  Okay.
00 01 23 25  CDR  Take that and put it somewheres else.
00 01 23 26  CMP  Okay, shall we? EXTEND/RELEASE. Cover.
00 01 23 36  LMP  There it goes.
00 01 23 37  CDR  ... what it does.
00 01 23 38  CMP  And the cabin pressure didn't go up?
00 01 23 40  CDR  ...
00 01 23 41  CMP  Oxygen flow ... go up. That's also very nice.
00 01 23 44  LMP  Did you get the ... through?
00 01 23 45  CMP  No, I just want to make sure it doesn't. Every
time I do something mechanical on the spacecraft, I ...
00 01 23 53  LMP  Okay. Did you go to --
00 01 23 54  CDR  Just about --
00 01 23 55  LMP  Did you go to RETRACT?
00 01 23 56  CMP  Okay. ... two gray, just like they told me. Back to -
00 01 24 10  CDR  ... supposed to leave it there.
Looks like we leave it in RETRACT, all right. Talkback gray at full extension. Did all those things. That's all did [sic]. (Sigh) Got all that stuff unstowed. And hold us on a hold attitude. That means I got to ..., damp the rate. If we do it, we'll do it with a - I'll make the turnaround in E and M [?]; then we'll go to SCS - Yes, because with the - the proportional control, I can set up a rate that's equivalent to the ... one. Okay.

Lift that ... up ...

Well, yeah. Well (laughter).

Have to do it ...

The thing I don't want to do is that I don't want to be talking about what we're gonna do and - when they're saying, hurry up and get over there before you lose attitude.

Yeah. Did you put the Flight Plans in R-12, Ken?

You should have volume 1 in here.

Okay.

...

Okay. Why don't you pull that out? Well, you remember we talked about it?

Yeah, I remember that.

We went over the procedures on how to dock the thing in ... --

Yeah.

-- because you get there faster --

Well, I hate to tell you, but I forgot to hook up R-12, and ...

I'll go get it.

It's just floating. Just reach around there, and it will just float right up.
Okay. Sometime here, before we hit the States or something, I sure would like for us to recap the checklist to make sure we haven't left something out.

I've gone over it three times.

Oh, you have?

Yeah.

Okay.

Based on the - our -

Okay, I just wanted to make sure that I - you know, there's some - some of my things that I didn't do because you did, and I don't have all of my stuff checked off, I'm sure.

Okay, you want me to get the Flight Plan out?

Yeah, I wrote some things in there. I think I got some camera settings ...

01:28, we come up ... States.

01:18?

01:28. Here you go, Ken.

All right. Thank you.


01:26. Sure is quiet up here.

It sure is. Okay, ... one coming at ...

Okay, at 01:30 - Just couldn't believe that these ..., and I'm already so baffled by these things that I wanted to remember about that I need to do. I was trying so hard to remember times and things; and there just wasn't any way.

Well, I'll tell you, all I was doing was holding on to that ascent ...
Man, when that thing started to shake (laughter) -
Oh, ... at staging?
No.
No. The -
Lift-off.
Just in general.
Oh, I mean, that's for sure.
Well, it's just like everybody said. They said it's like being on a freight train on a rough track. (Laughter) That's really weird. And when the --
The only thing that I didn't recognize was - there was a little ripple of pogo that kind of built up and died out to - to - to about 09:07 in the S-II burn, and then it quit at - and then after - after the engine shut down, I felt a little pogo.
After the engine shut down, you felt pogo?
After center engine shutdown.
Oh, in the S-II?
Yeah.
Yeah, it quit at 09:05. I remember that number.
Yeah, 09:07.
And it was - Yeah. And it was - the thing that bugged me was that the pogo or the buzz that we got in the S-IV was the same frequency; makes me think maybe that was coming from, not from the booster, but from the understage or something like that. Because it was a - I would have expected to, you know, to get a frequency change, wouldn't you?
... I wouldn't even think about it anymore. Okay, there's the coast of - of Baja.
00 01 28 48 LMP Yes, sir.
00 01 28 52 CMP Look at him out there ahead.
00 01 28 54 LMP Look. Yeah, way ahead.
00 01 28 58 CDR You know that center window isn't too good for that. Charlie, do you want to see if you get to take a pic - picture, or do you think it's worthwhile?
00 01 29 06 LMP Well, I don't know.
00 01 29 09 CDR Huh? I got so much junk in the window, I can't do it.
00 01 29 13 CMP Like my ...
00 01 29 14 CDR Yeah. Very good.
00 01 29 15 LMP Yeah, give me - give me the camera.
00 01 29 17 CDR Yeah, well, I got it set up at f/11, infinity --
00 01 29 21 CMP Okay, how about let's record the - what you take pictures of and things like this and all that ... and how to do it.
00 01 29 25 LMP Yeah, well, here comes --
00 01 29 27 CMP You took - did you just take one, John?
00 01 29 29 CDR No, I took two, one of which was the - No, that was the - it was the thunderstorm that really attracted me down there --
00 01 29 38 LMP Okay, that's Baja down there.
00 01 29 40 CDR Yeah.
00 01 29 43 CMP Why don't you read off and tell me what you got there, Charlie?
00 01 29 45 LMP Okay, frame count number ... --
00 01 29 47 CDR You got signal strength yet?
00 01 29 48 LMP Not yet.
You on the right antenna?

... now.

Yeah, well, I don't know.

Well, let's do that the first...

Well, we have it - orb rate. We ought to be -

We ought to be on the top one, or we ought to be on B or D.

We're on B...

All right. ... we get it. We get a signal right now.

It's about a minute late.

You got our VHF's going?

...

No signal strength, huh?

Not a thing.

Look at that. That...

I don't worry about any jet. Let's worry about a little comm here. ...

There it comes. There it comes.

Hello, Houston. Are you there?

Be - Let them get locked up, John.

Now you got signal strength; they ain't locked up yet.

Well, it's coming up MAX now. Okay, you should have them.

Houston, 16.
TIMESKIP

00 01 48 38 CDR
Put it to the side and ... right there. ... like ...

00 01 48 44 LMP
Could you - you switch to G&C and do a VERB 46 and drive around a little while?

00 01 48 48 CMP
We've already got a VERB 46. That's standard ... I was just curious if you had tried -

00 01 48 55 LMP
No. No. I really ...

00 01 48 57 CMP
Okay. I'm not advocating that you do.

00 01 49 00 CDR
Okay.

00 01 49 03 CMP
I would rather see that we do the most nominal things that the world has ever seen.

00 01 49 07 CDR
You better believe it.

00 01 49 09 CMP
But if we do something off of that, I just thought it would be nice to record it. What we found out. That's all. ...?

00 01 49 18 LMP
Yeah.

00 01 49 19 CMP
... have to ... it.

00 01 49 20 LMP
I could sure use a drink of water, but I sure don't want to - -

00 01 49 22 CMP
Want me to get it for you?

00 01 49 23 LMP
Yeah. But I don't want to - -

00 01 49 24 CMP
Okay?

00 01 49 25 LMP
No, I'll get it.

00 01 49 26 CMP
Hey, look, you don't have to.

00 01 49 27 LMP
Okay.

00 01 49 30 CDR
Yeah, let's all take a drink of water.
00 01 49 32 CMP  Here. I'll put the binocs up.
00 01 49 34 CDR  Okay. We'll have to stick this in that bag, wherever it is.
00 01 49 38 CMP  Oh, I put it up - up here through TLI. Okay. How's that?
00 01 49 44 CDR  We need it right after TLI ... --
00 01 49 45 CMP  Yeah, it won't be far away.
00 01 49 47 LMP  How about just on the Velcro over here?
00 01 49 49 CMP  I'd like to tighten this down.
00 01 49 50 CDR  For launch, it should be up somewheres, Charlie, because I think ... burns 5 minutes of engine, you get up to darn near two-thirds of a g.
00 01 49 58 LMP  Well, I was gonna put it on the shelf - girth shelf, on the Velcro.
00 01 50 00 CMP  Well, but it might - if you got an attitude excursion --
00 01 50 03 LMP  Okay.
00 01 50 06 CC  ... Houston through Canary.
00 01 50 08 CDR  Loud and clear, Gordon.
00 01 50 13 CC  You're a little - a little down in the mud, but I think I can understand you.
00 01 50 20 CDR  Okay.
00 01 50 23 LMP  Hey, Gordy, we heard you then before we got the signal strength. That must have been on the --
00 01 50 26 CDR  VHF.
00 01 50 27 LMP  -- VHF, huh?
00 01 50 31 CC  You are clear but weak.
00 01 50 39 LMP  Okay, we got - we got ...
Oh, look at that horizon! Isn't that pretty? You got one out your side, too, Charlie?

Yeah.

...?

Isn't that fantastic?

(Laughter) ... Oh!

Just as blue and pretty!

Can't you imagine that ...

... open.

... went ...

16, Houston. About 30 seconds to LOS. We figure to have you through ARIA at 02:22, a couple of minutes later than shown in the Flight Plan. Over.

Roger. Understand.

Did - did he ever say anything about why we got the thing late?

You know that's - Hey, you know, this light's on out there, Ken. Is that supposed to be?

What's that?

On that thing?

Whoops! Hmph. I didn't get my things on time.

Let me see.

Okay.

Maybe I hit something. Boy, it gets ... in here.

Yeah. Well, we might - Do you want to run into the TLI? We got a - we're at 01:55.

Yeah. I'm going to go LOW BIT RATE, COMMAND RESET - ... COMMAND RESET. We better go into the TLI prep.
Okay, TRANSLUNAR, INJECT, verify?

That's INJECT.

Okay. EDS POWER on up?

EDS POWER coming on up.

Okay. Perform EMS DELTA-V test and null bias check.

Okay.

And set the DELTA-V<sub>C</sub>.

1586.5?

1586.5?

Great.

Okay, Ken, I guess you can call P15.

All right. ...

Okay. ... want? 61 ... 63?

63.

Okay. ...

Okay, Charlie.

2.

2.

23.

Minus 18.9 on the DELTA-V test. That's pretty good, isn't it?

... particularly ... What's the next one?

20:57.

20:57, right? ...

No, 57 ... 57. It's 67 seconds. ...
Okay, I got 02:23:57 ...

Go.

Now you run that for how much? 100 seconds?

Yeah. Okay, 14 is the ... That was the time base 6 ... Isn't that right? Not the TLI.

Time base 6 ...

... count 0.3 for every 5 seconds. ... count a tenth every 5 seconds. ...

All right. Okay.

It's this number right up here.

Okay. I'd just - You know, I'd feel bad ... TLI.

Yeah.

Okay, NOUN 14 is ... cut-off. All right. Go on.

V₁, you want 35589.

Okay, 35589.

Go.

... 35, 36.

Do you do this for 100 seconds?

...

Okay, well, there's a minute. Plus 100 ...

What's that gurgling?

Wait a minute. Okay. Wait a minute.

4, 3, 2, 1 -

MARK it.

... two and a half; 100 seconds. ... 5 ... --
What's our pitch attitude, John? You got the optics ... there?

Yeah, full Moon.

You got ORDEAL on that?

Yep.

... hundred?

Yeah; 95, actually.

All righty.

Okay. Set DELTA-V ... John.

Okay.

It's 10, 373.0.

... over there, Charlie.

Got it.

..., Charlie?

Oh, yeah. Look - look, John.

What?

The fires. Out the right side. Looka there! They were right. They were really right.

What's that?

Beautiful!

The fires of Africa. They're there. Like he said. Isn't that spectacular?

That is really beautiful!

Can you see them, John?

Yeah, I see them. Yeah, yeah.
Day 1

00 01 59 48 LMP
00 01 59 49 CDR
00 01 59 52 LMP
00 01 59 54 CMP
00 02 00 05 LMP
00 02 00 07 CMP
00 02 00 09 LMP
00 02 00 12 CMP
00 02 00 20 CDR
00 02 00 22 LMP
00 02 00 30 CMP
00 02 00 31 LMP
00 02 00 32 CMP
00 02 00 33 CDR
00 02 00 34 CMP
00 02 00 35 LMP
00 02 00 39 CDR
00 02 00 40 CMP
00 02 00 42 LMP
00 02 00 45 CDR
00 02 00 46 LMP
00 02 00 48 CMP

Good gosh!
There must be a hundred or so...
... over there.
What are they from?
Nomads.
And - and there's brush fires, sometimes.
Mostly, I - you know there's the - all the nomads and stuff that are out there ... around.
One zero - What did you say it was, Charlie?
10, 373.0. Man, you can see them out here, I'll tell you.
Are they ...?
Yeah. I think they are.
Okay, you're looking -
...
Well, you're looking north.
North, yeah. I see some thunderstorms. Wow! Look at that! The ones ... there --
10, 37 --
...
Yeah, 10, 373.0.
... 37 ... - -
Okay, check the DAP, Ken.
Okay. You just want me to verify it?

CONFIDENTIAL
Well, it says load 310 --

Okay, ... --

-- 31 - point 11.

31.0, 0.11.

Okay. 10, 373.0.

That's good. Okay. GDC align.

Okay.

Do you want to hold off on the power until Carnarvon LOS?

Okay.

We got the DELTA-V test and ... 

I've never seen so many storms ...

... have a thunderstorm, ... be ... usually. The - the ... thunderstorm.

(Laughter)

I don't ... Wonder if that's not one of those fires.

Okay. Set ... Did you do a VERB 83?

No. I aligned the GDC ...

Okay.

That's really going to be a hassle.

Yeah, I know.

Okay.

Okay, do a VERB 83.

You really want one of those, huh?

I'd ...
(Laughter)

Yeah, I'm reading the checklist.

We already loaded P15.

Okay.

We got the – we got the ORDEAL SET.

Okay. TRANS CONTROL POWER, ON.

Okay.

And bypass the SECS PYRO ARM.

Okay.

ROT CONTROL POWER NORMAL, two, AC/DC, verify.

Verify.

ROT CONTROL POWER DIRECT, two, MAIN A/MAIN B.

MAIN A/MAIN B.

SPACECRAFT CONTROL, SCS, verify.

Verify.

LV/SPS INDICATOR, S-IVB.

S-IVB.

CB, DIRECT ULLAGE, two, close.

You don't want to monitor the – … you want to do that? …? …

Yeah, that's what I was doing.

… should be all right.

It goes back to whatever it was, doesn't it?

… ought to be able to call …
I don't want to experiment with that, particularly. ... I don't know whether we ever did or not, to be honest with you, Ken.

Well, I - that's why I asked. That's one that I don't --

I don't remember even ever doing that.

Let's not then.

Yeah.

It's tough when you ...

Did you get the DIRECT ULLAGE C breaker, John?

Yeah, I got them, Charlie.

Okay. Set the DET to 51 minutes.

You got them there, didn't you? ...

Yeah. DET to 51 minutes. Okay, going to RESET, 2 hours and 4 minutes.

It won't start?

...

Oh.

Okay, at 56 minutes, John, we got to change the slew FDAI number 1 to ... equals 16.

... equals 16.

...

It really isn't like I - I don't know, the way I - I thought it would - would be after ... It just feels like I've been here forever.

Yeah, I agree.

I must admit, I feel like I'm ...

I don't even feel that. I'm just --
My sinuses are all stuffed up - getting worse.

Mine, too.

I think my nose is, you know, just about to drain.  ...  (Laughter)  ...

Okay, you guys, you better start ... out your belts, because they could get in the way.

Can you -

Not with the seat down, you can't, Charlie.

Well, I'm gonna leave the seat down, okay?

Sure.  ...

Man, that booster ... ride.  I can't get over that.  It really felt like a runaway freight train!

I thought that ... was pretty impressive.

I saw that big flash of flame out that window, and I flat forgot that it was ...  Man, I thought I'd take this old arrhythmia gage --

Right.  That was pretty bad.

(Laughter) Either that or it'd absolutely stop (laughter).  Golly, I was just - I was all prepared for the shock ... separation --

Is ... is on?  ...

I'll go look.  I didn't really know that.

..., John.

I told you I'd forget.  Man, I'm forget - I'm in a rapid dump mode.  I'm forgetting faster than I ... Okay; 25 minutes to go again.

Attitude looks okay?

Looks super.
Man, I can't get over that ... (laughter) ... I tell you, there are a lot of --

... gonna leave them checklists up there during the boost?

Okay, I'm getting to them. My next course of action ... is to go around and see what I got laying ...

Okay, we got a lot ...

You want to eat a sandwich, you guys? We got about 10 minutes here.

Not me; I'm gonna wait until later.

... Okay. I don't want y'all to get hungry and starve. ...

I'll have to admit, when you get up here - I always thought that EL [?] was kind of a silly ... but when you get up here, it sure is different.

Sure is.

It just ... Don't you guys have a little - little ... thing on the --

... --

You can't see it?

... confuses me. Okay, 10, 272. Right, Charlie?

That's right. ...

Okay. What's the fuel-to-oxidizer DELTA-P?

Hey, could you get me a little piece of tape ...?

... What's the fuel - allowable fuel-to-oxidizer DELTA-P with this thing? On powered flight.

On powered flight is 30 - greater than - it's greater than 36; OX over fuel, greater than 26.
Okay.

If LOX goes greater than 50, you want emergency sep.

When is the - when does ... - when does old what-you call it predict when we ought to list this stuff down. Write all these numbers down so we ... , Charlie.

Man, they didn't give me nothing but a pen.

... Give me time base 6 —

You know where a pencil is?

-- ... , Charlie.

Okay, time base 6 started at 02:23 —

Okay.

Wait a minute; 02:23:57, I think it was.

...

02:23:57.

02:23:57.00?

Yes.

Okay; and then R-2 align?

R-2 align is 1 - 112.7.

112.7. ORDEAL operate time?

57:20.

57:20? Didn't they change that on us?

That's what it's - that's what's the new time.

Okay. And maneuver to the R-2 ignition would be what?

Okay, 107. ORDEAL of 107.
Okay. And then they said something about... data of 17 instead of 16, right?

That's right, at 56 minutes.

Okay. ...

Okay, and at - and at 57:20, your insured is 11 degrees.

57:20 is 11, right? Okay, 11. Thank you. No wonder we ain't never got the right profile. And then they have --

...  

V_I is what?

V_I is i at 35589.

And burn time? ... --

05:43.

Okay. ...

Well, I don't see what's back here that's not battened down. ... up here; ... over there.

Well, I'll try to take this camera ... How will that be?

Take the camera off?

Yeah. We can put it on ...

...?

Okay, going back to 12. There you go.

Okay. We've ... TLI preparation?

... to SECS PYRO ARM.

Can you make a good place to put that Flight Plan there? Guess I could put it there myself.
Right.

Okay — —

Well, let's see here, now. Again, we got the CSM/LM SEP breakers ...

We do?

Yeah. There we are. SECS PYRO ARM really is a sort of a ... for docking ...

Be kind of terrible ...

It's got CSM/LM SEP switch and then S-IVB/LM SEP switch. We got to be very sure we're pushing the right one ..., but anybody can look at it.

We're going to all look at that, aren't we?

Yes. We're all going to ... — —

Three, 4, and 5 - 5-second hold. Then we're gonna make sure we got the circuit breakers in. All ...

Might as well take my water wings off. What'll I do with them?

... go?

Right down here. ... you?

Let me turn the ...

Okay, ...

Yeah, we - we thought we was supposed to PRO there.

...

That's okay.

That's low ... — —

I just got a ... — —

... get any ...
00 02 14 38 CDR Yeah. ... all out. I don't know how you're ever gonna make it with that couch in there, if you don't ... to take the couch out ... (laughter).

00 02 14 55 LMP One thing about the ... especially ..., I got one little minor ... and that's ...

00 02 15 04 SC (Laughter)

00 02 15 08 CMP You know, you don't look fat faced to me.

00 02 15 09 LMP I don't? I feel a little ...

00 02 15 13 CDR It looks like - well, you - you --

00 02 15 14 LMP What?

00 02 15 15 CDR Yeah, you look like you're ... hat.

00 02 15 33 LMP It's natural.

00 02 15 34 CDR I mean, but it's not near as bad as standing on your head. That's what I did for 2 or 3 days. Stood on there for 10 minutes, and, boy, that's about 10 minutes ... Seemed like about - I'll tell you what's just as bad as standing on your head, though. ... got a couple or three ... Mine keeps going - it keeps --

00 02 15 43 CMP Keeps going ...?

00 02 15 45 LMP What, your sinuses?

00 02 15 47 CDR Yeah. And then it goes away.

00 02 15 48 LMP Yeah.

00 02 15 49 CMP Yeah, I suspect ... tomorrow.

00 02 15 51 LMP Mine really can drain. ... 

00 02 15 54 CDR There's nothing else they can do. But the zero g is sure neat (laughter).

00 02 16 03 CMP Freddie Baker's [?] simulator was never like this one.
<table>
<thead>
<tr>
<th>Time</th>
<th>Actor</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 02 16 05</td>
<td>CDR</td>
<td>Boy, I mean to tell you.</td>
</tr>
<tr>
<td>00 02 16 07</td>
<td>CMP</td>
<td>I wouldn't have ... if I was ...</td>
</tr>
<tr>
<td>00 02 16 10</td>
<td>LMP</td>
<td>I hate to tell you, but they don't have any ARIA AOS in this.</td>
</tr>
<tr>
<td>00 02 16 14</td>
<td>CDR</td>
<td>It's 02:22 is what he said, Charlie.</td>
</tr>
<tr>
<td>00 02 16 26</td>
<td>LMP</td>
<td>I couldn't get my helmet back down in there. ... Down under there. There you go.</td>
</tr>
<tr>
<td>00 02 16 37</td>
<td>CMP</td>
<td>Okay. Now that's - The only thing we got that I'm a little leery about is the camera.</td>
</tr>
<tr>
<td>00 02 16 42</td>
<td>LMP</td>
<td>It's supposed to be mounted there.</td>
</tr>
<tr>
<td>00 02 16 43</td>
<td>CMP</td>
<td>Okay. You want to leave it there?</td>
</tr>
<tr>
<td>00 02 16 44</td>
<td>LMP</td>
<td>Yeah.</td>
</tr>
<tr>
<td>00 02 16 45</td>
<td>CMP</td>
<td>...?</td>
</tr>
<tr>
<td>00 02 16 46</td>
<td>LMP</td>
<td>Yeah, I think so.</td>
</tr>
<tr>
<td>00 02 16 47</td>
<td>CMP</td>
<td>Okay, we got the Hasselblad.</td>
</tr>
<tr>
<td>00 02 16 48</td>
<td>LMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 02 16 49</td>
<td>CMP</td>
<td>I've got it up in R-2. And you got the TV monitor. Is it gonna be all right?</td>
</tr>
<tr>
<td>00 02 16 53</td>
<td>LMP</td>
<td>Yeah; well, yeah, I think so. It's on the shelf and it's on a big piece of Velcro.</td>
</tr>
<tr>
<td>00 02 16 57</td>
<td>CDR</td>
<td>... is all in there.</td>
</tr>
<tr>
<td>00 02 16 59</td>
<td>CMP</td>
<td>You got the COAS locked ...</td>
</tr>
<tr>
<td>00 02 17 09</td>
<td>LMP</td>
<td>(Laughter) Man, we're going to the Moon.</td>
</tr>
<tr>
<td>00 02 17 11</td>
<td>CDR</td>
<td>Well, we ain't there yet, babe. We got ... to do it. A couple of things you got to do.</td>
</tr>
<tr>
<td>00 02 17 17</td>
<td>CMP</td>
<td>A couple of things you got to do.</td>
</tr>
<tr>
<td>00 02 17 18</td>
<td>LMP</td>
<td>I know it. I know it.</td>
</tr>
</tbody>
</table>
And then Casper will be out of his bag.

I'll tell you, if this isn't the cat's meow if I've ever saw it.

You know, I'm getting used to it. My head's not feeling so poorly.

Okay. It goes up and then it goes back down again. Don't ask me how the head compensates for it, because - The sinuses, I don't see how they can ever drain. ... doctors ... It doesn't know it can't compensate.

... checklist. ... G&G Checklist ... there.

Aw, beautiful. It's got the little card.

You know the - the dadgum - the flow ain't exactly ...

I ain't got much flow, either.

It beats me.

Well, the - these extension hoses would make it better, Charlie ... --

Well, I don't want to do it now.

That's really the only thing.

That's okay. I'll do it after ...

I did it. It's pretty comfortable. It's cool. You want me to turn yours off? ...,

Okay.

How much time we got?

... What was time base 6 predict?

02:23:37.

...
00 02 18 54  LMP  Why don't you turn my - could you slide up - go right up there and turn my flow on, Ken.
00 02 19 00  CMP   ... get the top one.
00 02 19 01  LMP   Okay, ...
00 02 19 05  CDR   Can't do it if you don't ... strapped in.
00 02 19 06  CMP   ...
00 02 19 12  CDR   Okay. EMS DELTA-V test, set DELTA-V, DIRECT ULLAGE, two, close --
00 02 19 16  CMP   Here you go, Charlie.
00 02 19 17  CDR   -- UP TELEMETRY to BLOCK, that's BLOCK --
00 02 19 18  LMP   Okay.
00 02 19 19  CDR   -- EDS POWER is ON, Charlie. Okay, Charlie; I'm gonna arm the pyros. Charlie?
00 02 19 26  LMP   Wait a minute. You want to put your hose around through there? Okay, go ahead, John.
00 02 19 33  CMP   John, you want to do yours while I'm here?
00 02 19 35  CDR   Nah.
00 02 19 36  LMP   Okay. I'm ready on the pyros.
00 02 19 38  CDR   Okay, pyros are coming on. PYRO A, on; PYRO B, on.
00 02 19 43  LMP   Okay.
00 02 19 44  CDR   THC, it's on. RHC - what do they want to do with it?
00 02 19 50  LMP   ... Okay, wait a minute. THC - TRANS CONTROL POWER - we need ROT CONTROL POWER DIRECT, two, MAIN A/MAIN B - should have already had all that.
00 02 20 00  CDR   Yeah. DIRECT, two, MAIN A/MAIN B. Go.
00 02 20 02  LMP   Okay, two - NORMAL, two, AC/DC.
00 02 20 05  CDR   Go. SPACECRAFT CONTROL to SCS.
00 02 20 08 LMP Okay. We got that.

00 02 20 09 CDR LAUNCH VEHICLE GUIDANCE is IU. TRANSLUNAR INJECT, INJECT. Set DET to 51 minutes. Okay.

00 02 20 18 CMP Hey, is that tool E gonna stay up there, John? It's right over your head --

00 02 20 22 CDR ... Okay.

00 02 20 24 LMP Yeah, it'll stay up.

00 02 20 25 CMP Okay.

00 02 20 26 CDR I thought I ... --

00 02 20 27 CMP ... Okay, why don't I put it in my pocket. Here, I'll wrap it. I'll put it in my pocket.

00 02 20 33 LMP We've got an evaporator problem here. No, I guess we don't.

00 02 20 37 CMP You've got the radiators on, haven't you?

00 02 20 38 LMP Yeah. ... 

00 02 20 44 CDR Here you go.

00 02 20 46 ARIA ... 

00 02 20 47 LMP ... ARIA --

00 02 20 48 CDR ... a little rough there.

00 02 20 49 ARIA ... 

00 02 20 51 LMP ... antenna ... That was ARIA calling.

00 02 20 56 CDR I know.

00 02 20 57 LMP ... think they must be ... 

00 02 21 03 CDR Yeah.

00 02 21 04 CMP Hey, you want to check to see that that's going to be all right.

00 02 21 06 CDR Yeah, it's all right.
You might make sure that these shoulder straps aren't laying — floating somewhere where they get over your head — —

Mine are tied down — —

... are down.

Okay, because those clips are just ...

Okay. I'm gonna set 300 LUNAR on this ... ... to do it.

All right.

Okay, a couple of minutes, you guys.

300 and LUNAR, we got set on it.

...

We — we got signal strength?

Yeah, a little bit — —

Here we go.

— ... keeps babbling, though. ... locked up yet. We'll let them give us a call.

Okay, Houston, through the ARIA. We got signal strength and — assume you're down there somewheres.

Typical ARIA. Hey, that's a lot cooler, Ken.

Okay, Houston; we don't read anything you say, but we'll transmit in the blind.

Think they're having trouble locking up.

..., Charlie.

Try them now. ...
How do you read that down there now, Houston?
Apollo 16, this is Houston through ARIA. Over.
By gosh, loud and clear there.
So are you, John.
Okay, we'll stand by for the light.
What time?
09:38. About a minute.
How's everything on board?
Everything looks good here. We're a minute - we're 10 minutes and 30 seconds to the burn.

What's that black thing over there, Ken?
It's your neckband.
Oh. ...
You got the Flight Plan ...
Yep.
All put up.
When is this up-link on? Up-link activity light on?
That ...?
Yeah.
Okay, that and the S-II light come on at 09:38.
Okay.
Does that time base 6 start at 09:38?
Yeah, minus 09:38.
Day 1

00 02 23 59 CMP ... 
00 02 24 00 CDR Okay. On time for time base 6. 
00 02 24 03 LMP Okay, stand by to start it. 
00 02 24 04 CC Roger. 
00 02 24 07 CDR You start it on that. 
00 02 24 08 LMP At 9 min - yeah, okay. 
00 02 24 09 CMP Yeah. Yeah, that will be ... -- 
00 02 24 12 CDR This was - this is at ... 
00 02 24 13 CMP -- that ... was at 09:30 - 5, I get. 36. 
00 02 24 20 CDR Yeah, 36. 
00 02 24 21 CMP Okay. 
00 02 24 29 CMP Come on, boy. 
00 02 24 38 CMP That was on time. 
00 02 24 39 CDR Yeah, that was on time. 
00 02 24 40 CMP Now, I don't understand that -- 
00 02 24 41 CDR -- ... No, I don't understand it either, but I guess we'll ... -- 
00 02 24 45 LMP Okay, Houston. The S-II SEP light was out on time. 
00 02 24 50 CDR Charlie, ... -- 
00 02 24 51 CC Roger; very good. 
00 02 24 54 CDR Get this ball lined up? 
00 02 24 55 LMP What, John? 
00 02 24 56 CDR We were off -- 
00 02 24 57 CMP Yeah.
--- on ...

Yeah.

Roll is --

Okay, John. Okay. Let see, you can monitor the tank pressures. Nominal LOX, 40; LH₂, 31.

... 148, about?

No. No, we're below that, John. 146 - let's say 146.

Okay.

Okay.

Okay, now let's go over this thing here. What should I have on --

I got a couple of things for you.

Okay.

OR - DE - A - L - ORDEAL FDAI number 1, ORB RATE.

It's ORB RATE, Charlie.

2, INERTIAL.

2, INERTIAL.

ORDEAL MODE, HOOK - HOLD/FAST.

HOLD/FAST.

Okay, and go 300 LUNAR.

We're in 300 and LUNAR.

Okay, RHC number 2, armed --

... the SCS TVC SERVO POWER, ... Okay?

... Yeah.
Okay, and that's on your card over there.

Okay, and what's ... 5? ... --

... five ... degree ... 25.

Okay, and the shutdown, if it's - if it's ... control - TLI - if you overburn shutdown, you ...

Okay.

Okay, Ken - Excuse me. ... You want to do that for all the ...?

Yes.

Okay, we're in operating mode, gang.

Okay.

16, Houston, we're about LOS Carnarvon. Handing you over to ARIA. We'll watch the booster for you. The spacecraft's all yours.

Okay; thank you much. Okay; now we're at - 57:45, Charlie.

Okay; thank you.

There's a couple of things here that's got to be -

At 58:20, give me a call.

All right, I'll call you at 58:20. What do we do?

SCS TVC SERVO POWER, number 1, AC1/MAIN A; 2, OFF. And I go HIGH BIT RATE, RECORD, FORWARD, COMMAND, RESET.

And I go EMS MODE --

You go to NORMAL.

Okay, that - that TVC SERVO POWERs number 1 gets power ...

That's right.
00 02 31 50  CDR  Right.
00 02 31 51  LMP  That's right.
00 02 31 52  CDR  Okay, 15, 16, 17, 18, 19, 20, 21 -
00 02 31 57  CMP/LMP  Okay, DSKY blanks.
00 02 31 59  CDR  On schedule.
00 02 32 00  LMP  Okay, SCS TVC SERVO POWER number 1, ACL/MAIN A; 2, OFF.
00 02 32 05  CDR  2, OFF.
00 02 32 06  LMP  And we're going HIGH BIT RATE, RECORD, FORWARD, COMMAND RESET. Back to NORMAL. EMS MODE to NORMAL, John?
00 02 32 13  CDR  EMS MODE to NORMAL. S-II SEP light's on on time.
00 02 32 17  LMP  You should have ullage at 58:38.
00 02 32 21  CDR  ... where the ullage is.
00 02 32 23  LMP  Yeah (laughter).
00 02 32 24  CDR  ... do we count?
00 02 32 26  LMP  Look at the sunrise.
00 02 32 32  CMP  ... clock there. ... would you like ...?
00 02 32 35  CDR  No. ...?
00 02 32 39  LMP  02:33:35, John.
00 02 32 41  CDR  55 ...
00 02 32 59  CMP  You want to turn your numerics up, so you can see them a little better?
00 02 33 01  CDR  ...
00 02 33 10  CDR  Okay; we got about - 25 seconds.
00 02 33 24  LMP  Pressure's okay, John?
00 02 33 26  CDR    Yeah.
00 02 33 28  LMP    Okay.
00 02 33 29  CDR    At 59:55, we're going to be ...
00 02 33 32  LMP    ... EMS.
00 02 33 35  CMP    There it goes, you guys.
00 02 33 37  CDR    Okay.
00 02 33 38  LMP    There it goes.
00 02 33 39  CMP    Outboards.
00 02 33 40  CDR    IGNITION.
00 02 33 41  CMP    Outboards!
00 02 33 42  LMP    Boy, you don't miss that!
00 02 33 43  CMP    You sure don't miss it (laughter).
00 02 33 45  CDR    Okay. Something I missed -
00 02 33 48  LMP    Something fell to the bottom of the -
00 02 33 49  CDR    ... What do you do?
00 02 33 50  CC     16, we're showing good thrust on the S-IVB.
00 02 33 55  CDR    Roger. Steer, baby, steer.
00 02 34 02  CMP    Okay. It's steering right on, John.
00 02 34 08  LMP    How's the tank pressures look?
00 02 34 10  CMP    Fine.
00 02 34 11  LMP    Good.
00 02 34 13  CDR    That ... is ...
00 02 34 17  LMP    We're passing the 40-seconds mark. That might have been a second or 2 behind.
00 02 34 25  CDR/CMP  PU shift.
Boy, you feel that guy moving.
One minute coming up.
Our attitude is perfect.
Okay, stand by on - pitch and roll.
One minute - -
MARK.
-- Looks good.
Okay; I've got - I've got us - oh, I've got us about 3 seconds early.
Okay, ...
Roger. We're looking good here.
We're about - my time, 3 seconds.
Well, here. Let me give you a hack when I see - 01:30.
Okay.
We've seen PU shift; the thrust looks good.
Okay; well, I'm not sure this clock is right. Did it start on the time?
I wasn't watching it, Ken.
Well, I just want to know if there's difference at the mark.
Okay; we're 1 second off.
Okay.
Okay, we're up to three-quarters g.
It feels like the weight of the world's on my shoulders.
Yeah, doesn't it feel good.
00 02 35 25 CMP Wait 'til you're at reentry — ... you could ...
00 02 35 40 LMP MARK. That was 2 minutes.
00 02 35 41 CDR Yeah.
00 02 35 42 CMP Man, we're following this thing today.
00 02 35 45 CC 16, Houston. At 2 minutes, looking good.
00 02 35 49 CDR Roger. Steering right on in here.
00 02 35 55 LMP About 42 —
00 02 35 56 CC Roger.
00 02 36 03 CMP Okay, ...
00 02 36 09 LMP Pretty high — it's a high-frequency vibration.
00 02 36 12 CMP/CDR Yeah.
00 02 36 17 CDR Hitting 4 cycles per second ... 
00 02 36 23 CMP ... come back and tell us something, for heaven's sakes.
00 02 36 31 LMP Okay; coming up on 3 minutes. (Cleared throat) One last chance to drain your sinuses.
00 02 36 39 LMP MARK — 3 minutes.
00 02 36 44 CDR Three-quarters of a g, Charlie.
00 02 36 46 LMP Okay.
00 02 36 48 CMP ... 3 minutes to burn.
00 02 36 53 LMP ... about right?
00 02 36 56 CDR Yeah.
00 02 36 57 CMP Yeah. ... at 03:13.
00 02 36 59 LMP Three — No, that wrong. Something —
00 02 37 01 CMP Boy, that calculation's way off.
Yeah.

... there. Something's wrong. ... 42 seconds.

How does it look, Charlie?

I'll give you a mark at 2 minutes.

Okay.

MARK; 2 minutes to go.

Okay; it's converging.

Yeah. It's converging. Rapidly.

Stand by on 4 minutes -

MARK - 4 minutes.

There's 90 --

16, Houston through ARIA 3 now. Burn time is as predicted, 05:43. Everything looks good.

Roger.

Feels like you got pitch and yaw.

Well, you're up to 1.

And you can see those vibrations on the g-meter. Shaking ...

Hold together ... That's bad.

What's that?

Like these ...

MARK.

... could look at this.
00 02 38 11 LMP 04:30. A minute to go. I'll give you a mark at a minute on the time.

00 02 38 16 CMP ... check - check this. It's going to a higher freq.

00 02 38 20 CDR Yeah.

00 02 38 21 LMP MARK.

00 02 38 23 CMP/CDR (Laughter)

00 02 38 24 CDR Oh.

00 02 38 25 LMP What was that?

00 02 38 26 CMP (Laughter) John's hand controller ... Coming up on 5.

00 02 38 33 LMP Coming up on 5 minutes.

00 02 38 39 LMP MARK; 5 minutes.

00 02 38 41 CC 16, everything looks good at 5.

00 02 38 44 CDR Roger.

00 02 38 47 CMP They aren't concerned about it.

00 02 38 48 CMP They don't see that.

00 02 38 49 LMP I guess they don't. Okay, ... - -

00 02 38 54 CDR ... and the steering for the angles.

00 02 38 55 LMP Within 30 seconds.

00 02 38 56 CMP ... counting them down.

00 02 38 59 LMP I'll give you a mark at 13 seconds.

00 02 39 03 CDR 600 feet to go.

00 02 39 06 LMP 40 -

00 02 39 07 LMP MARK; 13 seconds.

00 02 39 11 CMP ... on the FDAI.
00 02 39 13 CDR 1.2, you guys. 41.
00 02 39 18 SC Whoo!
00 02 39 20 CDR SECO.
00 02 39 21 SC Whoo!
00 02 39 22 CDR Thank you. (Laughter)
00 02 39 23 CC Roger.
00 02 39 24 CMP Right on.
00 02 39 25 CDR Did I get it? I mean - see what it did.
00 02 39 26 CMP Yeah. That's good.
00 02 39 27 LMP I got - Okay.
00 02 39 29 CDR Okay. SECO right on time.
00 02 39 31 LMP It was a little early, John; 05:41.
00 02 39 33 CDR Yeah. I see it.
00 02 39 34 CMP Well, but this --
00 02 39 35 CC Roger. Looks like normal shutdown and a guided cut-off.
00 02 39 38 CDR That's what it looked like --
00 02 39 39 CMP Yeah, it was.
00 02 39 40 CDR We're looking at minus 10 on the DELTA-V_C.
00 02 39 44 LMP Okay. TF - What's DELTA-V_C? Minus 10?
00 02 39 46 CDR Yeah.
00 02 39 47 CC Roger.
00 02 39 50 LMP Man, all I can say --
00 02 39 51 CDR How you gonna get back to that?
00 02 39 53 CMP You want --
00 02 39 54  CDR  What do you need?
00 02 39 55  CMP  I need --
00 02 39 56  LMP  I need some times on --
00 02 39 57  CDR  You ... to record that stuff?
00 02 39 59  LMP  $V_g$. What is $V_g$?
00 02 40 00  CMP  ...
00 02 40 05  LMP  34? 354?
00 02 40 07  CMP  432 --
00 02 40 08  CDR  Yeah, but what's that other --
00 02 40 09  CMP  That's - that's probably --
00 02 40 10  CDR  That's ... --
00 02 40 11  CMP  -- ... time.
00 02 40 12  CDR  Yeah, that's what it is.
00 02 40 13  CMP  And 55 - Gee, that's high.
00 02 40 17  LMP  Yeah.
00 02 40 18  CDR  You see it's converg - converting.
00 02 40 20  LMP/CMP  Yes.
00 02 40 22  LMP  Okay, at 08:26, we maneuver to orb rate, heads down. Okay, John, S --
00 02 40 27  CMP  Make a note there that those times are --
00 02 40 28  CDR  Okay. Go ahead, Charlie.
00 02 40 29  LMP  Okay. SCS TVC SERVO POWER number 1, OFF.
00 02 40 31  CDR  It's OFF.
00 02 40 32  LMP  Going to LOW BIT RATE.
00 02 40 34  CDR  EMS MODE, STANDBY.
00 02 40 35 LMP   EMS FUNCTION, OFF.
00 02 40 36 CDR   OFF.
00 02 40 37 LMP   SECS PYRO ARM, two, SAFE.
00 02 40 39 CDR   Two, SAFE.
00 02 40 40 LMP   FDAI number 1, INERTIAL.
00 02 40 42 CDR   Number 1 is going to INERTIAL.
00 02 40 44 LMP   Okay, lock your hand controller.
00 02 40 46 CDR   ... should have done that first.
00 02 40 48 CC    16, Houston. If it's convenient, would you give us $V_1$ at cut-off?
00 02 40 58 LMP   Okay, Gordy, we got you a late time - Stand by.
00 02 41 04 CDR   He cut it off - I thought you -
00 02 41 05 LMP   No, huh-uh.
00 02 41 06 CMP   No.
00 02 41 07 CDR   What was that? That 35539 was what it was, wasn't it?
00 02 41 12 CMP   Well, that's what it was counting to - that's when they said "It," and it quit.
00 02 41 14 CDR   Okay, well, that's --
00 02 41 17 CMP   Gordy, we froze the display on the - $V_{15}$ displays - we were watching the countdown clock and when we got over to 64, it was already changed.
00 02 41 37 CDR   Okay --
00 02 41 38 CC    Okay, Ken. We copied that, although you faded out at the end. We'll be up on Hawaii here at 44.
00 02 41 47 CMP   Well, there's my first one.
00 02 41 48 LMP   Okay, Gordy. We're down - we got the pyros safed and we're just about to go to P00.
We're in POO.

We're in POO. And the - the - -

Charlie, you're just about unreadable. Copy that you're in POO, and we're standing by for Hawaii acquisition.

Okay.

Got to have that.

Okay. You want to swap seats to get in ... - -

Look at that horizon start to streak.

You want to swap seats?

Yeah.

Okay, Ken - Ken, look - -

I just can't.

One - one quick one. You got to look at that Moon.

No, no. Take the picture - take the picture.

Ohh.

Come on, you guys. Look at that pretty star underneath us.

Shut up and let's move.

Okay. Hang on a second. Let me get through this - let me get my clothes here.

Give - give us the camera.

Yeah.

Okay, I got - -

... get the camera for you.

Okay, I'm gonna switch comm, too. Okay, Ken?
Yeah. Okay, turn your suit power off.

(Laughter) Okay, what am I supposed to take a picture of, the Moon? It - Oh. Okay, let me take the dark slide out. Okay, I got about f/8; I put - I ought to put it on f/11, huh? I hope they don't expect me to look at the Flight Plan right now.

Transfer state vector. Did we do the VERB 66? Okay, the Moon is out of window number 2 - CMC 2 - 250 - CEX. Okay, that's a 250-millimeter lens you got - you want there. We don't want that. We want a Earth picture.

f/8? I'll try one at f/8.

Oh - you got your - you plugged in?

Apollo 16, Houston through Hawaii. Over.

Roger.

... We're reading you 5 by through Hawaii --

What, Ken? What?

-- Gordy, and they're shifting couches.

I didn't get any waste stowage vent valve closed.

Okay.

I got all those circuit breakers.

You got the high gain antenna?

Yeah.

And the FLIGHT BUS?

Sure.

WASTE STOWAGE VENT, CLOSED. It's going to CLOSED, old buddy.

Okay.
Look at the way the stars show up in the daytime.

Yeah, yeah.

Houston, this is the most spectacular view in the - you can possibly imagine.

What did you do with the camera?

I got it right here.

Okay, you got the --

Apollo 16, Houston through Hawaii. Over.

Got the what?

Roger, Gordy. You're 5 by and it's --

I'm turning DIRECT O₂ on.

-- the most spectacular view I've ever seen.

TIME SKIP

Okay, Houston. We're getting ready to arm the pyros. Are you ready?

Roger. We're ready.

Okay. PYRO ARM. A is armed and B is armed.

Okay. GDC ALIGN.

That's - done.

Okay. EMS FUNCTION, DELTA-V.

... good.

Okay.

Okay, let's read it - you want me to read out the - the rest of it?

Okay. Go ahead.
Let's see, I want to get a VERB 62 in here. Is that - that should be about where we start the time, right?

Yeah.

Yeah. We're right at where we start the DET.

Okay, now, what we're gonna do - is we're gonna start the clock, and I'll call times. At 50, I'll take the CMC MODE switch to AUTO; at 58, I start hitting the plus-X. And then at 0, I push this button.

Okay.

We ullage for 3 seconds, and I release it.

Okay.

I'll take my ACCEL COMMAND; pitch up - in 10 seconds, I'll pitch up, making sure this needle's positive.

Okay.

When it goes positive, you can go to --

PRO --

-- V18.

Okay.

And - and - Yeah.

PRO when you pitch.

Yeah. And it's a VERB 61.

Okay.

Okay?

Yeah.

Shall we?

Yeah.
<table>
<thead>
<tr>
<th>Time</th>
<th>User</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 03 04 16</td>
<td>CMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 04 17</td>
<td>LMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 04 18</td>
<td>CDR</td>
<td>...?</td>
</tr>
<tr>
<td>00 03 04 19</td>
<td>LMP</td>
<td>Okay. Yeah. EMS MODE to NORMAL.</td>
</tr>
<tr>
<td>00 03 04 20</td>
<td>CMP</td>
<td>Okay, I'm going to catch that at the last minute because it counts.</td>
</tr>
<tr>
<td>00 03 04 22</td>
<td>LMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 04 24</td>
<td>CMP</td>
<td>You know, John, if you'll just notice what it is for me --</td>
</tr>
<tr>
<td>00 03 04 25</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 04 26</td>
<td>CMP</td>
<td>-- so we have some measure. Okay? Ready to start the clock?</td>
</tr>
<tr>
<td>00 03 04 28</td>
<td>LMP</td>
<td>Yeah. I want to get my countdown on time.</td>
</tr>
<tr>
<td>00 03 04 36</td>
<td>CMP</td>
<td>Okay, we're coming up on 59:40 --</td>
</tr>
<tr>
<td>00 03 04 39</td>
<td>CMP</td>
<td>MARK. Okay, I'm going to hit NORMAL on the EMS. Eight - AUTO.</td>
</tr>
<tr>
<td>00 03 04 54</td>
<td>CMP</td>
<td>This is the right one?</td>
</tr>
<tr>
<td>00 03 04 57</td>
<td>CDR</td>
<td>Yeah.</td>
</tr>
<tr>
<td>00 03 04 58</td>
<td>CMP</td>
<td>1, 2 - Bang!</td>
</tr>
<tr>
<td>00 03 05 00</td>
<td>LMP</td>
<td>There we go --</td>
</tr>
<tr>
<td>00 03 05 01</td>
<td>CMP</td>
<td>1, 2, 3, release. It's off. Oh, boy. We're holding attitude pretty good. Pitch is - pitch up. Okay, PRO - John.</td>
</tr>
<tr>
<td>00 03 05 15</td>
<td>CDR</td>
<td>PRO -</td>
</tr>
<tr>
<td>00 03 05 16</td>
<td>CMP</td>
<td>Okay --</td>
</tr>
<tr>
<td>00 03 05 17</td>
<td>LMP</td>
<td>PRO's in; talkbacks are all gray.</td>
</tr>
<tr>
<td>00 03 05 18</td>
<td>CMP</td>
<td>Good.</td>
</tr>
</tbody>
</table>
All the talkbacks are gray.
Okay.
Okay. The REACTANT valve is going to ...
All right.
Okay, close the SECs --
Okay, all the talkbacks are still gray, Houston. It's pitching around now.
Okay, hit these four to CLOSE.
Roger, John.
Okay, and I got a gray on --
Man, look at all the junk out there.
Let me look out here and see what that stuff looks like. ...
There go the doors.
Can you see one?
Yeah.
Oh, I see one.
Okay, let's look for that booster. That's the guy I don't want to hit. Watch my - watch my hand controller, John.
There's a door out there by the Earth (cough).
Okay. Did you get DIRECT ULLAGE, two, open?
DIRECT ULLAGE.
There he is. He's right out there.
Okay. We're clear?
Yeah.
<table>
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<tr>
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<th>Operator</th>
<th>Message</th>
</tr>
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<tbody>
<tr>
<td>00 03 06 16</td>
<td>LMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 06 17</td>
<td>CDR</td>
<td>You're well clear, and you're about 60 feet out.</td>
</tr>
<tr>
<td>00 03 06 19</td>
<td>LMP</td>
<td>Okay. Load the DAP.</td>
</tr>
<tr>
<td>00 03 06 20</td>
<td>CMP</td>
<td>Not yet, we got to get ... --</td>
</tr>
<tr>
<td>00 03 06 21</td>
<td>LMP</td>
<td>Oh, okay. That's right. We got to go there.</td>
</tr>
<tr>
<td>00 03 06 24</td>
<td>CMP</td>
<td>Okay. Man, did you ever see so much junk?</td>
</tr>
<tr>
<td>00 03 06 30</td>
<td>CDR</td>
<td>No.</td>
</tr>
<tr>
<td>00 03 06 31</td>
<td>CMP</td>
<td>Oh, look at that. It's like a picture.</td>
</tr>
<tr>
<td>00 03 06 32</td>
<td>CDR</td>
<td>Yeah.</td>
</tr>
<tr>
<td>00 03 06 33</td>
<td>CMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 06 34</td>
<td>CDR</td>
<td>Load the DAP.</td>
</tr>
<tr>
<td>00 03 06 35</td>
<td>CMP</td>
<td>Wait, wait, wait - I'm not clear yet.</td>
</tr>
<tr>
<td>00 03 06 38</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>00 03 06 39</td>
<td>CMP</td>
<td>Yeah, let me get my ullage in here before you - before you change the DAP on me.</td>
</tr>
<tr>
<td>00 03 06 44</td>
<td>CDR</td>
<td>Okay. Is it going to stop by itself?</td>
</tr>
<tr>
<td>00 03 06 46</td>
<td>CMP</td>
<td>Yes, sir.</td>
</tr>
<tr>
<td>00 03 06 49</td>
<td>CDR</td>
<td>You want KEY RELEASE?</td>
</tr>
<tr>
<td>00 03 06 51</td>
<td>CMP</td>
<td>Yeah.</td>
</tr>
<tr>
<td>00 03 06 53</td>
<td>CDR</td>
<td>Ahhh. That maneuver put us -</td>
</tr>
<tr>
<td>00 03 06 56</td>
<td>CMP</td>
<td>Okay; here goes. 1, 1, 2, 3, 4.</td>
</tr>
<tr>
<td>00 03 07 02</td>
<td>CDR</td>
<td>That's 4 ...</td>
</tr>
<tr>
<td>00 03 07 03</td>
<td>CMP</td>
<td>Okay. Now you can change it.</td>
</tr>
<tr>
<td>00 03 07 05</td>
<td>CDR</td>
<td>KEY RELEASE. VERB - VERB what? VERB 48 --</td>
</tr>
</tbody>
</table>
ENTER, no, you got to ENTER first. John, let's go back to your RELEASE - KEY RELEASE - KEY RELEASE. There you go.

VERB 40 what?

VERB 48 ENTER.

... 111 -

11102. Hey, how you doing with that TV?

Coming up on the - getting the - ANTENNA's going to REACQ right now.

Looks like it's about 80 feet out.

Looks like it's still open.

Okay, Houston; you got the high gain?

Well, I think you're closing, but I sure can't tell it - -

Roger, Charlie.

You got the DAC started?

- - ...

Oh, I forgot! Ten feet, f/8, 12.

Okay.

... turn the power on and I think I'm gonna hold it off for a second here ...

Yeah.

... close ...

Okay, did you get the DAP?

The DAP is set.

Man, that looks like I'm opening, doesn't it, John?
00 03 08 19   CDR   Yeah. ... you ... Whatever you ... it ... much to open it.
00 03 08 23   CMP   I don't want to put in too much ... rate.
00 03 08 25   CDR   That's right. ...
00 03 08 28   CMP   Hey, when that thing turned around, guys, the crosshairs in the COAS are within the docking target.
00 03 08 37   LMP   Well, I can't get - - I - I got this half of a picture - -
00 03 08 39   CDR   It is close - closing, isn't it?
00 03 08 44   CMP   Yeah, he is.
00 03 08 45   LMP   Okay, Houston, you ought to be getting some TV.
00 03 08 47   CMP   I'm trying to get a mark on that.
00 03 08 51   CC    I haven't got it yet; we're working on it.
00 03 08 54   CMP   Have you - how does the monitor look?
00 03 08 56   LMP   It looks great; but all I got is just this little picture - the cor - the corner of the picture. I can't - -
00 03 08 59   CMP   Well, if you move the - -
00 03 09 01   CDR   You got to move the camera.
00 03 09 02   CMP   -- camera?
00 03 09 03   LMP   That's what I've been trying to do, and I can't get any more -
00 03 09 05   CMP   ... That thing is maneuvering in attitude a little bit. I don't think I'm closing ...
00 03 09 13   CDR   ...
00 03 09 14   CMP   Let it ride?
00 03 09 15   CDR   ...
Hmph, there we are - perfect picture.

I don't think you're closing.

Give me -

... Give me --

TIME SKIP

... on?

Well, I'm going back over them, and I can't see -- Well, I don't know.

I tell you, it doesn't dress up very much - or even.

... should be ...

Looks like something in the ... or something.

..., Charlie.

Man, this patience biz is hard to take (laughter). We're dressing up in pitch now, John, and the yaw is, too. We're gonna have lots of time here.

Ken's taking some time in dressing this thing up to get these attitudes right.

Seems to be ... --

... quite a bit from the attitude that we had.

Look at that. Isn't that something else?

Yeah.

... fired it again, it looked like ...

My docking budget didn't allow for all this. But I get no prize if I break it.
... 00 03 19 42 CDR

00 03 19 44 LMP

Looks like Mylar.

00 03 19 45 CDR

Yeah, I think it's probably Mylar. I think we got some gas ... trapped in those blankets maybe.

00 03 19 51 CMP

John, is it worth dressing up the roll, do you think?

00 03 19 54 CDR

I don't think so. It looks like that's ...

00 03 19 57 LMP

Yeah, it looks ... in.

00 03 19 58 CMP

Okay; we're about - I'm trying to guess what it is in degrees we're off. I guess we're still off maybe 3 or 4 degrees.

00 03 20 05 CDR

Ain't supposed to be off that far.

00 03 20 08 CMP

I'll go on over ... --

00 03 20 09 CDR

... what the book says.

00 03 20 10 LMP

... 9?

00 03 20 11 CDR

Yeah.

00 03 20 12 CMP

Well, you know they don't tell you how to tell the degrees you're off. I - I guess I never worried about it except ...

00 03 20 19 LMP

... pitch and yaw ... degrees.

00 03 20 22 CDR

Yeah. ... ... degrees.

00 03 20 33 CDR

Coming back.

00 03 20 34 CMP

Yeah.

00 03 20 35 CDR

... get it back ...

00 03 20 37 CMP

Yeah. Okay; all we have to do in order to do it now is what?

00 03 20 42 LMP

Put DOCKING PROBE, RETRACT, to PRIM 1. That's all you got to do.
00 03 20 46 CMP Okay.
00 03 20 47 CDR Say when.
00 03 20 49 CMP Yeah, ... get the camera started.
00 03 20 51 CDR Early?
00 03 21 05 CMP We got both rates nulling at the same time.
00 03 21 08 CDR Okay.
00 03 21 22 CMP Little more help here in pitch. ...
00 03 21 29 CDR Okay, you guys.
00 03 21 31 CMP Okay, Charlie.
00 03 21 32 CDR ... pitch?
00 03 21 34 CMP I tell you what. We're within a width of a line.
00 03 21 36 CDR That's good.
00 03 21 37 LMP That's good.
00 03 21 38 CDR Okay.
00 03 21 39 CMP I'm ready.
00 03 21 40 LMP Okay.
00 03 21 41 CDR Okay.
00 03 21 42 LMP PRIM 1. Here it comes.
00 03 21 55 LMP Man, I think that was it.
00 03 21 57 CDR ... it goes FREE ... AUTO.
00 03 21 59 CMP I am FREE.
00 03 22 00 LMP Okay. Did you get a --
00 03 22 01 CDR Okay, Houston. We're hard docked.
00 03 22 03 LMP Did you get a - a gray?
... John. We saw it come in.
Did you get grays?
And there is no question when you get the latches.
Yeah.
SECS PYRO ARM, two, SAFE?
..., Ken.
PYRO ARMs 1 and 2, SAFE.
SECS LOGIC, two, OFF?
LOGIC, two, OFF.
EDS POWER, OFF.
EDS POWER, OFF.
CB EDS, three, open?
EDS 1, 2, 3, open.
John, this is Houston.
Go ahead. Over.
We'd like - we noticed the mixing valves cycling about once every 10 or 15 seconds. We'd like to give you a mark at which time we want you to put the GLYCOL EVAP TEMP IN valve in MANUAL and try to catch the flow rate at the appropriate setting. I'll - I'll give you kind of a countdown and a mark here.
I think we saw it before.
Yeah, we've been noticing that ourselves.
Okay, Charlie. Let me - let me give you some numbers here before I get off. With it - When we were docked --
The flow rate's high and starting back down.
Go ahead and catch it.
Okay.
John, now all of a sudden we've stopped seeing it - that it has stopped cycling. You didn't throw the switch already, did you?
That's negative. We're awaiting your mark there.
Okay; that's DOCKING PROBE EXTEND/RELEASE ...
... (chuckle) It just hung up, just as soon as I said that. Stand by.
-- ... supposed to do that. Let me pull those docking probe circuit breakers.
Yeah, that's ...
So there's no danger.
Okay.
Okay, DOCKING PROBE MAIN A and MAIN B are open.
Okay; DOCKING PROBE EXTEND/RELEASE, OFF.
EXTEND/RELEASE, OFF.
DOCKING PROBE RETRACT, two, OFF.
Okay, ...
Hey, when that thing's lined up, it's one bar width - the target is one bar -
We'd like you to cycle the MANUAL back to AUTO and see if that starts it back down. Over.
For gosh sake.
Okay; you were in MANUAL for about 2 seconds, and back to AUTO.
And the - it's over to the right one bar width and up one-half bar width.
Okay, we're ...
Okay, it's coming down now. Stand by to put it in MANUAL.
(Laughter)
Ready. Now.
Okay, okay; you got it right now on the "now." Okay; say that again, Ken.
Okay. My - the cross is one-half bar width --
... was a little slow on the "now," but leave it there for now and press on with the normal procedures.
(Laughter)
-- and one bar to the right of the target. Right then - right here next to my docking ...
Okay. EXTERIOR LIGHTS, OFF.
Okay. TAPE RECORDER's off. Going off.

TIME SKIP

DAC 6 ... feet per second, 6 frames per second.
DAC's - was 6 frames per second, and what did you say - 6 feet?
No, just 6 frames per second. Okay, lo - DAP is - load the DAP, 21101.
And - Okay, that's go. And load PITCH trim a plus -
Okay, just ... 
Plus 123.
... 123.
And YAW is minus 0.2.
Okay.

Okay, load NOUN 22 attitude maneuver - monitor - Okay, it's a 90, 325 point - load NOUN 22. PRO on that one now.

Okay.

Nine - plus 90 - 09000, plus 325.5 - zero, plus 355.90. Okay; VERB 60 - VERB 63.

... set.

GDC align; DET, RESET.

It's RESET.

CB SECS ARM, two, closed.

That's affirmative. I got SECS ARM, two, close, verify.

Okay; that's right. Cue MSFN.

Okay, Houston. We're ready to proceed with the logic.

Okay. Stand by.

SECS LOGIC, two, on, up.

There's two LOGICs on.

Want me to hold the Flight Plan, Ken?

... GO for pyro arm.

Okay. All right, now. Yeah. Before we get ready to get off --

Roger, Houston.

-- there's a couple of items we need to review, so -

Go ahead.

Okay; why don't we go down to that part?
00 03 57 05  CMP Yeah.
00 03 57 06  LMP Okay. Have you armed the pyros?
00 03 57 08  CMP No, sir. Arm them.
00 03 57 10  LMP Yeah.
00 03 57 12  CDR Here comes PYRO A -
00 03 57 13  CDR MARK. PYRO B -
00 03 57 15  CDR MARK.
00 03 57 16  LMP TVC SERVO POWER, on - POWER number 1.
00 03 57 18  CDR TVC SERVO POWER, number 1, is ACL/MAIN A.
00 03 57 21  LMP TRANS CONTROL POWER, on, up; verify.
00 03 57 23  CDR TRANS CONTROL POWER's on.
00 03 57 24  LMP RHC -
00 03 57 25  CC Okay, they look good.
00 03 57 27  LMP Okay, RHC and THC armed?
00 03 57 30  CMP They're armed.
00 03 57 31  LMP Okay, then call P47. Okay, what do you want to do?
00 03 57 35  CMP Let - let's review before we get into 47.
00 03 57 36  LMP Okay.
00 03 57 37  CMP Okay. The - the thing we got to do when we get through here is I want to be sure that there's a - we're gonna come in the last thing we started and we said at the time we hit SEP, I start my clock, and - and then at - -
00 03 57 53  LMP To AUTO?
00 03 57 54  CMP - - 3 - 5 seconds, I thrust for 3.
00 03 57 55  CDR Okay.
Okay.

And you go to AUTO, - you go to - start your clock and go to AUTO.

And go to AUTO. At the same time, John hits the SEP.

Okay.

Right?

And we'll ... all three of the ... on the line again.

Okay, and I'm going to hold my hand here. Okay; now the next thing is that I want to do this maneuver - is within 30 - at - any time after 30 seconds, I can start my maneuver.

You got to get clear?

Yeah, 30 seconds and clear. We'll go ... approximately a minute. Okay. They haven't clued us to get off. I guess that's all we're waiting on. Are there any questions?

Houston, we got - we're ready to get off, if you guys are ready.

Okay. You're GO for ejection.

Okay. P47.

EMS MODE to NORMAL.

... this display up here? Okay, at 5, I go for 3.

All righty.

Okay. EMS MODE to NORMAL.

It's NORMAL.

Start the DAC.

DAC is started.
Okay. Are you all set? I'll give you a countdown. We'll go at zero. 5, 4, 3, 2, 1 -

MARK.

Man, there we go, man. Okay; we're off, Houston.

... 2, 3, 4 ... Okay, now, in a minute, we're gonna --

I guess it's gone; I can't see it anymore.

Well, we're not quite --

COMPUTER ACTIVITY light out, right?

Okay, and ... Okay and go to ... there.

VERB 49.

Oh, oh, don't - Yeah, okay. Let's go to a minute. Can you see the booster anywhere in sight?

No, it's gone.

Think so?

Yeah.

Okay, I got my EMAGs caged. All off.

Okay. ... --

All righty. I'm ready.

Okay.

ENTER. PRO. Is that the right attitude?

Yeah.

Okay.

Confirm that.

All righty. Go.
Okay. SECS PYRO ARM, two, SAFE.

Okay, looks good.

... CMC ... maneuver?

Yeah.

Yeah.

Okay.

Do you have your pyro --

Your PYRO ARMs are two going to SAFE.

Okay, SECS LOGIC, two, OFF.

SECS LOGIC, two, OFF.

CB, SECS ARM, two, open.

SECS ARM, 1, 2, open. There's another strap.

S-IVB/LM SEP - Okay, I'll ...

Okay, LM SEP, two, open.

I got them. Okay. The O₂ TANK ISOL valve is gray.

Okay. It says O₂ TANK 3 ISOL valve talkback gray.

Hey, what - did - didn't we -

MAPPING CAMERA ON switch is supposed to go to OFF.

21101. And it doesn't look like we're yawing enough. Oh, I know what it is.

MAPPING CAMERA, ON, to OFF.

We - we left it in the - No, you put a 63 in there. But, boy, that's ...

All right.
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<tr>
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<th>LMP</th>
<th>CDR</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 04 01 20</td>
<td>What do we do?</td>
<td>MAPPING CAMERA ON should be OFF.</td>
<td></td>
</tr>
<tr>
<td>00 04 01 21</td>
<td>I got it. PAN CAMERA --</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 23</td>
<td>PAN CAMERA POWER should be OFF. SERVICE MODULE/AC POWER should be OFF.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 29</td>
<td>Well, I can't ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 30</td>
<td>I can get that one.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 34</td>
<td>Okay, Houston. We're doing our maneuver, and we'll tell you as soon as we have a visual.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 40</td>
<td>Which way should it come out of?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 42</td>
<td>Well, that's why I got this ... --</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 43</td>
<td>-- ball set here. We have to get rid of that thing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 47</td>
<td>Yeah.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 48</td>
<td>It floated ... --</td>
<td></td>
<td></td>
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<tr>
<td>00 04 01 49</td>
<td>That's John's.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 50</td>
<td>-- ... pain in the neck.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 51</td>
<td>Sorry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 01 52</td>
<td>Oh, here it is.</td>
<td></td>
<td></td>
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<tr>
<td>00 04 01 53</td>
<td>It is a pain.</td>
<td></td>
<td></td>
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<tr>
<td>00 04 01 54</td>
<td>Okay; we have rolled right 20 degrees.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 02 01</td>
<td>Man, we fired some jets, I'll tell you.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 02 03</td>
<td>...?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00 04 02 04</td>
<td>Yeah, you can see those Mylar particles getting blown off of the ...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rolling to 90 - Oh, you can feel this thing kind of - -

SERVICE MODULE/AC POWER to OFF.

TIME SKIP

-- here now?

Supposed to. Trying to get it in the ... I'll get the second one up. How about a - - an antenna angle of minus 85 and YAW 153. Minus 85 --

Okay.

YAW 153. Is it ...?

No. We got comm.

Oh! I bet that's what I heard.

(Sigh) Well, I can see I was wrong.

In what?

The only guys that don't understand space flight are not the flight planners (laughter).

Yeah. The food people.

I'll say.

(Laughter) They is other folks in that operation that don't understand. Well, let's see. I guess you got to cut this thing first.

Yeah.

Scissors, John?

Yeah. I got them.

The old head full again?
Yeah. Really smart. You want me to unloosen this down here? Put it right up here.

Okay. I've got one of those bags back here that you can ... orange juice in.

Put that in the trash?

The trash bag's done untied itself.

Yeah, I ain't sure that's going to be an acceptable solution. I'm afraid I - Maybe we ought to use one of those TSBs after all. Let's try that.

Avoid that one.

Oh, here come de Sun. Order in the courtroom; here come de Sun.

What did you get, Ken?

I got one. Okay, I didn't realize you had one that was empty. Excuse me.

... That is obviously not one of the bags for me to fill up and use for my other water stuff.

Thank you, sir.

Guess we ought to tape the things. I don't know. Tape up the bags because if we throw them down in there loose, pretty soon we'll have so much stuff down in there we won't know what to do with them. What do you think?

Yeah. We ought to be able to make some kind of a lid to go over it. Tape a lid down or something? Don't you think?

Sock me a pill. Is there any left?

Yeah. Here's one right here.

Here you go.
Okay. What do you have to do? Take it loose, or just -

Yeah. I guess. Take the paper off that thing?

No, no. No. Just stick it in the way it is.

Oh, really?

Yeah.

Hmm; I took the paper off.

No, you don't need to. You pull it out - just pull the thing out and stuff it in there and it'll be fine.

It's not edible paper, huh?

I'm thinking about sticking a window shade in over here.

Yeah, you ought to have a little Sun. Well, it's really - ought to end up in here.

What?

Yeah.

The Sun?

Yeah. If you want to put that window shade in, it wouldn't be a - it would be an appropriate thing, I bet. Looks like we're about ready to - Well, we're on OMNI B now. ... maybe the high gain would pick up. Well, it's fluctuating back and forth.

Just leave those bags out until we get a whole mess of them, and then we'll put them all in the cupboard and stuff them in there.

Yeah.

That is going to be a bright bear out there, isn't it?

Yeah.
Yeah. ... What are we doing?
We're getting ready to go - do a P23. I - You trying to close it or open it?
I was trying to close it.
Okay.
Go ahead.
I'll get it. Boy, that comm is less than optimum.
Okay, now. Looks like I'd better heat up that evaporator, huh?
That's falling off a little bit. See?
Okay. I hate to - ... if I put some Velcro on it - a little bit.
Okay, Ken. You want to get down here and P23 your way through this thing?
Yes, sir. I'll be down there in just a second.
Being a big manual guy, huh?
Huh?
Being a big manual person?
Okay, here's two ... You're gonna have to screw in this thing, it looks like. It's really bad that we have to play with that thing. Can you - did we stop it in the attitude?
Yeah, we're here.
Okay. Do you think we're gonna - you gonna be able to work on that food business while I'm down here?
Yeah, maybe. I don't know.
I can probably work on this thing by myself, if I - Darned umbilicals.
Hey, Ken, could you put that in the jettison bag?
Yes, sir, ...
When you get a chance?
What is it?
It's all those screws and -
Oh, yeah. I was gonna - you got to wrap up this tape hanging down.
Well, you need - Here's two more that came off.
Oh, wait - wait a minute. I'll get some tape to hold it together.
You've got - What? Is yours off over there, too, Charlie?
What's off?
Oh, just - is it just over here underneath the docking ring that it's off?
Yeah. Well, I can see the edge of that panel over here and over there.
Yeah, it looks like some more of that gray stuff come off of it.
Okay, John. I'm gonna see what I can do here. Let me see if I can find me a G&C Checklist, P23.
By golly, it's right there. Some things we do pretty well, I guess. This program has figured out how to find stars.
Well, I'll tell you something, you guys. There may be a star out there, but I sure don't see it.
Even in the sextant?
Oh, yeah, it's right in the middle of the sextant.
What'd you get for ... --
Day 1

00 08 11 48  CDR  It's ...
00 08 11 49  LMP  ...
00 08 11 50  CDR  Sure ain't in the telescope, Ken.
00 08 11 51  LMP  Oh --
00 08 11 52  CDR  It's right in the sextant --
00 08 11 53  LMP  Oh, yeah; and it's fantastic.
00 08 11 54  CMP  But there's --
00 08 11 55  LMP  Oh, it's just great.
00 08 11 57  CMP  But there's just - that telescope is just useless unless you want to look at the quad or the radar.
00 08 12 01  CDR  Yeah, but what star is it?
00 08 12 02  CMP  It's 40.
00 08 12 15  CDR  Do you see anything leaking out over there, Charlie? Any particles coming off the LM?
00 08 12 20  LMP  No.
00 08 12 21  CDR  Huh?
00 08 12 22  LMP  No.
00 08 12 23  CDR  You see any particles coming off?
00 08 12 24  LMP  There are a few out there.
00 08 12 27  CDR  ...
00 08 12 29  LMP  See, you can't see -
00 08 12 49  CDR  Yeah.
00 08 12 58  CDR  Whatever it is, it's up in the -
00 08 13 14  LMP  It looks like if it had been a leak - in a propellant tank, it would have - it would have - blown up. Blown the whole thing out of there instead of shredded it.
00 08 13 36 CDR  Okay.
00 08 13 44 LMP  Well, whatever it was was coming out of there with full force, so it must have had some pressure behind it.
00 08 13 50 CDR  It's still coming out of there?
00 08 13 56 LMP  Do you see little particles?
00 08 13 58 CDR  Yeah.
00 08 14 02 LMP  Does that look like particles to you, vapor - vapor or just a -
00 08 14 06 CDR  Yeah.
00 08 14 10 LMP  Is that what vapor particles look like?
00 08 14 11 CDR  Yeah, I think.
00 08 14 13 LMP  Okay. Here goes.
00 08 14 18 CDR  Houston, 16. Over.
00 08 14 30 CDR  They reading us?
00 08 14 36 CDR  Houston, 16. Over.
00 08 14 44 LMP  We've got a pretty low signal here. Let me go to the high gain. Okay. You got - put it in REACQ. There you go.
00 08 14 57 CDR  Got them?
00 08 14 58 LMP  Yeah. With good signal strength.
00 08 15 00 CDR  Houston, this is 16. Over.
00 08 15 02 CC  ... 16. You're loud and ...
00 08 15 05 CDR  Roger. I see something coming off the lunar module now that I - I haven't been up here looking out the window. I just noticed it's a - it's a - it looks like it is coming out of a vent or something. It's --
Okay. I'll read these out as I go through them. And the only thing that looked a little different is when I got down to the step where it said PAN CAMERA MODE to STANDBY, it already was. I guess that's just an oversight. John, would you switch — why don't you put me on VOX?

You want to be on VOX?

Yeah. No, that's top switch, top left, all the way down.

John? John?

What?

What's the thumbwheel setting?

It's — too low. It's 5.

I — Okay, Tony. Can you read me now? I'm on VOX.

Stand by.

All righty. MAPPING CAMERA is coming ON. Stand by —

You like to have the PAN CAMERA SELF TEST simultaneously, or would you like to do it sequentially?

Yeah. Huh?

Okay. PAN CAMERA to SELF TEST. Getting SELF TEST —

MARK. Barber pole now.

It's on, Charlie.

Hope so. I wouldn't be talking to anybody if it wasn't on.

Ken, you what to try the —
Okay. Got the gray flag on the PAN CAMERA MODE talkback, and that took about 45 seconds as opposed to a minute.

We'll get it ...

Okay. We copy that.

Okay. So I'm gonna go ahead and take the PAN CAMERA POWER to OFF.

Okay.

If you're gonna oxidize your DELTA-Ps, you're in - That's really a pain. How you gonna monitor something with that kind of an attitude?

Okay. I'm getting ready to take the MAPPING CAMERA to OFF, center -

MARK.

Okay. I've got 2 minutes here.

You got a good watch.

Okay, there's our 30 seconds.

Okay.

Take the SM/AC POWER OFF. Man, that's what you call good timing.

Okay, Tony. We're going OMNI Bravo and selecting - turning the high gain.

S-BAND AUX TV to OFF.

Okay.

Gonna go OFF?

Okay. Sounds good, Charlie.

Yes, please, John. Back to PTT, INTERCOM. Thank you.
01 00 57 37  CDR  Back there?
01 00 57 38  CMP  PCM BIT RATE, LOW.
01 00 57 40  CDR  Got it.
01 00 57 42  CMP  We is done.
01 00 57 44  CDR  That was our big thing for today, wasn't it?
01 00 57 47  CMP  No, we got a little --

TIME SKIP

01 06 33 18  CDR  ... HELIUM VALVES, two, AUTO.
01 06 33 19  CMP  HELIUM VALVES. You got two in AUTO, right?
01 06 33 21  CDR  Yeah.
01 06 33 22  CMP  What's the -- what did the pressure go to?
01 06 33 24  CDR  ... have to go without that TVC SERVO POWER, AC1 and AC --
01 06 33 26  CMP  One and two is done.
01 06 33 27  CDR  Okay. Then RA -- RHC number 2 to AC.
01 06 33 29  CMP  Number 2 to AC.
01 06 33 30  CDR  DIRECT, two, to OFF.
01 06 33 31  CMP  DIRECT, twos are OFF.
01 06 33 32  CDR  EMAG, three, to 1/2.
01 06 33 33  CMP  One, 2, 3, to 1/2.
01 06 33 37  CDR  You have SPACECRAFT CONTROL to SCS.
01 06 33 39  CMP  SCS.
01 06 33 40  CDR  RHC number 2 to armed.
Number 2's armed.
PITCH 1 - 1 and YAW 1 to START.
MAIN A? Here we go; one.
It's START.
Two.
It's START.
Okay. Verify trim control and set. Verify --
Okay, Houston. I'm looking at oxidizer pressure just about 210. We're going to leave the valves in AUTO.
Okay.
Minus 0.12. Okay.
Verify MTVC.
Pitch is good. Yaw is good.
Okay, ... --
... feel that baby this time. Okay, going to CMC.
SPACECRAFT CONTROL to CMC. Yes.
Goes back to zero.
Yes.
No MTVC.
... MTVC.
Okay?
THC is --
Going clockwise --
MARK.
No MTVC.

MAIN B, Charlie.

Go ahead.

Here goes one.

And one.

Two.

And one.

... set GPI trim --

Hmmm.

-- and verify the MTVC.

Yeah.

Here you go.

Huh? Okay, they're set.

Okay.

MTVC is good in pitch, good in yaw. Back to neutral. They go back to zero, back in CMC. KEY RELEASE. PRO.

Looks good to me.

Okay; ENTER.

All right. Want me to get - let me get the atti - We're still oscillating. Let me get that squared away before I go back to -

Okay, let's ENTER on that, okay?

Yeah, yeah, that's fine.

ENTER.
01 06 35 24 CMP But don't PRO yet. Okay, got that.
01 06 35 35 CDR Okay?
01 06 35 36 CMP Yes, sir. Go ahead. Minus 2.
01 06 35 40 CDR Really shakes the ...
01 06 35 57 CDR Okay.
01 06 36 01 CMP Okay. SCALE is 5/1. Going to RATE, HIGH. Wait for 59. I got DELTA-V, 8.3. You're gonna need bank A.
01 06 36 18 CDR Yeah. ... --
01 06 36 19 CMP I'll shut it off.
01 06 36 20 CDR All right.
01 06 36 21 CMP ... this way. Turn her off at 3 seconds, or if you holler.
01 06 36 28 CDR Okay.
01 06 36 29 CMP Okay. Did the pressure stop going up?
01 06 36 31 IMP Yeah. It stopped at about 209.
01 06 36 32 CMP Okay. But - but it stopped on its own. It wasn't because you let go.
01 06 36 35 IMP Yeah.
01 06 36 36 CMP Okay. That was all I wanted. All rightly.
01 06 36 39 IMP Fuel side went up to about 175.
01 06 36 42 CMP Okay. Okay, ... what there was about that DELTA-P? We haven't made such an issue of the DELTA-P before.
01 06 36 56 IMP See that? We said fuel and OX greater than the DELTA-P - greater than 35, OX greater than fuel. That's what we got right now. Man, I thought I burned them all.
01 06 37 07  CMP  Okay. Coming up on - coming up on a minute. Still have no thrust light on. I have no translation control power on because we don't have any - don't have any ullage.

01 06 37 30  CDR  Yep.

01 06 37 36  LMP  Well, if you want to trim, you got plenty.

01 06 37 37  CDR  Point 5 - -

01 06 37 38  CMP  Yeah. I'll catch it afterwards.

01 06 37 40  CDR  -- well, ... worry about the trim.

01 06 37 45  CMP  We'll get this one right on time. See if their bias looks good. Oh.

01 06 37 57  CDR  There's a minute - coming up.

01 06 38 02  CMP  MARK it. The DELTA-V in NORMAL. The light is still out. I'm bringing on DELTA-V THRUST switch A. Stand by.

01 06 38 11  CMP  MARK. THRUST A.

01 06 38 13  CDR  ...

01 06 38 20  CMP  Yeah. Nothing more to do but monitor and shut down an overburn.

01 06 38 28  CDR  ... lights.

01 06 38 36  CMP  ... flashing. Okay. That doggone EMS isn't even going anywhere.

01 06 38 42  CDR  ... 16, 17 ...

01 06 38 59  CMP  Okay.

01 06 39 01  LMP  He's open.

01 06 39 02  CDR  One.

01 06 39 03  CMP  1000.

01 06 39 04  CDR  Two.
01 06 39 05 LMP      No.
01 06 39 06 CMP      Beautiful.
01 06 39 07 CDR      Isn't that pretty?
01 06 39 08 LMP      2.1.
01 06 39 10 CDR      Have you seen the SPS THRUST light? (Laughter)
                     Okay.
01 06 39 15 CMP      I don't know, John. I really don't.
01 06 39 21 CDR      Okay. Less that 0.2, plus 0.4. Well. The old
                     burn's complete, Houston. The big boot.
01 06 39 28 CMP      Okay. You want that to go to translation - we
                     take that to 0.2, right?
01 06 39 32 CDR/LMP  Yeah.
01 06 39 33 CMP      Okay. No weight to make. I'll let you -
01 06 39 41 CDR      Oh, man.
01 06 39 46 CMP      You got it?
01 06 39 47 CDR      You've got it.
01 06 39 48 LMP      I've got it.
01 06 39 49 CMP      It's off.
01 06 39 50 LMP      Got a ..., John.
01 06 39 51 CDR      Okay. Plus 0.1.
01 06 39 52 LMP      Okay. ...
01 06 39 53 CDR      Plus 0.1, minus 0, plus 1 [sic].
01 06 39 57 LMP      Plus 0.1?
01 06 39 58 CDR      Yeah. Minus 0, plus 0.1. And minus -
01 06 40 04 LMP      DELTA-V_C was plus or minus 3.1?
01 06 40 05 CMP  Minus 3.1.
01 06 40 08 LMP  Okay, what was our trim attitude?
01 06 40 10 CMP  Okay, you got these? Okay, just hit ...
01 06 40 16 CDR  9411, 35268 --
01 06 40 20 LMP  Wait a minute.
01 06 40 21 CDR  Plus 09411 --
01 06 40 22 CMP  Let - let's get some gimbals off.
01 06 40 23 CDR  Get the gimbals off ... here.
01 06 40 25 LMP  Okay, let's ... --
01 06 40 26 CMP  MAIN B --
01 06 40 27 LMP  Go ahead.
01 06 40 28 CMP  All right, MAIN B, number 1.
01 06 40 29 LMP  Good.
01 06 40 30 CMP  Number 2.
01 06 40 31 LMP  Good.
01 06 40 32 CMP  MAIN A.
01 06 40 33 LMP  Go.
01 06 40 34 CMP  Number 1.
01 06 40 35 LMP  Good.
01 06 40 36 CMP  Number 2.
01 06 40 37 LMP  Good.
01 06 40 38 CMP  Okay.
01 06 40 39 LMP  ...
01 06 40 40 CMP  SERVO POWERS are OFF. Got the residuals killed.
TIME SKIP

01 10 02 20  CMP
You're just as clear as you can be.

01 10 02 33  CMP
Go ahead.

01 10 02 35  SC
...

01 10 02 37  CMP
Okay.

01 10 02 48  CMP
Orion, Casper. Do you copy?

01 10 02 51  LMP
Okay, I'm reading you 5 by, Casper. How me?

01 10 02 55  CMP
Loud and clear.

01 10 02 56  LMP
You're super.

01 10 03 57  LMP
Okay. We're going BIOMED RIGHT. Okay, how do you read now, Pete?

01 10 04 03  CC
...

01 10 04 05  LMP
Okay.

01 10 04 07  CDR
TELEMETRY is LO; perform voice and low-bit-rate check.

01 10 04 11  LMP
Okay. Do you want to - we can - we're down to step 5 on page 1-118 - 1-18. Do you want to look at the bit rates some more?

01 10 04 37  LMP
You do not? Roger. We're going to LO bit rate. Okay. The book says perform voice and low-bit-rate check with MSFN. How do you read?

01 10 04 53  CC
...

01 10 04 55  LMP
Same-oh.

01 10 05 06  LMP
Okay, Houston. Our FUNCTION - S-BAND FUNCTION is in VOICE now. How do you read?
01 10 05 30  LMP  Houston, how do you read with the FUNCTION at VOICE? Over.
01 10 05 36  CC  Loud and clear.
01 10 05 37  LMP  Okay, you're 5 by. And LO bit rate, how does it look?
01 10 05 52  LMP  Okay. We're going to HI bit rate.
01 10 05 56  CDR  How do you ...
01 10 05 58  LMP  Okay. We'll do the same thing with you. Voice check and high-bit-rate check.
01 10 06 22  LMP  Houston, how do you read now? Over.
01 10 06 27  CC  ...
01 10 06 30  LMP  Okay. Give me a short count, please, Pete.
01 10 06 34  CC  5, ...
01 10 06 38  LMP  Roger. You're very good. Okay, we're going to bit rate is going LO, and we're going S-BAND RANGE to RANGING. Okay. How do you read now? Over.
01 10 06 53  CC  Loud and clear.
01 10 06 55  LMP  Okay. How is the ranging check going?
01 10 07 26  LMP  Okay, Houston. Our ED bats are both GO at 37 volts, and the sequence camera works.
MARK. Light streak – white streak in the right eye, upper center. Moving from up – –

TIME SKIP

Hello, there.

TIME SKIP

That's verified.

MAPPING CAMERA IMAGE MOTION is OFF.

That's verified.

That darn ... DATA SYSTEM is ON. PCM BIT RATE, HIGH?

Okay, go ahead.

System – S-BAND AUX TV to SCI?

Go ahead.

SM/AC POWER is coming ON.

Okay. MAPPING CAMERA is coming on to STANDBY.

Okay. Ready for MAPPING CAMERA and PAN CAMERA operations.

And that one.

Man, that peanut butter – –

---

--- peanut butter was really good.

Okay, proceed, 16.
Okay. MAPPING CAMERA is coming ON.
I just might eat the peanut butter with no bread. How would that be?
Borrow some.
Can't find the bread.
Got to.
Yeah, I know it.
And the PAN CAMERA SELF TEST is completed.
Well, I - I saw the ... around here - this morning.
... you say is true --
... peaches are delicious.
Oh, that --
Charlie?
Yeah. They're good. Want a bite?
No, thanks.
Want a bite, John?
No, I just had some peaches. I had to throw mine in the jett bag ...
What are you waiting for, a word from them?
No. Waiting for the time to run out. Okay. The PAN CAMERA MODE barber poled and gone back to gray. That took about 40 seconds.
Roger.
Now I lost my peanut butter. ... I lose some of my peanut butter.
I was only kidding. If you find it floating around, I bet you'll have a hard time finding the guy who hid it.

It's really good. Peaches is one of the best things we have.

... good.

MAPING CAMERA to OFF.

How did you cycle the film?

I didn't.

Huh?

Ken did it.

The - Was there something you wanted to say at the end of this thing, Charlie?

Huh? No. I just wanted to be sure at the end of this thing that the MAPING CAMERA to STANDBY MODE - -

Huh? Oh - -

-- on page 1-16 --

Oh, okay. While ... --

That's after - after you've cycled the PAN CAMERA switch.

Yeah. Well, let me see the Flight Plan. Thank you.

I ... "Houston, do you copy Casper?"

I've just been contemplating ... --

Read you loud and clear, Casper. Go ahead.
Okay.

The next item here is to take the MAPPING CAMERA to the STANDBY MODE, and I assume I should do that before I turn the SM/AC POWER OFF.

That's affirmative, 16.

Can they see that down there? ...

Yeah. Well, ... they can tell it, too.

... cyle.

Could it take the cassette? Will it sit one place and still - corners it has to go around and ... cassette?

You could have, yeah.

Probably you would --

Wait, yeah.

Oh-ho.

... Casper. After you turn the MAPPING CAMERA to the STANDBY MODE, we want you to add PAN CAMERA SELF TEST to HEATERS.

Okay. You've got HEATERS now, and we're in STANDBY, and I'm about to turn the SM/AC POWER OFF, unless you want me to hold it.

Leave it on, Casper. Leave that power on.

Okay.

... he say ... STANDBY MODE that I leave it? ...

..., yeah.

Uh-huh.
Day 3

02 04 04 34 CMP  Well, ...
02 04 04 38 LMP  I doubt it.
02 04 04 39 CDR  Number 2, a 3, a 4, a 5, a 6, ... all be ...
02 04 04 52 LMP  John, I tell you what I'll do ...
02 04 05 00 CDR  I'll ... --
02 04 05 01 LMP  Wait a minute.

TIME SKIP

02 05 32 14 LMP  That's signal strength for them.
02 05 32 22 CMP  Houston. Okay, we just got the signal strength on Orion.

TIME SKIP

02 21 40 19 CMP  That's where not having had an opportunity to fly all these things really leaves me uncomfortable.
02 21 40 25 CDR  ... here?
02 21 40 27 CMP  Yeah. You know, it's just - like there isn't just - you know, no chance to relax and that's so ...
02 21 40 31 CDR  That's exactly the truth.
02 21 40 33 CMP  Every time you turn around, even if you want to pick your nose, you got to be careful that you do it in the right sequence.
02 21 40 39 CDR  Right ... 
02 21 40 43 CMP  Well, I guess I broke the injector into the next ...
02 21 40 45 CDR  --
02 21 40 47 LMP  Yeah, the injector ...
02 21 40 49 CMP  Well. No. I - I don't think I - I'm not aware of anything I did in that injector that was wrong. I think the capture just broke.

02 21 40 57 CDR  ...

02 21 40 59 CMP  But - all the rest of that flapping around was due to my misinterpreting what I saw. I had visions of that nut coming off and filling the ... with water again. Okay.

02 21 41 17 CDR  HIGH GAIN angles are PITCH, minus 25; YAW, 307. But we ain't there. Maybe the HIGH GAIN ... 

02 21 41 21 LMP  ... gonna slide right by us or something?

02 21 41 30 CDR  Yeah.

02 21 41 31 LMP  If it gets into red, is it gimbal locked?

02 21 41 34 CDR  Well, it hasn't got a chance yet. Is the SPS gimbal locked, too?

02 21 41 40 CMP  Yes, sir.

02 21 42 00 LMP  I told you wrong.

02 21 42 03 CDR  ... Got a GIMBAL LOCK light ...

02 21 42 20 CMP  Okay. That happens before you get the - your red ball. Because when you hit the red dot, you do coarse align - or the maneuver stops, excuse me. You get this in - about 5 degrees - about 70 degrees and then 75 degrees, you stop the maneuver. At 85, you coarse align.

02 21 42 48 LMP  How'd you make out?

02 21 42 50 CDR  Just no way.

02 21 42 52 CMP  Okay. Why don't you set these numbers in the GDC?

02 21 43 00 CDR  ...
Okay.
... some?
Yeah.
...
... or something ... Co - What is it? Cotangent 90 degrees or something ...

Yeah.
Infinity minus 1. Some such --

Well, we'd better ... --

... Yeah. Okay. How about FUEL CELL VALVES - REACTANT VALVES to LATCH. SM/AC POWER to OFF.

Circuit breaker LOGIC POWER, two, close. Two, close. LOGIC POWER, two, to JETTISON. Oh, I'd hate to do this.

Why? Ken - why?

Why?

Afraid you might jettison something besides the door?

No, I want to make sure it doesn't. The momentary switches, unless they got - unless they have solder balls in them, you can't go. That can't go without a solder ball.

Ken, ... one step away from jettison ...

Yeah. I think I'm gonna stop right there - until we get our - until we do those things and actually torque to go for door jett. And all we have to do to jettison the door is - I'll take my LOGIC POWERS to JETTISON, and I'll jettison the door, and then we power back down. Be sure we check the propellant to see if we shook any of the - RCSs --
Keep your eye on the REACTANT VALVES, Ken. You ...

We've got them in LATCH -

Keep an eye on them anyhow.

But - anyhow. That's right.

What's the other thing, this talkback?

Okay. These guys won't have talkbacks so we'll have to check these.

... close one.

Yeah. We'll just do that as a matter of course. And that's all here in the checklist. I mean, it's not like - like we'll have to - we'll have to remember these things.

Yeah.

Okay. Let's see, the other thing is the - oxygen and cryo - oxygen tank B and hydrogen tank 3 sit right on top of the service module door. So that's a good thing to be monitoring.

Think we ought ...

Okay. Turn the page and we'll see what's coming after this. ... Your left one's off. It's moving around ...

... over here ...

Okay. I can do these things while I'm maneuvering. By definition, it's got to be 180 degrees. I've looked at the Flight Plan to check my ... maneuvers. Minimum 180 degrees. Yeah, ... into the computer. Okay. They haven't called up the - Well, I guess - pericynthian - plus 2 has the right weight and angles. We ought to get those before we get in there, I guess. Okay, we do this, we get the gyro --
... Yeah. Put - put the pad in the - in the book.

The Updates Book?

Yeah.

That's what I was gonna do.

It's still in here, too. Just in a useful place. Just ...

Put that in there, too?

The ... coming up. Let's just put these in here, just in the right place. Yeah, let me get moved up. We got an eat period in there. I'll change my sensors during the eat period. ... or something. Somewhere in here, we got to get - the cockpit ... set up for lunar orbit.

Yeah.

Then we'll get out our cameras and all that stuff.

... Yeah, I will need to use that mag but not until we get some stuff in here, get the booms and the ...

Okay, ...

... me your lens.

Are we using ...?

Doesn't matter. ... Got to make a correction - orbital chart; and after that, sports fans, I think we're probably back in business.

Okay. You want to take that door off, that boom off there?

Okay. Do you want to see what kind of thing you've got to do out there? Doesn't look right.
Yeah. Coming down.

Yeah, it does. Okay. You want a - you want a helmet wipe? You want to - I - You want to wipe off all the little windows in the cockpit?

We'll have to do that before we go into lunar orbit.

Just wait and do it then? Do it when - because - ... off one of those visor wipes in just a minute.

I don't ...

I just want something I can clean the windows with. They're sticky. Need a whole bunch of them.

...?

Okay.

There you go.

Okay?

...

You want to take that window right there off ... shade? ...

Charlie, ... by that power cable. These window shades work pretty good, but they still leak. They leak, but they get enough of a seal on them sometimes that it's hard to get ...

...

What - what's wrong with getting a -

...

Well. No.

... Call them up. Isn't that what you're gonna do?

Yeah, we're only a couple of minutes late.
02 21 51 29  CDR  Are we?
02 21 51 31  CMP  Aren't we supposed to go at 59?
02 21 51 34  CDR  Yeah. ...
02 21 51 36  CMP  Yeah? And maybe they'll --
02 21 51 40  CDR  Okay, Houston. Are we GO for SIM door jettison? Over.
02 21 51 52  CDR  Okay. Have you got the LOGIC POWER enabled?
02 21 51 55  CMP  No. I've got them - closed. They can't see it with the ... I'm down to here - three steps from jettison. There's - Okay. I was gonna hold up on that. I'll go ahead and give you a LOGIC POWER to JETTISON at this time.
02 21 52 26  CMP  Here comes - LOGIC POWER JETT 1 to JETT, and number 2 to JETT.
02 21 52 36  CDR  Okay, they're armed.
02 21 52 53  CDR  Okay, understand. GO for door jett.
02 21 53 01  CMP  Okay. And we checked that the cabin regs - emergency regs are set. They're in BOTH. The surge tank pressure looks good. Does it? Hey, Charlie, watch your --
02 21 53 12  LMP  Yeah.
02 21 53 13  CMP  -- toes ...
02 21 53 15  LMP  Yeah. ... Man, thank you.
02 21 53 17  CMP  (Laughter)
02 21 53 20  LMP  Okay. I'm ready with the camera.
02 21 53 22  CMP  Okay. But really, we're about - 4 minutes out.
02 21 53 27  LMP  Then let's go. Let's go. You have to be right on the second.
Well, I don't see any reason why we shouldn't do it on the second.

Okay. Well, I'll get out of this position then.

I'm sorry. I didn't realize you were in - Okay. Surge 3 - surge is good. Hydrogen pressures are good; quantities - there's 3 ... could be -

Is there any more?

No. That lower trajectory - probably going to have a hard time picking them up initially. You ought to go right out that way. And - there's a little particle that's just floating - look at that little guy just coasting along there, just sitting there.

Okay, repress package is good.

...?

Okay, John, if you'll just give me a little countdown at 69:59.

Okay.

Why don't you get the platform ... There we go.

...?

Man, I feel like if going to P00 coarse aligned the platform - -

Yeah.

(Laughter) You know, the - the most natural thing in the world, the safest operation you can ever think of, is go to P00. And what happens? The platform coarse aligns.

... that attitude ...

But according to my friend Murphy, it will occur just prior to the circ burn, just prior to the TPI - -

...
02 21 56 12  CDR       ... that.
02 21 56 14  CMP       Yeah (laughter).
02 21 56 17  CDR       I didn't realize ... circ burn that ...
02 21 56 20  CMP       Oh, don't tell me. Sounded like they hadn't researched that one this way. Sounded like they'd researched it for the factors ... it's safe, you know, we aren't in ... --
02 21 56 32  CDR       Yeah.
02 21 56 33  CMP       But you know what? I believe, just like the - you know, I think that the general attitude that we have seen, a one-in-a-million glitch, is probably quite correct.
02 21 56 47  CDR       ... our luck.
02 21 56 50  CMP       (Laughter) We - we uncovered --
02 21 56 52  CMP       -- somebody else's glitch. Well, that's part of the statistics, I guess. One in a million, when you've had yours, don't mean that you ain't gonna get the - that somebody hadn't gone 2 million hours without a --
02 21 57 03  CDR       ... down there since 1972. Now maybe zero g puts the little things closer to ...
02 21 57 12  CMP       Yeah, maybe. There's so many subtleties to this program we ain't figured out yet. Lot of ..., very subtle things. That's why ... glitches. I'm just amazed that we worried about anything happening.
02 21 57 20  CDR       Yeah, that's amazing. ... It's really ... Okay. A minute and 15 --
02 21 57 48  CMP       You notice, that signal strength doesn't stay as high as I thought it would, do you think? Has it ever come up full on the high gain, Charlie? Or is that as high as it's gotten?
02 21 57 57  LMP       ...
Okay. It's up on a minute. Give me a call at 30 seconds.

Okay.

Thirty seconds to door Jett.

Thank you. I've got the switch guard up.

I'll count you down from 10.

All right.

Ten, 9, 8, 7, 6, 5, 4, 3, 2, 1 -

JETT.

Man alive!

There it goes!

Beautiful. Beautiful!

Can you see it?

Yes, sir. Just great.

Okay. Reac valves, you guys.

Reacs - they're good.

Okay. The door went, and I don't think anything changed much, from what we could tell.

It was a big bang. Look at it spinning around in there. See it, Ken?

Yeah.

Can you see it?

Yeah. Sure is beautiful.

Oh. Yeah. You can see it out this window, too. Give me the camera quick. I think I can -
Oh.

I got it right in the middle of the -

You got it? Okay. That's beautiful.

Yeah. There's the satellite and everything.
(Laughter) Probably shouldn't tell them that.
That'll scare them. That'll - that'll upset them.

Okay, Houston. We can watch it spinning around
out both the center window and Charlie's window,
and it's --

Okay. Cameras ...

-- quite a sight. Every time it comes around the
bright side, the bright side front really flashes.

Let's go over the checklist.

I am. LOGIC POWER, two, OFF. SM/AC POWER coming
on. FUEL CELL REACTANT VALVES to NORMAL.

NORMAL. Go on.

SERVICE MODULE RCS PROPELLANT talkbacks, eight, gray.

They are all gray. Are we gonna ...?

He already did.

HELIUM talkbacks, eight, gray?

Go.

We got the SECONDARIES, CLOSED?

Yeah.

SELF TEST to HEATERS. Excuse me, Charlie.

Sure.

... lose something ...

... When you find it floating around, I think
you'll ... might not even get it.
DAY 4

03 02 22 33 CDR ..., Charlie, ...
03 02 22 44 CMP ...
03 02 22 47 CDR This where we ... here?
03 02 22 48 CMP Yeah.
03 02 22 50 CDR Yeah. You can turn it on ...
03 02 23 01 CMP Hey, we got something in that kit that'll clear your sinuses up?
03 02 23 05 LMP Yeah.
03 02 23 07 CDR Actifed.
03 02 23 08 LMP ...
03 02 23 09 CDR Afrin ...
03 02 23 10 CMP ... you squirt in there to --
03 02 23 12 LMP ...
03 02 23 13 CMP Yeah, I need to do something; this thing's getting worse.
03 02 23 18 CDR Well, we checked the switches three times. I guess it wouldn't hurt to check them again. (Laughter) Okay. ... popped.
03 02 23 27 LMP ...
03 02 23 30 CDR It's on panel 229 over there, Charlie. It's ... --
03 02 23 33 LMP I ain't heard a thing pop.
03 02 23 34 CDR You ain't heard nothing pop?
03 02 23 36 CMP Interplanetary IOS [?]. ... plain ...
03 02 23 43 LMP Well, that'll ...
03 02 23 46 CMP Okay.
Say that did kind of head out?

Ooh. I think I was right.

What's that?

That guy had died. My nose ain't that stopped up. All that goes through is the odors, no oxygen.

Whew! I see what you mean. That was me.

Well -

It's not --

Send that out of here.

Smells a long time. ... You guys are putting that on the tape, too. ...

(Laughter)

Just be glad they don't have a gas inlet around here.

That's right.

Oh, machine, do your thing. I won't badmouth you for being a marshmallow again.

Okay. Coming on 2 minutes.

... daylight, we'll see it.

We going to burn, we come into daylight.

Yeah.

Don't look.

No, don't look, we got too many - too many things going bad for us to look this time. Look after the burn. Get right there and then you get ... Phew!

Okay, gonna do it right in 1 minute ... Stand by.

There it is.
03 02 27 30 CDR  One minute. EMS ... 
03 02 27 32 CMP  TRANSLATION POWER, we don't need. The light is out. DELTA-V THRUST A is coming on - 
03 02 27 39 CMP  MARK. 
03 02 27 40 CDR  Okay. 
03 02 27 55 CDR  DSKY blank. 
03 02 28 03 CMP  Okay, average g is on. It's counting. Looks good, though. 
03 02 28 19 CDR  10, 9, 8, 7, 6, 5 - 50 99 - - 
03 02 28 26 CMP  PRO. 
03 02 28 27 LMP  PRO. 
03 02 28 28 CDR  Took; 2, 1 - - 
03 02 28 30 LMP  A's open. SPS - Okay, lights are out. 
03 02 28 33 CDR  Okay. 
03 02 28 34 LMP  Pressure's looking good. 
03 02 28 35 CMP  Stable. Bank B. 
03 02 28 36 LMP  They're open. 
03 02 28 37 CMP  I felt a - seemed like they dropped. 
03 02 28 38 CDR  Where? 
03 02 28 40 CMP  Pressure is 90 on the gage. 
03 02 28 42 LMP  Pressure's looking great here. Helium valves are open. PUGS is looking good. 
03 02 28 50 CMP  I can feel that sucker bring that second bank on. 
03 02 28 54 CDR  Yeah, I felt that, too. 
03 02 28 56 LMP  Okay. We - I see it in the reflection in the LM windows. 
03 02 29 00 CDR  Keep your eye on them, babe.
03 02 29 01  LMP  I am. I got them, babe.
03 02 29 03  CMP  What was the alarm at the start?
03 02 29 04  LMP  It went out, whatever it was. I think it was a
       overpressure on the SPS; now it's back nominal.
03 02 29 09  CMP  Okay.
03 02 29 12  LMP  Okay, fuel's running a little low. It's running
       about 165. Coming up on a minute.
03 02 29 23  CMP  Chamber pressure's staying, and - coming up a little
       bit, maybe. Up 92.
03 02 29 29  LMP  MARK, 1 minute.
03 02 29 31  CMP  Okay. Doesn't register on the g meter (laughter).
       Okay, gimbals are still steady.
03 02 29 41  LMP  Okay. Stand by -
03 02 29 42  LMP  MARK. Loose limit.
03 02 29 46  CDR  ...
03 02 29 50  CMP  Chamber pressure's going up a little.
03 02 29 56  CDR  ...
03 02 29 58  CMP  Yeah, I gave you bum dope. I was calling that 90, 
       but it was 95.
03 02 30 01  CDR  Son of a gun.
03 02 30 02  CMP  Inside.
03 02 30 03  CDR  Inside.
03 02 30 05  LMP  ... 130.
03 02 30 06  CMP  That's really 96 psi on the chamber pressure.
03 02 30 11  LMP  PUGS is looking great.
03 02 30 12  CMP  Attitudes are holding. How do the two DELTA-Vs 
       compare, John?
DELTA-Vs compare pretty close, as matter of fact.

Measurables ... I mean, to go.

Yeah, yeah.

About 10.

Yeah, 10 apart. Lot closer than in the simulator.

... Okay.

MARK, 2 minutes.

... coming down.

Trim's ... Chamber pressure, 97.

Okay. What's the cut-off?

BMAGs look good.

Four - about 04:15.

Four - yeah. 04:30.

04:20, actually.

Yeah. You're gonna make me nervous ...

When I say what?

MARK; 02:30.

Okay.

CMC's right on, with my time. PUGS is about 100, unbalanced, and holding. Decrease.

... Looks like it's working, doesn't it?

Man, it sure does.
Okay, coming up on 3 minutes --

(laughter). Chamber pressure --

MARK.

-- 78.

Okay, we got 150 on the PUGS, unbalanced, decrease.

Okay. Don says that if we watch it go, it'll go down to about - almost 200 and then work its way back up.

Okay.

Okay. Three minutes. Right on time.

Man, that thing is - their prediction is right on this.

Yeah.

Isn't that beautiful?

... heard of it.

...

Okay, coming up on 03:30.

EMS and the DELTA-V to go are right together. Perfect.

MARK; 03:30.

Chamber pressure's at 98.

Stand by for the tight limits -

MARK. Tight limits. We're at 200; unbalanced; jiggling around a little bit; decrease.

Okay, ...

Coming up on 4 minutes. SPS pressures are rock solid.
03 02 32 29  LMP  MARK; 4 minutes.
03 02 32 31  CMP  Inside (laughter).
03 02 32 32  LMP  I'm not, I'm looking at the gages. I was having a little bias back there. Okay?
03 02 32 39  CDR  Okay, and now for ...
03 02 32 40  LMP  Stand by for crossover.
03 02 32 43  CDR  EMSs and this thing are right together. Couldn't be any closer.
03 02 32 47  LMP  It looks like we've had crossover.
03 02 32 49  CMP  Okay. My chamber pressure very smoothly increased to 100.
03 02 32 53  LMP  Okay, and the unbalance went a back - that's jiggling around on zero. Stand by.
03 02 32 59  LMP  MARK; 04:30.
03 02 33 05  CMP  Man, that mental machine.
03 02 33 07  CDR  Keep doing it, machine.
03 02 33 24  LMP  Coming up on 5 minutes.
03 02 33 29  LMP  MARK; 5 minutes. Unbalance is 150, decrease. Looking great.
03 02 33 34  CDR  ... to go.
03 02 33 39  LMP  Helium's down to 1800. Nitrogen's looking great.
03 02 33 45  CMP  Man, that time is gonna be 06:14.
03 02 33 47  CDR  Sure is.
03 02 33 51  CMP  Casper, you're gonna lose your bar [?].
03 02 33 54  CDR  That's really spectacular.
03 02 33 56  LMP  Okay. Stand by, on 05:30.
MARK; 05:30.

At shutdown, maybe we can get another light ...

Yep.

Okay. Rock solid. Thirty seconds.

Not gonna get there early. Got 10 seconds overburn to worry about.

Yeah. 100, decrease, unbalance, looking super, 40 percent. Six minutes -

MARK.

...

06:05 -

MARK. 06:10, 11, 12, 13, 14, 15 --

Auto shutdown.

-- 15.1 --

MASTER ALARM.

RCS pressure.

RCS pressure.

It's okay.

Okay. Two, 3 --

It went high on the --

-- 4. Okay. We've done our thing. We didn't get anything here. You want to --

...

-- copy those numbers? Two, 3, 28039.

Yeah.

Okay. What, 28039?
Yeah, 28039.
They're okay.
Okay.
Plus 0.2, minus 1 - minus 0, minus 1. We got to look at 1620, right?
... 5.5.
1620.
You're not gonna trim.
No, but --
Okay, get the - DELTA-Vs now - I mean, DELTA-V, 20.
That just call a NOUN 20?
Yeah, VERB 6.
Okay. ENTER. Okay, now let's - Roll's fine --
...
-- ... 02. 35799.
Yes.
Plus 26.8.
Yes.
That's good. You get that?
Good, yeah. Let's go with the gimbal motors.
Okay. Wait a minute now. Let me see if we got everything here. GIMBAL MOTORS, four, OFF. Okay. MAIN B.
Go.
One.
03 02 35 55 LMP It's OFF.
03 02 35 56 CMP Two.
03 02 35 57 LMP It's OFF.
03 02 35 58 CMP MAIN A.
03 02 35 59 LMP Go.
03 02 36 00 CMP One.
03 02 36 01 LMP Go.
03 02 36 02 CMP Two.
03 02 36 03 LMP Go. Both OFF.
03 02 36 04 CMP Okay. SERVO POWER. Go ahead and go to POO. I'll do this one. Two, OFF.
03 02 36 09 LMP ... on.
03 02 36 10 CMP Okay, hand controllers are locked. DIRECTs, OFF.
03 02 36 13 CDR OFF.
03 02 36 14 CDR That's off.
03 02 36 15 CDR OFF. DIRECT POWER, OFF.
03 02 36 16 CDR/CMP DIRECT ULLAGE --
03 02 36 17 CMP -- was never closed.
03 02 36 18 CDR Circuit breaker, PITCH 1, YAW 1. I sure got that.
03 02 36 24 CMP/CDR Okay, did we get all that?
03 02 36 25 CDR EMS FUNCTION, OFF. STANDBY.
03 02 36 27 CMP STANDBY ...
03 02 36 29 CDR PRO.
03 02 36 30 CDR/CMP ATT DEAD BAND to MAX.
03 02 36 32 CMP BMAGs, three, to RATE 2. BUS TIES are OFF, Charlie?
03 02 36 37 LMP Yeah.
03 02 36 39 CMP Okay, the BIT RATE --
03 02 36 40 LMP Going LOW.
03 02 36 41 CMP Okay.

TIME SKIP

03 03 27 43 CMP You want to do one?
03 03 27 44 CDR Huh? Do I?
03 03 27 45 LMP Well ...
03 03 27 46 CMP You should be able to. Be right at the terminator.
03 03 27 51 CDR Right at the terminator, huh?
03 03 27 52 CMP Yeah.
03 03 27 53 CDR Trouble with the terminator, this Moon is so ragged, I can't - do it even. I'll get a decent terminator shot.
03 03 28 05 CMP I'll take care of all that. Okay, there's Taylor, Taylor A ... Zöllner - then we have to have ... Descartes. That is Descartes, right there. See the - ...?
03 03 28 27 CDR Where?
03 03 28 28 CMP Right down - Here, let me - get to this window; I'll show you. Right there? The crater Descartes --

TIME SKIP

03 04 17 54 CMP Well, I guess that - that sort of makes 6 days of PTC not so bad.
Let's see, I ought to be able to do both of these at the same time, or can I? Tsk, tsk, tsk, tsk, tsk, tsk.

Both of what?

Both these dumps.

... separate.

What time was our - AOS - I mean, sunrise?

Sunrise -

Just look at the Flight Plan, there. ...

You hope.

We got to get going here, I'll tell you. ...

Well, we've got at least 20 minutes, Charlie.

Charlie, ... Okay. AOS ... LOI, 74 --

No, no, no, no. Look at the Flight Plan where the column stops. It goes from black to white.

Oh. Okay. 76:18 ...

Sunrise?

I don't know. No, it's --

76:28, man.

No, couldn't be.

Well, it - if it goes to black to some other squiggly line, what is that squiggly line? It goes from black to a squiggly line. Okay. And then it becomes full sunrise at 76:35.

Okay, what settings do I use on this color? I don't see how this can show that terminator with color film.
Day 4

03 04 21 16 CDR  Have any ...?
03 04 21 22 LMP  Hm.
03 04 21 32 CMP  ...
03 04 21 43 CDR  No, you admit my ability to read the chart. It's wrong. (Laughter) One small step for mankind, here. What do you make it out to be, Charlie?
03 04 21 57 LMP  76:28.
03 04 21 59 CDR  Is that when it gets daytime? Or get sunrise?
03 04 22 02 LMP  That's our sunrise.
03 04 22 04 CDR  Our sunrise. Well, that can't be sunrise, man. He ain't gonna believe that. That's because you're looking at it ... which you ain't gonna ever see again (laughter). Every time we did this on Apollo 10, a FUEL CELL light came on; every time we ... And I was totally ignorant of what the fuel cell ... in here somewhere ...
03 04 23 05 CDR  Where are the scissors ...?
03 04 23 07 LMP  I put both pair down there in the ...
03 04 23 24 CMP  ...
03 04 23 53 CMP  Here ...
03 04 24 24 CMP  Okay. That's what we need to know.
03 04 25 39 CDR  Did we stop logging our intake and all that stuff today?
03 04 25 42 CMP  Yep. Did that this morning. I mean, after the first ... What time did they say we get the AOS? About -
03 04 26 05 LMP  He didn't say.
03 04 26 08 CDR  I never said.
03 04 26 11 LMP  Neither did the ground.
They're supposed to give us a rev 2 update for that stuff, and they did, didn't they?

No, I don't think they're supposed to.

Start coming out ...


I guess this is the real crux. If you don't get around on this rev, they've really screwed up.

We had ... terminator I'm supposed to take a picture of.

Then what?

Yeah.

You want me to take a picture of Crookes or not? I - I --

Go ahead.

I ...

I don't want you to take a picture of anything; ... asked --

... asked us to ask you to take a picture of it.

Oh. He did. Okay, ...

Please tell those guys - please tell Ken --

Exactly what he said.

-- that --

We're sorry he doesn't want to.

What he said was, "I'd like to get a picture of Crookes." He said, "There's a possibility that you guys may be able to pick it up, depending on whose window you're sitting in at the time. I know Ken looks at it, but I don't know if you do or not; but if you happen to be sitting there and
it comes around, why don't you get a picture of it?"
That's what he said. On account of something, I forget what. ...

I'm proud of you.

...

Now, how about putting the 215 lens on there?

Okay. Is that our waste water tank?

Yeah. ...

Still got 20 percent more to go.

Don't - don't ... (laughter).

I'm not able to tell that they're doing any of that.

You're right. That's a - that's a rather startling sunrise, isn't it?

Waste water ... 20.

Okay, it's on, Ken.

You want to get over here, Ken?

...

It's out of this window. Crookes's supposed to be.

It should be out - out of here or there, either one. This seems to be fine.

... I have one at ...

Okay, we got our fuel cell purge now?

No. I'm gonna start it right now.

Okay. Let's see, get - get the - Suppose we could use magazine SS? That other one.

That one's the magazine you want to use for this?
03 04 29 45 CMP Yeah.
03 04 30 02 CMP Okay, and this is gonna be ... 7 ... 6 ... okay ... SPS pressure.
03 04 30 24 LMP Going up, you mean?
03 04 30 25 CMP I put it to acknowledge [?] because it was on continuously. Must be ... It looks like it's gonna go higher. It's about 210 now.
03 04 30 36 LMP Well - Yeah, if the light was on, though, it should come back on again.
03 04 30 39 CMP It may have gone off from being cooled down.
03 04 30 41 LMP Yeah. Okay. Probably.
03 04 30 44 CDR Take a look in there. The condenser's normal. ...
03 04 31 00 LMP Starting to open the purge. ... Maybe we better turn off the waste water dump.
03 04 31 05 CMP Okay, I'll get it. What's that?
03 04 31 11 LMP Fuel cell 1. Okay.
03 04 31 15 CMP Have you already done the --
03 04 31 17 LMP It's did with the purge.
03 04 31 18 CMP Oh. All right. Okay. Okay. This is off.
03 04 31 23 LMP Okay, right at 10.
03 04 31 43 LMP Man, we are streaming out a lot of particles with us. Okay, this terminator's coming up, Ken.
03 04 31 51 CMP Okay. I'm coming. Well, we're not gonna be directly over it until about 34, which is 2-1/2 minutes.
03 04 32 17 LMP You wouldn't believe all the particles we've got.
03 04 32 20 CMP Look at that! Real pretty.
03 04 32 31 LMP I'm gonna let you get the ... I'll get the ...
Well, it's not clear to me we're gonna get anything here.

That's really spectacular. Oh, this is beautiful! Contrast.

H₂ purge, MASTER ALARM.

... that one.

See it coming, Ken?

Get these. I'm not sure it's - Harry [?] wants pictures of stuff like that. ... Get one here of this - these guys right here in the bottom of this thing. That should be ...

Look at the depth of that crater!

Except for the full Sun, it makes it look very - very -

A lot deeper than it is.

... picture.

... on?

No. Thank you.

Here's where they turn into hills.

... take a couple of pictures here. ... Excuse me.

Sure.

There's that central peak in Icarus.

Have you got Icarus?

Right out there on the right. You didn't see that, Charlie.

Oh yeah, I see it. It's taller than a - There it is. Right there. See it?
03 04 35 01 CDR It isn't really taller.
03 04 35 04 LMP Right out here. Right on - almost on ... horizon.
03 04 35 07 CMP Yeah.
03 04 35 31 CMP Okay, Charlie. ...
03 04 35 47 CDR Why does it look rounder coming around this way than it does when you go into the terminator; it looks straight on the other side.
03 04 35 54 CMP There's some suspicion that there's a different material.
03 04 35 58 CDR All right. Just wanted to ask ... Did I say the middle of Icarus looks like a big ... volcano? Couldn't.
03 04 36 28 CMP What did you call it? Icarus?
03 04 36 30 CDR Yeah.
03 04 36 53 LMP H₂ purge, MASTER ALARM. ...
03 04 37 09 CMP Let's see, we're about 37:06 and there's -
03 04 37 34 LMP What's a flashing 37 doing there?
03 04 37 38 CDR Ken will figure it out for you.
03 04 38 11 CDR ... out there.
03 04 38 29 CDR Looking at the Moon hurts my head. I won't look at it. There's too much down there I don't understand.
03 04 38 45 CDR Charlie, just keep ... on the book.
03 04 38 48 LMP That's why I'm purging the fuel cell.
03 04 38 50 CDR Oh.
03 04 39 02 LMP I tell you, when we get down to 8 miles, we're gonna really look like we're down among them.
03 04 39 08 CDR Sure are.
03 04 39 16 LMP What PTC .... Ken?
03 04 39 20 CMP Yeah. ...
03 04 39 39 CMP Okay. Get back here, Charlie.
03 04 40 32 CMP Okay. I guess I can turn that purge - that waste water dump off.
03 04 40 38 CDR Stuff is coming out, Ken.
03 04 40 40 CMP It is?
03 04 40 41 CDR Yeah.
03 04 40 42 CMP Okay. Our waste off.
03 04 40 57 LMP ...
03 04 41 20 CMP Okay; we get the AOS at -
03 04 41 27 CDR It really fires thrusters ...
03 04 41 33 CMP ... firing thrusters.
03 04 41 36 CDR Uh-huh.
03 04 41 37 CMP Yeah. What do you - what made the comment that you said was really firing one of the thrusters?
03 04 41 43 CDR ...
03 04 41 44 CMP Oh.
03 04 42 18 LMP ...
03 04 42 40 CDR ...?
03 04 42 41 LMP Yeah.
03 04 42 42 CDR Well, I don't know. I don't know.
03 04 42 55 CDR ...
03 04 43 03 CMP They all look different to me when I go hanging upside down.
03 04 43 06 LMP ...
I know they're not supposed to, but they sure do.
Sure do ...
Look at those little tracks down there running in between these two craters.
... big blocks ...
Seen with the naked eye from 60 miles, they've got to be big. ...
They're really big.
Which one are you looking at?
... 
Oh.
And it has a ray ...
I have to agree that the back side is rather monotonous looking, although I'm sure each one of these craters tells us something, if you're smart enough to know what's going on.

Wish I could clean this window.
Isn't that terrible? Wonder how that happened?
I don't know. It's on the outer pane.
Yeah. Inside of the outer pane.
Yep. It really makes a difference with the binocs.
Yeah.
Man, those are huge features.

What gets me is the ridge - is the - is the ridge line rou - around ... Man, there is just not a flat place anywheres. Do we go over Gagarin?

No.
Day 4

03 04 45 17 CDR
I didn't think so. We're coming up on something like Mendeleev now? Probably?

03 04 45 25 CMP
Uh -

03 04 45 28 CDR
That big flat thing right there.

03 04 45 30 CMP
Looks about right.

03 04 45 41 CDR
You want to get a picture of the Sea of Moscow? Anybody gotten any good pictures of it?

03 04 45 47 CMP
... we have enough Sun.

03 04 46 31 CMP
AOS? Maybe we should turn this thing off before AOS.

03 04 46 38 LMP
The dump?

03 04 46 39 CMP
Yeah. ... -

03 04 46 40 LMP
Am I looking up north for that?

03 04 46 43 CDR
You're looking up north. Yeah, you're looking north.

03 04 46 48 CMP
Is there still stuff coming out of our dump?

03 04 46 50 CDR
No. It's about to stop.

03 04 46 52 CMP
Okay.

03 04 47 20 CDR
Want me to get a picture of it on the right?

03 04 47 22 CMP
Sure.

03 04 47 23 CDR
It really makes a - Give - give me a thing.

03 04 47 25 LMP
...

03 04 47 27 CMP
Okay.

03 04 47 28 CDR
What should I take it at?

03 04 47 30 CMP
I don't know, John, I'll have to go and see, here.

03 04 47 33 CDR
This can't use 250 at f/11?
I'd better dump it.

Okay.

I ain't sure that's the right thing, but I know it --

This is probably about right for right in here.

Where did my little wheel go?

Here's one right here, Ken.

... Thank you. Well (laughter) -

Will a 250-millimeter lens get it?

John, I don't - I can't see through you, I don't know. But I would think that on the horizon you get most anything because --

Yeah, but that's a long ways out.

...

No, I'll do it ...

... Ten-year medals for free.

... tracking that out ...

... Right?

This is the most unique crater I've ever seen; the one right here with the black rim. It's all white except for the rim. See that bright crater.

Yeah, yeah. That's - that big crater is Chaplygin and the --

Okay. That was the Sea of Moscow. Excuse me.

Okay.

Whatever that means.

Take any good pictures yet?
Yes. ..., - - 

... handle it ... Soviets ... eat their heart out ...

If they come, I bet they don't quit.

... - -

You - you -

-- ...

You know, this window 5 is a little foggy on the outer pane, too.

Yeah.

Just a little.

What frame number was that?

That frame number was number 4. ... number 4.

Now, we're gonna be able to see earthrise right now.

... You want to get a picture of earthrise?

Well, probably not. There's probably only been 10 million pictures already took of it. But if you're looking for PR, like the Sea of Moscow or some other thing ...

What'd you take it at, 1/250? f/11 - f/8? John?

I put it 1/250 at f/11. f/8 was probably a better choice.

Okay, ... Let me get it set.

... Yeah, pitch, 10, and yaw, 355. We pick them up on OMNI C, and then we'll shift over.
03 04 51 14 LMP Yeah, we can do that.
03 04 51 32 CMP Okay. And in a few minutes, we're gonna do our systems checks. Huh?
03 04 51 38 LMP ...
03 04 51 39 CMP Yeah. Okay, we're gonna do our systems checks for DOI. Another one of these things we can get started early.
03 04 51 57 CMP Dang it. ... window screwed up like that? It's really ...
03 04 52 05 LMP I can't believe it.
03 04 52 08 CDR What's that, Charlie?
03 04 52 09 LMP That that's the fu - (laughter) - Tape recorder - that that's the Moon down there.
03 04 52 17 CDR It's the whole thing.
03 04 52 19 LMP The whole thing. I thought we'd see Tsiolkovsky this rev. Oh, yeah.
03 04 52 31 CMP It comes again.
03 04 52 32 LMP That right? Oh, yeah.
03 04 52 36 CDR Yeah, I imagine when the Soviets start up here, they'll set up their lunar base in the first place; stay for a while.
03 04 52 46 CMP Now that's really frustrating.
03 04 52 48 LMP I can't understand what ... doing out over that way.
03 04 52 51 CDR Man, there sure is a lot of things up here that I don't understand. Look at that big crater down south with the rocks in it. Or - you - you're looking right at it. It's got layers of walls there.
03 04 53 05 CMP Which direction? That bright one there?
03 04 53 06 CDR Yeah, the bright one. With the lay - it's got layers of walls in it. I don't know what the
name of that one is. It looks like - you get a little higher Sun angle, it looks like anthracite coal laid in against chalk. It doesn't look that way right now.

It's really a unique crater chain down there. Really - ... south of track.

... Really - south of track.

Okay, is that -

Yeah, that's ... right there.

Well, that's not - those crater chains there. Let's see, we just passed ... probably?

I just can't get it.

Try it again. You got King? Isn't that King back there?

...?

Right out to the left.

I don't see it. It may be in your window.

Yeah.

Way out there.

Where?

Way out there, yeah.

Okay, I'm looking - right there.

Yeah. I can see it.

... What do you think about King?

See, it's got kind of funny little things in it --

(Sneeze)

-- ... that - things that look like lava flows -

(Sneeze)
But they've got to be lava flows running down the side of that mountain there --

(Sneeze)

-- whatever made that crater.

It's pretty big.

Oh, yeah, yeah, yeah. It's got to be lava flows.

Okay. These crater chains running down here should lead down to Tsolokovsky.

Yeah. ...

They do! Aha! There it is! ...

Okay, there's ...

Oh, hey, that is pretty --

Isn't that something? ... --

Isn't that a beauty?

Yeah, dang.

That -- that must be one of the more spectacular things that ... here.

Oh, you bet.

Well, I'd cancel the earthrise here.

Okay. Okay.

What a treat. And so many things, I can't get. I'm like a little kid with ice cream; I don't know where to start.

Right.

Oh, these windows are just really frosting.

Should be AOSing here pretty quick.
<table>
<thead>
<tr>
<th>Time</th>
<th>LMP</th>
<th>CDR</th>
<th>CMP</th>
</tr>
</thead>
<tbody>
<tr>
<td>03 04 55 47</td>
<td>Yeah.</td>
<td>Shouldn't we, Charlie?</td>
<td></td>
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<tr>
<td>03 04 55 48</td>
<td>Not until we get eathrise.</td>
<td></td>
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<tr>
<td>03 04 55 50</td>
<td>... what I mean. We were talking to them about King the last time we came across here.</td>
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<td>03 04 55 54</td>
<td>We should get AOS at King. Now is that Thesaur [?]?</td>
<td></td>
<td></td>
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<tr>
<td>03 04 56 01</td>
<td>No, that's not Thesaur [?]. There's Thesaur [?]. Thesaur's [?] right here.</td>
<td></td>
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<tr>
<td>03 04 56 09</td>
<td>Ken, is it that little bright one right down there south of King?</td>
<td></td>
<td></td>
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<tr>
<td>03 04 56 11</td>
<td>That's what I was just wondering, but I think that Thesaur [?] is supposed to be bigger than that.</td>
<td></td>
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<tr>
<td>03 04 56 17</td>
<td>... could be ... the rays probably coming out of the King.</td>
<td></td>
<td></td>
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<tr>
<td>03 04 56 20</td>
<td>Yeah.</td>
<td></td>
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<td>03 04 56 21</td>
<td>It looks like it goes in the same sort of a ... See those bright things on the bottom of it?</td>
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<tr>
<td>03 04 56 25</td>
<td>Yeah. ...</td>
<td></td>
<td></td>
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<tr>
<td>03 04 56 38</td>
<td>... know what this ... and how all this happened.</td>
<td></td>
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<tr>
<td>03 04 56 43</td>
<td>Look at this - I never noticed this before. We got a crater chain. It goes from here, right straight to the horizon.</td>
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<tr>
<td>03 04 56 48</td>
<td>Yeah. Right along the track.</td>
<td></td>
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<tr>
<td>03 04 56 50</td>
<td>Yeah? I never noticed that.</td>
<td></td>
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<tr>
<td>03 04 56 54</td>
<td>Well, you ain't been here but a few hours.</td>
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<tr>
<td>03 04 56 57</td>
<td>(Laughter)</td>
<td></td>
<td></td>
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<tr>
<td>03 04 56 59</td>
<td>Right straight to the horizon?</td>
<td></td>
<td></td>
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<tr>
<td>03 04 57 00</td>
<td>Yeah. There's a - it starts down here.</td>
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</tbody>
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*CONFIDENTIAL*
03 04 57 02 LMP  South of Thesaur [?].
03 04 57 04 CMP  And these two - see these two craters?
03 04 57 05 CDR  Yeah.
03 04 57 06 CMP  It's almost right in the center of this window.  
                  Starts - And these two craters are together.
03 04 57 10 CDR  Yeah.
03 04 57 11 CMP  And then it cuts down here and it goes towards the 
                  horizon and stops at the mare.
03 04 57 22 LMP  Better get ready to ...
03 04 57 25 SC   (Cough)
03 04 57 43 LMP  While we were - while we were ... I guess the 
                  weight was 25 pounds, 10 percent.
03 04 57 58 CMP  Man, it's frustrating when one of these things 
                  pops those things in and out. Wonder what it is 
                  that makes it do this; it doesn't do it when you 
                  look at it. It only does it when you hit the 
                  binoculars. One other picture.
03 04 58 09 LMP  Waste water dump still open?
03 04 58 11 CDR  No. Better not be. ... now.
03 04 58 16 CMP  No, I don't think the waste water dump ...
                  particles?
03 04 58 20 LMP  There it comes; there it comes, you guys!
03 04 58 23 CDR  Oh, looky at that.
03 04 58 24 LMP  Isn't that spectacular?
03 04 58 26 CDR  Man, instant earthrise!
03 04 58 28 CMP  Look at that guy creep up.
03 04 58 32 SC   (Applause)
03 04 58 34 CMP  I don't care if we got 10,000 --
Hello there, Houston.

-- we're going to have 10,001 ... of these
(laughter) ... --

Hurry, quick!

Take it? Got to go to REACQ and you're at high gain ... --

No. No. ...

Houston, 16.

Beautiful.

Want me to get them on omni first?

Yeah.

Houston, 16.

We had S-band acquisition and S-band high gain.

Roger. Read you 5 by, Henry. We just got the 10,000th picture of a beautiful earthrise.

Ain't there yet. Over here.

This is really some place.

We had a chance to watch you get AOS that time. I know we got lots of pictures of it, but you're going to have to look at one more.

That is - man, that is --

Isn't that beautiful?

But you know, some of those photographs around the office that people say are - are no good, that looks the same color to me.

Yeah. I don't think that photo fidelity's true.
Man (laughter) -

... how long before we get to ...

About - 10 minutes.

... out the ...

... Yeah.

Negative. We weren't trying to say anything, Hank. He probably didn't get our initial call.

We just - can't find any words. Everybody's peeking out the window here. We got all the dumps completed and we're - all the dumps are secured.

And I got some pictures of the back side of --

TIME SKIP

Right down in there.

You know, that SPS comes on a lot --

Right there?

-- ... than I thought.

... Descartes.

I thought it would be a big bang, but it's a slow buildup ...

It won't be - the next one will be pretty slow, but the one you feel after that will be a surprise.

I bet. PDI. We get a plane change on board, too, don't we?

Yeah.


TIME SKIP
Oh, man, if I could just get my sinuses to stay cleared!

No way.

I just - yours ought to clear out on the ground, don't they? It sure is a pain in the neck.

Okay, nothing's hanging around the overheads anywhere that we've stuck out and we forgot to pick up? This burn occur in daylight or -

No. Dark.

Dark?

Here's a map.

Okay.

Boy, we'd use a lot of gas: 20,000 pounds' worth of fuel ...

Huh? We used a lot, huh?

... a lot.

I hope so. Never get it out of lunar orbit unless you do. ... jettison.

Some day someone's gonna explain to me why that was a rational decision, to not have a dump ...

Rational, I think, decision, that's because we couldn't get the SPS to burn or RCS to burn.

... Coming up on 2 minutes.

Roger.

Two clocks that say it's 2 minutes.

Right here's ...

I don't - how you can get the - don't know how to put a bias in.
03 06 32 08  CDR  I don't either.
03 06 32 09  CMP  With this kind of a burn - 20 seconds - it can't be more than a couple of tenths --
03 06 32 13  CDR  Yeah.
03 06 32 14  CMP  -- plus the minute. So with a foot per second there - which might be significant -
03 06 32 19  CDR  Yeah.
03 06 32 20  CMP  I don't know how to do that.
03 06 32 36  CDR  You got TRANS CONTROL POWER and all that stuff?
03 06 32 39  CMP  Comes on at - a minute. Okay. Okay, going to NORMAL, TRANS CONTROL POWER, on. DELTA-V THRUST A, coming on, no light.
03 06 32 57  CMP  MARK.
03 06 33 01  CDR  Go ahead.
03 06 33 19  CMP  Okay, average g is on. Okay, 18, 17, 16, ullage.
03 06 33 32  CDR  You have it, Ken.
03 06 33 37  CMP  Attitude's good.
03 06 33 39  CDR  Nine, 8, 7, 6, 5, PRO, PRO, 3, 2, 1 -
03 06 33 46  CDR  Zero.
03 06 33 47  LMP  Okay, he's open.
03 06 33 48  CMP  Okay.
03 06 33 49  LMP  Okay, everything looks good. HELIUM VALVES are open. Pressures are great. Past the 10 seconds.
03 06 34 02  LMP  Fifteen, 16, 17, 18, 19, 20, 21, 22, 23, 24 -
03 06 34 12  LMP  Auto shutdown.
03 06 34 14  CMP  I believe it was auto. Beautiful.
03 06 34 16 LMP Twenty-four - about 24 ... - -
03 06 34 17 CMP Okay, copy these numbers.
03 06 34 21 CDR 0.8, 0.2 - -
03 06 34 22 CMP Okay, we had about - almost one of those before we started.
03 06 34 26 CDR 28, 210.6. Two, four balls, 8, and 210.6.
03 06 34 36 LMP ... 210.6. Okay, go ahead.
03 06 34 42 CMP/CDR Plus 0.8 - -
03 06 34 43 LMP Yeah.
03 06 34 44 CMP - - plus 0, plus 0.1.
03 06 34 47 LMP Okay. Go ahead.
03 06 34 49 CMP Okay, wait a minute now. That's - Okay, that's - We're not gonna trim. That's close enough.
03 06 34 53 LMP All right.
03 06 34 54 CMP Okay, let's look it up. VERB 6, NOUN 20, 1.21, 272.7 - Yeah. Yeah, 3.44. That's good.
03 06 35 12 CDR Got those numbers, Charlie?
03 06 35 15 LMP No, I don't have them.
03 06 35 16 CDR/CMP 1.21 -
03 06 35 18 CDR 272.7 - -
03 06 35 19 LMP Okay.
03 06 35 21 CDR - - 3.44.
03 06 35 24 LMP Okay, I'm ready on the gimbal motors.
03 06 35 25 CMP Okay, ... GIMBAL, MAIN B.
03 06 35 26 LMP Go.
03 06 35 27 CMP One.
03 06 35 28 LMP It's off.
03 06 35 29 CMP Two.
03 06 35 30 LMP OFF.
03 06 35 31 CMP MAIN A.
03 06 35 32 LMP Go ahead.
03 06 35 33 CMP One.
03 06 35 34 LMP Go ahead.
03 06 35 35 CMP Two.
03 06 35 36 LMP Both OFF.
03 06 35 37 CMP SERVO POWERS are OFF.
03 06 35 38 LMP Okay. BIT RATE, LOW.

TIME SKIP

03 08 32 17 CDR ...?
03 08 32 20 CMP PAN CAMERA, STANDBY; STEREO.
03 08 32 32 LMP ...
03 08 32 33 CMP And POWER. Let's see. The V/H OVERRIDE is not on.
03 08 32 50 CMP MAPPING CAMERA, IMAGE MOTION is coming - ON -
03 08 32 57 CMP MARK. Barber pole. And it's gray. IMAGE MOTION is ON.
03 08 33 12 LMP ... keep talking ...?
03 08 33 14 CMP Yes. ... that way if they get any unusual things in their signaling. Man, they sure need a timer over here. 38:01.
No, sir. I'll take care of that. Thank you. Do you need to get in here?

Wanted to get a spoon is all.

No (laughter). Thank you. That timer is only good for telling me to not forget something. Huh? Yeah. That was so I wouldn't get hung up and forget to do what I'm doing.

Okay. Man, that's gonna ... a crick in my neck before this is over.

Hey, you want some ... turkey?

(Laughter)

MAPPING CAMERA is coming ON -

MARK. Then that goes - Well, let's see, I'll come back and catch the PAN CAMERA, OPERATE.

Okay.

Want me to take that stuff up for you, John?

Talkback is gray. PAN CAMERA is operating. Holy smokes!

What is it?

Okay. MAIN B UNDERSHIFT; turning the PAN CAMERA back to STANDBY.

Okay. That did it.
What's that?
The mapping camera.
Pan camera.
Pan camera.
Yeah. Okay. Okay. Let's see if I can reiterate what happened. As soon as I turned it on, we got an UNDERVOLT. Didn't happen to see how much it was?
Yeah; 25-1/2.
25-1/2 volts?
We're what? 26 - 27-1/2 now.
Seven.
That was MAIN B that gave us the UNDERVOLT?
Yeah.
Oh, darn.
...
We still at 25-1/2, Charlie?
Huh?
25-1/2?
Yeah.
... about to eat the chocolate bar, huh?
Mmm-hmm.
We will for that one.
You want to try it again, Ken, and let me watch it?
No.
03 08 40 31 CMP  Oh, I don't really think there's any future in that.

03 08 40 44 CDR  Make sure the ground doesn't want to try it either.

03 08 40 48 CMP  ...

03 08 40 51 LMP  ...

03 08 40 52 CMP  Pan camera.

03 08 40 56 CDR  Pan camera?

03 08 40 57 CMP  Yep. Yeah, but the pan camera's on MAIN A.

03 08 41 07 CDR  Well -

03 08 41 12 LMP  ...

03 08 41 13 CMP  Nope. Any conclusion they come to would be guessing anyhow. I suspect that MAIN B is running a little bit lower than MAIN A and they probably both got pulled down. You didn't happen to notice ...? I'm sure you didn't. I wouldn't have.

03 08 41 33 CDR  No. All I saw was MA.

03 08 41 47 CMP  Let's see. We're running 38 - almost 40 on fuel cell 3; 24 and 22. That's 32, 64 - 100 amps. That's a shame.

03 08 42 34 CMP  MAIN BUS B UNDERVOLT; 27 volts? I don't understand that. Must have been a --

03 08 42 44 LMP  Did you get another one?

03 08 42 45 CMP  Yeah.

03 08 42 46 LMP  Huh?

03 08 42 47 CMP  Yeah.

03 08 42 48 CDR  For what?
(Laughter) Well, John, I don't know what from. It's on 27 - 26-1/2 volts. MAIN A is on 27-1/2. Fuel cell 3 --

Fuel cells falling apart?

No, I think they're running - normal. It's only pulling 37 amps. Now it's something - just cycle it up to 40 amps.

What's ... fuel cell? Check ...?

That's running about right. It must have been sitting right on the - I got some heater load on there. MAIN B. Those radiators couldn't be cycling, could they?

... No. What's the radiator outlet temperature? 25 - No, they're not on.

Oh, shoot.

We've got 28 volts now.

Yep.

What else did you shut off?

Nothing. ...

Well, we aren't running the thing.

Check the --

Check the pressures on that.

...

Yeah, they're getting a pretty good spread there.

That's strange.
03 08 44 49 CMP
I think there's something wrong with that oxygen regulator. The flows in that thing are very unstable.

03 08 44 57 CDR
Fuel cell 3?

03 08 44 58 LMP
Yeah.

03 08 45 00 CMP
Well - You know, I guess it really isn't bouncing that much more than the others. It's just that there's a bigger delta flow between the oxygen and the hydrogen here.

03 08 45 11 CDR
Charlie, can you hand me my - my spoon out of my temporary stowage bag over there?

03 08 45 25 CMP
Pressures all look normal?

03 08 45 27 LMP
Regs look okay.

03 08 45 28 CMP
Okay. Well, we've got high bit rate data on all this. They can take a look.

03 08 45 37 LMP
Pressure's good.

03 08 45 57 LMP
... all right? Okay?

03 08 45 59 CMP
Okay.

03 08 46 00 CDR
CRYO 1 ... pressures are okay. Beats me ...

03 08 46 45 CMP
MAPPING CAMERA coming to STANDBY - OFF. IMAGE MOTION is OFF. LASER ALTIMETER is OFF. MAPPING CAMERA - Got a barber pole on IMAGE MOTION, and the LASER is OFF. MAPPING CAMERA's going to RETRACT.

03 08 47 08 CDR
Pan camera shouldn't have anything to do with it, should it?

03 08 47 11 CMP
MARK. And a barber pole on the RETRACT, the MAPPING CAMERA.

03 08 47 18 CDR
I thought that stuff was on MAIN B - -

03 08 47 20 CMP
They're split.

03 08 47 21 CDR
-- SERVICE MODULE/AC POWER?
Yeah?

I mean SERVICE MODULE/AC POWER is off of MAIN B, because --

It's half and half.

Is it half and half? Because --

(Laughter)

Well, the reason I said so -- the reason I thought it was -- I mean -- because I was reading the schematic somewhere and I thought you could lose -- that they're in series and the fact that, if you lost this thing, it would cost you your B servo.

Okay. I'm going to have to climb over where you are, John, for just a minute.

Charlie, you need to shift.

You want me to climb out of here? Where you want to go?

I don't know. Ken's got to be over here, and he's got to be over there.

Golly, there's some of those flows that go up the sides of walls.

Okay.

Get the pan camera ...

Pan camera on now?

No.

Well, now. Guess who's got their X - next failure. A mapping camera that's out -- to stay.

(Laughter) I figured it would break, but I thought it would last more than one extension.

There's 2 minutes and it hasn't come in.

How long's it supposed to take?
A minute and a half.

Hey, John, can you - let me in there?

Is that - barber pole still on the MAPPING CAMERA?

No, Ken, it's back in.

Back to gray?

Yeah.

Okay. It must have taken about - 3 minutes.

Watch the stick. I got it activated.

What's that 401 say? ...

...

... in here ...

You brute. Gol-dang-it. That thing went in before. There we go.

...

That ... like it should be?

I thought I put ... Oh, no, I did.

Okay. ...

What's that?

...

That'd never happen.

You told me to put it back, so I did.

It's right there.

Ha! Would you believe ...?

What?
...  

How long are ...?  

I don't know. ... there. You only have ... then you gonna get that MAIN B UNDERVOLT coming out on the front side ...  

Right now.  

Gol-dang-it. Once again. Didn't give me any pan. Set the high gain at 0 and 170?  

You say you'd set your ...?  

Okay. That's MANUAL and WIDE.  

Okay.  

Okay. How about MAPPING CAMERA/LASER ALTIMETER COVER to CLOSE? Let's see, verify that that MAPPING CAMERA RETRACT barber pole is off and that the switch is in the RETRACT position.  

Yeah.  

Okay.  

MAPPING CAMERA/LASER ALTIMETER to CLOSE?  

Yes, sir.  

The COVER?  

Yep.  

CLOSE.  

Barber pole? Back to gray?  

Yeah. It was so fast I didn't ...  

Okay.  

When am I going to eat?
…

03 08 56 48 LMP
03 08 58 49 CMP
03 08 58 50 CDR
03 08 58 51 CMP
03 08 58 52 CDR
03 08 58 53 CMP
03 08 58 57 LMP
03 08 59 04 CMP
03 08 59 05 LMP
03 08 59 06 CMP
03 08 59 11 CDR
03 08 59 23 LMP
03 08 59 27 CDR
03 08 59 30 CMP
03 08 59 31 LMP
03 08 59 32 CMP
03 08 59 33 LMP
03 08 59 34 CMP
03 08 59 35 LMP
03 08 59 39 CDR
03 08 59 41 CMP
03 08 59 42 CDR

…

No, go ahead and finish your --

Tell me what you want --

-- finish your cleanup.

-- and then I'll finish it up for you.

No, go ahead and finish whatever you've got to do to get ready for tomorrow because the next thing I'm going to have to do is go to bed.

03 08 59 04 LMP
03 08 59 05 LMP
03 08 59 06 CMP
03 08 59 11 CDR
03 08 59 23 LMP
03 08 59 27 CDR
03 08 59 30 CMP
03 08 59 31 LMP
03 08 59 32 CMP
03 08 59 33 LMP
03 08 59 34 CMP
03 08 59 35 LMP
03 08 59 39 CDR
03 08 59 41 CMP
03 08 59 42 CDR

That's how we figured these -- Where those water bags at, Charlie? We ought to fill those, right?

... exact ...

Okay. Where are the ... --

Is this --

Back there towards the end --

-- is this John's chow?

... 

That's mine, too? In addition to this?

No, no, wait a minute. ... Couldn't ... chicken stew.

You want a wet pack? You sure?

This.

All right. That's mine.
That yours?

... Yeah.

Oh, oh. Let me. Let me do some more things here. This ain't going to work (laughter).

Yeah. Well, it's too old (laughter).

This is downright dry!

What do you want me to do?

Well, I --

-- ... panel 230.

There ain't no way to have an eat period in all this, isn't it?

Looks like you can't have an eat period and see what's on the Flight Plan because you're gonna have ...

Yeah. Except this is the first time to move the boom, and I'd like to move it. But I got to have the Flight Plan to see what time - Go ahead and finish your menu. No, it's on the other page.

MASS SPEC and GAMMA RAY to DEPLOY. Okay. Go ahead. Finish your Flight Plan.

Okay. There's a barber pole on the GAMMA RAY BOOM.

And the MASS SPEC was running - 15 seconds after that one.

Okay. Thank you, sir.

Well, John, you want to put on the LTV - LCG ...?
Yeah. After a bit - soon as I defecate. ...

Okay. ... 1, 2 -

Stir up.

TIME SKIP

... (laughter) ...

(Sneeze)

... wash your hands ...

Hey, you lick your fingers.

... Yeah, if we could ... try it.

Looking out that window makes you think you're rotating instead of flying.

... going like this. Yeah. I keep looking back at the eight ball to see.

No. No.

Oh! I didn't check that - that comm.

How about hitting TELCOM, GROUP 2, AC1?

... Yeah.

... telecom groups. ... balance buses.
03 10 34 23 CMP Yeah. We're in the attitude I'll be in for - 6 days. Yep.

03 10 34 34 SC ...

03 10 34 35 CMP Oh, yeah, you can turn it on and look the other way around. Even the real craters turn inside and out on me sometimes. ...

03 10 35 11 LMP ...

03 10 35 13 CMP No, but you may have some. (Laughter) The last thing I want you to do, Charlie, is to return the toothpaste.

03 10 35 23 SC (Laughter)

03 10 35 25 CMP You may have that - and my tissues - on a nonreturn basis.

03 10 35 44 CMP I'll get the tissues out if that's what you want.

03 10 35 55 CMP (Laughter)

03 10 36 14 CMP Get out of there, you son of a gun. Can you move? Get my - -

03 10 36 21 LMP ...

03 10 36 22 CMP Huh?

03 10 36 23 LMP ...

03 10 36 25 CMP Well, you said you wanted some tissues. They're right in there - right down under there. Yeah.

03 10 36 43 LMP ...

03 10 36 44 CMP Huh?

03 10 36 45 LMP ...

03 10 36 46 CMP I don't think so. I think they should be loose. (Laughter) Right - about where your hand is.

03 10 37 39 SC ...

03 10 38 01 LMP ...

CONFIDENTIAL
Got your tissues and all that stuff? Okay. Now, are you going to defecate down there? Okay.

Well, I'll do my things after you get done. Well, I'm gonna change the canister, and chlorinate some water, and all that stuff. I'll do it later. Okay? Change the canister and all that crew-sleep bull.

Because it's interconnected with the waste water system.

Not when you - look to see where those vents go together. And those boats really do go upstream. They ain't smart enough to read those check-valve labels.

Okay. We'll bump up the cabin and then get a little - master alarm.

If you think you're grungy, grimy, dirty now, wait until you get out on the surface, then go back in the LM. Man, I bet - I bet that LM looks like a disaster area.

I suspect you're right. I suspect that - we got a - a sensor that's supersensitive, and when you put loads on it, it - probably triggers at the wrong level. But I ain't gonna run around and troubleshoot it.

Well, let's see, I got to make sure - I got a pair of scissors left with me. Boy, you'd really be in deep trouble around here without your scissors. You got to make - we got to make sure that - There's some things on this transfer checklist that aren't
there. What I want to do is make sure you don't transfer two more pairs of scissors to the LM. (Laughter) This is --

03 10 43 51 SC ...  
03 10 44 00 CMP I can't believe this place.  
03 10 44 32 SC ...  
03 10 44 36 CMP Yeah.  
03 10 44 50 LMP ...  
03 10 44 55 CMP No. In fact, you don't even have to put your headset on. Yeah. Yeah, if you don't want to do that, I'll plug into your hose, and let them correlate the data.

03 10 45 14 LMP ...  
03 10 45 18 CMP I am.  
03 10 46 04 CMP Charlie, did you fill out your menu?  
03 10 46 06 LMP Yes.  
03 10 46 07 CMP Okay. John, did you fill yours out?  
03 10 46 12 CDR No.  
03 10 46 13 CMP I'll fill it out for you if you'll tell me what you ate. Beef and gravy?  
03 10 46 17 SC ...  
03 10 46 22 CMP Huh? Chicken stew? Butterscotch? Chocolate bar?  
03 10 46 27 CDR ...  
03 10 46 31 CMP Chocolate pudding. Okay, I'll write that down.  
03 10 46 34 SC ...  
03 10 46 37 CMP (Laughter) What kind of tape did that bag have on it when you opened it? (Laughter)  
03 10 46 44 SC ...
(Laughter) You had a citrus beverage? How about gingerbread?

... Oh, man, you is a real hungry one.

DIRECT O₂ is OFF.

Adios, mother.

Gosh.

... The tissues? They're right here. Here you go. Turn around. Ohh. Darn umbilicals! I hate these things.

Yeah.

... (Laughter) They'll never publish it. (Laughter)

... (Laughter)

That's right.

... (Laughter)

... How did you guys decide who was the owner?

... (Laughter)
03 10 58 16 SC ... 
03 10 58 30 CMP (Laughter) Well, you -- 
03 10 58 35 SC ... 
03 10 58 39 CMP Well, you know, you come equipped with one. 
03 10 58 46 SC ... 
03 10 59 00 CDR What for? 
03 10 59 02 LMP ... 
03 11 00 46 CMP Huh? In 5 to 10 minutes. 
03 11 00 51 SC ... 
03 11 00 52 CMP Five to 10 minutes. 
03 11 00 54 SC ... 
03 11 00 55 CMP (Laughter) How about some water? It's chocolate pudding when you get through. (Laughter) 
03 11 01 00 SC ... 
03 11 01 12 CMP Is it what? Yeah, we're AOS now. Yeah. 
03 11 01 28 CMP AOS? Quite a while, I hope. 
03 11 01 38 SC ... 
03 11 01 39 CMP Yeah. 
03 11 03 34 SC ... 
03 11 03 39 CMP It says do that in the morning. 
03 11 03 41 SC ... 
03 11 03 50 CMP Hey, do you want me to fill them for you? 
03 11 03 54 LMP ... 
03 11 03 57 CMP Where are they, Charlie?
Okay. I'll fill them. How much goes in them?

Oh, you're kidding. Okay. I'll do that right now.

Okay, you decided you wanted to fill those drink bags, John?

Okay, pull the thing apart ...

John, you want me to fill these? Well, it looks like this high gain isn't working.

Okay. I did that last night.

... on that thing.

Here you go.

Want to change with me now?

Share the drink.

Okay. I'm not gonna make you drink it.
You want yours, Charlie?
...
There you are.
I got a ...
Okay.
... to the ... very cold.
Okay, we're eating.
Okay, have you got all the - got all the bags filled with tools and all that stuff?
Yeah, we're --
You got the pills down there, Charlie?
Sure. ... right there.

TIME SKIP

We're through with the LM umbilicals, I hope.
There's a lot of ... up here.
I think it's almost as easy to ... it was designed ...

Yeah, we're - The only way we'll keep from screwing up is to follow the checklist. Which comes after -
comes after the tunnel. Wait a minute. After what?

Yeah. We don't want to - we don't want to leave these up here. ... get in the way.

Huh? What?

Yeah, we're - The only way we'll keep from screwing up is to follow the checklist. Which comes after -
comes after the tunnel. Wait a minute. After what? No, sir. I got a course align that comes 40 min-
utes after probe and drogue. If I get out of sync, I'm going to make you run the ... Well, you're way ahead of your time line, and I'm just barely hanging on.
03 21 58 21 CMP Putting all this stuff in here. Trying to put the food on and then do ... food ...

03 21 58 51 CMP Okay. Let's start on the business. You say put the probe in, huh? I'll probe and drogue ... probe and drogue ...

03 21 59 52 CMP Yeah. Okay.

03 22 00 32 CMP Holy smoke!

03 22 01 19 CMP Okay. You got the - you got some - three capture latches in there? All righty.

03 22 01 38 CMP Last chance to swap seats, Charlie. I got my LCG all ready.

TIME SKIP

03 22 21 59 CDR Ken, are we pretty close to being at the undocking attitude?

03 22 22 02 CMP Undocking attitude is 01 plus 40.

03 22 22 15 CDR Okay.

TIME SKIP

03 23 23 35 LMP Ken, you can go FREE.

03 23 28 41 CMP Okay. I'm FREE now.

03 23 28 46 LMP All right.

03 23 29 11 CDR I believe you're moving them.

03 23 29 15 LMP Yeah. It feels like it.

03 23 31 37 LMP Okay. Ken, you can go wide dead band, att hold.

03 23 31 42 CMP Okay. We're in att hold.
03 23 31 55 CMP How about if we set up this comm configuration to record data, and then I can work on the hatch.

03 23 31 58 LMP Okay, I'll do it. Okay, you got it - B DATA.

03 23 32 30 CMP Okay, Orion. I'm going to turn my roll engines off because it looks like we're stable here, and go ahead with the procedure here, and close out the tunnel.

03 23 32 39 LMP Okay.

03 23 33 43 LMP Say, Ken. Can you turn the B3 off, please? We're going to do a rendezvous radar checkout.

03 23 33 46 CMP Yes, sir. It's been off.

03 23 33 47 LMP Thank you. And verify your transponder off.

03 23 33 54 CMP That's verified.

03 23 41 02 LMP Okay, Ken, you can turn on B3 and the transponder, as you would.

03 23 41 12 CMP Okay. And I'll - I'll put the hatch in.

03 23 41 38 CMP Okay. If you'll verify that your hatch is closed and dump valve in AUTO.

03 23 41 48 CDR That's verified, Ken.

03 23 41 50 CMP All right, sir.

03 23 44 59 CMP And, Orion, I understand you're complete with your rendezvous radar transponder check. ... Is that affirm?

03 23 45 07 LMP That's affirm, Ken.

03 23 46 06 CMP No good way to get to that ...

03 23 48 18 LMP Say, Ken, is the tunnel vented yet?

03 23 48 21 CMP It's venting.
Okay. We're ready for our regulator check right now, when you get a - if you'll give us a go on that tunnel vent.

Okay, I've got about a half of a psi to go before I get - let you have it.

Okay.

Okay, I've got us about 22-1/2 minutes from undocking, and I'm at 3-psi DELTA-P in the tunnel. Estimate another ... to get it ... down.

Okay, Ken, that's fine.

You guys don't have any problems over there?

Yeah, we can't get our COMPUTER ACTIVITY light to go out.

Well, that's a busy little thing anyway. Nothing in the - we do not undock before we get AOS?

Oh, no. We're ready to go.

Just don't have your state vector in and that's the prob - that's our problem - it's not - it's having trouble bringing state vector up.

... ***

Okay.

Okay, I'm doing a routine check on the tunnel. As soon as I complete this, you can go ahead and do your relief valve check.

Okay.

I'll wait - I'll make this a 1-minute check.

Okay, I'm back in tunnel vent and I'm gonna bring my roll engines on, and you're clear to check your relief valve.
Okay.

Okay.

Okay, Orion. I'm going to maneuver to the undocking attitude.

Okay, go to it.
Okay, Ken. Are you in undocking attitude now?

That's affirmative; 12 minutes.

Okay. Okay, Ken. Give me a VERB 06 NOUN 20 on my mark.

Stand by.

Okay, say when.

Three, 2, 1 -

MARK.

Okay. ... Let's do it again.

VERB 06 NOUN 20; 3, 2, 1 -

MARK.

Okay. Plus 000.04; plus 105.56; plus 000.45.

Okay, that was at 96:02:23, Charlie.

Yeah --

Read the numbers again, Ken.

Plus 000.04; plus 105.56; plus 000.45.

Okay. Copy four balls 4, 105.56, three balls 45.

That's affirmative.

Okay. And let me make a small trim maneuver. Looks like it should be less than a half degree, unless you'd like to just leave it alone. Either way.

It's up to you.

Okay, let's leave it as is.

Okay, Ken. How much to undocking?
Three minutes and a half.

Okay. It's gonna undock at 96:13 even?


Okay.

*** ... I can't.

Okay, can you read me on VOX, Orion?

Orion, do you read on VOX?

We're reading you 5 by.

Okay. We're inside of a minute. Understand you're still GO.

*** ...

Okay, if you're on VOX, you're cutting out pretty badly, too. Thirty seconds.

*** VOX, Ken. Okay, go ahead and undock whenever you want to, and then go ahead and separate.

Okay.

Okay, coming up. Give you a countdown for the release; 5, 4, 3, 2, 1 -

RELEASE. We didn't go very far. (Laughter) Okay. We'll let it sit here for a second. Okay, we're going to back off, now.

What more can you ask for?

Ken, you can - you can see your RCS spitting at us.

Yeah, yours is doing the same.

TIME SKIP
Okay, now, Jim. That was a little bit too fast but I think I got it all. 098:47:00.00; plus 0102.3, plus all balls, minus 0050.0; 0138.0; plus 0011.0, 0113.9; 0:35, all balls, 273; 5927.0; 0127.60, plus all balls, minus 0049.4; 099:35 all balls; 101:22:15.00. LM - that's throttle profile is 10 percent for 26 seconds in full throttle. LM weight, 36673. Go ahead.

Okay, and I'm going into the landing radar check again. You have it.

Okay, read that again, Jim. The - the DELTA-V_x.

Apparently you need some breakers ... I keep looking for your ... if you can't ... here, take it out ... Things I'm looking at now are really not that far from --

Okay, I was wrong on that. I got it now, 0102.6. And go ahead with the PDI pad. You speak.

Roger, Jim. Could we start a pitch attitude down to see the landing site?

Thank you, sir.

Are you done with our E-MOD, Jim?

Okay --

I didn't think you were.

Okay, fine. I'm - I'm down through Kilo, and I'll read back starting at India. 098:35:04.68; 11:04, plus 0002.6; 002, 114, 340; plus 56997; 101:22:15.00; 103:21:00.00. Over.

Go ahead.

It is in AU10. Okay, and reading back starting with Lima, 098:59:29.03; 105:19:45.00; November, 100:42:42.86. Go ahead with the next one. Over.

Okay, go ahead with the AGS.

Okay, copy 9 - 90, 00, 00111.
Okay - okay, there's the data. It's reading all right in H-dot, but it's changing data in - in the next two registers. And the tapemeter's not - and the tapemeter's now reading 480 opening, and the altitude meter, which first time I did it read 8000, and it's now reading zero.

Okay, we checked that one very nicely. Very easy to identify the optics and very ... AUTO OPTICS --

Roger.

-- ... - just a little bit -

Jim, I don't think it's tracking in yaw.

AUTO OPTICS leads the target about a kilometer out into the Cayley Formation.

Roger. You can see the data.

Roger.

Okay, you have it.

Okay, I'm going to terminate the landing radar test, if that's okay with y'all.

Orion, Casper. Are you ready for rendezvous radar and VHF range check?

That's negative; Houston wants them to stay locked on right now.

Okay.

Okay. And, Jim, I saw the landing site as we passed over it. We're not going to have any trouble recognizing it from the rays. The rays stand out beautifully.

Ken, how do you read? Over.

Loud and clear. How me?
Day 5

04 01 23 21 CDR Ken, do you read us on VHF? Over.
04 01 23 26 CMP Yes, loud and clear.
04 01 23 29 CDR You fixing to do the burn, right?
04 01 23 31 CMP Sure am.
04 01 23 33 CDR Okay; when you finish the burn, we'd like to get a radar check.
04 01 23 39 CMP Okay. I'll see what I can do.
04 01 23 43 CDR *** to it. We'll do a P76 after you finish your VERB and - and a VERB 83 and get a radar lock, if that'll be all right.
04 01 23 55 CMP Okay. Let's see how much I have to do.
04 01 23 58 CDR Okay.
04 01 31 50 CMP ... buses are ... AUTO, ... MAIN A ... AUTO ... AC2 ... OFF, ... EMAGs to 1 ATT, SPACECRAFT CONTROLLER to SCS.
04 01 32 19 CMP ... marked. ...
04 01 33 12 CMP ... yaw ...
04 01 33 31 CMP ...
04 01 33 43 CMP It's not gonna work.
04 01 34 26 CMP I be a sorry bird.
04 01 35 01 CMP Hey, Orion?
04 01 35 07 CDR Go ahead, Ken.
04 01 35 10 CMP I have an unstable yaw gimbal number 2. It's just been oscillating and - oscillates in - yaw any time it gets excited.
04 01 35 25 CDR Oh, boy.
04 01 35 26 CMP You got any quick ideas?
04 01 35 33 CDR No, I sure don't.
04 01 35 41 LMP What does your ***?

04 01 35 43 CMP This thing says I have to have four servo loops to do the circ. Every time I put number 2 servo on, it's okay until I disturb it, and then it starts to oscillate. And you can feel the spacecraft shaking. It's really doing it.

04 01 36 00 CDR Okay. You have to have four loops to do circ, huh?

04 01 36 12 CMP That's what it says. It's unstable in all SCS modes on secondary servo. ... I can't believe it, but I'm watching it. Every time I select the secondary yaw gimbal, any excursion in the thumbwheel causes it to go unstable.

04 01 36 41 CDR Well, just hold what you got, then.

04 01 36 44 LMP Hey, Ken, why don't you just stop it and then start it again?

04 01 36 47 CMP I've done that twice.

04 01 36 54 CDR Let us get pointed at you and do a VERB 83.

04 01 37 03 CMP Okay, gang. I'm sure sorry about this, but that number 2 servo is just oscillating like a wild man.

04 01 37 10 CDR Yeah.

04 01 37 12 CMP And I tried it both in MANUAL and TVC and in the - in the - just with the thumbwheel, and I get the same response. There could be a switch here somewhere but I - I swear I've checked them all, all I can. I guess I'll power them down.

04 01 37 32 CDR Tell the ground when you go around.

04 01 37 35 CMP Okay. Brother, what a way to start the day, huh?

04 01 37 46 CMP Do you suppose there's any - Let me try terminating 509 and see if that would help maybe. No, it was in SCS. That shouldn't have any effect. I wonder if we got that relay stuck in there some way.

04 01 38 00 CDR The TVC enable relay?
Yeah. I'm gonna try my gimbal drive check anyhow - in the G&N.

... no good in TVC either - in my gimbal drive check. I'm gonna back out here and power down.

Okay. Okay, Ken --

*** 2's OFF; PITCH 2's OFF. YAW 1's OFF; PITCH 1's OFF. Servos 1 and 2 are off. Going back to POO.

BUS TIES are coming OFF; 1; 2's OFF.

Hey, Ken, is it both gimbals oscillate like that?

No, the number 2; and my burn rules say I got to have two sets of servo loops - two on each; got to have all four servo loops to go.

*** Ken.

I'm sorry, gang. I don't know what to do with the darn thing. It does it both when the CMC drives it and when we drive it. I've started it, re-started it, and it's just apparently really in the servo loop.

Do you get there before we do, or do we get there before you do?

I don't know; it's probably a very close race. Yeah. ... In fact, I guess the next thing we've got to do is make sure we don't hit.

I'll work on that.

Okay.

Yeah, I show us at - 0.8 miles ... You got a lockup?

We got a visual on you. You have?

Yes, sir.
Okay.

Which way am I pointing compared to you - should be about 180 degrees away.

All we can --

There's no way to tell, T. K.

Oh, okay; I just thought maybe - All we see is your thruster firing.

Okay, I got ...

Okay, Ken. We're gonna lock up the radar on you.

Okay; I'm probably going to have to maneuver it so you can get a ... lockup, where I am ...

Well, we'll get ready to go anyway. You're not very far away. We'll see.

Okay, Ken. We must be out of your field of view.

Okay. I don't want to call P20 because I'm not sure how it would interact with all this other stuff. So I'm gonna try another way of finding you. I'm gonna start a little pitch around. I'll pick you up and catch you later.

*** Charlie.

We've had sunrise, and the Sun is behind us.

I got an unusually bright star. I bet that's you. I'm almost pointing at you, if that's the case. I don't - That couldn't be. Must be a planet.

We got our tracking light on.

You ought to be right in the sunrise.

Well, I guess you're a little ahead of me. You may get AOS first.

Is your transponder working?
Well, it self-checked okay. I don't show anything on the AGC yet. Power's on. It should work.

You're looking down-Sun at me, right? Is that right, John? You're looking down-Sun at me?

That's affirmative.

Okay. I'm coming into the Sun, so I guess I must be coming closer to you.

We're pointed right at you, Ken.

Okay.

I'm passing through the Sun right now.

You ought to be looking right at ***

Well, what I'm looking at right now is the Sun. Seen my attitude yet?

No, I can't. I can't see you at all. All I see is the light.

Okay. If you have your tracking light on, you can turn it off before you burn it out. Maybe they can figure out some way to make it useful yet.

Okay, we got signal strength.

Roger. I show you locking up.

Did it look like I was going over the top of you, John?

Yeah, I believe so.

Yeah, you are.

Okay. We're terminating this rendezvous radar test, Ken. We're gonna go to PDI attitude.

Okay; I don't have a visual on you yet, John.

Okay. Well, we're out in front of you, and we're --

You're out in front?
That's affirmative. We're ahead of you. No. Dadgummit.

I don't see how that could be.

We're—we're upside down and the Sun is over our shoulder, and we're looking back at you. And I promise that's the case.

I guess my nav system isn't very good.

Okay, Ken. Let's just forget this. I think you went down below us, and we're gonna go to PDI attitude, and why don't you go to your comm attitude.

Okay. What I'm trying to do is to keep *** I'd like to get a ***

Well.

My computer ...

Can you put me against the sky ...?

You're against the sky, about 5 degrees up—6 degrees up.

I've got you. You were ...

We are, huh?

I think we're about a half ...

*** that's all I know.

Well, ...

I think you're right.

Looks to me ...

...

Yeah, we do.

Okay, you want me to try and stationkeep ...
Say again?

Would you rather I stationkeep, or just let it drift?

I wouldn't worry about it right now, Ken; we got to get ahold of the ground and see what they want to do.

I was just wondering if ...

I guess we aren't going to be that far apart ...

I don't think so.

98:10.

Hey, Ken. The G&N won't do the gimbal drive right either?

... goes unstable ...

... pretty convinced that it's got to be ...

I don't think a switch can do that to you.

I - I'd like to ...

Did you try both sets of AC1 and AC2 on it?

Yes, sir.

Yeah, I figured.

Okay, Ken, we're getting earthrise.

Yeah, I got my high gain set up.

I think they locked up on me. Hello, Houston. This is Casper Bar [?] now. We did not do circ, and I'd like to talk about the TVC servo loop.

That's affirmative. Presently about a mile ahead of the LM. And I'd like to talk about a TVC servo loop problem.
Okay; and - and break in and tell me as soon as you get the DS - get ready to dump the DSE, so you can take a look at what I'm talking about, and I'll leave the antenna MANUAL and WIDE so you can. Okay; the text is that we came up to the burn time and I was going through the gimbal checks. Number 1 servo started normally, checked out. I switched to - clockwise on the THC to perform the secondary gimbal check and started them. They looked normal. I set the pitch trim normally, and I went to set the yaw trim. I've just been checking to see if the lock worked, and I got divergent oscillations on the yaw trim indicator, and you could feel them in the spacecraft. So I switched to the - SERVO POWER to the number 2 SERVO to AC1/MAIN A, tried that. That had no effect. Then I cycled through looking at - at the gimbal - with the AUTO ... switch in number 1, number 2 in AUTO. Every time I selected number 2, by some means, I had the same results. Then I tried SCS in AUTO, and as soon as I would excite some motion in the secondary yaw servo, why, it would go unstable again. I then tried using the G&N to drive the gimbal, and I did the first half of the gimbal drive in servo loop 1, then switched to the servo loop 2 for the second half, and again the same instability showed up. Based on the rule of four servo loops, I canceled circ. I had no other indications in the cockpit, no warning lights, no - no other abnormalities. The ... was, in fact, running, but I don't think that could have had any effect when SCS was going.

Yes, sir. Will do. How about if I just give you the high gain from right here?

Roger. That's what you have, FORWARD omni.

... the CSM to be active ... They want ... Oh, this one must be - Yeah, this is RCS ... - -
<table>
<thead>
<tr>
<th>Time</th>
<th>Actor</th>
<th>Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>04 03 16 46</td>
<td>CDR</td>
<td>Yeah, they - yeah, but they must want the CSM to be active on the ... What is the ...? ... go down there ... Can't ... these burns. ... it's very expensive to try to keep ...</td>
</tr>
<tr>
<td>04 03 17 18</td>
<td>LMP</td>
<td>Okay, Ken. We're gonna lock on to the landing rad - to the rendezvous radar, and are you just gonna move in with RCS?</td>
</tr>
<tr>
<td>04 03 17 26</td>
<td>CMP</td>
<td>Yeah. I think I'll ...</td>
</tr>
<tr>
<td>04 03 17 31</td>
<td>LMP</td>
<td>You're pretty garbled.</td>
</tr>
<tr>
<td>04 03 17 34</td>
<td>CMP</td>
<td>... Can you read me now, Charlie?</td>
</tr>
<tr>
<td>04 03 17 38</td>
<td>LMP</td>
<td>Yeah, we - we read you.</td>
</tr>
<tr>
<td>04 03 17 40</td>
<td>CDR</td>
<td>You sound like you're talking through about 6 feet of grits.</td>
</tr>
<tr>
<td>04 03 17 47</td>
<td>CMP</td>
<td>I don't think that's what it is right now.</td>
</tr>
<tr>
<td>04 03 17 53</td>
<td>CDR</td>
<td>That's ... all that stuff? Oh, man. ...</td>
</tr>
<tr>
<td>04 03 18 33</td>
<td>CDR</td>
<td>Makes you think that the ... valve ... ... landing radar, Ken. Pick me up ...</td>
</tr>
<tr>
<td>04 03 19 06</td>
<td>CDR</td>
<td>Look at that.</td>
</tr>
<tr>
<td>04 03 19 08</td>
<td>LMP</td>
<td>What?</td>
</tr>
<tr>
<td>04 03 19 09</td>
<td>CDR</td>
<td>Already lost some of it.</td>
</tr>
<tr>
<td>04 03 19 13</td>
<td>LMP</td>
<td>This was pretty good flight.</td>
</tr>
<tr>
<td>04 03 19 17</td>
<td>CDR</td>
<td>Going down.</td>
</tr>
<tr>
<td>04 03 19 32</td>
<td>LMP</td>
<td>Got time for this ...? It has - it's got a main ... minus something.</td>
</tr>
<tr>
<td>04 03 19 47</td>
<td>CDR</td>
<td>Well, it will be here pretty quick, Charlie. ...</td>
</tr>
<tr>
<td>04 03 20 07</td>
<td>CDR</td>
<td>That's 20 minutes. I don't think we'll ever agree on that, though; okay?</td>
</tr>
<tr>
<td>04 03 20 13</td>
<td>LMP</td>
<td>Okay. Let's try ...</td>
</tr>
<tr>
<td>04 03 20 16</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
</tbody>
</table>
... there and ...

Okay, ... lock up on the radar ... Okay, Charlie.

We're not locking up. We're gonna say that we don't want to do it for this, Ken.

... plans.

Okay.

... flight ...

... oh, okay ... try to ...

I didn't get a chance to follow all the things ... Do you have any problems or anything?

We got a RCS problem, but it's not too bad. Otherwise, we're okay. We can't get our steerable antenna up.

You don't need that now, do you?

No.

... go down on omni?

Yeah. We can land on omni. How's does that thing look to you, Ken? Is it unstable everywhere?

Yes, sir. There's no question about it. I - any - any force at all that moves at all makes it go unstable. Looks like feedback in the control.

Is that main B? Is it run off main B?

Yeah. But I don't think that - it's not likely that I wouldn't have done that, I wouldn't think. They - they told me after - I guess it was after you guys had left that they went back and looked at the dumps and found that we happened to hit all the heaters at one time.

Ah so. Well, I never did think it was a good idea to run those gimbal motors that long.
Well, I guess they're having some of those kind of thoughts right now, too.

Those once-in-a-million problems like that coarse align, ... boresighted on it.

Well, I guess we really need to wait and see ... really want. You never know, those guys might come through here and find a way to take you down. Thought that it would hold its position with an external force on it, we could control the problem pretty good by using the - just using the proper trims to start the burn.

Yeah.

But if you just count on the external forces not moving it, then I don't know what you do. I was thinking maybe we could use it in ACCEL COMMAND with - just set the proper trim and immediately go to SCS and ACCEL COMMAND, point it the right direction.

Was I sleeping? I was almost asleep.

... beside herself.

Yeah.

Well, we'll be ... *** right.

We ain't gonna do any EVA today, either.

You don't want to?

Not for two revs, Charlie. ... tomorrow ... full thing.

... bend?

Probably the first dish, yeah.

He's dropping down out of bottom of the window.

We're now passing right ... through Scorpio.
Yup.

Did find out that once we got the LM off there that the - we'd be able to see it a lot better. I guess the telescope just wiped out the ... the LM.

What's the limitation of how long you can stay before - you can't go down?

Five revs.

No, I mean what's the limiting factor? Is it water?

No. We got plenty of water.

We could - we can land and just do a couple of EVAs.

I just wondered what - how they came up with five revs - was it water or what ...?

Got no idea.

I don't know.

Light still on?

Yeah, ours is.

No, I mean the RCS light.

... pressure?

... 10.

I think we got enough ullage in there, in the tanks to -

Just let it go? It's not firing?

Well, I don't know.

I don't think we ought to fire anymore.

It's probably that thermal blanket blew off and caused this thing to overpressurize.
04 03 31 39 CDR  Probably right, Charlie.
04 03 31 43 LMP  But the temps are good.
04 03 33 21 LMP  That sunrise?
04 03 33 26 CDR  Yep.
04 03 33 30 CMP  Did you say you had sunrise, Charlie?
04 03 33 32 LMP  It's coming up. We can see it glowing beyond the horizon.
04 03 33 36 CDR  It's gonna be instant sunrise.
04 03 33 39 CMP  ... doing? Man, looks like ... dark as ever.
04 03 33 45 LMP  It's behind you, Ken.
04 03 33 46 CDR  Yeah, it's behind you, boy. When it comes up, we won't be able to see you anymore.
04 03 33 52 CMP  Okay; I've got you boresighted.
04 03 33 54 CDR  Okay.
04 03 34 15 CDR  Be kind of hard to get a radar lock. Oh, no.
04 03 35 24 LMP  Yeow!
04 03 35 25 CMP  Boy! Did you ever brighten up in a hurry!
04 03 35 34 CDR  It was long before we got there though that we saw it, right?
04 03 35 37 LMP  Right.
04 03 35 38 CDR  Reckon light bends?
04 03 35 40 LMP  Huh?
04 03 35 42 CDR  Reckon the light bends?
04 03 35 44 CMP  Man, are you ever bright!
04 03 35 49 CDR  Where'd my glove go?
We were GO for PDI there for a while.

Yeah.

I can't ... We'd had no trouble at all picking up the site ...

I know; it's beautiful. I guess you can't win them all.

I'm not getting any cooling at all, Charlie. Are you?

Cooling?

Yeah.

A little bit out of the suit. Not much.

... L ...

Okay.

Charlie, we ought to have ... You ain't hungry?

No.

How about something to drink, something like that?

Back there in the food locker.

I don't want anything, really.

You don't? Okay.

Unless they got a sandwich or something back there. I'll eat that.

All they got is those drinks, Charlie. Orange drinks.

Wait a minute. Open the top, John.

I don't want to get too close to the hatch.

Ain't nothing wrong with the hatch. ... okay.

Those two on the left come open.
See? Orange drinks.

That's all that's in there, is orange drinks?

Well, there's some stuff behind it, but I can't get at it. I'm not - I just can't. I - I could reach it with the moving the orange drinks, but if I do, I don't know what I'm gonna do with them.

Put them in the Flight Data File up here. There's plenty of room up here.

Uh-oh. Excuse me.

... I keep - I keep getting ...

Is this ...?

Yeah. Either one.

There is more pieces of metal around this spacecraft! You want a food -

It won't go in there?

Might if I fold them in half.

Stick them into the ISA then.

There we go.

I'd hate for that stuff to get ... in zero gravity. ... be a ...

Charlie, you got me almost to PDI there.

I tried hard.

You did good.

But if the gear don't work. Well, maybe they'll come up with something.

How about a food stick? Can I have a food stick, Charlie?

Sure.
... where he is now.

Probably down below him. Below us, rather. Hey, Ken, they want you to rendezvous at 100 hours, whenever that is.

Yeah, I thought they said that was our closest point of approach, and it sure doesn't look to me like it's gonna be. Looks like we passed it back there about 20 minutes ago.

Yeah, I - I agree with you. They want you to be active.

There's no way they can tell what it is on these short things; they don't have any idea where we are, Char - Ken.

Charlie, I'm going to try reacquire range and make sure I don't have a bad rate.

Okay, I got 0.68 on the --

I got 0.52. Let me reacquire and we'll try it again.

That ... That's not 1678.

No, that's --

Say, could you could stay off the mike while I get it working?

Okay, I have reacquired the LM. 0.55.

Okay; you can start closing if you want, I guess.

Yeah, I guess I will. I was gonna watch - watch the Sun here. It should scoot back around any minute.

Yeah, just be - Hey, if you want us to give you ... range rate, we'll lock on you. How about that?

I'm sorry. I didn't understand what you said, John.

We should lock on you and give you range and range rate.
Well, I thought you were saying you didn't have your radar, and I thought that made good sense.

No. We got plenty.

We've got plenty of radar. We're going to do it.

I thought you were trying to save on your Btu's.

No. No, we got plenty of amps.

Okay. Well, that would help. That's better than this thing.

Dang right. Where are - Which way should we pitch to get to you?

Beg your pardon?

Which way should we pitch to get to you?

Oh. Well, let me see here. All - Oh, boy. It's hard to tell what figures I'm looking at, it's so bright. I think I'm looking at the top of you, though.

Okay.

That's what it says, pitch up.

..., Charlie. ... updated it.

Huh?

... updated it ...

I said - Oh, you mean the radar?

I don't see him anywhere.

That's superbright. That must be - maybe I'm looking at the heat shield around your engine. That's probably it, because I can see the four gear. You - you must be pitched 180 to me.

That's what I thought. He's been going in under us.
Well, why did you say pitch up?

I didn't say that. ...

You ain't gonna take credit for it, huh? ...
I'd have swore I heard you say pitch up.

Well, that's what the AGS says, but that ain't right.

Well, ... You can't - Anything less ... Well, AGS is okay, but this thing here measures from the center of the Moon. I don't have the foggiest notion where our boy is.

Hear that noise?

It's in the comm. ...

That's what I mean. ... back here. It's got something to do with the VHF ranging.

Boy, I don't see him anywheres.

Think we got quite a ways to pitch yet.

Oh, shoot. ... Yeah, he's way far away from us. I think what the problem is, Ken, is you're opening up.

Dead ahead, Ken. Push your RENDEZVOUS RADAR breakers in?

I agree with you.

You want to be careful how much velocity you add, because you're too low to add a lot.

So far I've just put in 2 foot per second, but that's - that's even closing ...

Okay.

It looks like you're looking at me now.

Well, at 2 foot per second, you should of took out 2 foot a second on account of you're ahead of us.
Day 5

04 03 51 56 CMP Say again?

04 03 51 59 CDR Remember Mr. Kepler?

04 03 52 10 CMP Say again, John.

04 03 52 15 CDR Either way, 2 foot in or out will do it. That'll make him slow down ...

04 03 52 22 LMP Yeah.

04 03 52 28 CDR I'd rather have - There we go.

04 03 52 58 LMP Got him. Okay, he's still opening.

04 03 53 03 CMP Okay. What kind of a range do you read now?

04 03 53 05 LMP 0.66 miles and open, and it's 0.6 foot a second.

04 03 53 09 CMP Okay.

04 03 53 24 CMP Well, I guess I better put in another couple of foot per second then. Hate using all that gas on it, but I guess that's the only way.

04 03 53 50 CDR Let me get him boresighted and locked up.

04 03 54 08 CDR Well, let me get it like this.

04 03 54 10 LMP Okay. Thought we might have had a side lobe.

04 03 54 15 CDR Yeah.

04 03 54 18 LMP There you go. Go to LGC.

04 03 54 34 LMP Got a side lobe.

04 03 54 35 CMP Okay, what do you show now?

04 03 54 41 LMP Stand by, Ken. We had a side-lobe block. We're getting the main lobe.

04 03 54 44 CMP Okay.

04 03 54 48 LMP That looks like it, John. Oh, you want to go to -

04 03 55 04 LMP Okay; we close. Show 0.68 miles, 0 feet a second.
04 03 55 12 CDR Yeah, you're 4200 out. It says here it -
04 03 55 20 LMP Okay; we show you -
04 03 55 35 LMP Better not add too much.
04 03 55 36 CDR No. I'd just hold what you got, Ken.
04 03 55 39 CMP Okay.
04 03 55 41 LMP ... drop way down. You know, if he - if he fires this way, it's retrograde; it's gonna drop him low - lower his orbit.
04 03 55 55 CDR How much did you put in?
04 03 55 57 CMP I put in a total of 3.5.
04 03 56 01 CDR Okay. Well, that's gonna get you right close to the ground.
04 03 56 05 LMP Not from over here.
04 03 56 10 CMP Well, I ain't gonna get very far from you.
04 03 56 28 CMP Am I closing any yet?
04 03 56 32 CDR No. It - it'll take half a rev.
04 03 56 34 CMP Okay, I'm not sure - it seemed to me like they gave us bum dope on this 100 hours.
04 03 56 44 CDR Yeah, you know they have no idea where we are.
04 03 56 47 CMP Yeah, but they know where we undocked and we haven't done anything. Think they ought to - -
04 03 56 51 CDR No, no. There's no way. Not for short ranges like this.
04 03 57 24 CMP I really wanted to get within half a rev. I guess that ought to be a radial burn, shouldn't it?
04 03 57 30 LMP Okay. We show you closing slightly now, about a half a foot a second.
04 03 57 35 CMP Okay.
Yeah, it shows it took me down to 8.6. But as long as I stick with you, I can't get too far away.

Okay. Our RANGE RATE meter says you're 4100 foot out.

Okay.

What do you show for your — perilune?

The what?

What's your perilune?

Ours says 11.0, Ken.

Okay, I'm reading 8.6.

I guess the five revs might have been, John, the — the high gain coverage ... our steerable ... work. ... long as we got the 210. ... gonna be hard to run — He's gonna take a lot of gas to get over here.

Should have took it out.

Huh?

You thrusted toward us 3.5 feet a second. Is that true?

I thrusted toward you 3.5. Yeah that was — looks like mostly retrograde.

Yeah. Looks like to me you're gonna have to go up a little bit now, a couple of feet a second.

Have you got some kind of a chart there I could navigate with?

No, we sure don't.

No. But, see, that retrograde burn is going to take you down, below us.

Roger. I understand that. It really looks like what I want to do is make a radial burn, you
behind me. I really ought to make a radial burn now, shouldn't I?

04 04 00 33 LMP Yeah. Shouldn't he?

04 04 00 35 CMP How about let's do that?

04 04 00 41 LMP Okay.

04 04 00 44 CMP What's my range and range rate now?

04 04 00 47 LMP 0.680 feet a second.

04 04 01 28 CMP Okay. There's 0.5 foot per second radial out.

04 04 01 33 LMP Okay.

04 04 02 09 LMP Man, it's really white into zero phase, isn't it?

04 04 02 25 CMP Sure looks to me like I'm opening again.

04 04 02 29 LMP Well, we got you about zero, Ken, maybe closing slightly. I think it's gonna take a couple of feet per second radial.

04 04 02 49 CDR He's got to go up like that. ... our mechanics, it may not ...

04 04 03 04 CMP I guess I'm getting a little concerned about that minus-X I put in there.

04 04 03 18 CDR Guess I don't blame you. I'd have thought you'd have put in plus-X and rose over the top of us.

04 04 03 25 CMP Yeah, I think I'm gonna take it back out and go the other way. That sound reasonable?

04 04 03 36 LMP Sure does to me, Ken.

04 04 03 55 CMP Okay; here we go.

04 04 04 27 CMP Okay, there's two - two power.

04 04 04 30 CDR Okay, now that shows you're opening at 3 and a - that shows you're opening at 3.

04 04 04 44 LMP Comes earthrise. See it?
04 04 04 52 CDR  Yeah.
04 04 04 53 LMP  That's spectacular.
04 04 04 58 CDR  Yeah. Now according to our mechanics, you're bound to end up behind us, and close to us.
04 04 05 07 CMP  Okay. That shows I got a 59 by 9.
04 04 05 19 LMP  Houston, Orion. How do you read?
04 04 05 24 CC  Orion, this is Houston. Read you loud and clear.
04 04 05 26 LMP  Roger; same-o, Jim. We're about 0.7 of a mile out from Casper now.
04 04 05 42 CC  Say again, Charlie. We still have excessive noise ...
04 04 05 46 LMP  I say our range to Casper is about 0.7 of a mile.
04 04 05 51 CDR  And he's opening at 2-1/2. He put in some posigrade velocity to go up and above and come down and get with us.
04 04 06 06 CMP  John, I think that total is still slightly retrograde.
04 04 06 12 CDR  The total is slightly retrograde?
04 04 06 14 CMP  Yeah. You know, I'm - I'm thinking we ought to go put some more in, what do you think?

TIME SKIP

04 05 09 49 CMP  Yeah, I could tell I got you, but it's - it's a poor competitor for earthshine.
04 05 09 57 CDR  Well, we ain't got any earthshine, old buddy.
04 05 10 02 CMP  Beg your pardon?
04 05 10 03 CDR  I say, we're gonna lose earthshine here in a minute.
Roger. It will all of a sudden look very night.

You can rendezvous under these conditions very nicely, the problem being that you've got to keep referring to the - to the reticle to get some kind of range, because there's just no - you still don't have enough depth perception to tell where you are.

Right. You're gonna be clocking the Earth at - you're just slowly drifting to the north. You got the vertical line-of-sight rate killed.

Okay; in order to have good comm - Okay, you just disappeared ... the spotlight on.

You got the tracking light on?

Yeah.

I tell you, the spotlight isn't nearly as good as earthshine. I'm really surprised.

We got a tracking light on, Ken.

Yeah, I know. I'm - I'm using that. ... turned it over.

You're closing at - at 500 - at 2 feet a second, 520 feet.

Okay.

Spotlight is probably good for 300 feet on in, Ken.

That sounds like a good number. I can tell that you're out there. I can ... 3 hours ...

Okay; you're at 510 feet, 2 feet a second.

Okay. I'm really amazed how when you get range ... all the way in there. I'm at point - Well, I'm down to 0.09 now.

Okay.

Oscillating between 1 and 0.09.
Okay. VERB 40 should be - You're at 480 feet now, Ken.

All right, sir.

You're going to stationkeep, right?

Yeah, I thought I'd come in to where I can guarantee a good spotlight.

Okay.

Then you can - I'd like to get a little closer before you power down the radar.

Okay.

Hello. Maybe this is where we ought to stop to keep from burning it out. What do you think?

Ken, I don't know. If - if you want to get closer right now, I don't care. I think that - I would like for you to be in good stationkeep position and be sure what you're doing, and then we'll just go on around. Okay? Kind of dark out there.

We can still see your probe.

Yeah, I hope that's still there. We've got enough problems without that. Actually, the RCS ... doesn't look as bad as I thought it would.

You better ... again.

Say again?

... again.

Okay, Ken. You're at 370 feet, 360 - 370 feet at - still at 2.

Okay. ... It'll be daylight by the time we get there, won't it?

Probably. Have you got me good enough to where I can shut off the radar?

Yes, sir.

Thank you.
What me to - want to slow it down?

Yeah. Okay; you're - we still showed you with 2 feet a second. You still got it, man.

Okay.

We see you getting a hair bigger.

Okay; I pulled off 1 foot.

Okay.

Okay; you can pull the breakers.

If I knew where they were, there'd be no need to sweat it.

Want me to turn those lights on?

... 

I thought I'd leave the tracking light on. Ken, do you need the tracking light?

Well, you can turn it off and let's see.

It's off.

Nope, don't need it.

Okay. 101:15.

... 

Boy, that landing site and that North and South Ray are really something, Ken.

That sure is. I got a good look at them a couple of times.

It looks just like the LMA.

Sure looks different than it did yesterday.

Yeah.

Guess we better ... track. ... on the ground. ...
Boy howdy. That ...

... Yeah.

Phew! There's no cooling on this thing at all.

Sure looks like a jack-o'-lantern.

Oh, me! Give me some water, Charlie. I'm really about to erp.

Okay, just a minute.

Well, you're in SUIT DISCONNECT. That's why.

Huh?

You're in SUIT DISCONNECT.

Oh, no kidding?

Yeah.

What a ... Okay, you can shut that water off.

Okay.

Well, you're holding like a rock out there, Ken. Not using any thrusters, are you?

Beg your pardon?

Huh?

I'm sorry. I didn't understand you.

Not using any thrusters, are you?

Yeah, I think so. Bound to be some for attitude control.

Oh.

What are you looking at, Charlie?

The RCS.

How you like the propellant position?
04 05 22 21 CDR  I just ... How about turning your ...?
04 05 22 27 LMP ... over here. ...
04 05 22 31 CDR  Okay, ... little gadget ... I think ... 101:22:36.
04 05 22 55 LMP  I think you got ... pretty bad.
04 05 23 01' CDR  Is that what ...?
04 05 23 02 LMP  Yeah.
04 05 23 40 CMP  ... cut in here. ...? Seems like it ... on the gimbal? ...?
04 05 23 51 CDR  Boy, Ken. You got me there.
04 05 23 53 CMP  Did you understand?
04 05 23 54 CDR  I don't have any idea.
04 05 23 56 CMP  Hey, if y'all will turn the VOICE/RANGING off, maybe we can get better comm.
04 05 23 59 CDR  Okay.
04 05 24 02 LMP  It's off. How do you read?
04 05 24 04 CMP  Loud and clear. I got a - a squeal with you. But I got you good and - good and clear.
04 05 24 13 LMP  Ken, how do you read now?
04 05 24 15 CMP  You still got a real bad squeal.
04 05 24 21 LMP  Ken, over.
04 05 24 22 CMP  Loud and clear.
04 05 24 27 LMP  Okay, Ken, we have VOICE/RANGING back on. How do you read?
04 05 24 30 CMP  Well, it's a little scratchy, but clear.
04 05 24 38 CDR  Charlie, we must not be doing anything right.
04 05 24 42 LMP  Ken, how do you read?
04 05 24 44  CMP  Loud and clear.
04 05 24 49  LMP  Okay, Ken. How do you read VHF B?
04 05 24 51  CMP  Loud and clear.
04 05 25 10  LMP  Okay, Ken. How do you read?
04 05 25 12  CMP  Okay, if you read, I'm transmitting -
04 05 25 13  LMP  Okay; are you getting - getting me now?
04 05 25 17  CMP  How do you read, Ken?
04 05 25 35  LMP  Loud and clear. How me?
04 05 25 36  CMP  Okay; you're still a little garbled but okay. What are you transmitting?
04 05 25 38  LMP  I'm transmitting on B and receiving on A.
04 05 25 49  LMP  Okay. Why don't we try - I think it's our B RECEIVER. Why don't you try B DUPLEX? Transmit B - correction, transmit A and receive B.
04 05 26 00  CMP  Well - Okay, just a second. Let's go to something simplex. That worked real nice.
04 05 26 09  LMP  Okay, B SIMPLEX.
04 05 26 10  CMP  Okay. B SIMPLEX.
04 05 26 20  LMP  How you read B SIMPLEX?
04 05 26 22  CMP  Loud and clear. How me?
04 05 26 24  LMP  Still the same. You sound - you're a little garbled is all, but you're okay.
04 05 26 30  CMP  Okay; you sound good.
04 05 26 32  LMP  Okay. I think it's our B RECEIVER.
04 05 26 35  CMP  Well, why don't we use A SIMPLEX then?
04 05 26 39  LMP  Tag back back here in 30 seconds.
Say again?

A SIMPLEX is no good. Tag back B SIMPLEX in 30 seconds.

Okay.

VHF A, Ken?

Loud and clear.

That's the best one. It - it's our B RECEIVER is a little scratchy.

Ken, this in plane may be mighty bad if the Sun comes up and hits you in the eyes. I don't know which way you're pointed.

I don't either.

Find out right quick.

Yeah. Well, if it is ... field of view.

Yeah, I'm pointing --

It ought to - I think you're the one that's going to be looking into the Sun, because we're in - in an inertial attitude and I was looking at the Sun at sunset. I think the Sun's going to rise over my back.

That'll be fine. I don't care.

I'm glad to hear that because there's really not much that I can do about it.

Yeah, I knew that there wasn't. You know, if we do PDI from now, it will be a miracle.

I'm afraid you're right. And here comes the Sun. Man, are you bright.

Well, Ken, at least our urine dump works.

(Laughter) Well, I guess ... you have to have something to do. Have to get down and get that
water in a few minutes. I thought about that on the last pass, and I thought I had - had more than enough time to get it squared away.

Well, we don't see you venting anything.

I'm not. Had a problem ... Afraid I'm gonna - gonna pop that relief valve if they don't ...

Okay; well, are you - No. Hey, Ken, if you - you're in great shape. Why don't you go get it, and we'll - watch it.

Let's wait until we get - get daylight on the whole spacecraft.

Oh, we ain't got day - I got daylight on you.

You have? Okay. That's a beautiful sight. All right, I'm going to go down and turn the dump on, and if it looks like it's going to obscure our vision, then I'll - holler and I'll turn it off right away.

We'll do it.

Bring that out of there! I can see why that's propulsive.

Okay; I'm back at the capsule to visual.

Okeydokey.

Man, we must be over the Sea of Rain.

Ken, you ought to see that dust squirt out of there.

I can see it going past you.

I got a good picture of that.

That's good. Somebody will get something out of all this.

Looks like you're translating your spacecraft.

Yeah, I've picked up quite a drift here.
04 05 33 40  CMP  Man, that's a long wench coming over the cold north ...

04 05 37 56  CMP  You guys have another dump going?

04 05 37 58  LMP  No. This thing just catches this in a can down there, Ken.

04 05 38 03  CMP  Oh. There was still something. Maybe it's just - my stuff was bouncing off of you.

04 05 38 08  CDR  Hey, there's an icicle hanging off that dump.

04 05 38 11  CMP  That right?

04 05 38 13  CDR  Is you about to go ahead and terminate?

04 05 38 16  CMP  I beg your pardon?

04 05 38 18  CDR  *** popped your dump valve, there.

04 05 38 21  CMP  Did you say something about terminating?

04 05 38 25  CDR  ***nate your dump?

04 05 38 28  CMP  If you want me to. Like I'm down to 50 percent.

04 05 38 35  CDR  It's ice, I guess.

04 05 38 52  CDR  That little door down there that's open, is that the solar door?

04 05 38 57  CMP  Well, the solar door should be down off my left foot. Yeah, underneath the terminal lines of the urine dump - the water dump, rather. Can you see it from there?

04 05 39 12  CDR  Sure can.

04 05 39 14  CMP  How about that.

04 05 39 31  CMP  If you'd like to yaw around and get the Sun out of your eyes - you can do that.

04 05 39 38  LMP  We're in great shape. It's not in our eyes, Ken.

04 05 39 40  CMP  Oh, okay.
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<tbody>
<tr>
<td>04 05 39 42</td>
<td>LMP</td>
<td>Ken, your SIM bay is all retracted.</td>
</tr>
<tr>
<td>04 05 39 46</td>
<td>CMP</td>
<td>Okay; how about taking a look at that mass spec. You - you know where that one is. That's the one in the - all the way in the aft shell, and it's the one towards the plus-Y axis.</td>
</tr>
<tr>
<td>04 05 39 58</td>
<td>CDR</td>
<td>Cover's silver, right?</td>
</tr>
<tr>
<td>04 05 40 01</td>
<td>CMP</td>
<td>Beg your pardon? The cover over it is white. The silver cover goes over the gamma ray.</td>
</tr>
<tr>
<td>04 05 40 09</td>
<td>LMP</td>
<td>Okay; it's all - everything's in, and all the covers are closed.</td>
</tr>
<tr>
<td>04 05 40 16</td>
<td>CMP</td>
<td>Okay. That's interesting.</td>
</tr>
<tr>
<td>04 05 40 19</td>
<td>LMP</td>
<td>Following us?</td>
</tr>
<tr>
<td>04 05 40 22</td>
<td>CDR</td>
<td>Yeah, he's drifting some.</td>
</tr>
<tr>
<td>04 05 40 30</td>
<td>CMP</td>
<td>Yeah, I was trying to see what this dump did. Looks like it started out giving me DELTA-V and then it looked like it quit. Or at least it changed. It could be that it - if it's forming icicles out there, that it's deflecting us up.</td>
</tr>
<tr>
<td>04 05 41 17</td>
<td>LMP</td>
<td>That big chicken's been over on this side again, Ken.</td>
</tr>
<tr>
<td>04 05 41 22</td>
<td>CMP</td>
<td>Yeah. That sure is a fascinating place down there. ... good-size chicken, though.</td>
</tr>
<tr>
<td>04 05 41 42</td>
<td>LMP</td>
<td>You said it was - once you tried it with the - in ACCEL COMMAND with the 204. Did that have - It said it looked like it was stable but oscillating. What does that mean?</td>
</tr>
<tr>
<td>04 05 41 57</td>
<td>CMP</td>
<td>Well, it meant that it was pointing about plus or minus 1 degree. But it seemed to be pointing at 1 degree about the desired axis.</td>
</tr>
<tr>
<td>04 05 42 10</td>
<td>LMP</td>
<td>We got you about 10 minutes on the dump, Ken.</td>
</tr>
<tr>
<td>04 05 42 14</td>
<td>CMP</td>
<td>Okay; I'm down to 40 percent. I got my timer running here.</td>
</tr>
</tbody>
</table>
One for you, too. You know every crater — every one over here shows those lineations, like on 15.

Yeah, I was noticing that. Everywhere I looked, I saw that. In the craters, in the highlands, in the — just the whole surface of the Moon is covered that way. I was about to decide it was an optical illusion, but the last time I came across Theophilus down low, it turned out that those lineations follow the depressions that touch the craters that are along the rim. Where — where there was a crater on the rim, you see these — these little lineations curve around it. They take the same pattern, like there is really a whole bunch of — of fractures there.

Yeah.

But you're right. They're everywhere. I haven't seen any place, except there's a couple of places around Descartes that looked to me like they didn't have it.

All right. Let's see, if we delay — I bet one of the constraints may even be the Sun angle for me. Just trying to think — looking back at — at how much effect that Sun angle had between looking at that landmark last night and looking at it this morning. Last night you couldn't tell North and South Ray. You could tell that the craters were there, but you couldn't see any Rays. And this morning, the rays were very obvious.

I think the constraint to landing is you.

Well, I'm thinking that, if we get a — if we get a workaround, which right now, I'm fresh out of ideas. But they've given me clever ideas before.

Yeah. Let me say I didn't mean that "you" literally.

I understand. (Laughter) You don't — well, I guess you do feel worse than I do, but not a lot.

It'd be better. You'd get shadows and — and then the shadow of the LM when it comes down, in case this landing radar does its thing again.
If we do go, it'll probably be - probably just a two-EVA sequence.

Yeah. Yeah, it seems like the only hope is to get back on the time line and pick it up with the nominal numbers.

Yeah, I don't think we can get a - have the consumables to stay for three EVAs.

Not after all this, I don't think. Might not even be a one-EVA, or a one-EVA is about all, I guess.

Well, unless - Your battery power may be down? I bet you could get two. Well, there's no sense in speculating. The numbers will come out of the computer. Man, that ... of yours sure is looking clean.

Okay; down to 8 percent.

Okay; I'm going to go down and shut it off.

Okay.

Okay; it's off, so it ought to tail off pretty quickly. It'll be ...

Okay, we're looking at it now, Ken. It's still splitting out quite a few particles.

Yeah. On this side, it looks to me like the particles have changed nature, though. They look like snowflakes now, when they looked like rain before.

That's true.

And they don't have the appearance of having the same velocity, but I'm not sure about that.

No, they don't have the same velocity. They just sort of sublimating out of there. The other ones were coming out like a rifle shot.

What time do you have AOS on the Flight Plan, Ken?

Well, the schedule numbers all went out the window.
CDR: You got the dooby ... abort? Anybody?

CMP: Do I have any more what?

CDR: *** body. Our first CSM active rendezvous, too.

CMP: Okay, Charlie, we're at 138 now, so at 155 before we pick up AOS and - Well, no, it should be about 145 at this altitude. That's - that's - it looks like we ought to get it pretty soon.

CMP: Looks like all those little particles there, they're coming out and slowing it down. They look like they're just sort of stopping out there.

LMP: Okay; it's almost stopped, Ken.

CMP: The thing I haven't figured out is that the particles also look like they're coming out slower.

CMP: Every now and then you get a blizzard. It looks just like you're really drowning in ...

CMP: Okay; rough calculation says we should pick up AOS about 102:02. ...

CDR: What's your best guess for P21, say, Ken?

CMP: Where we are right now. We're about 125 degrees, probably about 30 miles high.

CDR: I don't care. Just wondering when we was going to get acquisition.

CMP: I'd say about 102:02, I think.

CDR: Okay.

CMP: That's about 100 degrees east and gonna be about 25 miles high. I got that out of our spiffy - spiffy little P29. He's doing longitude now. Get that. That wasn't a bad guess. We're now at a 121 and 33 miles high.

LMP: Ken, the way that figure looks, we're down to one gimbal motor in yaw then, huh?

CMP: Well, that's right unless they can find something.
04 05 56 30 CDR Well, there's not much that they can find on the
ground to fix it, though.

04 05 56 34 CMP Well, they may find some crude control mode that
you could use in here that would make it oscillatory
but not unstable. It's the divergence ... it's
tracking. If it had been just the ... we got to
go ahead and burn; then we go ... the Moon.

04 05 57 02 CMP I tell you, that thing is really threatening to
whip around to the back end. Think it'd just be
... like that.

04 05 57 22 CDR They've got the data from one that you'd let it do
that on a little?

04 05 57 27 CMP Yeah, I showed it to them on two separate occasions
on that last pass. Both times, they had high gain
all the way. So there should be no question about
it.

04 05 57 55 CMP I just really didn't follow their comment about
what they were trying to duplicate conditions on
the simulator.

04 05 58 13 CDR Well, they want to make - make it unstable and see
if somebody can fly it. Would you believe?

04 05 58 24 LMP Hey, Ken. If they let us go, boy, I'll tell you,
if you ask me, you ought to just forget about that
MEP - EMP thing, and just leave the gimbal motors
on those 6 minutes.

04 05 58 51 CMP Well, I really don't really know if that had any-
thing to do with it or not. It - it would seem
that, with this being our first gimbal problem and
that's the first time we've done that, that would
seem like a reasonable thing to suspect. But if
that's what they suspect, then - then the next
answer is pull the ...

04 05 59 17 LMP First answer's what - second answer's what?

04 05 59 21 CMP We've got AOS, looks like.

04 05 59 29 CMP Hello, Houston.
TIME SKIP

04 07 02 13 CDR What time did they say AOS was, Ken?

04 07 02 17 CDR Well, the reason I ask, Ken, is, for this P52, I need to be close to the right attitude to pick up your story.

04 07 02 34 CDR My eight-ball in normal.

04 07 02 42 CDR Oh, let's try it and see what happens.

04 07 02 45 CMP ...

TIME SKIP

04 07 14 15 CMP Okay. CAUTION/WARNING's back to NORMAL. TVC SERVO POWER number 1 and number 2 are on. RHC is to AC. DIRECT is OFF. The BMAGs are uncaged.

I'm in SCS.

04 07 14 43 CMP MARK it. Seven minutes, the gimbals are coming on. One, PITCH; one, YAW. Pitch looks good, trimmed at 1.5. Yaw looks good, trimmed at 1.2. MTVC; good in pitch; it's good in yaw. Turn the THC control. Goes back to zero. No MTVC. Going clockwise. No MTVC. Secondary GIMBAL; PITCH 1. MTVC is good. Thumbwheels are good. Back to neutral. AC/DC; MAIN A, MAIN B. BMAGs are caged.

04 07 16 17 CMP Gimbal drive check; minus 2 in pitch, plus 2, minus 2 in yaw, zero. And they're trimmed. Trims are good. And P509 is coming out.

04 07 16 43 LMP Hey, how about going VOX, Ken.

04 07 16 45 CMP I am in VOX.

04 07 16 57 CMP Are you reading me in VOX, Charlie?

04 07 17 03 LMP Yeah, your VOX circuit was like a key, but it's fine.

04 07 17 17 CMP Okay; 509 is out.
Okay. I'm strapped in. I'll turn the VOX up a little if that'll help.

It would sure be good.

Okay. And I'll try to talk to you as loud as I can and good. Burn time is 5 seconds. Two jets for 16 seconds, the ullage. Coming up on 3 minutes to burn. EMS is in DELTA-V; the DELTA-Vc is set.

And I'm bringing on the YAW GIMBAL number 2 - MARK. And ... that's a good sign.

Coming up on 1 minute. Stand by.

One minute. EMS is NORMAL. TRANSLATION POWER is ON. The DELTA-V THRUST switch A is coming ON - MARK.

DSKY is blank. Average g is on.

Ullage; ullage is good.

PRO.

IGNITION.

SHUTDOWN. Looks like a good one.

Gonna have to do some trims.

Okay; I'm gonna have to roll to get the - to trim out.

Might know this little guy would be the one that takes the Z-axis trim that you have to roll for.

Why do you got to roll, Ken? Because of jets?

Yeah.

The GIMBAL MOTORS are OFF.

You got about a 20-hour charge on those batteries, I bet you.
Yeah. Okay, let me cut this Beta. I have a residual of plus 0.2, plus 0.2, zip. Attitude -61-

Okay, I'm going off VOX. Have a good trip.

*** one, Ken.

Okay, Orion, you don't need any further data for the P56, do you?

No, we got it all, Ken. Thank you.

All right. Sorry we held you up so long.

No problem.

We're just happy to be on our way, babe. That was great. Hang in there.

I'm gonna have to buy some of those cats a couple of cases of beer when we get home.

You can bet.

Like a light to the blind.

Okay, Ken, I think we ought to go back to the VOICE RANGING on the VHF. Is that what your PDI switch list called for?

Okay.

Ken, do you read? Over.

Loud and clear. How me?

Ken, do you read? Over.

Loud and clear. Did you copy him on VOICE RANGING?

Houston - Ken. Over.

Do you copy me now?
04 07 40 31 LMP  Yeah, I copy you now.
04 07 40 34 CMP  I went to VOICE RANGING and DUPLEX Bravo, and I 
could hear you, but I couldn't receive.
04 07 40 40 LMP  *** read now?
04 07 40 44 CMP  How about now; do you hear me?  Okay, I'm talking 
to you on the A SIMPLEX but I'm not getting through 
to you on the B DUPLEX.
04 07 40 56 LMP  Okay.  You weren't getting through on B DUPLEX, 
because I was - I was - had B RECEIVER OFF.
04 07 41 05 CMP  That'll do it.
04 07 41 06 LMP  Okay, I'm gonna go VOICE RANGING and B RECEIVER, 
okay?
04 07 41 12 CMP  Okay.
04 07 41 16 LMP  You can put B to RECEIVE over there, John?
04 07 41 19 CMP  ..., sir.
04 07 41 20 LMP  Okay, you're a little scratchy, but okay.
04 07 41 23 CMP  All righty.
04 07 41 28 LMP  My helmet looks like my training helmet now.
04 07 41 31 CDR  Yeah.
04 07 41 41 LMP  What time do you have, John?
04 07 41 45 CDR  I've got - Well, my clock is wrong.
04 07 41 50 LMP  Ken, what time do you have, Houston time?
04 07 41 54 CMP  I got - 22 minutes of 8.
04 07 41 58 LMP  Okay, thank you.
04 07 42 01 CDR  What I haven't been able to figure out is whether 
it's a.m. or p.m.
04 07 42 04 LMP  p.m.
You can feel those thrusters burn.

Yeah.

Okay, 35 minutes, the ASCENT BATs are coming ON. They're ON - at 103:42.

Okay, if we're 66,000 feet, we're probably gonna have 10 or 15 or 20 feet a second more to start with.

Yeah. Okay; THROTTLE CONTROL we got. LMPs we got.

Yeah.

RATE SCALE, 25 DEGREES PER SECOND?

Go.

ATT/TRANSLATION, 4 JETS?

4 JETS.

Okay. Check DCS [sic] - DPS, APS, RCS. Let's go look at the DPS. Okay. APS - was okay. Okay. Okay, there we go. Press 1, press 2. Pressure's coming down. It must be cooling off. Supercrit ... - but that ambient's okay. Okay. Okay?

The switch guards are checked.

Okay. ECS looks good.

Bias my gages, and EPS.

Okay? The commander's BUS, INVERTER 1.

INVERTER 1 is closed, Charlie.

Okay; going DESCENT 1.

Okay; we've still got the S-band antenna open.

That's okay. That's just the high gain; and we're not using that.

Okay.
04 07 44 45 CMP
Coming up at AOS in a moment - at 6 minutes.

04 07 45 39 CDR
See my - It's shedding.

04 07 45 41 LMP
It is? Yeah, I know. Uh-huh. Right out front.

04 07 45 51 LMP
I wish I had a drink of water.

04 07 46 47 CDR
I don't know what that noise is, but it really is something.

04 07 46 50 LMP
It sure is.

04 07 47 58 LMP
Man, that really is something. We don't even have VHF RANGING on. Well, we got it on, but Ken's not locked up.

04 07 48 18 CDR
That Moon is really some kind of place!

04 07 48 22 LMP
Yeah.

04 07 50 13 LMP
Okay, it's gonna be almost - by - let's see, we're 6 hours late and it's 3 degrees - about a 15-degree Sun angle, John.

04 07 50 20 CDR
Okay. Whatever that means, Charlie.

04 07 50 23 LMP
Whatever that means.

04 07 51 52 LMP
We'll be having AOS here, momentarily.

04 07 52 00 CDR
Okay, I'm AGS initialized.

TIME SKIP

04 08 11 24 LMP
Roger. Copy.

04 08 11 36 LMP
Why don't you pull me right up under my - little ***

04 08 11 50 LMP
Okay, 05:36, John. Everything looks great.

04 08 12 00 LMP
Hey, Casper, how do you read? Over.

04 08 12 06 LMP
***
Okay; 5 minutes, LANDING RADAR breaker is going closed.

BAT 3 is ON.

ALTITUDE TRANSMITTER is 3.4, almost. VELOCITY TRANSMITTER is 0.82.

What's the ALTITUDE TRANSMITTER?

3.8.

Correct.

Roger. GO for PDI. Okay, PRO for final trim.

Go. ... DET. Go ahead. ENTER.

ENTER.

Go. My watch is set and wound.

... about a second off here.

Okay. Sta - stand by for 2 minutes, John.

Roger.

Fantastic!

Target about 10 miles, it looks like. Excellent.

Okay; 2 minutes; MASTER ARM, ON.

Two minutes, MASTER ARM's ON; two lights, Houston.

PGNS is MODE SELECT; P67 is in. Next thing is at 30 seconds, John. Turn the page.

Hey, Jim, you want us to turn the ranging back on?

Okay. We have VOICE BACKUP.

Fifty seconds.

Okay. At 30, we hit ENGINE ARM; then we - 30 seconds, ENGINE ARM goes to DESCENT, then we --
... light. PRO.

Okay. ENGINE ARM, DESCENT.

ARM is DESCENT; ALTITUDE light, VELOCITY light.

Okay. There's no ullage plus-X.

Okay.

If no ignition, you START pushbutton, if we get ullage.

Ullage.

Auto ullage.

PRO.

Okay. Engine START.

START. DESCENT ENGINE COMMAND OVERRIDE is ON.

Stick your throttle in MIN.

...

Okay, DESCENT ENG - ENGINE COMMAND OVERRIDE; MASTER ARM, OFF.

MASTER ARM is coming OFF.

Stand by for throttle up; thrust-to-weight is okay.

22, 23, 24, 25, 26 -

Throttle up!

On time!

Feel that beauty come on. Okay; thrust-to-weight is good - 66,000 feet. They were right on.

Looking good at a minute. Hey, Jim, at pitchover, do you want me to go AFT omni or stay FORWARD?

Roger. Hey, we're way high, John, we got to get down. Way high on the H-dot.
All right. ..., Charlie. Down to 45 already. How am I doing?


... 

Go ahead.

Go ahead.

Plus 00800.

Interesting, isn't it?

Okay; we have - Excuse me, John.

Okay. That's entered. That's entered.

Passing 2 minutes.

And I'm looking good.

Okay, we're going to have to yaw out here at 3.

I can take that out when we get ... dot. AGS and PGNS are tracking right on, Jim - within a tenth of a foot a second.

*** 3 minutes; propellants.

Pressures are holding good in the - DPS.

All oxidizer pressures looks good.

Three.

Roger. GO at 3.

I'll check the ED batteries one more time. And they're still 37 volts, Jim.

VELOCITY light's out, Charlie.

Okay.

Wrong transmitter, probably.
We got a *** ... *** way.

Cutting out, Charlie.

I say there's no way to *** get that altitude light at this high.

*** minutes.

We're 50,000. Look at that, ALTITUDE and VELOCITY lights are out at 50K. Isn't that amazing? Copy that, Houston? Look at that data, Houston. When do you want to accept it?

Okay; it's in.

AGS and PGNS will be getting off a little bit in altitude now. Updates.

Okay, at 5 minutes. Coming in like gangbusters.

Roger.

39,000. Hey, look at that - hundred - 136 feet difference now. *** radar.

Roger. We'll get there.

Six minutes; we should be at 32,000. *** not quite back on profile, but almost.

*** 45 percent *** ... *** ...

Okay, at 06:30, should be at 30,000.

MARK it; 32,000 *** Okay; looking good, John. Sun angle's getting down there. AGS and PGNS H-dot are right on. Good enough.

Understand; 07:23.

Seven minutes -

MARK it; 7 minutes. Roger; go; 104 down and 28,000; still about a thousand high, it looks like.
... look pretty good?

Yeah; 223 *** ready; the AGS ready at 14K. Then I do a 360 and then turn the camera on. Breaker's in. Throttle down.

*** on time.

It was right on time, wasn't it?

How you reading, Jim?

Okay. You were clipping a little bit, John.

Okay.

21,000; coming up on 8 minutes.

*** I can see the landing site from here, Charlie.

Amazing.

Okay, GO at 8. John's got a visual.

130. We're right on, John. Right - right back on profile.

How does it look to you?

*** right in there.

Okay, standing by to update the AGS. Had a little roll steering here.

Roger. DESCENT 1.

Hey, Jim, we got about a 3-degree roll command in. Okay, ENTER, 360 minus 01720 ENTER; 367 is coming up, and I'm starting the clock - I mean the camera. Okay, we're out at 12,000, John. GO at 9. Coming down at 182; a little steep. Okay, well, we're gonna be right on. It's just about right on, maybe 10 feet; 10,000 feet. Stand by. P64 at 8200. PRO.

Pitchover.
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<td>LMP</td>
<td>Pitchover. Hey, there it is. Gator, Lone Star, right on!</td>
</tr>
<tr>
<td>04 08 26 59</td>
<td>CDR</td>
<td>Call - call me the things, Charlie.</td>
</tr>
<tr>
<td>04 08 27 01</td>
<td>LMP</td>
<td>Okay; it's 40 deg - 38 degrees. Palmetto and Dot, North Ray.</td>
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<tr>
<td>04 08 27 07</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>04 08 27 09</td>
<td>LMP</td>
<td>Looks like we're going to be able to make it, John. There's not too many blocks up there. Okay, 4000 feet - 4 - 4 - -</td>
</tr>
<tr>
<td>04 08 27 16</td>
<td>CDR</td>
<td>Okay. GO for landing.</td>
</tr>
<tr>
<td>04 08 27 17</td>
<td>LMP</td>
<td>-- 42 LPD.</td>
</tr>
<tr>
<td>04 08 27 18</td>
<td>CDR</td>
<td>42 ***</td>
</tr>
<tr>
<td>04 08 27 20</td>
<td>LMP</td>
<td>Okay, 3900 feet.</td>
</tr>
<tr>
<td>04 08 27 23</td>
<td>CDR</td>
<td>Okay. Two to the south, Charlie.</td>
</tr>
<tr>
<td>04 08 27 24</td>
<td>LMP</td>
<td>Okay. It's in. Okay, 42 - 41 LPD. 3000 feet on profile.</td>
</tr>
<tr>
<td>04 08 27 31</td>
<td>CDR</td>
<td>Okay, there's - we're coming right down. Going to be a little past ... --</td>
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<tr>
<td>04 08 27 37</td>
<td>LMP</td>
<td>41 LPD.</td>
</tr>
<tr>
<td>04 08 27 38</td>
<td>CDR</td>
<td>Okay. ... --</td>
</tr>
<tr>
<td>04 08 27 42</td>
<td>LMP</td>
<td>2000 feet, 60 on profile.</td>
</tr>
<tr>
<td>04 08 27 43</td>
<td>CDR</td>
<td>Okay.</td>
</tr>
<tr>
<td>04 08 27 48</td>
<td>LMP</td>
<td>Okay, 42 LPD. Couple of more in. 1400 feet, 44 down. Looking good. Okay, out at 1000 feet. Right on profile. 54 LPD; dropping out the bottom now. 800 feet, 30 down.</td>
</tr>
<tr>
<td>04 08 28 12</td>
<td>CDR</td>
<td>Okay, Houston. We're going to be just a little long. But, we're just now abeam Double Spot.</td>
</tr>
<tr>
<td>04 08 28 20</td>
<td>LMP</td>
<td>Okay, 23 - 22 down at 500 feet.</td>
</tr>
</tbody>
</table>
04 08 28 25 CDR  Okay.
04 08 28 26 LMP  Some big blocks over here to the left, John.
04 08 28 28 CDR  Okay.
04 08 28 31 LMP  Okay, 300 feet, 15 down.
04 08 28 33 CDR  Okay. Okay. Take over, Charlie.
04 08 28 37 LMP  Okay, fuel is *** at 10 percent. There comes a shadow. Okay, 200 feet, 11 down. Give me a couple of clicks up. Okay, 5 down at 130 feet; 2 forward.
04 08 29 07 LMF  Okay; 80 feet, down at 3 - looking super. There's dust.
04 08 29 13 LMF  Okay, down at 3, 50 feet. Down at 4. Give me one click up. Okay, back it up slightly.
04 08 29 21 LMF  Okay, 2 down. Stand by for contact. Come on, let her down. You're leveled off. Let her on down. Okay, 7 - 6 percent. Plenty fat.
04 08 29 36 LMF  CONTACT. Stop. Boom. PRO. ENGINE ARM. Wow! ... man. Look at that!
04 08 29 47 CDR  PRO. ENGINE ARM. DESCENT ENGINE COMMAND OVERRIDE.
04 08 29 50 LMF  Okay.
04 08 29 51 CDR  Okay, 413.
04 08 29 56 LMF  ... in. Check the APS.
04 08 29 58 CDR  Well, we don't have to walk far to pick up blocks, Houston. We're among them.
04 08 30 03 CMP  Good show, gang.
04 08 30 04 LMF  Close, open, close. Old Orion is finally here, Houston. Fantastic!
And I can look right out to the left and see - see Double Spot, and we're about - -

Okay, you got it.

Okay, we're forward and to the north - forward and to the north of Double Spot; I would guess about 200 meters to the north and maybe 150 meters to the - to the west. *** It's not flatlands, though, Houston.

Well, that attitude is super though, John.

Yeah, and I could see - I could see all the way to the ground. Just like flying the LTV - piece of cake.

*** good. Ascent pressure - -

TIME SKIP

Okay, mapping camera I just did.

(Yawn)

Okay, the LASER is ON. The camera is extended, and the cover is open.

Okay, coming up on 29:57 for a PAN CAMERA OPERATE.

(NO COMMUNICATIONS FOR 17 MINUTES)

Okay, if you're listening, tape recorder, we're passing over King now. And - something I hadn't noticed before kind of unusual out here. There's a lot of clumpy material all around King. The central peaks definitely have big blocks sticking up in them. The things that we've called dark material are not dark, but rather they are big blocks that cast some pretty long shadows. They look like they're piled on top of some very soft and unconsolidated material. But they are indeed
big blocks on the central peaks. And - I'll also say that they're on - surprisingly, they're mostly on the eastern side, but there are some on the western side. The floor of the crater looks like a big, big flow - lots of flow bands and things. In the crater rim to the west, it looks like there's a definite textural change at the top; and it looks like it has a dark band and then a light band, then it goes back to the same old dark gray. This entire area has a large amount of light material around it. It is not entirely associated with - with the - the crater King. It looks like there's an area in - We've even come into some new swirls I didn't know had existed, but I think they do. And I got a picture to take here. Well, I'll get a picture of them next time around. Let's look for a topographic expression.

Where'd you go, you sucker? (Sigh) What'd that color wheel say I should have here? Let's see, 1/250 - f/8.

Hello, Houston; Casper.

... Loud and clear.

Henry, I'm gonna - Okay, barber pole plus 3.

You have it. And would you remind me when you get about 30 seconds from PAN CAMERA to STOP.

Okay.

I want to mark something on my chart, and then I'll talk to you for just a minute.

Okay. And I put BATTERY A on CHARGE at 105:35.

I got you out the window now, but it looks like - like half of you has gone away. It's all black.

Oh, I bet you were in the dark half, weren't you? That shows how long it's been since you been outside.
As I came over - I finally got squared away and, as I came across King, I had the binoculars out. And sure enough, on the - on the central peaks down there, the things we've been debating for so long, about whether they were streaks or outcrops or what they were, are large blocks which are on the - the central peaks. Most of the blocks seem to lie on the eastern side of the peaks; however, there are a few blocks on the western side, enough that you can tell that the reason they look dark is they cast some pretty long shadows because they're pretty huge blocks. The floor looks like it's - looks like an old mud flow. It's really a - a strange-looking floor. It's got lots of flow bands and patterns in it, and the crater rim to the west on the interior shows at least three distinct shades of this gray. The upper one is the same color as the surface, which is a light - sort of a darker gray. Then there's a light gray band, which runs parallel to it. And then a dark band begins below that. And the light band is perhaps a quarter of the depth of the crater wall. To the north and west of King, I ran into some things that look like the same sort of swirls we've been looking at up around Al-Biruni and around Reiner Gamma. These, too, are in the highlands. And, with the binoculars, it's my impression that these probably have a certain amount of relief - topographic relief with them. But they look - when you look straight down on them, they look exactly like the other things we've been looking at. And I took a quick picture of that thing, and I put it on magazine Victor. And if you'll keep a record of these things, that - that one is on Victor at exposure - Oh, excuse me, it's magazine November November, and that's exposure 41.

You've got AUTO now.

And it's oscillating. Suppose I go back to - There it is. Okay, I have a - a little tone in my headset that was beeping very softly, and the - the signal strength was doing the same thing.

Okay, the computer's in BLOCK.
Okay. I'm in STANDBY.

... (Laughter) Okay. No sweat; we got it done. I'll check the optics and, when you're ready, I'll start the - configuring the SIM bay.

And, Hank, would you verify that it's okay to take the optics and put them to CMC and - or to zero them? I sure don't want to take any chances with it.

TIME SKIP

Okay; we're coming up on the crater Sharonov, and we're trying to catch up on the photo pass. And I'm aimed roughly between Sharonov and Anderson. And we'll fly along here until Spencer Jones, and the next time we have something coming up is an IMC change at BB. Sharonov is a rather interesting crater. It's got a lot of big slumps that are in the wall to the east that you don't see, looks like the western wall. They're in the shadow, but they're very, very predominant slumps, some with little craters. They look very smooth and rounded. In fact, they - the walls to the south look smooth and rounded compared to the - to the walls that are lighted by maybe a sunlight illumination effect. There's a - Across the Moon, now, we see several different kinds of material, and there doesn't seem to be any exception. We see Cayley-like material which is - this altitude, is anything that has lots of little pits and relatively smooth surfaces. And coming up now on Spencer Jones. And we see that this area out here has a - a lot of gently rolling topography. You see streaks of it, and then - well, I see some little hummocks, and then I see it going out to smoother areas. I'll try to compare this with the - with the Cayley. I see several places where there's little clusters of holly [?] cratered area. I see there are more craters than the - the average that you would expect.
Day 5

04 11 30 58 CMP

Shifting to 1/250. 1/250 I shifted to at Spencer Jones. I'm shifting a little later because it's a rev later. Spencer Jones is again another one of these strange ones that looks like it's slumped. It looks like it's been here forever with slumps in it. They're all around it. They don't have sharp terraces anywhere. I have the impression that within the material that comes from Spencer Jones down into Pap - Papaleski is even smoother, and it looks like it flows down in there and just creeps over it. And this is true all over the north - excuse me, the northeast and also the southwest side.

04 11 32 01 CMP

Take a quick look down in there. Back to our strip.

04 11 32 23 CMP

Apparently some of these things I'm looking at north of Papaleski there that they're unnamed on our - our chart, but look like they're just filled with so much stuff, big blobs of things that couldn't all be slumps that just fell down from the side, but they'd almost have to run in to form the kind of blobs that they have. There's one here that - it's a little to the north. It's a very strange-looking thing.

04 11 33 30 CMP

Man, everywhere you look there's craters and craters and hills. Hummocks up on the northern horizon. Let's get one shot of that stuff. Okay. Well, I guess that I'm not coming up on Van Gent. And I guess it's about time for me to shift to - to an f/8.

04 11 34 59 CMP

Man, there's more of that stuff. It's just all over here. What looks like areas have just flown down into these big ditches.

04 11 35 25 CMP

Okay; there's the end of that strip.

04 11 35 44 CMP

I've got Mendeleev - out here also.

04 11 36 26 CMP

Okay; at 38, going barber pole plus 3.

04 11 36 40 CMP

Hilly. Stop taking it across the wall. Oh, I should have taken that thing. Oh!

04 11 37 12 CMP

Okay; at 38, go barber pole plus 3.
Barber pole; 1, 2, 3.
Okay. Catch Mendeleev.
Oh, come on. There we go.
MANUAL and WIDE, okay. ... setting ... f/11, 1/250.
Okay, take pictures.
MARK. That's magazine November November again.
Right up over Green. Mr. Hartmann and Mr. Green.
Well, there's some very, very smooth places in the floor out here.
Well, got a lot of smooth floor areas that slump and come right up over this crater. And that just looks like so much gypsum out there; it's just soft. I just can't believe any of that stuff has ever been crystal. Interesting little patterns on these little hills down here. Got a little ripple to it.
Hal! There's definitely a dark albedo unit that comes down through here. I don't think I understand.
Boy, it sure shows in the binoculars as an entirely different texture. When you look at it, it doesn't look surprisingly so much. Just to the north - just to the northeast of Green, there is a distinctly different textured unit that shows up. It looks like a flow. It's just spread out in there. And it does indeed look distinctly different. The terraces in Green are large banks, but there's no evidence of bedding in them. They just look all slumped, except for some little patches every now and then, flat places. And one little spot looked like it had a dark - block on it or something.
Okay, now, let's see, what's next? Man, whoever put that Velcro on there just didn't believe you'd want to use it. Okay, back to the Flight Plan. See what I'm doing. Okay, we got Hartmann and Green. Let's see here; I concluded this one at - at 145. Looks like I'm supposed to take two.
Where are you ... catch up in attitude.

Descartes. Here we go. And Crozier. Magazine Papa Papa.

Crozier. Wonder where he's gonna be. Yeah, we can catch him. Gonna let me do it on the same -

Okay, I can catch her.

Best way to catch those would be look up on ...

P7, P1, P7, P16, next one coming up, P12.

f/8, 1/250. Next - Crozier.

Then Ptolemaeus. And I'll need - to get Ptolemaeus, I'll need magazine SS. Okay, SS it is.

Houston, are you there?

... Hello, there.

...

Okay, every time I try that, it looks like it does worse. I don't know what's holding it in there this time, I guess.

And, Ken, ... verify ... Over.

TIME SKIP

Okay.

All right, Henry. Talk to you in about 40 minutes, then.

Go ahead.

Well, thank you. I wonder how - how that one happened. I tell you, it's pretty easy to kick a switch when you're rolling around in here. You
chase a piece of the Flight Plan away from you, or you kick a camera, and - and that's not an unusual thing to happen. I appreciate your telling me about them.
Boy, I tell you, that solar corona is really spectacular, along with a lot of other things we've seen here.

Not long after we had AO - LOS, I could see the - I could see a - distinct horizon, and for the last 15 minutes, it's been getting more and more distinct. And now I'm seeing a very bright piece coming up. And you can start to see little reflections along the horizon. And we're going to have sunrise here in just a second. It doesn't show any prominences or anything like that; it just shows this huge disk, and it looks like a black-and-white photograph. Now it's getting brighter, and you can start to see your rays that are streaming, and - There it is! Man, that is a bright son of a gun. Whew! Don't want to get caught looking at that guy. Golly. Most impressive.

What do I have to do next here? I got to - gonna slide over here. MAPPING CAMERA, EXTEND, but it already is.

Okay, at 32:18, I start it.

Well, I have to say one nice thing about Mr. Mercer. His filter bag is a useful little tool. It really is.

IMAGE MOTION coming ON -

MARK.

Barber pole's off.

MAPPING CAMERA is coming ON.

MARK. IMAGE MOTION's coming up. Barber pole plus 1, 2, 3. Barber pole plus 3.

Oh, now we're coming up on a challenge.

(Music)
Go one click to the right, one-half second. Stand by. ... Go two clicks to the right, and I'm on one-eighth of a second; 5 seconds to go. Stand by.

... the equivalent of 4 minutes on the countdown in the checklist. Stand by for start the ... It's on the solo sunrise - solar corona portion. Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ...

Four, 3, 2 -

Four, 3, 2, 1 -

START. Fifteen seconds, CMC MODE going FREE.

Stand by. CMC MODE, FREE. In 20 seconds, the DAC will go on and remain on until sunrise. The ... will be DAC ... adjust the settings. Stand by -

DAC on. ... setting, this one here. All the way to the clockwise direction on the ... coming up. First exposure will be 10 seconds. I'll call "Start, ..., stand by." Second exposure is ¼. And then we ... exposures on the dial of 1, 1/2, 1/8, and so forth. ... will be a second. Stand by -

OPEN; 1, 2, 3, ¼, 5, 6, 7, 8, 9 -

CLOSE. Stand by for 4 seconds. Stand by -

OPEN; 1, 2, 3 -

CLOSE. Stand by for 1 second, then one click. Stand by -

OPEN. Go one click to the right; one-half second. Stand by -

---

*Voice played back from portable tape recorder.

**Voice played back from portable tape recorder at double speed.
05 01 26 49 CMP** OPEN. Go two clicks to the right, and I'm on one-eighth of a second. Five seconds to go. Stand by -

05 01 26 53 CMP** MARK it. Two clicks to the right and I'm on one-thirtieth of a second. ... to go. Stand by.

05 01 26 58 CMP** MARK it. One click to the right; one-sixtieth of a second. Stand by -

05 01 27 03 CMP** MARK it. ... off and the DAC off ... AUTO. ... on the countdown. ...

05 01 27 25 CMP Okay, we're standing by ... Stand by.

05 01 27 36 CMP Okay, the ... is there; 10 seconds to ...

05 01 27 46 CMP Four, 3, 2, 1 -

05 01 27 50 CMP START the thing.

05 01 29 37 CMP Get all of our dim light things to do out of the way. Now, I am in a forward, oblique attitude. That means I'm flying - just normally now, pitched up like this, ... 3 ... forward. And it looks like I can afford to put my regular film back - magazine Victor back on the Hasselblad. We'll do that.

05 01 31 05 CMP Okay, magazine Victor is out, loaded, and ready. Okay, now I need to know some settings to use it on. That's also a hard thing to do. Now my little photo wheel. I'm on rev - ... the final one. Let me what - look at the revs - 25. This is rev 25.

05 01 32 07 CMP And AOS should occur at 5 - and a half. Oh, man, look at that. Isn't that clever? Somebody really did a lot of good work here. My little photo wheel, I'll put right here. It's on ... Now let's see if we can see some electricity. Binoculars, put up; dark side goes out. Man, that's a super crew - some octopuses that's trying to balance three checklists, two cameras, a photo wheel; take your

*Voice played back from portable tape recorder.

**Voice played back from portable tape recorder at double speed.
sunglasses on and off and not lose them. Well, here comes our old friend King. This time let's look at King out to the north. Seems like I never get set up in time. All these...

05 01 33 23 CMP

Well, we'll get a good view of King. Let's see what's out this way. There's that minor crater chain, running down to Tsiolkovsky. It's a little bit disappointing. There is nothing you can see from the south of King. Boy, I'd swear we were seeing things when we were down lower.

05 01 34 14 CMP

How about that. AOS will be about 02:13 ... Okay, we can take the dark slide out just to be different. ... off. Sure hope they put the UV transmittance in the right window.

TIME SKIP

05 02 55 25 CMP

That was a flash. I know it was.

05 02 55 40 CMP

123:07, that had to be below the horizon.

05 02 55 51 CMP

At 123:07, I was looking in an area - Let me see where it started at now. Well, I don't want this to get out, but I think you might - you might make a note that at 123:07, I was looking out the window, and I was looking at the horizon and there was a horizon, and there was a bright flash that I saw. It was below the horizon. Now whether that was - Maybe I saw one of these light flashes that everyone else has been seeing all day and that I have not seen yet, or maybe I saw a flash. I don't know. It was a ..., was a bright flash. It could have been one of these light flashes that everyone else sees. But I'm going to look at this same area again. Now back to the zodiacal light. Blah. Get the feeling I've been all day with my nose pinned to the window. Trying to get these star patterns here ... I was looking at ... 30938, coming up on T-start. Okay, ... on.

05 02 57 50 CMP

MARK; 6, 7, 38. ... go again. ... Take two pictures. ...
Okay, there's 1 minute.

... seconds to go, ... seconds ... exposure ...

Okay, 40 seconds. ...

Get the ... Stand by. ...

The next frame will be for 60 seconds. ...

Okay, ... for 60 seconds. Stand by; ... 60 seconds. Stand by. ...

... for 20 seconds. ...

Stand by. ... another ... Stand by. ...

Okay, stand by. Stand by ... next exposure will be for 30 seconds, 30 seconds from start.

Stand by. ...

... second exposure. ...

... Stand by -

CLOSE. ...

Okay, ready.

Stand by to close. ...

Stand by for the T-64 [?].

Ten seconds to ... second ...

Ten, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20. Okay, it's all there. ... Stand by for ... 64. Stand by. ...

Sixteen, 17, 18, 19 -

CLOSE. I'll go back to the ...

Stand by for ... 5, 6, 7, 8, 9, 10. ...

Stand by ... seconds. ... 8, 9 -
CLOSE. ...
CLOSE. Okay, ... 3, 4 -
CLOSE. ... up. ...
Okay.
One ... 2 ... 26, 27, 28, ...
... 60; 60.
... 3527½, 25. About a minute to spare. Good. How did we work out all that kind of tight? Okay. Can't believe anyone would really do this if they were serious about getting their data.
Zodiacal light. ...
That's probably ...
That's ...
Okay.
IMAGE MOTION ON. There's a barber pole. And it's gray.
Okay, we're in attitude at 31:05, and we're supposed to start at 31:12. Oh-ho. Would you have believed all that? MAPPING CAMERA is ON. IMAGE MOTION is going barber pole plus 1, 2, 3. A-okay. Then I guess we're obligated to humor the Flight Surgeon and change the sensors.
Oh, very well.
And here's a whole lot of those crow's feet patterns over here on the back side just past the terminator. Let's see where we are. One, 2, 3.
Holy smoke! That's Mandel'shtam I'm looking at, and from here, I didn't even recognize it, I'm so close, but that's it. And in the floor of Mandel'shtam, there is a definite - there's a definite flow that's along the floor there with another ... flows. There's a definite ridge line there in
Mandel'shtam. You can see a subtle flow pattern; it runs into the crater. And then in - down in the crater shadow, with the binocs, I can see things I can't see with my eyeball. And I can see that there is a rille that runs down inside that thing; looks like the same sort of thing that shows that flow pattern on the outside that follows that scarp. And here is another band of this thing, and this thing curves around now and gets lost over here. Get a quick pic of that, and that should be 28. I'm using 5.6 and 1/125. Let's see if we can get a picture of that thing. No, I bet I've already missed it. Bigger than life, I let it get away from me. Even a poor camera that automatically set itself would be an improvement.

I crossed Mandel'shtam and come out. The material out here doesn't seem to show - Well, most of these big craters have - have wet pies [?] at the bottoms. They characteristically have something that looks like the little - ripples, concentric ejecta patterns ... the fact that they're small and very limited in duration, vary in size; they just go out a little ways. The smaller craters - actually, their crater count here is much smaller than it is in a lot of places. This is - from a small scale, the crater count's relatively low. There are more of the large craters back here. And we see some areas now where there is just an awful lot of craters, and I'm looking in an area where I'll get a picture of. We'll call this frame - Oh, come on. Boy, there's not enough room for me and this camera.

Okay; that was frame number 10 of magazine Victor, and that should show a whole lot of rimless craters in a very textured area that's in this large crater rim just to the - just to the west of Mandel'shtam. I guess I'm going to have to knock this off now and go back to the sensors, or I'll have a direct call from my boss.

And we'll be off comm for a minute.

05 04 52 35 SC (Music)

05 04 57 43 CMP (Singing) Dee-dum-dum-dee-dee-dum.

(NO COMMUNICATIONS FOR 18 MINUTES)

05 05 16 01 CMP IMAGE MOTION is coming ON. And barber pole went gray.

05 05 17 15 CMP Okay, at 28. That should be 175. It's right ... Sharanov.

05 05 17 38 CMP No, by golly, I bet that's Papaleski. Spencer Jones.

05 05 17 55 CMP Now I get that mapping camera going. MAPPING CAMERA coming ON.

05 05 18 03 CMP MARK. And that's to be - barber pole plus 3. Barber pole, 1, 2, 3.

05 05 18 36 CMP 28? That's 5.6 and 1/125. Papaleski.

05 05 19 08 CMP Floor of Spencer Jones. Okay. Magazine Victor, frame 16, is the floor of Spencer Jones.

05 05 19 52 CMP I ought to be able to get Mandel'shtam out here. There's good old Mandel'shtam again. Now maybe I can get a picture of this thing I was talking about.

05 05 20 49 CMP There's the section and, by golly, it's still - Okay, frame number 20 on magazine Victor is straight down at Papaleski. And that's the one that shows this ribbon of material; looks like a flow front laying down in all this kind of - kind of hilly and pitted material, and it runs right on up, and there's a whole bunch of these little parallel lines right next to the rim on this big crater in Mandel'shtam. And they run right down in there. Let's see, I have nothing to do until AOS. Okay. Except play.
Okay, we're now at -35, maybe a little f/4, ... 206. We've passed Mandel'shtam. We're going for Konstantinov - must be that guy.

Okay. Frame number 21 is of Konstantinov. And an apparent ridge of mountains that runs out to the north of there, I'll take a picture of that. And that's frame number 22 taken looking north from Konstantinov in what appears from here to be a very subtle topographic high, and that may or may not be the case.

Okay, coming up here on - here comes Mendeleev.

All this material on the back here has the same conglomerate mixture. Look at that - Hey, look at that. Okay, there's two at f/5.6, and we'll take two more at - that was at 1/125, and we'll take two more at 1/250. I'll draw this on the map. That's in the area between Mandel'shtam and Mendeleev. And the reason for taking the frames was this - this beautiful flow that - flow front pattern that comes along here; and it runs right down through a crater right on up the side and out.

And the more I look at this material, the more I see it has an awful lot of these little flow pockets in it. There are a lot of collapse features like - it looks - I would say a whole large area may have collapsed. You see relatively large numbers of small craters and a generally undulating pattern that covers this entire area. And we're almost up to Mendeleev now, and the material looks a little smoother. It looks like I've got some smooth material that's kind of filled in with a little rougher material. And it looks like, as I look down at it, that - what is in fact smooth just doesn't have as many of those little craters in it. But that's not really the case. The dark stuff has more craggly kind of craters and more linear furrows.

And here's a picture straight down that ought to illustrate both kinds, if I don't get too much window in it. We're coming up now on Schuster. Schuster doesn't look particularly different than
anything else. This whole area over here to the north of Schuster – is just like all this back material. It's got craters in it. I have the distinct impression that the small-crater population is less. And the larger craters are all subdued. They have no significant rims to speak of. And maybe the real big ones have mud pies in the bottom, and the mud pies all have little holes in it. You'd swear that bubbled up and just went pop, and all the little bubbles burst, and they collapsed and are very thick. This is typical.

05 05 26 28 CMP I'm taking a frame now. Okay, that's frame number 28 on magazine Victor, and it's looking down into one of these typical cone craters. I'd say the depth to diameter is about one-half. There are a few of these bright ray craters on the floor of Mendeleev, but actually remarkably few. And the ones that I see – don't seem to me to be particularly different.

05 05 28 05 CMP Okay, the large craters on the floor of Mendeleev and the crater chain are coming up. And here's one of these pretty little guys that has a –

05 05 28 22 CMP A little slump of material that runs out in the crater. The crater chain comes down and doesn't appear to be unusual, and this one place has a little tail that runs out. It runs out into the floor, and there's nothing to say about it except it's very textured, but so is the incrim - inside of the crater chain. As I look down into the one that's cut off, I can see again a whole lot of evidence of bands and flows and things that – Just took a picture, that's number 28 of the slump area in the northwest corner of Mendeleev. And you see all those striations that run up there that all look twisted and like they kind of draped and mantled itself over there. I don't see any flow front connected with it, though.

05 05 29 44 CMP And we're pressing right along. I guess the next little guy we'll come to will be – Vetchinkin should be this one. All right.
Day 6

05 05 30 05 CMP

Oh, maybe that's still - I'd swear the general impression I have of this back side is that it has a much harder surface on it. And I don't really know why. I'm looking now at - I think I'm looking at Green. And on the northern end of it - north - again we see a lot of material that seems to be striations and streaks that go down over the sides. There's slightly different albedos. Almost everything up here is just a subtle tone of albedo change. But everywhere you see an albedo change, there is, in fact, a nice demarcation that goes with it. And I'm going to get one here that's on the crater rim.

05 05 31 04 CMP

That picture is number 30 and it is just to the west of - of Green. I'll have to stop here for a minute and see if I can get a better focus on these binocs or find out what's fogging them. Oh, somebody put their finger on it. Oh, my, Casper, you've done it again.

05 05 31 51 CMP

I thought I had a bad eye on it; wasn't about to admit it. Somebody's put their finger on it.

05 05 32 24 CMP

That does help. One should remember to use good optics. Okay, what have I got in the Flight Plan? AOS here at 48. Okay. I can look north from - Let's see - I need about an f/11 here. Oh, no. Last picture may have been out of focus a bit. Oh, look at that little beauty. Isn't that pretty?

05 05 33 07 CMP

Okay, those are two pictures, numbers 30 and 31, taken north at about 125 degrees, so that's - Well, what are those craters' names?

05 05 33 33 CMP

And I can't tell what they are. They're off my map here. Here comes King in all its beauty and splendor. This time I'm not going to get trapped looking down inside it except for one little look - now that I got the binocs cleaned off. Beautiful! Big improvement!

05 05 34 04 CMP

The things that look like outcrops in the northern flow walls - got all these little fingers, these little white things that stick out there. And I don't know that I really see outcrops.
05 05 34 29 CMP
Oh!

05 05 34 44 CMP
What I do see are the same old globs of material that cast shadows - that are just like the ones on the central peak. The dark material in there does seem to be mantling over the top of the white. There's no question in my mind about that. And it forms a lava - let's say it forms a pool, and the dark material does in fact lay right on top of that bright white stuff. Well, let's see if we can look out to the north here and catch some more of that line of things that runs out of there. Well, there's an interesting thing; let's see what that is. Holy smokes! Ahhhh! Beautiful!

05 05 35 34 CMP
That's frame 34, and that's on this big crater to the north of King, and it's a beautiful little crater wall in the side of this big crater, and it's got some black material that looks like it's just oozed out of the bottom of it. It's running right down the side. It's really something. The first - It's really dark material on really white sides. Haven't seen anything like that anywhere up here so far. You see little splotches of material, but this is just really spectacular. This is not slumping - Let me verify that I got the right setting on that. I sure don't want to mess that one up - f/11, 1/250.

TIME SKIP

05 06 49 29 CMP
Okay. That now, we got to take a --

TIME SKIP

05 07 04 36 CMP
Okay. Who stole the window shade? Lock all the doors until I find the window shade. Nobody leaves the room.

05 07 13 29 CMP
Okay, the boom's going out on the gamma ray. It'll be for 14 seconds.

05 07 13 41 CMP
And it's OFF.
Okay, IMAGE MOTION is coming ON -
MARK. Barber pole.
Now it's gray. LASER ALTIMETER is ON -
MARK.
Okay. MAPPING CAMERA is coming ON -
MARK. And this one is supposed to be at barber pole plus 4.
Barber pole, 1, 2, 3, 4.
Okay, MANUAL and WIDE, PAN and ZERO. High gain.
That's ... out there on that boom. Let's see where it is.
Okay, the gamma is out 15 inches.
Okay, and I've got an orbital science at Kapteyn - 127:50.
... hold that right there ... map ... over here ... worry about Kapteyn.
... Kapteyn.
... right now ... 32.
Now look at that - my imagination. I don't think so.
Coming over Chaplygin.
Oh, there's good old Mendeleev again. Schuster - and on Schuster, it - all this stuff just looks like it's been plastered over.
Oh, look at that pretty crater chain. Cuts right through there. ... Hey, that looks like that there's lava flows here.
05 07 27 12 CMP

Down along the margin in the bottom of Mendeleev, there's - some of the dark materials that are out there. They've all got this little textured slope to them. Really, I think that's about all you can say for it is that it's just textured. It's very strange.

05 07 27 51 CMP

You don't want to call them flow fronts, and yet there is definitely a margin. There are two different - distinctly different units, but whether they're just - part of it's consolidated and part of it's talus, it's very hard to discern. The central peaks and all these things - everything back here's been mantled, it looks like. Even the things that are relatively sharp. There are sharp features back here.

05 07 28 38 CMP

Quite a few very sharp things, as sharp as things in the front. Everything in here has just been mantled.

05 07 29 39 CMP

I'd say that there's nowhere near the number of craters out here that there is on the front side on the - There are nowhere near as many sharp ones. There's an awful lot of - constructional things and there's some tremendous blocks up ar - around this one back here. Just blocks all over the place, around and on the outside, and then this big mud pie that just cozes up inside. It looks like it might even carry through on the flanks.

05 07 30 35 CMP

Must be coming up on King. Sure enough.

05 07 30 45 CMP

Gonna be hard pressed to see very much of Kapteyn on this pass. No, we weren't talking about Abul Wafa either. It's north of Abul Wafa. It's more like in the area - I got to get me a new set of coordinates. And there's - that ought to be Chaplygin. No, what's the name of that thing? Lohse [?]. How about that.

05 07 31 59 CMP

Well, Lohae has an awful lot of boulders around it, just an awful lot of big blocks - on the flanks - plus a lot of - an awful lot of big boulders inside.
The boulders around the flanks are very impressive. They've got very short - if that's an ejecta blanket, it sure is a short range thing. It's got big clods all around the outside. All up and down inside, there's big clods on top of those things. And it looks like the ground is just slumping in big concentric rings. I wish I could get closer to see that piece up there. That's really interesting. My first chance to see some - a piece of crater forming - going out. Apparently, that place just bends and goes right down in there.

Now there's something that sure looks like leach, swirls, what have you. I'm going to take a picture of that guy. It's - let's see, it's now 127:46, I mean, 11 - Where did my camera go? You go at the time I want to take a picture. Come back here, you. In there with the urine bags. What a place for a camera. 500 - Okay, that's frame 38 on magazine Victor. That's taken looking straight down at a place about - well, let's see - Could that be Abul Wafa there, maybe? ... find King. I've just passed King, so it must be -

Roger, Stu. Be with you in just a minute as soon as I find out where I am here. I just took a picture and now I don't know how to tell you where I am. It's really bad when you switch from window to window to try and figure out where some of these things go to.

Okay, Stu, I'm --

TIME SKIP

(Humming - "Got to Travel On")

Boy, is that water good. Uhm. That's really super. That's as good as a martini. Almost.

Oh, hey. There's something I can do. I'll be a regular little pig. If you've seen one pig, you've seen them all.
05 09 06 30  SC  (Music - "Pink Panther Theme")
05 09 07 06  CMP  (Humming)
05 09 08 43  CMP  (Humming; snapping fingers)
05 09 11 29  CMP  (Humming)
05 09 12 08  CMP  Okay, MAPPING CAMERA to OFF. ... 30 seconds, go back ON.
05 09 12 34  CMP  Asked them not to write two things on the same line.
05 09 13 08  CMP  There's barber pole and 1, 2, 3, 4. Comes OFF. Now we ... 30 seconds.
05 09 13 32  CMP  (Humming)
05 09 13 51  CMP  Okay, now I'm on the STANDBY. IMAGE MOTION comes OFF.
05 09 14 03  CMP  It's OFF, and we're going back to fine on the camera.
05 09 14 16  CMP  Okay, Pink Panther, you'll have to wait.
05 09 14 37  CMP  Let's see. Set the ... MANUAL and WIDE, plus 10 and 0. Get my binoculars, my camera, trusty long magazine ... No, I haven't got that many.
05 09 15 45  CMP  A fourth of the frames to go. Adjust ...
05 09 16 08  CMP  Okay, I guess it'd be about 5.6 and a 1/125 coming here.
05 09 16 29  CMP  Well, for about 6 or 7 minutes - Well, here we go again. And this is Mandel'shtam I'm coming up over. I'm starting to recognize these little guys, and let's see if we can get back down into that area that was interesting in the crater floor. Well, start ... Well, this isn't a good time to look at that; it's a good time to look at the - at the subtle characteristics of this highlands material out here. What are the general characteristics of the highlands as seen ... the floor? Well, in Mandel'shtam around this central crater, the center
one, it looks to me like there are at least two different types of material. There is the type of material that surrounds it that looks very, very hummocky and all filled with lots of - of craters, but they're all rounded craters, no sharp rims. I guess that means they're all rimless, really. And outside of that is an area with a - with a lower concentration of large craters - and maybe a little higher concentration of small craters. And on one piece of it, it's obvious that there's a flow that demarcates the difference between them.

But there are places where this flow appears to have nice margins, and then there's other places where it gets covered over by things that are not so obvious. The flow front comes out the - it overlaps itself in places, and tucks underneath and disappears, then comes out the other side. And over here a little farther, it looks more like a wrinkle ridge - from the way it stands up.

I'm looking at the central peak in one of the subsidiary craters - far one on Mandel'shtam. And it again shows very nice stratification just like all the other places we've seen on the Moon - stratification which more than likely does not exist, just because it seems to be everywhere. Everywhere you look, you have the impression of - of lineaments. And they're generally in a crosshatched patched pattern. They go in all kinds of directions. Looking down at some very smooth places, there's places in here that are very subtly separated. They're very smooth, and then there are - there are places that are pockmarked, and they look like Cayley. And the parts that look like Cayley look like the same Cayley that you see on the front side. The smoother stuff is lighter, and I'm trying to pick out what it is that makes the difference. I think the difference is what I think looks like Cayley and what doesn't is more than likely just the absence of many sharp small craters in the lighter material.
There are places where it looks like it's been overlain by something, and it has the same appearance as the ray patterns do - the ray structures. And now I'm looking at a real old subdued crater; I'll have to look at my map here to see which one this is. You can just make out the outer basin on it, and I think at low Sun, it'll probably stand out. It's just to the - just to the east of Mandelahtam - correction, just to the west. Now, there's a faint little interesting feature. I'm looking at a ridge - with its scarp going into downdrop to the - to the east - correction, to the west, between two craters. It comes along, and it becomes a little scarp, and now the scarp completely goes south and drops down to the - to the west. They both lead into a crater. It's - These little features show up all over this area. They look like the things on the mare, except they don't seem to have nearly as much pattern to them. The color of the Moon back here, by the way, is changing now. It now appears to be gray to me rather than - than the brown that we were looking at the first day. That can partly be due to the fact that I'm looking through a different window, which may have different transmissions, and partly it could be caused by the Sun angle changes. I'm just not at all confident, but I know - it's hard - Here again, I can't get any direct Sun on my chart to compare it with, but it has more of a grayish tint now. Well, 17 still lines up, but it looks to me like 19 is a closer match today; 7 is too gray, 8's too gray, 9 is a pretty good match.

Well, I don't have any direct sunlight on my wheel. It may be off at - Let's see if I can get some direct sunlight on it through this other window now. Looks like somewhere around 8; maybe a - 7 or 8. It doesn't match any of these things. It's always off a little bit. Everything you have up here. It's very frustrating. You'd think it ought to agree, but it doesn't. It's like a lot of tests; you can't tell when you're on, you can only tell when you're off. It looks like it might go somewhere between 8 and 9 when I hold the lighting card in the - in the shadow of the spacecraft. It's somewhere between 8 and 9, and I get the impression - I'm gonna try the tans and see how they do. Well,
they don't do so badly either; it's 14 - nope, that far off. And the one we picked yesterday was 17. That was in the direct Sun, and that's - I think that makes a difference. I think these colors lose their - some of their vividness when they get in bright sunlight. Okay. We're now coming up - Let's see, time for a camera change to -

1/250, f/5.6.

And where should I be?

It's kind of frustrating out this window that features the size of Mendeleev at attitudes we're flying just - just aren't good for viewing. When we had that north oblique and the forward oblique, you could really see what you were doing, and it was nice. Here I am coming over Mendeleev, and only because you know where you are in the sky does it become a meaningful thing. I actually prefer looking out of - out of window 3, even though it isn't looking straight down so much. It's very difficult to tell which way the groundtrack is going at times. I'm now looking at the highlands material to the west of Mendeleev and Hartmann and Green. And one of the first things that you can say is there are no of these elongate kind of craters. Now there are some crater chains, but the elongate things are not there. Everything is generally the same color here. Very, very little color difference, although there's some very light material that you'd call white. But most everything has the appearance of just having been covered over. When I look at it through the binoculars in this area, the - this material is - does not seem to have that many craters and has this - this bashed pattern everywhere - on the inside of crater walls, on the flat floors and everywhere I look. It's the same thing down low. There are relatively few bright halo craters. Most of the craters are - even craters that have rims are indeed rather subdued. They just don't show up very well. Now, there's a nice scarp running concentric with nothing that I can see. I took a picture of it; you'd never find it on the map. It's just a - it's just an interesting little thing that happens to be down there.
You can see subtle expressions of it running along for a while, then it goes away. Okay. If I look way up to the north, that must be - oh, with that stuff in it. I think one of those beauties up there has got a big splash on the side of it. We're coming up on King and Ostwald. And the terrain around here doesn't look that different. You could really say all this stuff was covered with snow, and that would - that would be a very reasonable explanation for the - for the way it looks. I think that's exactly what it all looks like.

And the third one; there's King and then one, two, three craters up to the north - It looks to me like this stuff along the - the - the easternmost of these two tails that come north out of King, which is - has the whitest material around here, that - that stuff that runs along a - a topographic rise, looks like a plateau, and then this plateau sort of drops off as it goes over. There's a couple of craters - I just get the general impression that these things drop off as they go along. Everything around King has these same lineations running - right now they're running generally - generally radial to King.

All these black things that are in there - along those little white peaks in the northern end of King - are places where there's boulders and things that are sticking out of the sides - the same as we see in central peaks almost everywhere else, except here there seem more of them along the walls. On the western wall, those just seem to be places where the residual material is hanging out, sticking together consolidated. I think this is all slumping. You can see places where there's a - looks like a piece is pulled out of the side, and there's a lot of slump down below it. Then there's big pieces that have seemingly resisted. Then on the - out on the western rim, there's one of these real white spots, just a different color. The floor is not that must different in texture, but it's just a real different color. As I look north up along those rays, it doesn't look any different. You don't get any more impression of anything than you do by looking
at the photographs we have. Now the thing that I do see as I look to the north-northwest of King is that, going up towards Sir Don [?] Rille, we see a - another large crater here, very subdued, and - all along its walls are these places where it looks like something is draped; and I'm trying to figure out now whether that's slumped down or splashed up. I can see the margin - and I just can't tell which way it's going. Apparently, those are slumps coming down. That seems to fill all of those craters along there, and - and the demarcation without the binoculars makes it look like they're sliding up the sides of - of the craters, and with the binoculars, it looks like maybe they're - coming down the sides. And you see a lot of these very light, bright patches, and you don't see that in the highlands material anywhere else. And now I'm looking at these things that look like exactly swirls. And the material has - from this angle, it looks like nothing but coloration; no other differences whatsoever. Except there are places where I know some of these swirls do indeed have - have topographic expression; I can see that. But then there's other places where it looks like the swirl is just sort of a coloration that's on the surface. The general texture of this material hasn't changed any, the albedo hasn't changed a great deal, but the color has kind of darkened a bit.

05 09 34 13 CMP There's the old Earth, and why don't I have a signal? In WIDE, MANUAL, HIGH GAIN, POWER AMP's on. ... 

05 09 34 42 CMP There they come. I think they've been sleeping. Come in, Earth.

05 09 35 24 CMP There we - Oh, well. I almost had a lock on that thing.

05 09 35 51 CC Okay, Casper; Houston standing by.

05 09 35 56 CMP Hello, there.

TIME SKIP
Okay, waste water dump. The potable is full; the waste is about half full - 40 percent. I think - 8 minutes. I'll set the clock for 6.

There it goes. Gurgle, gurgle, gurgle.

Ugh. Come open, you son of a gun.

Oh, man. You son of a gun!

Oh, that's explains it.

It's not my imagination. Everything does float up.

(Music - continuous for approximately 22 minutes)

(Humming)

(Humming)

(Singing) Ta-ta-ta-tee-tum. Ta-ta-ta-

(Humming)

ALPHA particle COVER coming OPEN -

MARK. Barber pole and gray.

It looks like Hiyarama [sic]. It couldn't be there. Hiyarama's way over here. It must be Schuster.

Well, there are, indeed, little particles flying along with us.

That must be Tsiolkovsky over there - the chain that runs down to it.

There's another one of those little particles.

Okay. Looking back to the - the south and east - at the central peaks of King, I would say that they do indeed have dark material and blocks all along the side, that they're equally as jagged as the ones on the other side. That is not a Sun effect. They're not shadows; they're real. Set that on about the - 11 at 250. Take one of that. Okay,
frame number 39 on magazine Victor is - Okay - looking back - dark material on there.

Hello there, Stuart.

TIME SKIP

Sixty. ...

Another one we sneaked by.

... now.

Thirty-six.

Okay, now this little terminator should be out here at 60.

Must have been Mandel'shtam I was looking at. Yeah. That would change ...

Okay, and the lighter areas seem to have fewer craters.

Almost all these craters in the - let's see, can we say that the - I see no elongate craters at all. I'm just looking in the area just past Mandel'shtam. The dark areas seem to have more craters and more small craters. The light areas have - not so many craters.

Some bright halos and dark ones. And the darker areas look like Cayley, don't have as many bright craters on them, as a matter of fact. Let's see, can I - Yeah, there's one bright-rayed guy on - another Cayley type. Most of the Cayley types seem to have dark craters - generally rimless. Everything here is still - On the small scale, we have circular craters; on the large scale, we have crater chains and - and lineaments - they're on a very large scale. Both ... certainly.

Now, there's places out here in this Cayley now where you find smooth areas that interweave with the - the more pitted areas. Then these smoother
bands seem to be just like these thin bands at ... Then some of these bands seem to cross both the white and the Cayley-looking materials. Now then, here comes – this must be Mandel'shtam that I'm coming up on now.

05 23 14 06 CMP
No, I guess not. Rather, this must be – our old friend, the Cayley floor.

05 23 14 40 CMP
That stuff is all so subdued, it's just like someone stretched a cold cream over it up from underneath to hide it. Like it was a thick paint, and it – it just barely reflects all the things that are underneath it. And every now and then there's a little old bubble in it that popped.

05 23 15 14 CMP
As I look out to the south, I still see more and more of that same sort of thing.

05 23 15 35 CMP
See Chaplygin on the horizon there, and it's got – you can even see from here the – the bright rays that are splashed –

05 23 16 33 CMP
Okay; I'll come back to all these things. I'm gonna eat chow.

05 23 17 49 CMP
Red filter.

05 23 22 07 CMP
Boy, talk about being a creature of habit. Look at everything right side up.
06 00 59 48 CMP
... reason not to wear this hat ... thing. Okay, I want to go magazine Papa Papa.

06 01 05 16 CMP
(Sneeze) Excuse me. Mmm.

06 01 05 41 CMP
Okay. IMAGE MOTION coming ON -

06 01 05 43 CMP
MARK. Barber pole.

06 01 05 49 CMP
And it's gray.

06 01 07 28 CMP
... on at 19.

06 01 07 58 CMP
There's the barber pole; 1, 2, 3.

06 01 08 12 CMP
Intervalometer; coming.

06 01 09 32 CMP
Partly blank.

06 01 10 43 CMP
106.

06 01 17 49 CMP
Well, the outer flanks of King look exactly like the central peaks in their characteristics.

The old Sun angle comes down, you start to see more and more features around King's rim. This real white stuff looks like it's all streaked flow. It's hard to tell. Right now it looks to me like maybe some of these pools of things - they've got dark blocks in it and a lot more ripples. And it almost looks like that white cliff to the north had material flowing into the pool, rather than vice versa. And yet the stuff in the pool looks like it's flowing down and lapping into the crater itself. That pool of material runs out to the north. And this time, we'll try to follow some of these things out. The terrain out here doesn't look significantly different. It all has a somewhat radial pattern leaving King.

06 01 18 12 CMP
You sure can't see any here yet, the very subtle expression that runs up. These slumps that I talked about yesterday that are out here in the crater just to the northwest look like they emanate away from King, like they maybe rushed up the side
of this - of this cliff in this old crater. I'm not sure if that's the true interpretation, but that's the way they appear. The one that I find that's so dramatic and startling - is this blob on the side. I'm gonna take a frame of Papa Papa of that anyhow. Now where did it go? Come here, you. That is really an impressive thing.

There's some blocks of material on the wall and some blocks in the center.

Let me get a picture here of the center, one out here of the wall feature, one of the rib feature. Okay, that's three pictures on magazine Papa Papa. They go up to 65. And that - that crater is really different, in that - that one outcrop, that outpouring. It's got a very dark band of material that hangs down from it. It's got another lighter blob running down that looks dark, but it's not as dark. Around the very upper crest, you see the same evidence of dark material that you see around the sharp crests of most of these big craters.

Ah, the good old Earth. And in this - this little area here where it has - this bright splash going over the sides -

Doesn't seem to have hi - has hills that look like King. And you find all these color variations up here; they're really associated with the craters for the most part. They look like swirls, but they really are associated with craters. Now I think that I'm looking at right below me - stuff like just very light, dusty patterns that are laid out on the surface that really aren't associated with swirls or any such thing.

By golly, I did clean my sinuses out. (Laughter)

Casper, Houston. Do you read? You are looking at LOS, and we'd like you to verify the DSE after LOS.

Okay, Hank. Will do.
Casper, if you still read, the Surgeon says you got your heart rate up to 90, now.

(Laughter) Doesn't look to me like you got above about 70.

According to that theory, the hardest exercise I've done during flight was lift-off.

Hank, according to that theory, it sounds like the hardest work I've done in this flight was lift-off.

(Laughter) Roger. Hey, INCO says he's going to take care of the tape recorder, but you might ought to verify.

... supposed to ... But - don't care about that.

Okay; I'm looking down at Mendeleev again, and - guess one of the things that I'm starting to notice is that - in this outer rim up here, we have a - a fairly smooth, Cayley-like looking material. It's the same as what's down on the floor. Then we have what looks like an old slump material. And on the outside of this smooth Cayley that's at the top, looks like more smooth material. It's non-pitted, which means non-Cayley. The margins of all this stuff are all very, very indistinct. Just can't see anything. There's no flow fronts, there's -

They just come together. You can see where the break is, and it's just exactly the same way it looks down there at Stone Mountain. It just isn't obvious where one unit starts and another one stops. It looks like mare material to me, but with - without the grabens and without the wrinkle ridges and with probably a larger crater count in general.

I'm looking at that big chunk in the wall where it looks like something else has run down inside. And when you get up and look at it up close, it all looks the same. You don't see that something else. That's - that's a subtle textural difference. That little area has a lot more pits, and there seems to be a lot more slump. I can look back in the
shadows with the binoculars, and I see a lot of what looks like unconsolidated material. It just sort of looks like mud that exceeded its angle of repose, all slumped in there. There are craters in the walls of this slump material. Some look like they're pointing down, some like they went into the sides. Around the top, it looks like another highly cratered area. As though this top portion may have been a - a crater all its own, just like the one next to it. And then whatever dropped in this big event created Mendeleev, just sliced it off. But throughout it all, the only thing I see that's different from one place to another is just the amount of - of pockmarks that you see on these surfaces. They're all cross-hatched, and thatched, and some of them show - there's one here that shows a little bending. When you look down on it, they look like nice sharp lineaments, but, boy, when you get down and look at them in detail, they just lose all that sharpness completely.

06 03 14 07 CMP Why, it looks just like soil that's been torn up.

06 03 14 54 CMP Mostly the back side is - is characterized with an absence of blocks. It's really devoid of constructional features. King is a - a markedly different feature than everything else we've seen. Most of the things I've seen have been up to the north. That little crater that's coming up - coming up to King looks like it's got this same material that looks like it's emanating from King, but now this stuff is coming down from the south; that may be ray material from Bruno. And I'm gonna get a picture of this little guy, because it's -

06 03 16 02 CMP Oh, that thing is probably gonna be too hard to get to. Doggone it. There it is. It looks like a baby King.

06 03 16 26 CMP That one was number 43, the magazine Victor.

06 03 16 41 CMP Now I'll get a good picture of the outer materials of King; this is typical sampling. Here's a good picture of that northern rim. Looks like this stuff to the south looks very much like a flow that comes out from King. And the south midwest
looks very much like the material that's oozed out. All the material that's going out to the north - I mean, that's the south and east - all the material that's going out to the north and east has that same characteristic. There's light material that runs through there and seems to be running through - almost without any kind of rhyme or reason, go through the walls and out onto the ejecta.

Whole area looks different than most other places around here. Now, some of this stuff that I'm calling ejecta - I'm gonna get a picture here of what it looks like as it goes up on the rims of this adjacent crater. And looks to me like it splashes up onto this other crater, as though it all came out in a big surge. I'm not sure that's a reasonable thing to be saying. This series of King ends with frame number 50.

Well, I'll be darned. That looks - that's even different than I thought it was before. Here I got this crater that goes from the top of Guyot down; then this black stuff comes down; then all those striations around there make a pattern that swirls and curves with it. I'm gonna have to draw a sketch of that, because I'll never be able to describe it in words. But it does indeed run right down the walls. That's really beautiful. And there's old Mother Earth. Man, that is a beauty, too.

Never get tired of watching earthrise.

TIME SKIP

... It's on the solo sunrise - solar corona portion. Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ...

*Voice played back from portable tape recorder.

CONFIDENTIAL
Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ...

Four, 3, 2, 1 -

START.

One-half, 1/8, 1/30, 1/60; 4 seconds, 1 second, ...; 10 seconds, 4 seconds, 1 second ...

One-half, 1/8, 1/30, 1/60.

(Cough)

(Singing) Dee-dee-dah-dum. This darn spacecraft is really cooler ... is.

Fifteen seconds, CMC MODE going FREE.

Stand by. CMC MODE, FREE.

In 20 seconds, the DAC will go on and remain on until sunrise. That will be DAC ... adjust the settings.

Stand by.

DAC on. I got the EL camera. Verify that it ... to the ... exposure ...

... be 10 seconds. ... Stand by.

One, 2, 3, 4, 5, 6, 7, 8, 9 -

CLOSE ... 4 seconds. Stand by. ... 2, 3 -

CLOSE. Stand by for 1 second. ... Stand by -

OPEN. Go one click to the right, one-half second. Stand by -

*Voice played back from portable tape recorder.
OPEN. Go two clicks to the right and I'm on one-eighth of a second. Five seconds to go.
Stand by -

MARK it. Two clicks to the right and I'm on one-thirtieth of a second. Five seconds to go.
Stand by -

MARK it. ... to the right, one-sixtieth of a second. Stand by -

MARK it. The EL camera off and the DAC off.
CMC MODE, AUTO. ... GET. ... on the countdown. ...

GAMMA RAY coming to RETRACT -

MARK.

IMAGE MOTION going to barber pole plus 4.

Barber pole, 1, 2, 3, 4.

The GAMMA RETRACT is OFF.

Actually, that worked out pretty good. I've never done it without the - without the two ...

Okay, STANDBY, STEREO, POWER. STANDBY, STEREO, and POWER. Barber pole and gray. Go to OPERATE at 16:24.

...

OPERATE. Barber pole and gray. Now we'll finish up a little sunrise solar corona.

Now, let's see, we got a 70 - EL shows 73. DAC shows 82.

Eighty-one.

That's right. That's supposed to ... seconds before it. ... right.

*Voice played back from portable tape recorder.*
06 05 08 55  CMP  ... DAC's  ... here.
06 05 09 09  CMP  And ... POWER, ON. Okay, put the tone booster
                    back on. And we'll check it. [Tone] Oh, there's
                    my ... for the night.
06 05 10 41  CMP  Sure would like to have that little Hasselblad.
                    That's a nice camera. Had a real one that you
                    could keep as your own. I like that electric
                    feature.
06 05 13 21  CMP  Okay, let's try a little check on the surface
                    polarizer filter. I don't think that'll show me
                    a thing. I think I looked at that once.
06 05 13 42  CMP  Now, that's interesting. ... looked at that once.
06 05 22 34  CMP  Hello, Houston. Are you there?
06 05 22 42  CMP  Oh, just fine. That last sequence worked out just
                    right on the money. Clicked the last frame off,
                    and up came the Sun.
06 05 22 53  CC  ...  
06 05 23 04  CMP  Oh, it doesn't do a thing. There's apparently just
                    a little bit of polarizing done by the windows.
                    And, as I rotate the filter, why, it brightens and
                    dims the scene just slightly. And I checked it
                    against different types of material, the dark -
                    darker materials and the lighter things, and they
                    all seem to respond exactly the same way. I can't
                    see any - I can't see any effects of polarizing
                    from the surface reflection at all.

TIME SKIP

06 10 19 39  CMP  Oh, I'll take all the thoughts that you got, Stu.
06 10 19 55  CMP  Okay.
06 10 20 07  CMP  I'd hardly be the Government's hero if I over-
                    torqued my Dukesons [?] on the rendezvous.
Okay, thank you. Is it that time? It sure is.

Hey, you know, I haven't - hadn't gotten around to looking for planets. That's what I was doing the other night when - when things went to worms, and I decided they're probably trying to tell me something. It really is pretty out there, the way you can see all those stars. They - they really stand out. Looks like a planetarium, there's so many.

All righty. See you in a little bit.

This tape can be used in the ... sunrise solar corona ... Requires 5 percent of the DAC film in the ... camera. That's gonna start at minus 3 minutes before sunrise, or the equivalent of 4 minutes on the countdown in the checklist. Stand by for start ... Four, 3, 2, 1, START.

That's getting to my peace and quiet.

Okay. I'll see you on the t'other side.

That's gonna start at minus 3 minutes before sunrise -

*Voice played back from portable tape recorder.
... Just look at that. Want that? Thank you. All righty. ...

-- at minus 3 minutes to sunrise. Fifteen seconds, CMC MODE going FREE.

Stand by.

CMC MODE, FREE. In 20 seconds, the DAC will go on and remain on until sunrise. That will be DAC ... adjust the settings.

Stand by.

DAC on. I got the EL camera. ... it at the B setting. ... First exposure will be 10 seconds. ... Stand by. Second exposure ... should have been a timed exposure ... second. Stand by.

OPEN; 1, 2, 3, 4, 5, 6, 7, 8, 9, CLOSE. Stand by for 4 seconds. Stand by.

OPEN; 1, 2, 3, CLOSE. Stand by for 1 second. ... Stand by -

OPEN. ... one-half second. Stand by -

OPEN. ... to the right and I'm on one-eighth of a second. Five seconds to go. Stand by -

MARK it. ... to the right and I'm on one-thirtieth of a second. Five seconds to go. Stand by -

MARK it. ... to the right ... second. Stand by -

MARK it. The EL camera off and the DAC off. CMC MODE, AUTO. ... configure ... GET ... countdown. ...

Okay.

(NO COMMUNICATIONS FOR 11 MINUTES)

*Voice played back from portable tape recorder.
C_ Page 303

Day 7

06 23 00 15 CMP Oh. Don't stick, BB, please. That sorry -

06 23 01 09 CMP Okay, now. Exposure wheel, go.

06 23 01 24 CMP ...

06 23 05 03 CMP 48.

...
07 00 57 37 CMP

SERVO POWER 1, ACL, SERVO POWER 2, AC2. ROTATION
CONTROL POWER NORMAL, number 2, AC; DIRECT, two
are OFF. EMAGs are uncaged; 2, 3 uncaged. Going
to SCS. RHC number 2 is armed. Here comes GIMBAL
MOTOR number 1. PITCH 1 -

07 00 58 14 CMP

MARK. Good start. YAW 1 -

07 00 58 17 CMP

MARK. That's a good start. The trim thumbwheels
work - both directions - on PITCH, 7.48, 1.5. I
can tell the difference. YAW thumbwheel works in
both directions set on plus 1 - 02. Okay. PITCH,
MTVC; YAW, MTVC is good. Okay; back to CMC; then
go back to zero. Going clockwise. START, PITCH 2.
It trims, and MTVC. Back to neutral. I have no
MTVC, PITCH and YAW. Then back to zero. ROTATION
POWER number 2 is AC/DC. DIRECT number 2 is
MAIN A/MAIN B. Let's see. We'll take a maneuver
and see if it gives us one. It does not. The
gyros - I'll just sort of cage them to bring them
up to speed and back to uncage. TVC looks good.
Enter the 204. PRO. It's a plus 2 in pitch,
minus 2 in pitch, zero; plus 2 in yaw, minus 2 in
yaw, and zero. And it's trimmed. I'm out of 204.
The RATE switch is going to HIGH; the SCALE is 5
at 1. The DSE is running. Okay; we're going to
terminate 509. That's VERB 46 ENTER, VERB 21 -
and I want that to be a 10101. VERB 25 NOUN 7
ENTER, 75 ENTER, 1 ENTER, 0 ENTER. I will now
take down the 509 flag.

07 01 01 46 CMP

And it's time to strap in my trusty machine. A
piece of bread I don't need in my face.

07 01 02 00 CMP

Do not yet have YAW GIMBAL number 2 on. But I will
bring it on in just a minute.

07 01 02 27 CMP

Okay; I'm going to bring YAW GIMBAL number 2 on.

07 01 02 32 CMP

MARK. DIRECT ULLAGE breakers are two, in. Okay,
we're at 3 minutes and 9 seconds. I'll go to VOX
at - 2 minutes. Let's see, it should have Houston
here in another minute or 2.
I am indeed going sideways, so I must be doing it right.

Hello, Houston. How you doing?

That's on STANDBY. No, it's actually FORWARD.

One, 2, 3, 4, 5. This is a test of the recorder. Over.

This tape will be used for the solar -

One, 2, 3, 4, 5, 4, 3, 2, 1. This is a test of the recorder - recording capability. One, 2, 3, 4, 5. Over.

Three, 4, 5, 4, 3, 2, 1. This is a test of the recorder - recording capability.

That's a way; it works.

Well, open the inverter breaker - and that's it.

Let me have it over here, John, a minute. Thank you. Yeah. It's getting all - there's a lot trapped up in here, and it's getting it all out.

Okay.

Okay, 16, we're about 30 seconds from LOS.

Okay. When you see us next time, we'll be ...

*Voice played back from portable tape recorder.*
Okay, and AOS time, 179:08; and your angles are zero - zero and 170.

Okay. Thank you, Jim.

Hello. Yeah. I ain't sure where we're gonna put them, but I - I've got them. There's one - Okay.

Okay. Got one more glove to go.

... 

Okay.

Okay. Thank you.

Get out of your suit.

Never put it on. No, I - don't know why. I decided I didn't need to put it on. It may have - I don't think I've done a thing that was in the Flight Plan, since you left.

Really? ...

It's really been grim as far as that kind of stuff.

I think it's made up --

Yeah.

-- ... camera.

Hey --

Hey, ... You're in mine.

Yeah.

It's already in there. Bet you 5 dollars.

They've been - they just driving me up the wall. So far, I ain't lost my cool. Which is - for me is very unusual. I think I'm -
07 10 19 18 CMP (Laughter)
07 10 19 20 LMP ...
07 10 19 39 CMP Yeah, we do need their waist tether. That's one - Okay.
07 10 20 03 CMP Ah. I bet Grumman pays a guy something for a special tool to do this.
07 10 20 26 CMP How come you've been to a - you've been in the minstrel [?], huh? You've been in the minstrel [?]. You look --
07 10 20 45 CDR Hey, Ken, let me tell you something. After touch-down - ... Ken! ... Right after touchdown, the President's gonna call me... (Laughter).
07 10 21 02 CMP (Laughter)
07 10 21 04 LMP Man, that's really funny.
07 10 21 10 CDR ...
07 10 21 14 CMP Kind of a shame to throw it away, isn't it?
07 10 21 27 CMP Oh, you son of a gun!
07 10 21 45 CMP Ah - what kind of camera is it? What kind of camera you got? Yes, sir. Sure do.
07 10 23 03 CMP Yeah. Throw it. Okay.
07 10 25 24 CMP Yeah. I don't have any place to pulse [?] as yet.
07 10 25 35 CMP Oh. You going to be able to take those tonight? Oh, oh, okay. That's not so bad because I'm sitting here with - with no place to go. I don't - I don't understand the - There's so much bull in there that I don't understand what's going on.
07 10 28 54 CMP Charlie, what piece of gear would you like first?
07 10 29 13 CMP Okay.
07 10 30 06 CMP Okay. What do you want to give me now? The LEVAs?
Be a good way to get dirty. Yeah.

(...)

(Laughter)

... on that total.

(Laughter) I believe you.

(Sneeze)

Can I sell you guys some bags?

(...)

(Laughter)

(...)

I - Have - have they been all messed up with you guys? Man, it's like - it's like they'd never flown a flight before. Like the very first sim. Couldn't believe it. And I kept hoping that maybe you guys weren't getting the same stuff.

(...)

Okay. What -

(...)

(Laughter) That one's not even filled.

(...)

(Laughter) I've been practicing. Here, I'll get the bags out of your way. Trying to get rid of something because I ain't sure where you're going when you get here.

(...)

(Laughter)

(... real bad.)
What - what are you - what have you got to work with there, John. Okay. I got your - I got your new clothes in here. Do you want them? You ain't gonna get any better.

Did you - did you find any big rocks that were con - that were consolidated? Did you find any big rocks that weren't breccias?

Okay. (Laughter) You were what? I feel like - if you want to hand me the probe, I'll lay down here while you get it. We is sort of full right now. I hate to see that thing go. Yeah.


You want a drogue? This is the ... that keeps ... This is - this is a tight fit. Well - -

Some smart man just stepped on his own cable.

Chas, can I interest you in something else?

Well, I guess I'm supposed to take LEVA bags from Charlie.

I got one.

(Laughter)

Are you ready for the decon bags?

Okay. All right. (Laughter) No. None of us are going very far.

Okay. Let's see. Where was that supposed to go?

Here. Here's what I was gonna - Okay. Oh. Okay. I'm gonna have to - I'm gonna have to get under there to get to those for you.

The bag is getting - The whole purse? The whole purse?
Okay. I'd sure like to get rid of something out of here. Good grief! Why don't I just - throw that in the corner. (Laughter) We can sort that out tomorrow. Okay. You don't need the purse back, do you? All right. Okay. Seven - 70 millimeter - How about taking this and throwing them to me, and tell me where they go? And I'm gonna - As long as we're throwing trash in there, we might as well throw it all. (Laughter) That'll fix it. (Laughter) Okay. Three of those must go in A-8, huh? Just one of the three.

Okay, you got those 16s? Got another pack like that of 16? You don't say. That's all the film? Sure took a lot more than that out of here.

Well, it gives them a serial number.

What - where do they go, John? Yeah.

TIME SKIP

... What are we gonna do with our suits now? I hate to waste all the effort to wad them up. How about -

Well, I guess ... We can put a - we can put the LEVAs and probably one of the suits up here and lay the other ones down here athwartships. And Charlie can use his rack, and you can use this one, and I'll use this one. Down here under his three rock bags. I'll get them out tomorrow. I'll get it out tomorrow. I'm not that tired, I just don't feel like fooling with it (laughter). Because whatever they do, I know it's gonna be changed.

Well, I bet you you don't. You know, it would be a - because they ain't gonna tell us. I think about the only way we're gonna get a straight answer out of them is to say, "All right, you guys, now knock that off and tell me what you're doing."
And I suspect that would - that wouldn't buy us anything. And it would probably upset all the program.

That's right. Well, I guess I really don't object to that way of operating, as long as I have my day in court when we get back. Jim, did you call?

We just have LOS? No. I don't know. Got any signal strength there? No? Okay. ... Okay.

You know, it's a shame you don't get to fly these things more often, because - well, I could do it so much better if I - with some experience. You know, I - now I got some i - up to now, it's been all imagination. And now I got some idea what's real and what's bull.

Yeah. Yeah, I - There's just so much you could do to make it better. But you can't tell somebody else, because they've got to go through that learning period.

... Huh? [Laughter] Thirty minutes after the next hour.

Okay. I got 180:18. Okay. Well, I guess we ought to go ahead and try to stow those suits somewhere. Wait a minute. Let me make room for it, and then I'll - Hang on a second, Charlie, let me -

I'll tell you what, John. We could sure put one of these in here.

Okay, I'll get it. Why don't we just put one of them in there, John? Well, they ain't gonna get any cleaner. I mean - we got to live with this stuff.

Hey, John, you want to throw these away? You want to throw these fecal bags away? No. Those are brand new. Those are brand new. I don't - it's - I don't know how much you guys have been defecating; I've been - I defecate once a day (laughter).
Yeah. We got - Man, we don't have an overabundance of these things.

Why - why don't we - why don't we just keep this? Let me keep it.

You know, if we just put that one in here - that'll be okay.

Okay, John, just slide the leg - -

... 

No, daddy.

Okay. Did you just - I am?

(Laughter) It's a lot better looking than what's supposed to be there. (Laughter) See if you - if you perform as well as your outstanding performance on the ground, or some such bull.

Might be.

Well, maybe that's what - Those guys are so dingaling, they might want to see if you really - if you do good there - if you really could do good - I don't know. I - You got one more suit to go, huh?

... 

... 

Tell Charlie it's 30. It's 30.

It's 30, Charlie.

I sure am impressed with how easy these things control. I'm also impressed with how fast the fuel goes away. That part of the simulation's right. You get rid of gas so fast you can't believe it. I - think so. I'm ready to try.

Well, I'm sure sorry. I felt like I - I - blew that thing. Okay? Make good and sure these breakers are in. I'll check that. I'm sitting
here with my hands folded. Okay, I might – Wait, wait, let me see here. Okay, they're in.

Okay, have I got it? Still haven't gotten 7-B. It says I got a volt and a half now. Down to 0.4. Looks like I got all the batteries cycled and stuff. I put it in the top of your – of your helmet stowage bag. Which is – either this one – yeah. The one you just gave me. It's in there. Say again? Yeah. Yeah. Yeah. As far as I know, I do. I'm getting you power some way. That'll be a twist. (Laughter) Well, it's a good way to get dirty.

You're right; same old food. (Laughter) I'd recognize it anywhere. (Laughter) I ain't sure where that is. We're at – we're LOS now. Aren't we? (Laughter) ... Yeah. Yeah. Well, once they powered up your loop, why – that was it. Well, I'm just looking for a place to put it, John.

Yeah, but there ain't many ways to get to it. I'll tell you what we could do, we could put some rock bags back there for the night. Let me do that.

Let's see. I can probably get one more back in here.

Well, I'll tell you what I could do is put the – Well, I was gonna say, I'll put the fecal bag back there; but, if I do that, sure as heck we'll need it. I'll shove one more – maybe this guy will go back there. ... he's too big.

Ah, no way.

Just hold off for a minute. Just hold that there a minute. Yeah.

Ah-ha!

... 

Yep. We'd be jettisoning the LM in another 30 minutes. We'd be jettisoning the LM in another 30 minutes. 175:43.
Okay. John, what I was gonna suggest is, we just crumple this thing up athwartship here. Is that all right? Instead of putting it in the bag? Because we just got to get it out tomorrow morning, sometime.

What? About 45.

No, 180 something. 180 - 180:40.

I doubt it. Not when you consider the fact that we got to get - how many hours it's gonna take to get suited up and jettison the LM tomorrow. It's gonna take all day to do that. Well, what do you got to do now?

Yeah. Let's close up, get some chow, and - Yeah. Yeah, but - let's get that tomorrow.

You - Well - Don't hang the DeBakey [?] against the switch panel. Oh, that's what it was. That thing. I knew there was something. Now, where was I? I had a place all in mind for that thing. Figure out where it was. Okay.

I'd suggest, if anybody's got to defecate, that you go over to the LM to do it.

They get tired. But they're fresh. (Laughter)

Charlie, if you got to defecate or something, I'd suggest you use the LM. Yeah.

Well, that's a change. Last time, they let them oversleep.

Well, that - that's the name of the game right now. I don't understand it, but that's the way it is. I - I guess I'll just learn to accept that.
Looks like those straps on your - on your right shoulder there are catching, Charlie.

Are you gonna scare me again?


Okay, John, just - don't - (laughter)

... (Laughter) I never would have guessed.

Huh? Well, I thought we had - thought we had just made our first lunar abort. Yeah. Ever since then, I've had this terrible feeling that maybe they should have aborted us. (Laughter)

I got the distinct impression they weren't very happy with our questioning. Well, I thought the thing to do was do nothing. You know? Because then if they decide to go, we're probably still not that - we're within phasing capability. If they decided not to go, then we could afford to use the gas. The thing I couldn't see was why we were still questioning and pressing on, and wasting all that gas to accomplish nothing. Now that one really puz - that - On the first rev, that was okay. That would have cost me maybe 50 pounds. Oh, yeah. Well, we almost were. And that's the reason I asked you, "Should I tag up?" And you said, "No." Well, I didn't either. And - no, I - I was just saying, you know, I - -

You got to phase it.

Yeah, but I just didn't like the idea of doing it the expensive way. Brute force is never the way to do anything in a marshmallow. Are you looking for a place to stow that, Charlie? Oh, okay. Yeah. I was gonna say - Hey, there's a - plenty of room down here.
(Laughter) No. I tell you what, for a temporary thing for tonight - down in the bottom of John's TSB over there, I put in those - those two - plastic over - urine overwrap bags; let's use them tonight, and I'll start on the other jettison bag after we get rid of the LM.

Well, how big a bag do you need for that?

The DEDA? Did you say the DEDA? Oh. I was gonna say - I wouldn't mind having your platform, but I really don't care about having your - (laughter) Go ahead. Well, here's one we can certainly afford to throw away. That's the most worthless piece of junk. Yeah, it does spin, but that's all it does.

What do you say we - we - Well, I'll tell you what I'm gonna do. I'm gonna pump the cabin up and make sure I got a little DELTA-P, and make sure the hatch is - (laughter) yeah. I haven't copied this - this - hour yet. You know --

TIME SKIP

... stuff ... against the wall.

Yeah. ...
Well, ... when you get - when you get through, you better complain about it because ... you got to get that around .... ...? You'll never believe ... you're practicing.

Did you get it?

Yeah.

If you ... feel like it, before you go to bed, I'll show you something.

...?

No, I didn't.

... off. ... off?

No.

...

I already ...

... all the ...?

(Sneeze)

Okay, ...

... the first one.

... the first one. ... second ... Thinking about all the ... Okay, that's all down. ...

... you can't get - you can't get ... you can do with something. Bunch of this stuff ... 3 days in a row, every hour ... If they ... I got one whole hour. ... think of something. ... eat my sandwich ... records ... Man, I love those ...

I don't have any i - (laughter) I don't have any idea. I hope not - they don't make this 11 against one. He really likes them.
... back over there.

Have to do that today. ... Ow! ...

... last button.

Think it ought to be about ... pounds ...

(Laughter)

I feel like ... on top of ... Any man who could do that ... I don't understand ... this stuff and ... one on top of the other and then shake them up ...

... Take a look, dad. ... open ...

Well, I ain't sure - I ain't sure that circuit breaker was open, you know?

... ...

TIME SKIP

Isn't that good? Nice and cold?

TIME SKIP

So I've deleted all that stuff that's there, except for the ALPHA COVER, CLOSE. At 193:46, we'll take the MASS SPEC ION SOURCE, OFF, and EXPERIMENT to STANDBY. Start our 5-minute time. The gamma ray boom gets retracted, the X-ray goes to standby, and after 5 minutes, I retract the mass spec boom, and the alpha particle cover will come closed.
That's affirmative. And then you'll do the - you'll do the PURGE LINE HEATERS, ON, configure for the dump, and the rest of the things there.

Okay.

Charlie, I - I have no remembrance --

And on the next page, at 194:10 --

Hey, Hank - Okay. This - this PGA donning with things going on during it bothers me a little bit. We - this PGA donning in our present configuration is a - is a three-man effort, even if one man's job is just to get in the corner and stay there - stay out of the way. And I'd like for us to do the minimum activity while we're putting those suits on.

Unless we could go over in the IM and do it.

We can do it in the IM. That might be best ...

Ask them if we can do it --

If we can do it in the IM, I guess that'll relieve a lot of the load here.

That's pretty low signal strength.

Okay, I guess we're just gonna have to do the best we can, Ken, and we'll try to help as much as we can from down here.

Okay; it's not so much a problem entirely of just keeping track of things, but you just - once the guy starts putting that suit on, he commands the rest of the volume in the spacecraft. That's - that Apartment is a real - real interesting operation. If we can use the IM for it, that'll help out a great deal.

I don't see why not.

Okay; we'll plan to do that.
Now, we gonna have the LM - do we have the LM closed out?

Okay. At 194:10, delete the P52 and --

It'll --

-- the "P20; CMC MODE, AUTO; GDC align."

It'll be - Oh, excuse me. It'll be closed out, and all you have to do is close the hatch.

Do the purges and dumps, delete the P30 remark there --

Thank you, John.

Want some scrambled eggs, hot?

-- and, at 194:23, we're going to close the hatches.

Wait a minute. Did you say delete the dumps?

Negative. Do the dumps.

Okay. Do the dump with the purge, delete the P52 and the alignment and P30 stuff. And let me write some times on this page.

Roger. And at 194 -

Shh! Look at that!

It's cold up in that tunnel.

Okay, Hank, go ahead.

That's ...
- - we're going to jump in the Flight Plan. I think that's as far as we ought to go on this rev. We're about 2 minutes from LOS - -

Okay; you're starting to break up.

- - but, at this point, you're going to jump back to 176:55.

Okay; if you'll tell me the time bias to put on that page, I'll have that ready.

We'll catch that the next rev, Ken.

Can you give me the time bias so we can — I can do that — update the times on the page?

21:50, I think he said. Is that right?

We weren't planning on doing that section. We were just going to do all those steps. There's about 45 minutes of stuff in there getting ready for the jett before we do it.

Okay; how about if I am standing by with a blank page and just let you read me a new time line?

We'll have it ready for you, Ken.

Thank you, sir.

As a matter of fact, the Sun doesn't sink slowly in the east here; it sinks slow -- I mean the west; it sinks slowly in the east. Thank you.

Ken, what do you want? We got a choice of scrambled eggs, grits (laughter).

What I want is a brand new Flight Plan.

Yeah.

I'm glad you worked —

... in here.

- - I'm glad you worked that 500 hours on that Flight Plan, Ken. (Laughter)
Man, I'm gonna - I'm - I'm right on the point of going unstable.

You poor thing. I really feel sorry for you. I'm kidding you about it, but I - I just - I think that's really not a thing to kid about.

It isn't even the right thing to do. You know, it's just got to - -

How about a cup - a hot cup of coffee, Ken?

Yes, sir, please, and some juice.

Watch that water, there, John. That thing leaks hot water.

It - No, if you - it leaks and everything. If you keep the cap on it, it doesn't leak. I don't understand why, but it works.

Okay.

If you always - as soon as you take something off, put the cap on. You'll never have a bubble. And I need to -

Defecate.

No. (Laughter) That's all we need now. Hey, let's go over that - that postsleep checklist to make sure I haven't forgotten something. I think all I had to do was to -

I'll cut it off for him.

I tell you what. I'm - I'm about ready to invoke our privilege and tell them that we didn't have - we didn't keep track of the meal last night. Just to - just to tweak them.

How about opening that, too, John?

Okay. Wait a minute. I'll hold it up for you, sir. Here you go.

Thank you.

John, that Foley's shopping bag -
How about a cocoa, Ken?

That'll be okay. I'd like to have a juice, too, though.

Okay.

A juice and - and coffee or cocoa or anything like that'll be fine.

Okay.

Man -

This coffee's ... look good. Glad we got coffee.

No sweat.

Okay, you've got to get - I think you've got to get the coffee out of the sack locker.

And, of course, John, right now I'm doing a P52.

You want me to do it? ...

Are you supposed to?

Yeah.

...

You said that before, but it's --

Right now?

-- it's going to ridiculous now.

...

Yeah.

If they weren't stowed, I couldn't even do what I'm doing. Where do these things here live?

Okay; well, since - I think the next thing to do is to put them right back on, so why don't you just hand them to me?
Okay.

I sure don't want to get a lot of crud in there.

Okay, now I need no special techniques to do this.

You don't even need the telescope.

John, when you get around to it --

He's not even using -- I better not -- not even use it. When I get around to what, Charlie?

When you get around to it, I'll eat your grits. If you don't want them.

Okay.

Or Ken's.

Or both.

Or both. Yeah. These are good.

(Laughter)

You all set, Ken?

Okay; you've got to turn the optics power on.

Okay, ... something like ...

Okay, now take the OPTICS out of ZERO and back to ZERO.

What's that switch there do?

That -- that's your manual switch. And if you ain't in SCS, don't touch it, which you are in SCS now.

Okay.

SCS --

... P52?

Yep.
07 22 06 38 LMP  Does it keep the orb rate going?
07 22 06 39 CMP  No, but I've got a rate that - it's not gonna change much.
07 22 06 46 CDR  My gosh.
07 22 06 50 LMP  Man, it's delicious.
07 22 06 52 CMP  Okay, star 21.
07 22 07 12 CDR  Right in there. That's a super platform, I'll tell you.
07 22 07 20 LMP  We had ours powered down completely for 2 days. When we brought it back up, the torquing angles were something like - well, in coarse align, it doesn't - we put it - we parked it in gimbal lock. We didn't have any gyro drift updates or any PIPA bias. That procedure really worked, John.
07 22 07 43 CDR  Sure did.
07 22 07 44 LMP  Parking that beauty over there. And my ... was right on the time.
07 22 07 52 CMP  Oh, darn. What star - that was -
07 22 07 54 LMP  Thirty.
07 22 07 55 CMP  Thirty. Okay. And the other star was 25?
07 22 08 01 LMP  Twenty-one, you --
07 22 08 02 CDR  Twenty-one.
07 22 08 03 CMP  That's what I thought, but I just saw a - Oh, that was the code. Oh, oh. ... that 25 I saw ...
07 22 08 13 CDR  Be easier - ... tweak optics? Well, I'll set it back because I can't do it ...
07 22 08 31 CMP  Okay.
07 22 08 37 CDR  That ... 
07 22 08 41 CMP  That's one of the biggest gyro ... I've had.
Well, don't forget ... new man on today.

Okay. Okay; why don't you torque it, and tell me when you do?

Tell you?

Yeah.

That'll be 190:20:55.

Okay.

MARK. Oh, I should have PROed. That'll be 190:21.

(Laughter)

Okay.

Okay; put it to --

Trunnion is back to normal. I'm going to CMC and ZERO. I've had --

You got the trunnion back to - close to zero.

Yeah.

All right.

... zero.

And the CM - the mode switch is in CMC.

Mode switch is going to CMC.

Okay.

That shaft couldn't ... trunnion, though.

Hasn't gotten any worse.

Now, I - I PRO out of here, right? Or ENTER out of here. PRO?

ENTER.
What do you want?
Twenty.
Okay; you're back and running.
John, why don't you come let me mix? I've eaten my two things.
Okay; you're back and running.
Okay, we've got a lithium change. Oh, forget it. We don't do it. We can — we can do it right after we eat, if you help me remember it.
Wednesday, I think I might shave.
That won't — it won't hack it, Charlie.
It won't work? The thing ...
It will on a beard like that.
Oh. What do you mean?
It just sits there and whirs.
Oh. It doesn't cut at all?
I couldn't tell I made a dent.
On your beard like that?
Yeah.
Charlie, you look like that, too. I hate to tell you.
Yeah, I wish you wouldn't cast any stones there, old buddy. (Laughter)
Well, I know it. I know it. I know it. I feel like it. That thing won't cut, huh?
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<tr>
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<tbody>
<tr>
<td>07 22 11 11</td>
<td>CMP</td>
<td>I think if we cleaned it out and all, it probably would make a big difference, but -</td>
</tr>
<tr>
<td>07 22 11 14</td>
<td>LMP</td>
<td>I - that'll be my project for the - for after the EVA.</td>
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<tr>
<td>07 22 11 20</td>
<td>CMP</td>
<td>(Laughter) We'll be copying Flight Plan updates right through EI.</td>
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<tr>
<td>07 22 11 30</td>
<td>CDR</td>
<td>That water doesn't have any bubbles in it!</td>
</tr>
<tr>
<td>07 22 11 33</td>
<td>CMP</td>
<td>No, if you go slow, it doesn't. Okay, did you put the optics back up?</td>
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<tr>
<td>07 22 11 38</td>
<td>CDR</td>
<td>No. Excuse me.</td>
</tr>
<tr>
<td>07 22 11 50</td>
<td>CDR</td>
<td>184.</td>
</tr>
<tr>
<td>07 22 11 52</td>
<td>CMP</td>
<td>There you go. Charlie, let's see - how about setting PITCH 10 and YAW 0 on the HIGH GAIN, and - MAN - yeah. And MANUAL and WIDE.</td>
</tr>
<tr>
<td>07 22 12 51</td>
<td>CMP</td>
<td>Okay; here's the covers.</td>
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<tr>
<td>07 22 12 55</td>
<td>LMP</td>
<td>... any target we pick out?</td>
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<tr>
<td>07 22 13 02</td>
<td>CMP</td>
<td>Well, we had a burn yesterday.</td>
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<tr>
<td>07 22 13 04</td>
<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>07 22 13 26</td>
<td>CMP</td>
<td>Now, I wonder if I can get down there and get to my bag.</td>
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<td>07 22 13 31</td>
<td>CDR</td>
<td>Your urine bag?</td>
</tr>
<tr>
<td>07 22 13 32</td>
<td>CMP</td>
<td>Yeah.</td>
</tr>
<tr>
<td>07 22 13 33</td>
<td>CDR</td>
<td>You want me to pass it up to you?</td>
</tr>
<tr>
<td>07 22 13 34</td>
<td>CMP</td>
<td>No. Yeah. I hate for the cook to do that.</td>
</tr>
<tr>
<td>07 22 13 40</td>
<td>LMP</td>
<td>(Laughter)</td>
</tr>
<tr>
<td>07 22 13 44</td>
<td>CDR</td>
<td>Here's your urine bag.</td>
</tr>
<tr>
<td>07 22 13 45</td>
<td>CMP</td>
<td>I just emptied it.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oh, you're a nice guy. Okay.</td>
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</tbody>
</table>
I had to have a urine before I started making the tow - the chow. I have - Oh, you dumb - it feels like it put hot water in the orange juice, but it didn't.

No, the first shot'll be hot.

The whole thing's getting hot.

No. It - Yeah. Man, one of the feats of my existence the other day was, in 42 minutes, I strapped on a bag, went out of both ends, and ate lunch.

Fantastic, that's a record!

By doing it all at one time. (Laughter)

Doing it all at the same time?

(Laughter) I had this bag on the front end, a plastic bag on my rear, and a juice bag in my mouth (laughter). That's the only chance I had all day. With one back-side pass. I used to want to be the first man to Mars. This has convinced me that, if we got to go on Apollo, I ain't interested (laughter). I tell you, it's really surprising how one man in this vehicle, once you get - if you get squared away, there's enough room - and you can do more with one man in here than you can with three, operating all the equipment and everything. And I wouldn't have guessed that.

It's like a three-man Gemini now.

Actually, I can't get out of the way.

It's like a three-man Gemini. There was no room in there.

I don't see how y'all did it.

Not very well. ... More hot cocoa or cold cocoa?

Hot, please.

Okay. This is with K.
Oh, good!

Gonna get your potassium level back to where it belongs.

You want to cut your open - orange juice open? ... more cold water in there.

I wonder who's responsible for all this?

Dr. ...

Probably no one.

Yeah, but this - this regrouping is just - you know. Atrocious.

If we hadn't talked about this beforehand, you know, I wouldn't feel quite so irritated. But we talked about this very specific problem, and I talked to all the flight directors about it. It's - if you've got to regroup with the kind of Flight Plan we've got, just emasculate pieces. Don't try to reschedule. And they all agreed, that's right; if you have to reschedule and re-write, we'll get even less done. And that's all I've done for 3 days. And my efficiency has got to be low. That's something. Gee, Charlie, I don't know. I'll be darned.

What is it?

I have no idea, Charlie.

... On the outside?

That's a little strap - from a hatch.

You can put your finger in.

Probably the -
07 22 18 07  LMP  Verify ... 5000th time.
07 22 18 16  CDR  That's their favorite thing to tell you to do.
07 22 18 18  CMP  They'll forget to tell you to configure the jets.
07 22 18 21  CDR  That's right.
07 22 18 22  CMP  They'll tell me not to forget to turn the - I guess I am - -
07 22 18 27  LMP  ... you'd think they'd accept the Flight Plan ...
                       And I checked the MASTER ARM, OFF, ... checked
                       the MASTER ARM, OFF, verify. (Laughter)
07 22 18 38  CMP  Somebody has really gone Able Sugar over there.
07 22 18 41  LMP  ...
07 22 18 48  CDR  Really - There was two of them like that - there
                       was two of them in there that said verify. You
                       want me to cut this open, Ken?
07 22 18 55  CMP  Yes, please, sir. Yes, I've made several notes in
                       my Flight Plan to quit wasting time reading up
                       trivial things.
07 22 19 08  CDR  That's what - the outfit's so big now that that's
                       their goal in life. And that's no bull. I can
                       see it. Chris doesn't know all this bull is going
                       on or he wouldn't allow it.
07 22 19 20  LMP  What outfit ...?
07 22 19 24  CDR  FAO, MCC - FAO, probably. They got --
07 22 19 28  LMP  That's our guys.
07 22 19 29  CDR  That's right! But they've got these TRW weenies
                       working for them and they're - you know, what
                       they're gonna do is correct typographical errors
                       on the Flight Plan next.
07 22 19 42  CMP  (Laughter) Well. When all the trivial things
                       have been done, they did get us down to the ground.
07 22 19 53  CDR  Yeah.
What? Pages and pages of corrections? ...

Oh, not sometimes. Just the last 3 days (laughter).

I don't see how you stood it - I really don't.

I don't either, as a matter of fact.

... bad, but with three guys, it's gonna be unbearable.

I ain't the most --

...

-- stable guy in the world for that kind of stuff, anyhow. And I'm quite impressed that I ain't popped off at them. But it ain't an accident.

It takes ... easy going to do it. I'll tell you that, because I got mad at them yesterday. Didn't do any good.

Well, that's right. It won't - won't alter anything except --

Tee the big boys off.

That's right. You get a speech from Chris, and that's about what you have to look forward to when you - when you talk back. Now I take my - now I know why the Arabs eat with one hand and urinate with the other. They grew up in Apollo.

What? They eat with one hand and urinate with the other? Is that right?

They wipe with one hand.

They won't use any paper, huh?

...

That's right. Most of them eat left-handed. I remember seeing somebody.

No, they eat right-handed. ... left hand ...
CDR Is that right? Kill it! That guy's getting feces on the table! (Laughter) You don't dare put your left hand on the table, huh?

LMP ...

CDR Well, when I was --

LMP That's the only --

CDR When I -- when I was eating with the ambassador in Kuwait, I saw him staring suspiciously when I got both arms on the table and put them together. He says (laughter) - I never did figure it out.

LMP ... check it out.

CDR (Laughter) Here's a grapefruit drink, Ken. What else do you want, Ken? There ain't much. There ain't much. Bacon squares or something like that?

CMP No. A couple of those --

LMP ...

CMP -- couple of those little pills, and I'll be all set. Thank you, sir.

CDR Okay. Well, I'll -- just a minute ... bags ...

LMP I'll eat Ken's grits. ...

CDR You just ate Ken's grits. How about a cup of coffee?

LMP ...

CDR How about you, Ken? You want a cup of coffee?

LMP I don't really want any coffee, no.

CMP If you've got some coffee there, put it aside, and I'll drink it later.

CDR Okay.

LMP Woo-ha! ...
I can't either. No, the thing is that I'm sure Deke was in - had to be party to that. That means he had to agree to it.

Mm-hmm.

I don't think the doctors had anything to do with it.

Yes, they did.

Doctors ...

Yep.

All they supposed to do.

That's right. I think you're right, Charlie. They are running completely -

Okay, I'm gonna stick that up here right by 305, because it's ...

...

Here, I'll stick it in my pocket.

Okay; that's a good idea.

You got some pills there?

Yeah.

I'll put them in?

I'll put them in.

Okay; thank you. Okay.

Johnny [?] should get the best.

(Laughter)

... sunrise.

Hey, you should look at that - that corona at sunrise. That's really pretty.
Charlie, what else do you want? You don't want any bacon squares, huh, Charlie?

No. Just some - just like some juices.

Okay; coming up. How about an orange juice?

That's fine. Is that cocoa ...? One more time ... okay.

Now where did I put my Flight - Yes, sir, we are in attitude and --

Who you talking to?

Oh, it'll be - the horizon right now is right down here. If you'll turn the - turn the floodlights down, you'll probably see it right now.

... find it, I'll show you ... Well - Yeah, it may be because the old terminator's moving around pretty rapidly. When it comes up, you can see it - you can see it nicely with the cabin lights up and everything. It's - it's really pretty.

Ken, you're kicking this stuff off the food bay.

Oh, excuse me. I'm sorry.

No problem.

I'm sorry.

You can put your foots on there now.

No, I don't put my feet on the dinner table.

I think you put your left hand on it the other day; you might as well put your feet on it.

Now, now. I know what I'll do. I'll fold my tent. Suit donning. Ah! An exercise in futility. The - the thing is that what we have to do now is, after
suit donning, we still — when we go to doff the suits now we still got to go back and stow stuff in the places that was gonna originally have been stowed.

Yeah.

In fact, I tell you what, when you guys go into the LM to don the suits, I can go stow that stuff before I put my suit on.

That's a good idea.

Hey, that'll — that'll get it done a lot faster.

... Okay. You know we can always handle stuff like that. That's no big deal.

... Well, I tell you, I - I'm - I'm really confused, because I am thoroughly convinced that what John's been saying about everything goes up to the tunnel is true. And in SIM bay attitude with only the minus-X jets firing, that makes sense. And it's true I'll wake up in the morning, and the - the tool E is always hanging that way, the jett bag's up there, all my trash is going up there. It's a - it's a self-cleaning cockpit.

Yeah.

But when you go to couples, they still hang up there. And I ain't figured that out.

Well, I'll tell you why. Undocked, it's colder up there. They settle out when the cold hits there. Pressure changes.

... We're gonna do it earlier than that, old buddy. There is — there is only one — one way to survive with MSFN. And that's to get ahead and don't tell them. Now we're coming up on time to open the hatch now. Sit there in your suit. Huh? What do you mean?
Okay. That's - that's all you do. All you're doing is seeing that they've got in the command that runs the tape. Yeah.

Juice for you, Charlie. What else do you need?

I might of been ...

(Laughter) Well, I'm ready to say, at this point, I don't care. All they can do is tell me to come home, which they have already done. And they ain't gonna take my next flight away from me, so -

Really does upset me. All the time you put into trying to make it a good one, and then someone that hasn't given it any real thought or effort comes up and wipes it all out with a stroke of his hand.

What's his name? ...

Well - not - that's - Okay, but that's different. That's unavoidable, you know, and we regrouped from that nicely. We got everything done that we would have done - at least on my end, I got everything done that I would have done had we not slipped that three revs. So that was no - you know, that - that part worked out okay.

... yesterday ... It wasn't working right ... they said, "Okay. You got an hour and a half." ... Okay. You got that one? Come around and get this. ...

Just sitting there in a limit cycle.

... and I don't think ... we ...
Day 8

07 22 32 19 LMP

07 22 32 20 CMP

07 22 32 20 CMP

07 22 32 29 LMP

07 22 32 30 LMP

07 22 32 39 LMP

07 22 32 40 CMP

07 22 32 41 CDR

07 22 32 43 CMP

07 22 32 58 CDR

07 22 33 05 CMP

07 22 33 06 CDR

07 22 33 07 CMP

07 22 33 08 CDR

07 22 33 13 CMP

07 22 33 14 CDR

07 22 33 17 LMP

07 22 33 19 CMP

07 22 33 20 CDR

07 22 33 26 CMP

07 22 33 31 CDR

07 22 33 32 CMP

... No. That's right. It's better to take a plan you understand and is thought out that is less than optimum and execute it the way you planned it.

All we had to do was take our checklist and subtract 10 minutes from this, subtract 10 minutes from that...

Yeah.

They didn't do that.

I thought that's why we picked these kind of people throughout the program - was people that understood how to operate as opposed to how to have meetings. But it's been a - this has looked more like a - an operational data priority than a -

... they're not. I don't ever expect those guys to understand the - -

Well, that's why - -

-- rules of operation.

-- we got Sir Lovell down there to - -

You know that's a mistake. You don't do that.

(Laughter)

... pilots. They ain't got ...

...

(Laughter)

... You get a little peeved, I'll tell you that.

Hey, now, look. There's - there's meal A, day 9. Now -

Where?

Right there.
No, you - that's what you ate this morning. I just fixed it for you.

Oh. Well, you've got to eat one.

Oh, well, I ain't got around to that.

Well, you can't - you can't button up your toys. You've got to go --

You want to - you want these in here?

No.

If I eat it, I'm going to have to defecate.

Here you go, Charlie. How many you want? Oh, no, no, no, no. The pills are floating!

Oh. I'll do that. Hey, Charlie? Oh, the IM was hiding it. That's why you couldn't see it. Here.

See a corner of it. Look straight out the ... It's almost sunrise. Aw, you missed it. Get your head out of there before it comes up. Okay.

Come here, you little pills.

You know, one of the things I found worked real well was, instead of using the - the big trash bag - (laughter) - That one just got shot down - was to keep one little temporary trash bag out that was easy to get in and out of. And put stuff in it, and then every - couple times a day, dump that into the big trash bag.

Yeah. That's what I got between my legs, I think.

Looks like we overdid it. I should've kept - I thought about keeping one of those Jett bags ...

I can't! There's no way.

...
Pull up the ladder. I tell you what. If you - are you using that table?

No, not right this second. Gonna change that LiOH canister?

Yeah. The other terminator is prettier, because it's - got more - relief to it.

... Yeah. It is. There's - -

What's that?

That's your meal! You're getting behind, John. Oh, what canister was that I was gonna change? I was gonna put 16 into A - no, 13 in A-3.

(Sneeze)

... What's the matter?

... What's wrong with that? Huh?

... I've cut you off from all your chow.

No, that's all right.

Can you get to everything?

Yeah.

I know why the guys had arrhythmias and took so long to get back in shape; they couldn't move around - couldn't move!
Oh, yeah, you can. It's - it's kind of overwhelming at first, but it - it catches up and it's --

Are we - where are we now? About Men - no, we're past Mendeleev.

I want to show you that --

I think we're past Mendeleev, if I'm not mistaken. Yeah. Give you what? Huh?

I don't know, Charlie.

Who put these stupid sponges in here? That's one sponge that ain't going back to Houston.

Four open. ... four closed. ...
DAY 9

08 00 00 04 CMP And we're coming through here. We're about on the

time line, but the trouble is, they didn't allow

enough time. If we don't get ahead somewhere,

we'll never make it.

08 00 00 11 CDR I know it.

08 00 00 13 LMP I - I think we'll catch up over here, Ken.

08 00 00 15 CMP Yeah, but when we get to that suit-donning busi-

ness, that's where the whole world falls on its

ears.

08 00 00 17 LMP That's right.

08 00 00 18 CMP I can't follow that. I keep trying. So we're

right down here, now. Jettison comes up - Let's

see, have you got it? Got this 30 minutes, here's

30, there's an hour. But most of this is gonna

get taken up with suit donning. And I've got to

reconfigure the cockpit here. And then we close

the hatches and do the jettison over here. And

then I know good and well they're gonna have -

they're gonna have us do all kinds of stuff in

here. It won't be nice and clean like this.

They're gonna be rolling left, reading updates,

and all that bull. During the eat period, you're

gonna take your suit off. I'm almost at the point

of just saying, forget it, I'll keep my suit on

for EVA.

08 00 01 27 CMP No. No. (Laughter) Sometime tonight about 200

and - 200 and - that's not far away. 210? 220?

No. It was normally 220. So it ain't very far.

There's - 200 hours; 8 hours from now.

08 00 01 54 LMP What, TEI?

08 00 01 55 CMP Yes, sir.

08 00 01 56 LMP You're kidding.

CONFIDENTIAL
08 00 01 57 CMP No, I'm not. You know, I - and there's - I even threw out where that time is to sit down and take an hour and get ready for TEI. And I'm ready to tell them to delay it a rev, if they don't give us one. I just can't seem to do a TEI in a hurry with a whole lot of things dangling.

08 00 02 31 LMP Yeah, you can come over here and cut this cord, John.

08 00 02 53 CMP I thought we had such a good chance of completing the mission. And then go home. At least you guys got all your work done.

08 00 03 01 CDR Yeah, but that ain't fair to you.

08 00 03 04 CMP Well, it ain't individual fairness that counts in this program. The program has never tried to do that.

08 00 03 10 LMP Okay. You're maneuvering to steerable attitude, right?

08 00 03 13 CMP I'm there.

08 00 03 14 LMP Okay.

08 00 03 15 CMP Yeah. You said sharp, VHF, I guess.

08 00 03 26 CMP You can start moving these ACAs, if you want to. I got a - I got a procedure for you. (Laughter) Wait. There's a change.

08 00 03 40 LMP Huh?

08 00 03 41 CMP I'm sure there's a change, Charlie. You don't want to do it yet. I'm sorry, John. What? No. Well, to check the procedure, it moves power to them.

08 00 04 00 CDR We might have some power right now, but it removes power.

08 00 04 44 CMP Okay. Look here.
08 00 04 57 CDR
Make sure of that, Charlie. Ace performance on backing it out of - I think I'll just go right through here. This shorting plug's dimmer.

08 00 05 08 LMP
Well, that doesn't matter. We're not gonna have any power. That was because it was - it'd do that so they would see you removing power off of it on the front side; but we don't have power on it anyway.

08 00 05 21 CDR
... one ...

08 00 05 36 CMP
Okay; go ahead.

08 00 05 40 CDR
Okay. Well, see, push them all back in over here, anyway.

08 00 05 43 CMP
...

08 00 05 47 CDR
You can leave that - you can leave all your breakers in.

08 00 06 01 CMP
Okay.

08 00 06 09 CDR
Huh?

08 00 06 12 LMP
Yeah, we're on the back side, aren't we, Ken?

08 00 06 14 CMP
Yes, sir.

08 00 06 15 LMP
Okay.

08 00 06 18 CMP
Okay.

08 00 06 19 LMP
What?

08 00 06 20 CMP
Okay, both the same.

08 00 06 33 CDR
... these two right here? ... It's real hard; you just got to really pull.

08 00 06 54 CDR
Okay.

08 00 06 56 CMP
Let's see, there's a little clips here you can use, John.
08 00 07 31 CMP
Huh?

08 00 07 40 CDR
Ken, you've already done it. Won't go forward? Yeah, uh-huh. It's cross sliding ... Here are the screwdrivers and the -

08 00 08 31 CMP
These two right here. This one right here. There's one - there's one back up under here.

08 00 08 39 CDR
Ken, you probably need a flashlight. They're cross sliding. Do you have your flashlight? They're cro - I think you've got the wrong screwdriver.

08 00 09 24 LMP
Huh?

08 00 10 11 CDR
There you go.

08 00 11 13 CMP
I need to defecate. Hey, I was gonna suggest, if you guys need to take one, you ought to do it before we get rid of the LM.

08 00 11 17 LMP
I agree. Let me get over here.

08 00 11 27 CMP
Does anybody have any desire to keep this URA?

08 00 11 29 LMP
I don't. Doesn't look like we'll get to use it.

08 00 11 32 CMP
Well, even if we did, the thing doesn't work.

08 00 11 35 LMP
Yeah.

08 00 11 37 CMP
I'd just as soon get rid of it. It's just that much more volume we have to play with.

08 00 11 39 LMP
Bring her over.

08 00 11 41 CMP
Okay.

08 00 11 45 CDR
I might - I'm gonna keep this bag, though. I think that might be a good trash bag. Got a zipper on it.

08 00 12 28 CDR
Won't turn? Which one - which screw? Can't get this screw out?
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<td>LMP</td>
<td>...</td>
</tr>
<tr>
<td>08 00 12 44</td>
<td>CDR</td>
<td>It's this one right under here - you can't - no? There you go.</td>
</tr>
<tr>
<td>08 00 13 06</td>
<td>CMP</td>
<td>Okay, torque that dude, will you?</td>
</tr>
<tr>
<td>08 00 13 26</td>
<td>CMP</td>
<td>Let me try it.</td>
</tr>
<tr>
<td>08 00 14 09</td>
<td>LMP</td>
<td>Let me hold it, maybe you can push on it, you know. Okay, you're not quite. ...</td>
</tr>
<tr>
<td>08 00 14 24</td>
<td>CMP</td>
<td>You're on internal power, aren't you, Charlie?</td>
</tr>
<tr>
<td>08 00 14 25</td>
<td>LMP</td>
<td>Yeah, uh-huh. I got bats on.</td>
</tr>
<tr>
<td>08 00 14 30</td>
<td>CMP</td>
<td>I was wondering - you suppose there's any reason to save these - the umbilicals?</td>
</tr>
<tr>
<td>08 00 14 32</td>
<td>LMP</td>
<td>No.</td>
</tr>
<tr>
<td>08 00 14 33</td>
<td>CMP</td>
<td>You don't want them?</td>
</tr>
<tr>
<td>08 00 14 34</td>
<td>LMP</td>
<td>Uh-huh.</td>
</tr>
<tr>
<td>08 00 14 35</td>
<td>CMP</td>
<td>Okay.</td>
</tr>
<tr>
<td>08 00 14 37</td>
<td>CDR</td>
<td>... on that.</td>
</tr>
<tr>
<td>08 00 14 41</td>
<td>CMP</td>
<td>I guess we can leave them in, then. Latches and all are gonna go, so that doc - that electrical connection should go, too. It should sever right here.</td>
</tr>
<tr>
<td>08 00 14 51</td>
<td>CDR</td>
<td>There they go on their trip to the Moon.</td>
</tr>
<tr>
<td>08 00 14 54</td>
<td>CMP</td>
<td>Oh, sure.</td>
</tr>
<tr>
<td>08 00 14 58</td>
<td>CDR</td>
<td>Huh? Yeah. You want to go on through - well, I'm - I've got the CBs dumped and - We're right here for the docked IMU align. I'm gonna let you do that. Let me try and stop. Okay.</td>
</tr>
<tr>
<td>08 00 15 17</td>
<td>LMP</td>
<td>Hey, Ken. Are you in MIN DEAD BAND, attitude hold?</td>
</tr>
</tbody>
</table>
08 00 15 20 CMP Yes, sir. Use the thumb switch.
08 00 15 25 LMP Okay, you need a ...
08 00 15 34 CMP Whoops! Is this your - this isn't a - this is your transfer items bag, huh?
08 00 15 37 CDR Yeah.
08 00 15 39 CMP (Laughter) I don't want to throw my trash in there.
08 00 15 49 CMP Okay. Well, you got - What did you do with those jettison bags? You tied them down, huh?
08 00 15 58 LMP Yeah, they're all tied down. Just - I can stuff them down -
08 00 16 02 CMP Just give me that stuff - there's plenty of places to stuff. Good old 06 20. All right.
08 00 16 17 CDR Can you imagine in - in orbit?
08 00 16 21 LMP I can't believe EVA, John. Those guys! Suppose we'd had a short in your thing?
08 00 16 31 CMP Okay; you ready for the 06 20, John?
08 00 16 42 CMP Hey, John? Oh, 323.17. Oh, heck. We're - we're moving around. Just call it 323, 116 and 305.
08 00 16 56 CDR ...
08 00 16 59 CMP Yeah, I know. But there ain't no sense in counting hundredths when I got a half-degree dead band. It's 323.17, 116.36, 305.00.
08 00 17 14 CDR ... 305.00?
08 00 17 16 CMP Yep. But those numbers are changing.
08 00 17 18 CDR Huh?
08 00 17 19 CMP Those last two digits are changing. Okay.
08 00 17 27 CDR ...
We were doing it with an 06 20 of a mark and an ENTER right then and there that'd correct it. Huh? Oh, wait a minute. Let me go to SCS, I can get you a smaller dead band with that.

... that's fine.

Okay. Do whatever you want.

John, I can't budge mine either. I don't know how big of a screwdriver the guy had, but he must of had a monster. ... Can't even come close to it.

Well, guess what.

We don't get to bring our ACAs back.

I can't budge it. I just cannot budge it.

Yeah.

Okay. It'll be plus 45, 361, 304 - What's the command module?

That's 304. This is 304, minus 323. Be a minus number ... in the 300s. 300 plus 4 is 304.

Add 360 to that one ... Yeah. Make it - yeah, why not? Okay.

... 

Now subtract --

Okay.

-- 33, 3, 1, 4, 3 - 341.

Yeah. I do, too. Okay, now this one is plus 160 and ... is straight forward to ... 6. Okay, that looks okay. Well, John, don't get to ...

Huh?
08 00 22 56 CDR
Look I - I can't understand you. Oh, you wanted this right here.

08 00 23 13 LMP
I don't know what you're gonna do with that. Can't roll it, stick it on itself. You could put a piece of tape on the back of it, John. Here, let me do that.

08 00 23 20 CDR
Oh, yeah. I'll - I'll -

08 00 23 22 LMP
You do this, and I'll (laughter) ...

08 00 24 01 LMP
... this thing ... this neat.

08 00 24 29 LMP
Hey, Ken, ... on my mark - on your mark.

08 00 24 38 CMP
Say when.

08 00 24 40 LMP
Tell me what GET it is. Up the GET and give me a mark. Okay? 0 - okay, Ken. On the comm.

08 00 24 49 CMP
Okay. I'll do it on the comm at 192:36:40. Stand by -

08 00 24 53 CMP
MARK. Got it? You got the time?

08 00 24 58 CDR
Yeah.

08 00 25 00 CMP
Okay. And the angles are - -

08 00 25 01 LMP
Wait a minute, say the time again.

08 00 25 02 CMP
192 - -

08 00 25 03 LMP
Okay - -

08 00 25 04 CMP
36.

08 00 25 05 LMP
192:36 - -

08 00 25 06 CMP
40.

08 00 25 07 LMP
40.

08 00 25 08 CMP
Okay.
08 00 25 09 LMP  Okay.
08 00 25 10 CMP  The 06 20s are 322.94.
08 00 25 11 LMP  322.94.
08 00 25 13 CMP  116.31.
08 00 25 16 LMP  One decimal, what?
08 00 25 18 CMP  116.31.
08 00 25 21 LMP  116.31.
08 00 25 23 CMP  304.99.
08 00 25 24 LMP  304.99. Thank you.
08 00 25 26 CMP  ...
08 00 25 27 LMP  Thank you.
08 00 25 37 LMP  Crummy things. That upsets me. Really ... beat.
08 00 26 01 LMP  Not in this attitude. Why does it have to?
08 00 26 18 LMP  Let me try this again, John.
08 00 26 54 LMP  You want to give up on those things?
08 00 26 57 CDR  Huh?
08 00 27 01 LMP  You want to give up on those things?
08 00 27 04 CDR  Give up?
08 00 27 06 LMP  On the ACAs?
08 00 27 41 LMP  Yeah. Uh-huh. All that's in there. You can do the Tephem. Ken's got the Tephem. You can do all this stuff. Bring up the numerics lighting; you can get the ... count; ... just like we did on the activation.
08 00 28 12 CMP  You probably have the right Tephem in there, don't you?
08 00 28 15  LMP  Probably.
08 00 28 17  CMP  That won't change just because you powered down.
08 00 28 20  LMP  No. Un – unless they've changed yours since we powered down.
08 00 28 25  CMP  No, we haven't changed anything like that.
08 00 28 28  LMP  I didn't think so.
08 00 28 38  CDR  Ken, what's the GET?
08 00 28 39  LMP  What's the GET, Ken?  Give us a mark at – Okay.
08 00 28 42  CMP  Okay. It's 192:40:30 now, and you can have a mark at 192:41.
08 00 28 50  LMP  Okay. 192:41, John.
08 00 29 09  CMP  4, 3, 2, --
08 00 29 11  LMP  Not gonna make it.
08 00 29 12  CMP  -- 1. Okay. How about 41:30?
08 00 29 15  LMP  That's good, 41:30, John. Okay; we're ready.
08 00 29 19  CMP  All right.
08 00 29 33  CMP  10 seconds to go.
08 00 29 37  LMP  Okay, 10 seconds, John.
08 00 29 39  CMP/LMP  5, 4, 3, 2, 1 --
08 00 29 43  LMP  MARK.
08 00 29 44  CMP  ENTER. Okay, we got it going.
08 00 29 46  CDR  Okay.
08 00 29 54  CDR  And we need a Tephem, Ken.
08 00 30 01  LMP  Yeah. Let's – Okay. Why don't you read it out and see --
Okay, VERB --

Why don't you read out what you got - VERB ... compare them. I hate to change it. Okay. He's got the clock update now.

Hey, Ken. There's a - there's a towel over in - in my TSB that's got a red stripe on it. Will you put some water on it and - and throw it across, please?

Yes, sir.

Thank you.

Surely will. You want cold or hot water?

Cold. I just want to clean off this jett bag.

Oh, oh, okay. That's right.

... face ... or something?

Okay.

Huh? You need what?

He said he needs a Tephem, Ken.

Okay. Before we change it, why don't we check it? I - I hate to change it.

How do you read lookout octal? VERB 04? Okay; let's look at it and see what it is.

What you got, Ken?

(Laughter) I'm one of those darn octopies [?]. I -

Yeah. I know.

--- ... just a second. Excuse me. He'll be there in a minute, Charlie. Here comes your rag.

Okay; thank you. Huh? Don't know whether it's good or bad.
Day 9

08 00 32 17  CMP  Got 47651, 70362, and 67651.
08 00 32 24  LMP  That's not even close to what we got.
08 00 32 26  CMP  What you have?
08 00 32 27  LMP  We got 11, 000, 11. Give us the numbers.
08 00 32 32  CMP  Okay. I'll - -
08 00 32 33  LMP  Wrong one. Let me make sure I got this out right now before you change all that. I just looked up 1703.
08 00 32 40  CDR  ... 1706. I can tell you that for sure.
08 00 32 52  CMP  Okay, three balls 11.
08 00 32 56  LMP  Okay.
08 00 32 57  CMP  13347.
08 00 32 58  LMP  Okay.
08 00 32 59  CMP  65620.
08 00 33 00  LMP  Okay; same. We got it. Yeah. Go ahead.
08 00 33 22  LMP  Is it bad?
08 00 33 33  LMP  That was really a dumb decision. And it was all because the docs got them panicked.
08 00 33 42  CMP  It goes further than that, Charlie. The docs may have caused the panic, but somebody had to realize - someone operationally should have realized that - that no matter how panicked they were, they couldn't do any better than what they had already planned.
08 00 33 55  LMP  Yeah.
08 00 33 56  CMP  They should've seen that.
08 00 33 57  LMP  Do what, John? Yeah. Go ahead; whatever it says do. You do ahead and do. We're not gonna get the edge. Go ahead. Just push them all in.
You should not, but if you get one, it'll come on right away.

Okay.

And I'll get up here and see if I can look out this side hatch, too.

Okay.

Okay; we're about to jettison the boom.

Okay.

Okay; go.

Okay. It's up --

Okay.

-- and off. There she goes.

Boom clear.

Straight out. Boom's clear.

I'll see if I can see it.

Not a bit of roll. There she goes, Ken, this way --

... see it.

-- straight out window 5.

Hey, that is beautiful.

... That's affirmative.

That's about as stable as you can get. That thing isn't tumbling, rolling, doing a thing.

Let me see it. Can I see it?
08 03 23 43 CMP Yeah. It's right straight out there. Beautiful. Here, Charlie. Charlie?

08 03 23 49 LMP Yeah.

08 03 23 53 CDR There she goes!

08 03 23 56 LMP Gee, I hadn't even thought of that. ...

08 03 24 00 CMP It's all set.

**TIME SKIP**

08 03 56 12 CC -- POWER; 197:05, configure camera for orbital science; CM5/EL --

08 03 56 37 CMP Whose?

08 03 56 38 CC -- 230/CEX intervalometer. That's f/8, 1/250 --

08 03 56 48 LMP Huh?

08 03 56 50 CC -- infinity. You'll be taking 128 frames --

08 03 56 55 CMP I think this is where it's - where it's bad.

08 03 56 57 CC -- magazine Romeo Romeo.

08 03 57 02 CMP ... got it ...

08 03 57 06 CC 197:14 --

08 03 57 09 CMP Okay; what's that gonna be a target of, Hank?

08 03 57 11 CC -- PC - Okay, we're going to pick up that long run you had that started down at Vogel and --

08 03 57 23 LMP Why don't you get a new one of those?

08 03 57 26 CC -- and went up to Lassell and Alpetragius and stopped. And then you picked up at the one down at Bullialdus. Well, Bullialdus --

08 03 57 32 LMP Hey, John.
Day 9

08 03 57 33 CC

- - is too far south. So what we're going to do is start at Vogel, make a jog at Alpetragius, and go all the way to the Helmet on past Gassendi. And we're about up on LOS now; I'll tell you more about that at AOS.

08 03 57 47 CMP

Okay, Hank. Thank you.

08 03 58 08 CMP

Okay. What were you getting ready to ask?

08 03 58 10 CDR

Huh?

08 03 58 11 CMP

What were you getting ready to ask?

08 03 58 12 CDR

...

08 03 58 13 CMP

Okay. I got to - got to launch this satellite now.

08 03 58 18 LMP

What time does that come on?

08 03 58 20 CMP

In 3 minutes. John, can you get over there? I got to launch this satellite in 3 minutes.

08 03 58 25 CDR

Sure.

08 03 58 29 CMP

Okay; I'm panel 230. Check that the DATA SYSTEM is ON.

08 03 58 37 LMP

Here, I'll get it, John.

08 03 58 39 CDR

...

08 03 58 42 CMP

Okay. On panel 230, you got a couple more things. Make sure the - Is the gamma ray retracted? Is the switch down in RETRACT position and is the talkback gray?

08 03 58 58 CDR

Yeah.

08 03 58 59 LMP

...

08 03 59 00 CMP

Okay; before I can tell if that talkback's gray, are those switches on 181 in the center OFF or in the DEPLOY/RETRACT position? Put them down to DEPLOY/RETRACT.
08 03 59 16 CDR ...  
08 03 59 19 CMP Huh?  
08 03 59 20 CDR GAMMA RAY's still gray.  
08 03 59 21 CMP Okay. ALPHA/X-RAY COVERS, CLOSE, Charlie.  
08 03 59 26 LMP Oh, sure.  
08 03 59 27 CDR ALPHA/X-RAY --  
08 03 59 28 LMP Hey, wait a minute. They're here. They are closed.  
08 03 59 38 CMP We're in attitude; we've been damping rates. Holy smokes! Where was I going to put that attitude? Okay.  
08 03 59 55 CMP Okay, on 250, we've already checked our PYRO A, SEQUENTIAL A; PYRO B, SEQUENTIAL B is closed. Okay; on 181. LOGIC POWER, two, is closed. We know that. The LOGIC POWER switches, two of them, up to JETTISON.  
08 04 00 16 CMP Okay. All right, the next thing we'll do is I'll give you a call when to hit the SATELLITE LAUNCH switch. And we - we're about a minute and a half from the launch. And the SATELLITE LAUNCH switch is one - is one that you put up and hold. I think it's a three-position guy.  
08 04 00 36 LMP That ... switch?  
08 04 00 38 CMP Yeah. But not now. I'll give you a call.  
08 04 00 42 SC ...  
08 04 00 44 CMP We'll see if it - if it - should be a - a - maintain. And it should go barber pole when you put it up, and it should hold barber pole until it's launched, and then it should go back to gray.  
08 04 01 10 CMP Say again?  
08 04 01 11 LMP ...
Okay. And the circuit breakers are in? The two logic guys next to them? All right.

... seconds.

Two, 3, 4, 5 -

LAUNCH.

... out there.

Okay, did you turn? RETRACT?

... found this mistake.

Barber pole?

... go gray?

It went back to the center OFF position?

They're OFF.

Okay, LOGIC POWER ... 181 ... DEPLOY/RETRACT. That's done.

... Okay.

... All right.

... Good. ... good work.

I found our - I found their mistake. Their mistake. They left the - they didn't have any AC power ...
08 04 03 30 LMP ... 
08 04 03 35 CDR Yeah. 
08 04 03 41 LMP ... asking me - asking me AC power. 
08 04 03 45 CDR ... 
08 04 03 46 LMP Yeah. Okay. ... 
08 04 03 51 CDR Okay, Charlie. It's - it's no good then. 
08 04 03 54 LMP Okay. ... 

TIME SKIP 

08 04 49 10 CC -- changing over at Alpetragius - a little jog and then on up past the cinder cone. And you were originally scheduled to look at Bullialdus, and we're going to have to delete that because your track is too far to the north now. So, we're going to bring your groundtrack from the cinder cone right on up through Helmet and Gassendi and on up to Mersenius Rille, from D-11, 12, and 13. 
08 04 49 39 CMP Okay, you want to take one continuous strip. 
08 04 49 42 CC That's affirmative. 
08 04 49 43 CMP This is to be one continuous strip from Vogel to Alpetragius to the cinder cone to the Helmet to Gassendi to the Mersenius Rille. Okay. I tell you what -- 
08 04 49 57 CC ... except that there will be that little jog at Alpetragius over to - to the right there and then on up through cinder cone and straight on up through Helmet, then Gassendi and on up to the rille. 
08 04 50 06 CMP Yeah, I understand that. I'm going to have to have some help on the f-stops, and I guess I'd rather have you call them out to me rather than have me try to write them down and jot them on the map and all that jazz.
Okay; we'll do that.

Okay; thank you. And can you give me a time for passage of Vogel?

Okay; hang on a minute.

That - it should be --

TIME SKIP

Okay. "Load 509 at 199:40."

... Go ahead. Over.

... --

Some chicken soup?

-- ... --

Hmm?

...?

Yeah.

... the last one.

Yeah.

Okay.

Chicken soup. I get you some meatballs with sauce; you got some instant breakfast; you got some orange juice.

-- ... --

Okay.

-- ...
Okay. Pre-TEI-64, SPS/G&M; 38 - 3 - 38332; plus 0.61, plus 0.95; 200:33:20.44; plus 3265.6, plus 0808.0, minus 0215.1; 180, 000, 000; plus 21.7, plus 3371.0 - -

TIME SKIP

TVC SERVO POWER 1, SERVO POWER 2, done. ROTATION NORMAL, number 2 to AC, the DIRECT 2s are OFF. BMAGs, three, to 1/2. SPACECRAFT CONTROL going to SCS -

MARK. RHC number 2 is armed. Standing by to bring on MAIN A's - -

Go ahead.

- - 20 seconds. I've got no objections to doing them now.

Okay.

Here comes MAIN A, number 1.

One.

One.

Good start.

Number 2.

Good start.

Okay. Thumbwheel trims.

Okay, plus 61.

Plus 61. The trim's good in both directions on pitch.

Plus 95.

Plus 95 in yaw. Trim is good in both directions in yaw. Let me try a little MTVC. Pitch is good. Yaw is good.
08 08 14 45  CDR    Yeah.
08 08 14 46  CMP    Return to zero. SPACECRAFT CONTROL, CMC -
08 08 14 50  CMP    MARK.
08 08 14 51  CDR    Okay.
08 08 14 54  CMP    Okay. TRANSLATION CONTROL, clockwise -
08 08 14 59  CMP    MARK. Dadgum. Okay. I have no MTVC. MAIN B,
number 1.
08 08 15 11  CDR    Go ahead. Good start.
08 08 15 13  CMP    Okay. Check that, 0.6. Pitch. Okay, we won't
start number 2 yet; we'll start it later.
08 08 15 21  CDR    Okay.
08 08 15 24  CMP    Okay, going back to neutral.
08 08 15 27  CDR    And no MTVC.
08 08 15 28  CMP    No MTVC. Okay, we're at 0, 0, trim. Okay.
08 08 15 36  CDR    Says circuit breaker PITCH 2 --
08 08 15 38  CMP    Yeah, but I haven't started my second one. I'm
going to wait and pull those after we get going.
08 08 15 41  CDR    Okay.
08 08 15 42  CMP    Okay, POWER to AC/DC. DIRECTs to MAIN A/MAIN B.
I'm going to arm both hand controllers. Make sure
yours is locked.
08 08 15 51  CDR    Locked.
08 08 15 52  CMP    Okay. The BMAGs are going to RATE 2.
08 08 15 54  CDR    Two.
08 08 15 56  CMP    Gonna PRO.
08 08 16 08  CMP    Okay, the attitude is dressed up. I'm changing
BMAGs and an ENTER. Okay. Gimbal drive check. John,
you can go ahead and give a PRO.
08 08 16 25  CDR  PRO.
08 08 16 28  CMP  Minus 2, 0, yaw, plus 2, minus 2, 0. Trim - trims are good.
08 08 16 45  CDR  Okay.
08 08 16 46  CMP  Okay. Now we'll do a VERB 48 ENTER. VERB 21 ENTER. 11001 ENTER. PRO, PRO, PRO. VERB 25 NOUN 7 ENTER; 1 ENTER; 0 ENTER.
08 08 17 15  CDR  Good.
08 08 17 16  CMP  509 flag is down. Okay. With 4 minutes to go, SCALE is 5/1. All right, now I'm gonna bring on MAIN Bs, number 2; go --
08 08 17 33  CDR  Go ahead.
08 08 17 34  CMP  Here comes.
08 08 17 35  CDR  It started.
08 08 17 36  CMP  Okay. I am now going to pull PITCH and YAW BATTERY B circuit breakers.
08 08 17 45  CDR  Number 2 is right.
08 08 17 52  CDR  Okay, ready over here.
08 08 17 53  CMP  All ready on the right.
08 08 17 57  CMP/CDR  All ready on the left.
08 08 17 58  CMP  All ready on the --
08 08 17 59  LMF  Firing line (laughter).
08 08 18 03  CMP  Okay. My RATE switch is going to HIGH.
08 08 18 06  CDR  HIGH.
08 08 18 09  CMP  Start the DET again at 58. No, I think I'll catch it at 57. Give it another try.
08 08 18 36  LMP  John, there's old Orion out there.
08 08 18 40  CDR  Okay.
08 08 18 42  CMP  Okay. Good, Charlie.
08 08 18 43  CDR  Burn time is 2 minutes and --
08 08 18 46  CMP  Forty-two --
08 08 18 47  CDR  -- 42 seconds.
08 08 18 48  CMP  Okay. And that means I go to 2 seconds overburn, and shut it down.
08 08 18 55  LMP  Okay, I'll give you the normal countdown, Ken.
08 08 18 57  CMP  All right, sir.
08 08 18 58  LMP  Starting at about 35.
08 08 18 59  CMP  That'll be just fine.
08 08 19 00  LMP  Okay.
08 08 19 07  CMP  Okay, the GDC looks like it's -- pretty much -- I'm gonna dress it up. ... has nothing to do with the uncaged gyro. It's the attitude reference. Okay.
08 08 19 35  CMP  It counted that time.
08 08 19 36  CDR  Two minutes. It's working now.
08 08 19 38  CMP  Okay, Charlie's got the watches?
08 08 19 40  LMP  Yeah.
08 08 19 46  CMP  Okay, we've done everything down to here.
08 08 19 52  CDR  Two jets, 17 seconds. Our A and C [?].
08 08 20 33  LMP  Awful quiet, isn't it?
08 08 20 34  CDR  Okay.
08 08 20 35  CMP  Okay.
08 08 20 36  LMP  DELTA-V to normal.
08 08 20 37  CMP  DELTA-V is going to normal. Translation control power is on. Hand controllers are in neutral; they're both unlocked.
08 08 20 46  CDR  Okay.
08 08 20 47  CMP  DELTA-V thrust, and the light is out. Okay, it's coming to normal.
08 08 20 56  CMP  MARK.
08 08 20 57  CDR  Okay. DSKY blank.
08 08 21 07  CMP  Average g is running.
08 08 21 13  CDR  Looks like it's counting good.
08 08 21 15  CMP  Okay.
08 08 21 16  CDR  Seventeen seconds.
08 08 21 17  CMP  Ullage is on.
08 08 21 18  CDR  ... 
08 08 21 19  CMP  EMS is counting.
08 08 21 20  CDR  Working. Nine, 8 -- 
08 08 21 25  CMP  Attitude's good.
08 08 21 26  CDR  -- 7, 6, 5, PRO -- 
08 08 21 30  CMP  ENABLE.
08 08 21 31  CDR  Three, 2, 1.
08 08 21 33  LMP  She's open.
08 08 21 34  CDR  Man, hardly move.
08 08 21 35  LMP  Okay.
08 08 21 36  CDR  B.

---

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08 08 21 37 LMP ... is open.
08 08 21 38 CDR MARK B.
08 08 21 40 LMP B is open. I think it's late on the second watch.
08 08 21 45 CDR Okay.
08 08 21 47 LMP FUGS is looking good.
08 08 21 50 CDR Steer, baby, steer.
08 08 21 53 CMP Chamber pressure is riding at 98.
08 08 21 56 LMP Okay. Helium tank pressure's - I mean - tank pressure's looking great. Steady as a rock.
08 08 22 03 CMP On 30 seconds -
08 08 22 04 CMP MARK.
08 08 22 07 CDR Okay, calling 2 minutes and 8 seconds to go. Okay.
08 08 22 12 CMP Looks good from my calculation.
08 08 22 16 CDR EMG and VT to go are right with each other.
08 08 22 19 CMP Okay. The gimbals are nice and steady.
08 08 22 21 CDR Okay.
08 08 22 22 CMP It's just this - Boy, you know, look at those rates. Imagine what that would look like if you're really had the thing swinging.
08 08 22 31 CDR The roll has increased - -
08 08 22 32 LMP Coming up on a minute -
08 08 22 34 LMP MARK.
08 08 22 36 CMP Okay. Chamber pressure's up to 99. Reading almost half a g.
08 08 22 45 LMP This FUGS and AUX is glitching, I guess every time it goes by a point sensor, it - -
Yeah.

---

Both attitudes are steady as a rock, 18 percent.

---

Chamber pressure steady. Got a little buzz.

---

Twelve percent.

---

Chamber pressure's increasing.

---

Tank pressures are rock solid, Ken.

---

Okay.

---

MARK. Two minutes.

---

Boy, that burn time is right on.

---

Right on the burn time. Okay. We have less than a minute, and we're still right on.

---

Yep. Two attitudes --

---

We are.

---

-- are sitting perfect. We're up to 100 psi chamber pressure.

---

EMS looks good.

---

01:15.

---

For some reason --
08 08 23 58 LMP  01:25 -
08 08 23 59 LMP  MARK.
08 08 24 00 CMP  -- this thing is cycling -- well, it's cycling in roll. I've never seen that.
08 08 24 03 CDR  Yeah.
08 08 24 04 LMP  01:30. 02:30 -
08 08 24 05 LMP  MARK. Thirty-five, 36, 37, 38, 39, 40, 41, 42.
08 08 24 18 CDR  SHUTDOWN.
08 08 24 20 LMP  SPS PRESSURE light.
08 08 24 21 CMP  Okay.
08 08 24 22 LMP  41 --
08 08 24 23 CMP  Okay. Right on.
08 08 24 25 CDR  -- 3371 point --
08 08 24 26 CMP  Wait -- wait -- we've got to get the attitude stopped here. Why don't you go ahead and PRO?
08 08 24 29 CDR  PRO.
08 08 24 30 CMP  That'll put me back in narrow DEAD BAND and hold it.
08 08 24 37 CDR  Plus 0.2. Plus -- plus 1.2 --
08 08 24 39 CMP  DEAD BAND.
08 08 24 40 CDR  -- plus 1.
08 08 24 44 CMP  And after that, an attitude of 184.28, 5.82 --
08 08 24 49 LMP  -- point 1 and the drogue? What, sir?
08 08 24 53 CMP  184.28 --
08 08 24 54 CDR  I got it ...
Okay.

351.69.

Okay.

Okay, now what's the rule say on trim?

Okay, trim X and Z to less than 0.2.

Okay. We got only Y.

Ready. Get it.

My \( \Delta V_c \) is minus 19.1.

Okay.

That's about right.

Okay, let's get the gimbal motors off. Let me get my circuit breakers --

Go ahead. You get your breakers.

Got them. MAIN B.

Go.

One.

Good.

Two.

Good.

And A.

Go.

One, 2.

Good. MAIN BUS TIES coming OFF.

SERVO POWER's OFF.

Do you think you're in?
08 08 25 32  CDR  ... two OFF. TRANSLATION CONTROL POWER, OFF. ROT CONTROL POWER, DIRECT 2, OFF.

08 08 25 35  CMP  DIRECT ULLAGEs are out.

08 08 25 36  CDR  Okay. Got the DIRECT - DIRECT 2 ullage on the ... powers.

08 08 25 42  CMP  Okay. Circuit breakers. I'll pull them now.

08 08 25 44  LMP  PITCH 1 --

08 08 25 45  CDR  TCA.

08 08 25 48  CMP  Anybody get that?

08 08 25 49  LMP  No.

08 08 25 50  LMP  Have you got the fuels there?

08 08 25 51  LMP  -- residuals.

08 08 25 52  CMP  Yeah.

08 08 25 53  CDR  Okay.

08 08 25 54  CMP  EMS FUNCTION, OFF, and MODE to STANDBY.

08 08 25 57  CDR  Yeah, I'll just leave it here because that'll keep quiet in here.

08 08 26 01  CMP  ... Have you got the DIRECT ROT CONTROL, ON?

08 08 26 05  CDR  Okay. I've got those two OFF; and this is back; these go to RATE 2.

08 08 26 07  CMP  Okay. MAIN BUS TIES are OFF.

08 08 26 09  LMP  We got those. You got the BIT RATE back to LOW?

08 08 26 10  CMP  Sunrise!

08 08 26 11  LMP  Okay.

08 08 26 12  LMP  Okay. You got it.

08 08 26 13  CDR  Check the SIM bay.

08 08 26 13  CMP  All right.

CONFIDENTIAL
COVERS, OPEN -
MARK.

MAPING CAMERA to EXTEND.

MAPING CAMERA going to EXTEND; TRACK EXTEND.

Yes, sir.

MARK. Barber pole.

PAN CAMERA, STANDBY.

PAN CAMERA, STANDBY ...

STEREO - No, wait a minute - MONO.

MONO, okay, go.

Got the POWER to POWER.

POWER to POWER. Barber pole.

Okay.

She's gray.

All right.

We'll put it to ON as soon as we get in attitude.

Take the PAN CAMERA V/H OVERRIDE. See that switch?

Yeah. It goes there.

Okay. Put it to HIGH.

Okay. Just a second.

I just got three pictures of it.

Hey, you got the one with the Earth in it?

Yeah.
Beautiful.

... Hello, there.

Man, you come up like thunder. Wowee!

Okay, is the mapping camera out yet?

Yeah, it says barber pole.

All right. The burn was nominal.

Barber pole. Still barber pole.

Let me get this ... before ... -- 

Okay. ... operate it, though.

... this book here.

... 

Roger. The burn was nominal. We had - we just saw you rise.

He already knows.

We got a high - we got a high gain angle?

Not until we get there. I - I think I set it.

Well, what did - what did you set it to on this, Ken?

On what?

This camera.

What are you taking pictures of?

... the Earth, and then me.

1/250, f/8.

There's OMNI Delta.

Charlie, what's that result again?
I'm just about pitch and roll.

Oh.

When we get to attitude, it'll be PITCH, 45; and YAW, 320. It's set. I don't see how that's gonna work; it's not looking at the Earth. ...

Me, either. What is it? Just targets of opportunity out through there?

Man, we are climbing out.

Do you read us now, Don?

... 

Roger. We just saw you come up like thunder, and that's how we're coming up. Just going away from it like - nothing.

Hey, look at that beauty out there. Isn't that something? It's ...

It's better than an AB climb, Pete.

Okay, Charlie, how about the mapping camera. Is it out yet?

You have the burn status report, Charlie?

Yeah, it's out.

Okay, would you put the MAPPING CAMERA to ON?

MAPPING CAMERA's going ON, right.

Okay, PAN CAMERA to OPERATE.

OPERATE.

...

That came off.

Okay, IGAME MOTION to INCREASE.
Okay.

... plus 2.

... --

You have --

- - - barber pole plus 2?

You said it. One-

Barber pole. One - Got it.

Okay, have you got the PAN CAMERA to V/H ...?

Yeah.

Okay, I'll pick you up the status report. Why don't you get this one? It's all on the same page here.

Okay. Okay, that's right.

Then I'll get one.

Okay, Houston. We're working some mapping stuff. The burn was completely nominal. We'll give you the status report in - just as soon as we finish here.

Look at that horizon thing, would you, you guys!

Wonder if I can get that DAC on this thing.

Yeah, why don't you get the status report; I'll try to get the DAC going.

Okay.

John, ...

Here. Take the pictures, Charlie.

Roger. Give me a window.

Okay, I think we can get it out of that one.
Try the f/8, that one? Hold me.

Okay, now don't — don't stop it down any more.

Okay, Houston. Burn status report follows. There is no DELTA-Tg. Burn time, 242.4. There was no trim. And the residuals were measured at $184.005$, and $351$ degrees; $0.2, V_gx; 1.2, V_gy; 0.1, V_gz$; all pluses; minus $19.1$ DELTA-$V_C$. Which was the fuel and which was the oxidizer, Charlie? 3.9?

The -

3.9 is the oxidizer and 5.2 is the fuel.

Man, did that beauty feel good! Ah! Must admit I feel good enough to ... --

Hey, Charlie, beautiful! That baby just humped right out of there. She can really put on the power. It's — it's kind of refreshing to get a whole half a g from her.

How about let me use the center window for a second?

The boys are all at the window taking pictures.

Get a pan.

We got — we got some pictures of earthrise as we were climbing out. I bet they're really spectacular.

This Moon is really — is really a fascinating satellite. Boy, there's something new and different, and — and you can sure see a lot of variety from this view right here. This is almost —

Look at that!

This is even more spectacular almost than the Moon — than the Moon in earthshine when we're coming in here just —

Boy, you can see old Neper and all that stuff.
-- 5 days ago, or however long ago it was.

Let's see, am I looking north or south here, Ken?

North is that way.

Okay. I'm looking north. This is beautiful! You really get the idea it's a planet. It's just a-

Look over here.

I think the general agreement in the cockpit is that morale around here just went up a couple of hundred percent.

Hey, are we in SIM bay attitude?

Yes, sir.

Got to have the high gain.

(Laughter) How can I come around with a POO?

... Can't believe that'll work yet.

... Okay, I'll let you back at the -

Yeah, I can get that ... Thank you.

Hey, Houston, how do you read on the high gain? Okay, I missed your last thing; we're switching over.

We're now getting a view of - on the horizon, and there's Crisium. Way up north there, Charlie.

Hey, Charlie, be sure you get the florals (?) down there.

Right down there? Yeah, that's what I been doing.
08 08 39 02 CMP No, wait a minute. No --
08 08 39 03 LMP I didn't see anything.
08 08 39 04 CMP I don't think that's what I'm talking about.
08 08 39 05 LMP Right down here?
08 08 39 06 CMP This stuff over here. All those - take a strip that runs right out through here.
08 08 39 11 LMP Okay.
08 08 39 12 CMP And --
08 08 39 13 LMP Oh, yeah, yeah. I see it.
08 08 39 14 CMP That stuff?
08 08 39 15 LMP Uh-huh.
08 08 39 16 CMP And - Yeah, it does keep on coming down here.
08 08 39 17 LMP Yeah.
08 08 39 18 CMP You can take a strip starting at the top of it and then come all the way to the bottom.
08 08 39 20 CDR You want a VERB 58?
08 08 39 24 CMP Is that what he said?
08 08 39 25 LMP I don't know.
08 08 39 27 CDR What does that do?
08 08 39 30 CMP Oh, I guess I didn't stop it in time.
08 08 39 34 CDR Didn't stop it in time?
08 08 39 36 CMP I'm going - going to attitude. And - ... That's the problem with that program.
08 08 39 45 CDR What's that?
08 08 39 46 CMP That thing goes off to - to play with itself and then you maneuver at - at 15-minute maneuvers; but
you got 8 seconds at the end. If you don't hit PRO on it, it stops right there and it won't keep the rate drive going.

No, but you have to watch it; it's okay.

That's just spectacular!

Well, I told you if you watch it. But you got to sit there and watch it. Which I ain't - guess I haven't --

At 10-minute intervals?

Huh?

At 15-minute intervals?

No, if it takes you 15 minutes to get into attitude --

Oh, by then you got to - you got to hit the maneuver when you get there. Yeah.

Whenever it gets through with this, 10 seconds or 15 minutes.

Yeah.

You got 8 seconds grace.

Should give you a tone warning or something.

Yeah.

Look at that. Isn't that something, you guys?

It really is.

It is really --

I don't care. I'm sorry E.V. [?] isn't getting his pictures. To heck with that. (Laughter)

Go ahead. I wish we had ...

Hey, Pete, this is really a spectacular view. Wait until I get the camera clear.
08 08 40 47 CDR Yeah, the old crescent Earth coming up there.

08 08 40 49 LMP Boy, look at it. There's old King right down there, the old crab.

08 08 40 53 CMP See it?

08 08 40 54 LMP Yeah, I can see it.

08 08 40 56 CDR The - the earthrise was just beautiful, and it just --

08 08 41 00 LMP Well, you look like ... -- came up like gangbusters. We were looking right out the window --

08 08 41 02 LMP Right down here.

08 08 41 03 CDR -- and there you came, and right now --

08 08 41 05 LMP ... are?

08 08 41 06 CDR -- you're a - almost a - just a crescent Earth, just a very sliver out there. And I tell you, we can hardly wait. I know we got a couple of things to do before we get there, but we're looking forward to it.

08 08 41 23 LMP Did you tell them about sunset?

08 08 41 25 CMP What about sunset?

08 08 41 27 LMP I - I mean earthset? Did you tell him about that? No?

08 08 41 30 CDR No. What about it?

08 08 41 31 LMP I - I just want to try it.

08 08 41 33 CDR Tell him.

08 08 41 34 CMP Earthrise. Take a look now.

08 08 41 37 LMP Houston, another great view that we had right before TEI was your - your prime earthset. Your crescent was - your - the lit - light crescent of
the Earth was tangent to the lunar horizon. And, as you went down, you ended up looking like a --

I bet you'd like ...

-- big bull horns up there.

Look at all those swirls.

Yeah, why don't you get some of those? I --

I have made it.

Thanks.

HIGH GAIN to AUTO.

Got to have it. I don't think that thing's gonna work. It's beeping.

That's the antenna. Well, increasing rate. Isn't it?

It's like a billiard ball. That's what people can't understand, how flat and round it --

And my TSB has got a red stripe on it. Will you put some water on it and - and throw it across, please? Just --

TIME SKIP

-- LMP on Apollo 16 has been wearing for the last -- well, ever -- all the way out and all the way back.

If y'all get tired of looking, you can just cut off the lines or go to COMMAND RESET or something.

Huh?

One final shot of the beautiful Moon.

Say, Charlie, why don't you try to give us a close-up of each guy and maybe we can get a playback for the wives tomorrow.
Okay, we'll do that.

You want - you want ...

I think if we get in the LEB ...

... always work ...

That ain't ...

Okay, we got it off. We'll turn - bring it up in just a second.

All right, you guys. ...

(Laughter) ... Boy, you know, I think this is ...

picture.

Huh?

Huh?

...

I know it. (Laughter)

... like that, you could go all over the country.

... Flight Plan right in front of you.

Yeah, ...

Are you?

Huh? Yeah, I'm trying ... (laughter).

Oh, yeah. Don't want to waste any time.

This is the relaxing attitude for the well - for the seasoned space traveler.

Boy, I can hardly believe the last - 3 days, Pete. That was - yeah, these Cayley Plains was really the most fascinating place I've ever been in my life and will ever hope to go, and we sure had a good time collecting all the rocks.

Shift.
08 11 18 27 LMP Yeah. Okay, let you look at somebody else now.

08 11 18 38 LMP (Laughter) You - you say? What - what was that?

08 11 18 46 CMP ...

08 11 18 50 CDR (Laughter) Okay.

08 11 18 53 LMP That's great. He said everybody in the MOCR has been interpolating but the Surgeon; he's standing on his head.

08 11 18 59 CDR (Laughter)

08 11 19 04 CMP Hey, tell him ...

08 11 19 08 LMP Okay. Ken just turned the camera over. You can have him - turn the other way now. Then maybe the rest of you will stand on your heads.

08 11 19 39 CDR Are you transmitting? Okay. I don't know if you can see this or not. See this dirty hand? Can you see that? Can you see the dirt under those fingernails - can you see the dirt under those fingernails? That's Moon dust. You talk about a - you talk about two dirty human beings. It took 10 minutes before we could get Ken to open the door. As soon as he saw us, he wanted to close it. And - and we're still that way. Yeah, wait until you see some of these rocks and we - and some of the data that Ken's got. That's really something. That's the - the Moon around Alphonsus. I got a chance to look at it today for the first time, and - it's really - it's really a strange place. How's everybody doing down there in MCC? Is - is everybody starting to take it easy for a change?

08 11 20 48 CC Oh, I think we're all breathing easy now. And if we can, we'd like to get a quick look at the CMP because we're going to have to give up the lines here in a couple of minutes.

08 11 20 55 LMP Yeah. Okay, will do.

08 11 21 08 CDR Excuse me, Ken.

08 11 21 11 CC The only - the only really neat guy on the crew.
Huh? ...

... 

What did you say? You must be blind.

He does dress pretty well.

Notice the reflection off the bald head?

Did the Surgeon do a back flip on that one?

Negative. He's not agile enough.

Ken doesn't look like he is either.

(Laughter) I tell you, in a J-mission spacecraft, you either - you either have to be a midget to do that, or have thought about it a lot before you try it.

Okay. We're - we're gonna sign off here. Here comes the lens cover.

Okay, thanks a bunch, guys. We'll be talking to you again in a minute.

Okay. Thanks, Pete. We'll go back to SCI on the S-BAND AUX.

Okay. And for thermal reasons, as soon as you can, we'd like to go on now and get into PTC.

All right. We'll start up.

We're for that.

..., Ken.

Let me move out of here, T.K. Okay. What'd you have?

What's happening down on Earth?

Say again, Charlie?

You got any newsy items for today?
08 11 23 24  CC  No, I guess we don't have anything going on right now, Charlie.
08 11 23 29  LMP  One mom - Is that what you want, Ken?
08 11 23 32  CC  Everything's routine. If you want a news report, we can dig one up, I think.
08 11 23 38  LMP  No, it's not important. Wondered what - we hadn't had an update in a while. Y'all must have ran out of pa - -

TIME SKIP

08 14 51 48  CDR  How's everybody doing down there at MCC?

TIME SKIP

08 20 51 23  CDR  Yes, sir.
08 20 51 25  CMP  Thank you.
08 20 51 35  CDR  I really slept good last night. Really did.
08 20 51 37  CMP  Boy, I did. (Laughter)
08 20 52 03  LMP  ...
08 20 52 05  CDR  By the time we get ready, we - we've got to go back and land. Of all the dumb things (laughter).
08 20 52 11  CMP  That's about right.
08 20 52 25  CMP  Hey, how about hitting the GAMMA RAY, SHIELD OFF, once you're in? Let's see, I guess we aren't in yet, though.
08 20 52 38  CDR  It's in work.
08 20 52 39  CMP  Okay.
08 20 52 43  CC  Apollo 16, Houston.
08 20 52 45  CMP  Hello.
Roger. For your information, old Mother Earth's got you now, and you're coming home.

Well, that's nice to know.

Hey, Hank --

How about some words --

-- it had us last night.

How about some words on the midcourse 5?

Roger. We're just now showing you crossing under the Earth's in - sphere of influence.

...

Roger. Midcourse 5 will be about 4 feet per second. It'll be an RCS burn.

Roger.

Did we - we didn't turn the mapping camera on, did we?

No. You want that turned on?

Just a second, let me find it here. It's presently off, right?

Yeah.

There's a place in here where it says turn it off, and then some place it says turn it on.

Well, that's just something - maybe you could clear it up.

No, I found something in the Flight Plan where I turn it off. Hank, would you say again what you wanted done with the mapping camera, please?

Roger, Ken. We just want to run the film out and leave the door shut. We want to get the IMAGE MOTION, ON; MAPPING CAMERA, ON; and barber pole plus 2. That gives us a higher speed.
Okay. We'll leave this in the center position, then. Okay; the MAPPING CAMERA, ON; top switch.

Okay.

Yes.

I should move the switch and all of a sudden it went barber pole --

It's looking great. The IMAGE MOTION did that.

Okay; and we go to ON.

Okay. Now, take the switch below - this one. It's momentary. Get it up until you get barber pole.

There you go.

Okay; now two more.

One, two.

Okay.

And, 16, Houston. Whenever you get a chance, we'd like to get yesterday's crew status and today's crew status report.

Okay. That's in work now, Hank.

I tell you, let's tell them this about PRDs: we'd like to put that off until we can ... up to date ... stand there ... PRD ... Sure it's down there, Charlie?

Okay. ... just reading ...
These were not on board.

Well, I wouldn't worry about it.

That's where I hid a ..., wasn't it? Yeah.

Gingerbread?

Yeah, I guess we better. How about if I get a P52 in there before you pull up that Boyd?

No.

I can't believe how well it ... Man, I must have gotten 7 hours of sleep. I can't believe it.

... on there a while.

TIME SKIP

Seven hours, good sleep. Num - A-4: none. Day 9: still skip the PRD reading for the same reason; 6-3/4 hours, good sleep. A-4: none. On the CMP, day 8: B-1, 15059; B-3, 5.5, good sleep; B-4, none. Day 9: B-1, 1564; B-3, 7 hours, good sleep; B-4, none. On the LMP, day 8: skip the PRD - the suit was out of the way then - C-3, 7 hours, good sleep. C-4, none; and Charlie remembered to get his PRD reading - reading machine out today, and C-1 is 21143; C-3, 7 hours, good sleep; C-4, none.
Did you have comm there at all? It sounds like you lost him.

Did we lose you during any of that, Hank?

Negative, John. We got it all.

Okay. Now on to the menu. We'll get back to the - to good old Casper here. We're working on day 8, meal C. And for the CDR, substitute hamburger for beef and gravy and scratch the gingerbread. And for day 9, meal A: scratch the peaches and the grits. Day 9, meal B: scratch the hamburger and add meatballs with sauce. For day 9, meal C: scratch the pecans.

And for the - for the CMP - What did you eat on A-1 and B what - A and B?

Huh?

Did you eat anything on A and B? The first 2 days in that thing?

Shoot, I don't remember.

Okay, I'll agree with it.

Why don't we get the -

You leave my pencil with it?

Yeah. And we got this burn coming up before we eat.

Yep. Yeah, I can do that while you're eating.

... 

Huh? That RCS?

Yeah.
I think something ...

Is that right? ...

I guess they are? ...

... about it. I - I had to put mine up in ...

Ken, you got to get off my bag. Ken, whoa, Ken.

(Laughter) All night long with no biomed.

I sure had it plugged in. I had it plugged in the night before last, too. I don't understand that.

... get that up ...

Okay. Well, why didn't you tell me, I could have changed this sensor out - this - It's probably in this box here, don't you reckon?

Well, here's a spare --

Yep.

-- ...

...

They're about --

TIME SKIP

-- you guys.

..., Ken?

I didn't notice.

How big is the Moon this morning?

Haven't gotten around to looking yet, Hank.

Think we ought to tell the docs we - I'm using some of this skin cream? For this dryness? On my arms?
08 22 07 44 CMP Want to?
08 22 07 46 LMP Well, I mean they'd be real pleased.
08 22 07 48 CMP You're gonna start something. Are you sure you want to finish it?
08 22 07 52 LMP What do you mean, Ken?
08 22 07 53 CMP You're gonna start a long discourse with those guys. They're gonna want to know what it is, describe it to them and --
08 22 07 58 LMP I tell you it's nothing on my arm - I'll tell them it's nothing.
08 22 08 02 CMP Well, okay; but just - just be prepared to - It's not a simple thing of saying, I'm doing this.
08 22 08 06 LMP Yeah, they're - Okay.
08 22 08 10 CMP I think you're probably doing the right thing, but beware.
08 22 08 16 LMP They've - they got -
08 22 08 18 CMP Yeah.
08 22 08 19 LMP They get upset when there's just medication gone.
08 22 08 22 CMP Yeah.
08 22 08 23 LMP And we haven't told them about it.
08 22 08 24 CMP Yep.
08 22 08 25 LMP So I put it on my cut.
08 22 08 28 CMP They're gonna want -
08 22 08 30 LMP They're gonna want to know why you didn't report your cut.
08 22 08 32 CMP Yep. It's - Let's see, I don't know which side the Moon is on, ... do is look. In fact, I'll tell you what I'll do. When we get there, is I'll ask the computer where the Moon is. It knows. It knows everything.
Ah, yes.

Sees all; tells all. My own version of Hal.

There it is, right out the hatch window, on this side. See it, John? If you hold a silver dollar up to the window, it might cover.

Okay; that small? Aw, the stinker.

No, it's probably bigger than a silver dollar.

I bet at arm's length it -

Yeah, it's a little bit bigger - no, it's a little bit smaller than a silver dollar.

Yeah, it's smaller.

At arm's distance.

Fifty cents?

Fifty-cent piece, yeah.

Well, feels like we're about --

If you really want to be precise, we'll check the distance, and you can give them a ratio. And then they'll really think you're smart. They'll think that's a bunch of...

Okay, Hank at - at arm's distance, if you cup your fingers around it, it's about as big as a 50-cent piece. But you can sure tell that it's changed size for the smaller, but we still feel like we're pretty close to it. Like I - I don't how far away from it we are, but probably about maybe 25 - 30,000 miles.

Fifty-three.

No, Ken tells me 53. That's why they let the computer run it.

Roger. We show you about 30,000.
30,000? Okay.

Couldn't be. Look at that; 187,000?

Take it back; they rewrote about 38,000.

Okay.

EECOM. The Flight Plan's wrong, then.

Well, now, we - Yeah.

That 30,000 here is still in my lunar - lunar sphere, aren't you?

-- we'd like for you to bring up the high gain, and you're there.

Roger.

I don't understand that.

What are the angles?

Minus 90 and 285.

For some reason ... only got ...

Oh, is that right? Oh, I thought it was 240. That's where I missed it.

Yeah.

...

It's minus 90 and ...

285. Let's see, did we put the shield back on?

Yeah.

Okay. How about looking at the repress package and tell me if it's repressed.

It's repressed.

We're gonna --
Can't get the —

We're gonna use it. Well, I've got minus 90 and 171. Of course, that's the center of the Earth. Mine may be over on a limb. Boy, that's a big discrepancy. There's no way that y'all can — Well, at minus 90, it doesn't matter. That's right.

... problem on that ...

Okay. Let's do it; avoid the gimbal problems.

Yeah.

TIME SKIP

-- ... Let me do it.

No, I'll do it.

... orange juice.

I'd like some orange juice, too. There isn't any.

Anybody want a fruit cocktail right now? I got two of them in my TSB ...

... some orange juice?

... hot water ... cold.

Try it and be quiet.

Oh.

Golly!
08 23 01 20  LMP  What'd you do?
08 23 01 21  CMP  Oh, boy. All over (laughter). Gosh.
08 23 01 31  LMP  ...
08 23 01 41  CMP  Oh, look at that. Hey, I'll tell you what would be a good idea.
08 23 01 47  CDR  What?
08 23 01 48  CMP  Planning purposes, while you got food open, is to stick a couple of juice bags into the - in somebody's TSB for post-EVA. Because it's going to be awhile after that before we get around to getting unsuited and all that jazz.
08 23 02 00  CDR  Okay. ...
08 23 02 03  CMP  Well, okay. I was going to stick my juice bag in there for post-EVA or maybe for a - a pre-EVA last drink. No. I won't do a post-EVA - Stick it in my bag. Okay; where's our trash?
08 23 02 28  CMP  Is our trash bag right down there? Yeah. How about the pills?
08 23 02 41  CMP  Got the pills down there, John?
08 23 02 43  CDR  Yep.
08 23 02 49  CMP  Oh, boy. Well, I'll say one thing, coffee up your nose clears out your sinuses.
08 23 02 55  CDR  That right?
08 23 02 59  CMP  Darn silly way to do it. I think I'm getting the hang of these pills. That gets to be fun. Okay, I take it - if you guys could -
08 23 03 25  CDR  What do you need?
08 23 03 26  CMP  Well, ... there's no way we can get ahead. Then we got to do it anyway. Defecate.
08 23 03 31  LMP  No. Uh-huh. Hank, 16.
08 23 03 35  CC  Go ahead.
Okay; that bat B charge is underway, and we've been watching this battery compartment. We're back up to 2 now.

Roger. Copy.

1.8, Charlie.

Well, okay. I'm sorry. It's still climbing.

No, it's important, though. It's only 1.82. Great difference as far as pressure is concerned if it fails. ...

Come on! Uh-oh.

What's the matter now?

My sausage got off my spoon.

Oh, I thought you had something major.

... how you eat that. Don't handle it, Charlie.

Well, I couldn't squeeze it out of there, John.

Couldn't, huh?

Unh-uh.

That's amazing. Something's screwed up here.

Try it on the - I know it - try it on the -- WIDE BEAM.

-- WIDE, to start - to start with. Start on WIDE.

But look at that, NARROW. You should - There is something wrong with the beam switching.

... better signal ...

It ain't working. Man, I'm glad as long as that --

I got it. I got it. It's working.

Glad -
08 23 05 24 IMP

Here it comes.

08 23 05 25 CMP

Yeah, but it - it's not working. Yet this works like a - Hank, I don't really know what's going on with our antenna. It's - I get you the best signal strength by going to MANUAL and NARROW. And every time we switch to either AUTO or REACQ, why, it seems to break - break some kind of a beam switch, lock, or something. And we tried going to MANUAL and WIDE and then working it through REACQ and then bringing it down and things. That doesn't help any. Would there be any future in trying secondary electronics, the servos? Think it's in the antenna electronics itself. Which one you going to fix?

08 23 06 07 CC

Okay; INCO says we're just right on the line there. Why don't we just leave it in MANUAL and NARROW?

08 23 06 16 CMP

Okay.

08 23 06 17 CDR

All right, who's the guy stole my sugar?

08 23 06 19 CMP

Oh-oh. I didn't know you were going to eat that. I'm sorry.

08 23 06 24 LMP

It's already reconstituted.

08 23 06 26 CMP

Was it? I don't think that's a purely reconstituted, what's in there. There's a - that - that hasn't reconstituted.

08 23 06 34 LMP

No.

08 23 06 35 CDR

Well, Charlie, I don't need it. Here's another one.

08 23 06 38 CMP

And it ain't reconstituted. That's all I threw in there, honest.

08 23 06 42 LMP

...

08 23 06 43 CMP

I did not, Charlie. But you may reconstitute this one.

08 23 06 49 LMP

That ... reconstituted.
08 23 06 58 CMP: You know, I think we - you know, I planned to use this bag because I thought we had about 3 days on it. Now, I'm gonna throw it away, and we got --

08 23 07 05 CC: ... I'd appreciate it if from time to time, you'd just give me an idea where you are in the checklist.

08 23 07 10 CMP: We is at the eat period.

08 23 07 15 LMP: Ken, I don't think we ought to stow that big bag; that's not hardly much in that big one. We ought to do the small one.

08 23 07 20 CMP: That's what I was thinking about; putting this into something else.

08 23 07 22 LMP: That's right. We need this; we don't need that.

08 23 07 25 CMP: We'll be ready to start into that checklist in probably about 10 minutes or so. And it just didn't seem like it was proper to - to go ahead and press on the rest of the day without stopping for something.

08 23 07 39 CC: ... terminate that battery B charge and keep an eye on that thing. If it gives - gets above 3, give us a call.

08 23 07 51 CMP: Okay. Why don't you call us back in about 30 minutes and ask us to look at it, because that's not the kind of position where we can keep an eye on it without making a conscious effort at it.

08 23 08 03 CC: Okay; we'll give you a reminder, and --

08 23 08 06 CDR: There you go, Charlie.

08 23 08 07 CC: -- ... we're gonna want to vent it again back down to 1.

08 23 08 11 LMP: Okay; do you want to vent it now? It's at 2.

08 23 08 18 CC: Negative. They want to see if it'll stablize.

08 23 08 21 LMP: Okay. You've got - the bat B charge is terminated, and we'll watch the battery's compartment pressure.
(Singing) Do-dee-do-dee-dah-dum. Let's see what's a good - We got one more of those plastic bags - overwrap bags in - in your TSB, John. Haven't we?

I don't remember seeing it there yesterday.

I don't remember seeing it either, but -

While you're eating there, I'll tell you a little news. The Astros have ... they are tied for first place in the division.

Well, that's outstanding. Congratulations!

(Laughter)

That is a first. Maybe we could make a little presentation - to Biafra - as we throw the bag out. On behalf of CSD, Rita Rapp, all Medical Directorate, all you starving people of Biafra, we're throwing away - 1 month's supply of food for the Trojan Army.

(Laughter)

What d you say we're looking for here? A ...

You remember that - that plastic bag like we ... the last day of the LM - threw the LM? There were two of those left over.

Yeah.

You can't find them?

Here it is.

Okay. Let's see if I can transfer this stuff into it and save this bag, because this is a big - this is a good bag for trash. We got another - we got a ways to go yet.

Gonna transfer all this stuff in here into it?

Yeah.

I don't think you can make it work, man. There's a lot of trash in here.

Well -
Okay, I'll give you a normal countdown, Ken.

All right, sir.

Starting at about 35.

That'd be just fine.

Okay.

Okay, the GDC looks like that's pretty much - but I'm gonna dress it up.

ATT 1, RATE 2. ...

Has nothing to do with the uncaged gyro. Okay. Attitude reference. Okay.

It gimbaled that time.

Two minutes. It's working now.

Okay. Charlie's got the watches?

Yep.

Okay. We've done everything down to here.

That's two jets, 17 seconds. IMC.
DAY 10

What about this urine bag? We gonna save this? You want me to put it in the jett bag?

Don't need it.

Huh?

Don't need it.

Well, we might need a trash bag, John.

That ain't true, Charlie.

... What about ...

Okay. It says "Stow under LMP couch" - It says, "Open EVA umbilical bags."

16, Houston. When you get around to - prior to suit donning, we recommend that you lubricate those wrist rings using the maintenance kit that's stored in A-8. And you might try to work some of that lube in around the locking rings and work the ring several times to try to free them up a little bit - the locking rings.

Sir?

...

Okay, Hank. We've already done that --

Okay. "Open EVA umbilical bag" --

-- we did that when we doffed the suits yesterday as best we could.

-- "Unsnap the top strap and remove the spacecraft EVA umbilical all the way to the second tiedown strap" --

I'm not sure I had my ... whoops.
09 00 18 56 CDR  --- "Unsnap the second tiedown strap."

TIME SKIP

09 03 21 47 CDR  Okay, Ken. What - what do we have to have on that, plus or minus 5?
09 03 21 51 CMP  Seven.
09 03 21 52 CDR  Seven.
09 03 21 54 CMP  That's on the sight here. Wait a minute.
09 03 22 01 LMP  What you need, Ken?
09 03 22 02 CMP  Oh, I can't - I got this visor stuck down, and I can't see what it is.
09 03 22 06 LMP  Yeah.
09 03 22 08 CMP  Got it locked down.
09 03 22 09 LMP  I meant to tell you about that.
09 03 22 16 CDR  Need somebody to hold your foot there, Ken?
09 03 22 19 CMP  Yeah, wouldn't hurt.
09 03 22 20 CDR  I got ahold of it.
09 03 22 22 LMP  Okay, I got the other one.
09 03 22 23 CMP  Okay. I got to rotate it another few degrees. You got both my feet there?
09 03 22 32 LMP  Yeah.
09 03 22 34 CMP  Okay.
09 03 22 37 CDR  Why didn't you go out there with a pocket? Take some goodies out with you.
09 03 22 41 CMP  Okay.
You got two pockets: one on each foot.

All right. Let go of my feet.

Okay.

I'll get up here to attitude.

Where's my foot, there? ... outside, I don't think. Let's see, Charlie -

What?

Gonna have to - Let's see -

I got you - your - your -

All right, just a second. Oh, that - Guess what we didn't think about.

What?

What's that?

Oh - that Velcro strip lays right in front.

Of the sight?

Yep.

Well, I'll tell you what.

Hang on. I got my scissors right here.

Why don't you open the thing and let's forget it? It ain't all that important.

I'll be right with you.

Okay.

You'll never - you'll never get those scissors out, Ken.

Ken, I wouldn't do that.

Okay, okay.
Okay.

Anybody ought to be able to figure that mean attitude close enough within 7 degrees.

Okay. What we do need to do is to ... up minimum impulse.

Oh, for goodness sakes. Okay. How man - how far, Ken?

Oh, it's got to go about 3 degrees.

Okay, going to FREE.

You want me to -

... do it.

Let me get this old thing out of your way, John.

Attitude in yet?

... we're going up 3 degrees.

... you catch it?

Pitch down, then.

... you pitch it?

Pitch down?

Yeah.

Pitch down. We're going down. I just put in one click down, Ken.

Okay. Up should be the right direction on this thing.

You said up - you said down.

I said up the first time, and it - and that looked like you went the wrong way.
Day 10

09 03 25 14  CDR  I didn't do anything.
09 03 25 16  CMP  Oh, okay. You need to go up about 3 degrees, then.
09 03 25 21  CDR  Is that the right way, now?
09 03 25 23  CMP  I can't tell that you're moving.
09 03 25 26  CDR  I put in three pulses.
09 03 25 27  CMP  Has the attitude changed?
09 03 25 29  CDR  No. Want me to fire — If I go to CMC in FREE, it should — it should fire in min impulse, right?
09 03 25 37  CMP  Yeah, and that's moving now. Moving in the right direction.
09 03 25 40  CDR  Okay.
09 03 25 42  CMP  Let it rise. The slow rates are about another minute.
09 03 25 49  LMP  Guess what I caught floating out the hatch?
09 03 25 51  CDR  What?
09 03 25 52  CMP  What's that?
09 03 25 53  LMP  A ring.
09 03 25 54  CMP  Oh, is that right?
09 03 25 56  LMP  Yeah. I think it's yours.
09 03 25 57  CMP  (Laughter)
09 03 25 58  CDR  Yeah, it is.
09 03 25 59  LMP  Here, hold it, John.
09 03 26 00  CDR  That's it, all right. We got it.
09 03 26 03  LMP  Just got it going over the sill.
09 03 26 05  CMP  (Laughter)
In fact, it had already gone out and hit you and was coming back when I saw it.

(Laughter) Boy, how's that for luck. Okay, John. We've got another - another - another 30 seconds of drift, and we'll be there.

Okay. And just - Can I go back to AUTO when we get there?

Yes, sir.

Okay. And then stay at that attitude?

Yeah.

All I have to do - I have to enter on this display, right?

Nope.

Okay.

It'd take you back, if you entered on that.

Yeah. No, it'll stay - it'll hold what it's got.

Won't it - won't it trim to those numbers that's in there?

...

You've been out about 25 minutes now, Ken.

Okay.

That's funny, I've got 35.

Well, maybe I - I didn't start my watch exactly right.

It's more than that because I started after we started --

Okay. Why don't you go to AUTO?
Going back to AUTO.

Come on. Let's open that thing.

Okay. Are you ready?

All set to open it.

Ready.

You got a clock, Charlie?

Yeah.

Stand by.

Needing some help, Ken?

Yeah, can you hold my feet?

Yeah, I got them. Well, that one slipped out, but I'll get this one. Can you get it open?

There it is.

Okay -

MARK.

Okay. Pull me in.

Wait a minute.

I'll pull myself in.

Okay.

Hoo.

... over there, Ken.

Is the MEED open now, Ken?

Yes, sir.

Fifteen seconds it's been open.
09 03 28 39  CMP  Been open 15 or 20 now.
09 03 28 41  CC  Okay. I didn't get your mark.
09 03 28 42  CMP  I'm sorry.
09 03 28 43  CDR  Yeah, it's on 22 seconds now. I'm timing it.
09 03 28 47  LMP  Me, too.
09 03 28 50  CDR  What time you got?
09 03 28 52  LMP  Twenty - 30 seconds.
09 03 28 54  CDR  Okay. I - I got 3 seconds after that. Did you watch him open it?
09 03 28 57  LMP  Yeah, I had it - when he hit a mark, I started my watch.
09 03 29 00  CDR  Okay, well, you're 3 seconds ahead of me then.
09 03 29 03  LMP  I don't think it's exactly -
09 03 29 06  CDR  Well, we got to - we ought to have two watches because this event timer's not working.
09 03 29 09  LMP  I know it. We lost a pencil.
09 03 29 20  CDR  Only one?
09 03 29 22  LMP  Saw it float out as I was climbing out.
09 03 29 26  CDR  Probably mine. I think - I had one up here on the ...
09 03 29 32  LMP  I don't understand that suit loop.
09 03 29 34  CDR  It's the first time anything like that's ever been in outer space, isn't it?
09 03 29 37  LMP  Yeah.
09 03 29 38  CMP  What kind of pressures you have now?
09 03 29 39  LMP  I got 4 and John's got 3.5. It looks like it's the - the - the flow divider or whatever's in there that's not doing right.
I'm in fine shape, Charlie.

How about a suit gage?

Huh?

Could be a suit gage, yeah. I - I kind of feel like I got more than 3-1/2 in this suit, because I can't do nothing with it much (laughter). And if it - if it were 3-1/2, I'd be able to - to break it.

Okay, coming up on 2 minutes, Ken.

Okay.

Is it hot out there now, Ken?

I'm very comfortable.

You got good -

MARK.

-- flow, huh? What's your suit - what's your pressure, Ken?

3.85.

There you go.

Like a champ.

John, could you give us a cuff-gage reading?

Okay. I got 3.85, Hank.

I got 3.95. Did he ask for all of us or just for Ken?

I can't transmit, Charlie.

I - Well, Ken can transmit for us.

Hey, Hank. Did you want all of them or just mine?

Roger. Could we get one from John and Charlie?
Okay. Say again what you got, John.

I got 3.55.

John has 3.55.

And I got 3.95.

Charlie has 3.95.

3.55. Roger. 3.95.

That must be sublimating from somewhere.

It's coming off - it's coming off the - conden - the condensation is coming off the glycol lines.

Oh.

Probably getting some off the bulkheads, too --

Yeah, that's right --

-- it's drying up the...

I mean to tell you, there's a lot of cottonpicking water in this machine. Didn't you notice all them bubbles leaving? That was all water.

Yeah.

Okay, how's the time coming?

... You passed 3 minutes.

Seems like an eternity.

It sure does.

It's gonna be the longest 10 minutes in history.

MARK; 03:30.

Houston, you are now wit - witnessing one of the longest 10-minute periods in history.
09 03 32 02  LMP  That - that's the wro - -
09 03 32 04  CC       Roger.
09 03 32 05  LMP  Yeah.
09 03 32 08  CDR  That is the wrong thing to say (laughter).
09 03 32 10  LMP  Huh? (Laughter) I don't know, that 2-1/2 min-
utes - the 2 minutes and 42 seconds was pretty long, too. (Laughter)
09 03 32 18  CMP  (Laughter) Yeah, I think that one was longest.
09 03 32 23  LMP  Yeah.
09 03 32 27  CMP  I was looking at our dump nozzles out here and there's very little buildup on the - on the waste dump.
09 03 32 34  CDR  Listen, if anything happens during this period, the only thing we can say is that we died so that the germs may live, and that ain't no good at all.
09 03 32 42  CMP  (Laughter) I don't plan to have that.
09 03 32 45  CDR  That's right.
09 03 32 48  LMP  Okay, we've passed 4, coming up on 04:30.
09 03 32 50  CMP  Okay.
09 03 32 51  LMP  MARK.
09 03 32 55  CMP  Henry, was there anything else you wanted to know about the SIM?
09 03 33 04  CC  Roger. When you were arou - around the mapping camera, did you happen to notice the condition of the cable that lays between it and the bulkhead there?
09 03 33 11  CMP  No, I couldn't see down in there, there was too many shadows.
09 03 33 17  CC  Roger; copy.
The camera looks --

And on the stellar camera door, how far out was it?

Oh, I'd say the -- the last folding lip is up against the handrail. Well -- Yeah, just about that far.

We've passed 5 minutes, Ken.

All right, thank you.

Are you comfortable, Ken? You want me to hold on to something?

No, I'm just fine. I got nothing to do but just loop my finger around this thing.

Okay. Can you see the sun sight?

On this -- on this event timer, Charlie, I got 04:16. Is that right?

That thing ain't working. No. Can you see the sun sight, Ken?

No, sir.

Okay, now. We need a mark for Charlie at 09:30 and one -- I mean for 09:30, we need to mark and for 09:50, we need to mark.

Right.

Okay. Look at that piece of ice, John.

Yeah.

How you doing, Ken?

Fine.

Okay.

First time anybody ever laid it on the line for a microbe.
09 03 34 32 LMP I'll say.
09 03 34 35 CMP (Laughter) I wish you wouldn't put it that way.
09 03 34 37 LMP Can you see the surge tank?
09 03 34 39 CMP No.
09 03 34 40 LMP John, can you see the pressure?
09 03 34 43 CDR Yeah, it's - You won't believe what it is.
09 03 34 47 LMP 860?
09 03 34 48 CDR No, it's 720. Just about what it could get. It just stays there. It's really in good shape.
09 03 35 05 LMP Oh, no, I must be nervous. I've taken two leaks already. (Laughter)
09 03 35 08 CMP (Laughter)
09 03 35 14 CDR Okay. Now I got 5 minutes on this thing.
09 03 35 16 LMP No, it's coming up 7.
09 03 35 18 CDR Okay.
09 03 35 20 CMP (Laughter) No wonder that was such a long - Hank, we got another one of those event timers that times at some pace other than universal time. But don't worry about the MEED; we've got a watch on it.
09 03 35 39 CC Okay; I'm timing you down here, too.
09 03 35 40 CMP Okay; we got regular - regular watches on it, so it's okay.
09 03 35 44 LMP Tell him to give us a mark at 8 minutes.
09 03 35 47 CMP Yeah, why don't you check us at 8 minutes, Hank?
09 03 35 52 CC Will do.
09 03 35 56 LMP How, Moon rock.
09 03 36 07  LMP   I think this may be tuff - tuff breccias, John.
09 03 36 15  CDR   Call them like you see them, Charlie. You said that once or twice.
09 03 36 20  CC    Coming up on 8 minutes -
09 03 36 22  CC    MARK.
09 03 36 24  LMP   Within a second.
09 03 36 25  CMP   Okay; thank you, Hank. We're right with you.
09 03 36 30  LMP   And with the time delay, I'm probably right on. Ten minutes to look at the bugs. You got to be crazy! (Laughter)
09 03 36 47  CMP   Did you get a good look at the Earth, Charlie?
09 03 36 49  LMP   Oh, yeah. And I spun around and looked at the Moon, too. The thing that impresses me, though, is how black it is, Ken. Yeah, is it black!
09 03 37 04  CMP   I'm really surprised I don't see any stars.
09 03 37 07  CDR   Charlie's only said 25 times it's black out there.
09 03 37 11  LMP   What?
09 03 37 12  CDR   You've only said that 25 times. (Laughter)
09 03 37 14  LMP   ... see ... (laughter).
09 03 37 15  CDR   It really must be black out there! (Laughter)
09 03 37 17  LMP   It's really black! (Laughter)
09 03 37 21  CMP   (Laughter) Okay; what time is it?
09 03 37 22  LMP   MARK; 9 minutes.
09 03 37 23  CMP   Okay; 9 minutes.
09 03 37 28  CDR   Okay; after 10 minutes, give mark, close experiment, and turn lock 90 degrees CCW.
Okay; he needs a mark at 09:30 and --

09:30 ... 10 ... in 10 minutes.

Okay. Okay; coming up - it's 09:25 now. Stand by. Okay, Ken.

MARK; 09:30.

Got about 30 seconds, Ken.

Okay; I'm on my way to the experiment. Charlie, can you hold my feet there?

Yeah, I got you.

And would somebody give me a call at 10?

I will.

Okay; give a call at 09:50, too.

I will. 09:45 now.

Man, that sight's right on.

MARK; 09:50.

Okay. We're counting down the last 10.

Three, 2, 1. There's 10 minutes.

Closed.

Okay.

And make sure it's closed and locked, Ken.

It's closed --

Turn lock 90 degrees --

I'm working on the lock.

Turn lock 90 degrees CCW.
What if those bugs get out of here -

They'll die.

Charlie, can you hold my feet real good there?

Yeah, I got you.

How about both of them?

No, I can't reach --

Okay.

-- the other one, it's above my head, Ken.

How are those TV cables down there, Charlie?

They're okay.

Are they well out of the way?

Yeah - they're - No, they're not well out of the way, but they're out of the way.

Okay. Now what you got hung up on last time over there was that pan camera --

Okay.

-- hanging thing, and it's well out of the way.

How you doing, Ken?

Well, I didn't get it locked.

Ninety degrees CCW.

Yeah, I'm - I'm working on that, John. I got to compress the seal. I'm trying to get some leverage on it.

Oh, man.
Looks like it's the other cor - the corner next to your lock - the lock, Ken, that's not quite closing. You want to bring it in and let me help you?

Wait a minute.

Probably got some bubonic plague in that son of a gun.

Man, I'll bet you that UV got them. Now, that looks pretty good, Ken.

Well -

Looks like it's locked to me.

No.

... Closing.

TIME SKIP

Yeah.

...

... AUTO.

... there's one.

John, what does it say do with the MEED?

It doesn't say. It says, "Remove center couch and temporary stow under commander couch. Stow couch straps in R-5." "MEED and cover, A-7 - with cover, A-7, installed." No, no, it doesn't say what to do with it yet. Why don't you just don't worry about it. Huh?

No, it says "Stow in A-7," John.

No, it doesn't.
09 05 43 05  IMP  Stow in A-7, all of these things. And the MEED --

09 05 43 08  CDR  With cover installed, yeah, that goes in A-7.

09 05 43 14  CDR/LMP  The OPS --

09 05 43 15  CDR  -- "EVA equipment container, fold up place next to OPS; penetrometer drum; secure the strap; entry boots and ropes with other straps; restow headrest pads, loose; vacuum cleaner bag."

09 05 43 28  CMP  ...

09 05 43 31  CDR  Well, let's not do that yet. There's a whole bunch of other things that they want you to do here first. You want to do it in order?

09 05 43 36  CMP  ...

09 05 43 37  CDR  No. It says "Remove center couch and temporary stow under the CDR couch." Now that ain't even in order.

09 05 43 42  CMP  ... couch ...

09 05 43 45  CDR  What it says here.

09 05 43 46  CMP  ...

09 05 43 48  CDR  Oh.

09 05 43 49  CC  16, let's go OMNI Delta; we reacquired a high gain when we went into a new attitude.

09 05 43 54  CDR  Say again.

09 05 43 55  IMP  Okay.

09 05 45 56  IMP  That's a pretty good program they've got that can figure out how to point all these experiments at the right places in the sky.

09 05 46 36  IMP  Ah, that's old R-12 floating by. Humm. Hey, when are we supposed to cap the relief valves on our suits? John --
09 05 46 49 CDR  What?
09 05 46 52 LMP  When are we supposed to cap the relief valves on our suits?
09 05 46 58 CMP  ...
09 05 47 04 LMP  Well, I had done that when I got my suit out, because I thought it was in the procedure, and I said, well, I'll get a step ahead. But I don't ever ---
09 05 47 13 CMP  ...
09 05 47 16 LMP  Doesn't matter. How many rads did I get? Not a one.
09 05 47 28 CMP  Okay, I'm coming down. ---
09 05 47 36 CDR  It says, "Stow couch straps in R-5." It says, "Stow OPS hose, actuator, and flaps. Verify O₂ is off." "Stow OPS hose, actuator, and flaps. Verify the O₂ is off." It says, "Report the OPS pressure to Houston."
09 05 47 55 LMP  How's the maneuver?
09 05 47 58 CDR  Doing good. We're almost there. How much - how much is OPS pressure, Ken?
09 05 48 11 CMP  ...
09 05 48 18 LMP  Really?
09 05 48 19 CDR  Houston, we still got 1300 psi on the OPS. That's being reported as per page ---
09 05 48 29 CC  Roger; we copy.
09 05 48 30 CDR  --- page X/3-22, in the middle of the page.
09 05 48 36 CC  Roger; copy.
09 05 48 54 CDR  Then it says, "Remove from A-7 to stow in U-2, two HEL bags," whatever a HEL bag is. Doesn't say "Helmet bag." It says "HEL bag"; H-E-L b-a-g.
09 05 49 25 CDR I lost my pencil. Charlie, you took it --
09 05 49 29 LMP I have it. I got it.
09 05 49 33 CDR Got to have it back.
09 05 49 34 LMP Here you go.
09 05 49 35 CDR Thank you.
09 05 50 27 CDR Huh? It says, "Stow OPS hose, actuator, and flaps. Verify O₂ off." "Report OPS to Houston." We did. "Remove from A-7 to stow in U-2: two helmet bags and one accessory bag, and the cabin fan filter"; that's "if required, if required." Then it says, "Remove A-9 rock bag and temporary stow."
09 05 51 03 CDR Where's the A-9 container?
09 05 51 08 LMP We do this alphabet again?
09 05 51 13 CDR Yeah. Charlie. Okay, it's, "Stow in A-7: OPS, flag up, feet inboard." Charlie, I'm going off comm.
09 05 51 29 LMP Okay.
09 05 52 00 CDR Okay, EVA equipment container, fold up, place next to OPS.
09 05 52 51 CDR ... Where's that?
09 05 53 41 CDR Okay, ... "Secure the strap." ... "Secure the strap."
09 05 54 05 CDR "Stow entry boots and ropes" ...
09 05 54 36 LMP You want me to ...
09 05 54 38 CDR Yeah.
09 05 55 38 LMP Houston, 16, on the high gain.
09 05 55 44 CC Roger. Loud and clear, Charlie.
And it doesn't look like it took, Pete.

... again?

Okay, Pete. I went to MANUAL and tweaked up the PITCH a little bit.

... hand controller ...

And then went to NARROW and REACQ, and it looks like we got it now.

..., Charlie.

Yeah.

... to us ... now, Charlie.

Well, I am. I'm gonna get out of the suit. How's that, huh? Hello, tape recorder. It's running. You know, I forgot to ask INCO how that old pro [...? temp was. Never once did I ask him.

TIME SKIP

Knew we'd find it.

... cover.

Close the X-ray alpha cover.

Okay.

Is - is the - Wait a second, Charlie. Is that thing retracted?

...

Okay. ... One of these days I've got to learn what's in this package.
You want to take that for me?
Pretty hard to make the old ...
When does that happen? ...
This thing is leaking like a sieve.
... 
... 
This place is gonna - it smells like an outhouse now. I don't --
... 
... back? 
... got ...
... rubber to the valve in there.
That makes me mad.
Ken is watching it. ... just give me the word they want to watch the middle gimbal angle.
... around it. ...
In fact, he was just flying around it.
... 
Ah, my salvation! I found you, you son of a gun. It's an extra thing.
... Charlie.
... Charlie.
Charlie.
... hear ...
OMNI Charlie.

OMNI Charlie.

I found it.

No, one of these things.

Charlie, you've had it. (Laughter) I don't know ... I saw it go floating by here a minute ago. That's about the truth. You put it in the seat there, I thought. Notice it didn't stay there (laughter).

... I'll find it for you, Charlie.

Okay.

Just hang in there ... Don't need it right this minute, do you?

No, ...

Ken, that's the ... on that EVA.

Oh, shoot.

Oh, shoot?

Fantastic. No way ... everything ... run perfect.

A lot of hours there.

... Why was it embarrassing?
Man, that place was dazzling.

No. I'm trying to finish off the one I started about 10 minutes ago. If I don't finish it, old Henry is going to get all mad at me and quit.

She's running on choked flow right now, supposed to be.

Here's one of our basalts, Charlie.

Oh, I been looking ... I put it in here. ...

What's that?

No, there it is; it's back in there.

Thank goodness! Oh, that feels so good. Oh, oh. Oh, man.

I got some ... here.

Yeah, that's what I want to do is wash up and get some dirt off my hands.

You can have a couple, Ken.

We got - we got some hand ...

Really?
These guys from the South, they just don't wash regular (laughter). So used to digging in dirt, they just don't — don't even bother.

That ...

Is that ... my ...?

Yeah.

...

Where is it? Where's the stowage bag? I don't see that. Oh, there it is.

Yeah, I'll get some.

...

First night? First 5 minutes. I told those doctors when we hit that deck, I want a shower. I've been there before, and I ain't putting up with anything else. I ain't gonna do nothing.

... (laughter) ... back off.

... you guy ... over there?

...

...

... (Laughter)

That's telling the whole world, yeah.

...

I get the feeling that potassium — You want some?

...

I got the feeling that potassium in there has a lot to do with that. I really do.
09 08 17 48 LMP Well, that was the reason ...
09 08 17 56 CC ...
09 08 18 11 CDR Roger; understand. HIGH GAIN, minus 10 and 260 on HIGH GAIN. And follow that up by the GAMMA RAY - GAMMA RAY DOOR - ALPHA/X-RAY DOOR to OPEN, and the GAMMA RAY SHIELD, on?
09 08 18 29 CC ...
09 08 18 33 CDR Plus 10 on the HIGH GAIN.
09 08 18 37 SC ...
09 08 18 38 CDR Supposed to go OFF.
09 08 18 40 LMP ...
09 08 18 45 CDR Okay, the DOOR's OPEN, and the SHIELD's OFF.
09 08 19 26 CDR I don't know if I had any records in there or not. I'm going to get me some music.
09 08 20 25 CDR What are you doing? ...
09 08 20 29 LMP Testing the light.
09 08 20 41 LMP ...
09 08 20 50 CDR Oh, boy!
09 08 20 52 SC (Music)
09 08 21 01 CDR Yeah. ...
09 08 21 11 SC ...
09 08 21 14 CDR I don't care who it is; it sounds great.
09 08 21 16 SC ...
09 08 21 32 CDR Yeah. Yeah. I played football with Diercino [?] in high school. Yeah, he'd make - he was a big 190-pound kid when I played. ... he went to Florida and got to be all Southeastern Conference or something. Just goes to show you. Me, I used
to knock him around, and when I can knock somebody around, you - you ain't any good. You're really bad. I sure would hate to knock - to knock him around after he got to Florida (laughter).

... Okay; plus 260 - 280 and plus 10.

Is that HIGH GAIN?

HIGH GAIN, yeah. Plus 10, he said. Got it, Charlie?

... Put the UV thing in there, Charlie.

TIME SKIP

Where do we stow the high gain ...?

Okay, Pete. We're putting TELCOM GROUP 2 to AC2.

... Okay, I put GR - GROUP 2 to AC2. They said for some reason they lost the high gain - they lose the high gain.

... Me, too. That's the way they want it.

... No, we're - they're controlling the antenna.

They have - they can only control between Delta and what we have control of.

Well, I switched it to HIGH GAIN.

Do you think the high gain will ...?

I'm turning the VOICE, OFF.
09 11 22 48 CMP ...?
09 11 23 00 CMP ... Charlie?
09 11 23 01 LMP No. I done that last one.
09 11 23 15 LMP Houston, 16.
09 11 23 19 CC ...
09 11 23 20 LMP Pete, are y'all satisfied with our antenna setup?
09 11 23 37 CC ... TRACK mode to REACQ and NARROW BEAM.
09 11 23 43 LMP Okay. You've got REACQ, NARROW BEAM, and HIGH GAIN selected.
09 11 23 53 CC Okay. That's fine, Charlie. Thank you.
09 11 24 08 LMP Okay.
09 11 24 31 LMP (Laughter) I haven't ..., John, ...
09 11 24 36 CDR ...
09 11 24 44 LMP I get hot under there ...
09 11 24 47 CMP ...
09 11 26 14 LMP ... ditty bag.
09 11 26 16 CMP Well, it's pretty ...
09 11 26 17 LMF Yeah.
09 11 26 22 CDR What we want to do is ...
09 11 26 42 LMF Well, the way I sent them over is the way - is the way they were to be stowed because - they were - and that's the way we stowed them over there.
09 11 26 49 CMP ... That was the way we had stowed them ...
09 11 27 22 LMF Yeah, but the decon bags that came ... in, too
09 19 40 55   CDR Changes on initiation before we stop, huh? Okay.

TIME SKIP

09 19 55 49   LMP You mean the experiment?
09 19 55 51   CDR No.
09 19 55 52   CMP ...
09 19 55 55   LMP What do you want - the shield?
09 19 55 57   CMP That ...
09 19 55 58   LMP No.
09 19 55 59   CDR That was the GAINSTEP.
09 19 56 00   LMP Well, it's ..., but it's shield on the bottom.
09 19 56 04   CDR Oh. Oh. Excuse me.
09 19 56 05   LMP Okay.
09 19 56 06   CDR No wonder I couldn't find it. I'd be over there looking for a month.
09 19 56 30   CDR ...
09 19 56 31   CMP Okay. Oh, that's why it didn't - that helps. I turned it off so I wouldn't keep you awake.
09 19 56 37   CDR You thought - you thought my ears were going bad, huh? All right, we'll cycle our cryo fans. I'll start the watch.
09 19 56 47   CMP Good. I got the watch.
09 19 56 50   CDR Speaking of starting watches, there's my watch. Come back here, you rat.
09 19 57 35   CMP Excuse me, Charlie.
Okay, where's that Super Gal located? Is that where it's at, huh?

I wasn't very far off.

I can't believe that they can tell any difference. That's roll - yaw.

We didn't scratch anywheres close, did we?

Why we went to 189 when we could have gone to exactly the opposite up here, I don't know. ...

That doesn't make a lot of sense, does it?

No.

... in, but that doesn't ...

Well, what's going on here?

It's not moving?

... here.

I don't - Well, we're supposed to swap, yeah.

Am I supposed to be on it all this time?

Huh?

Am I supposed to be on?

No.

What am I doing wrong, John?

I'm sure I don't know.

How come my DAP isn't running?

11101. Okay?

Why don't those needles center? I think you didn't get any power to that switch.
09 20 01 39  CDR   Check the group 2s.

  TIME SKIP

09 20 19 30  CDR   ... meals.

09 20 19 31  CMP   Yeah. Okay; now - you got 6-1/2, Charlie, and no - and no medication?

09 20 19 41  LMP   No. That's right.

09 20 19 42  CMP   Yes --

  TIME SKIP

09 20 32 57  CDR   Why would you --

09 20 33 01  CMP   Well, they were turning the power off there for a while because of a possibility that you - they thought that - you were sleeping, you might bang it.

09 20 33 12  CDR   Kick it off, huh?

09 20 33 13  CMP   Yeah. And I guess I can't say you couldn't do that, because I - I caught myself when I was - the times I was knocking switches was when I was moving around trying to do things.

09 20 33 28  CDR   I tell you, I fell asleep with my hand on the integral lighting the other day, and I - and it - and I woke up still holding on to it. Funniest thing I ever did in my life. Boy, that tape recorder switch's just going like crazy.

09 20 34 07  LMP   Okay. I ... to the last. If I eat all this, I'm going to explode.

09 20 34 11  CMP   What, Charlie?

09 20 34 12  LMP   If I eat all this, I'm gonna explode.

09 20 34 16  CMP   ... peaches ...
I like those peaches, Ken.

Apollo 16, Houston. If one of you have a chance, would you read out the battery compartment pressure ...?

2 --

2.5

-- 2.5 and holding.

Okay.

That's what it was - When it was get --

Okay; Ken says he looked at it several times during the evening, and it's been there most of the night.

Okay; fine.

Hey, John, could you spin around here? ... behind you.

Yeah, Charlie. Just a second.

Sure.

Sir? Okay. Here's the Flight Plan. We're doing what we're supposed to be doing for a change.

Here you go, Charlie.

Thank you.

... Oh, no. Here's another - another whole package. Excuse me.

What have you got I can substitute for the cracking - for the grits?

...
Day 10

09 20 36 26  CDR  Not for the grits, no. I don't want to hurt your feelings, Charlie. I mean for my coffee.

09 20 36 34  LMP  I'll get you some out of the food locker over here.

09 20 36 39  CDR  Yeah, maybe a dark drink. Not bad. You mix this with coffee and you know what you got? It's bad.

09 20 36 51  CMP  ...

09 20 36 54  CDR  (Laughter) I'm going to try that and see what they say. (Laughter)

09 20 36 59  LMP  What is that?

09 20 37 01  CDR  I'm going to mix this with coffee and put it in - down in there and see if they can tell what it --

09 20 37 08  CMP  ... Why don't you do that?

09 20 37 10  LMP  Surprise.

09 20 37 23  CDR  Oh, oh. ... that gonna be funny. (Laughter)

09 20 37 42  CDR  Charlie, these grits are all right.

09 20 37 44  LMP  They are ...

09 20 37 45  CDR  Mm-hmm. Just what I'd always eat when I was starving down South.

09 20 37 56  LMP  Kept people alive.

09 20 37 58  CDR  Sure did.

09 20 38 12  LMP  Kept lots of people alive. You know the old saying.

09 20 38 21  CDR  I think these are better than the Skylab peaches.

09 20 38 25  LMP  What we used to say - what my roommate used to say - He was from New Jersey - he said you had to be near dead to eat grits. I'll never forget the time that he - we were going through - eating at the mess hall at Georgia Tech, and he thought he was getting some Cream of Wheat --

09 20 38 47  LMP  Yeah.
and they put it on his plate, and he couldn't understand why they didn't put it in a bowl. Man, he spit grits.

... had them.

He spit grits for 20 feet when he put them in his mouth - He thought they were trying to kill him.

... down, John. ...

Yeah.

...

Sorry.

(Cough).

Well, another thing I ought to do a lot of exercise today. Get the old cardiovascular system back in shape.

First thing we ought to do is go to work on the Entry Checklist, right? Entry Stowage List?

What for? We haven't figured it out.

We could get the TV.

That's way back over here. Right on the very bottom of everything.

We should have thought of that.

Huh?

We should have thought of that.

... changing ....

Yeah.

I never could --

TIME SKIP
09 20 52 50 CDR  What's that?
09 20 52 52 CMP  We're getting better. Started late and got through early.
09 20 52 55 CDR  That was real organized this morning, Ken.
09 20 52 57 LMP  It worked great. You just cutting that meat.
09 20 53 01 CMP  Yeah. That seemed to work out pretty good. ... pretty good?
09 20 53 07 CDR  We should have done that all along - I guess.
09 20 53 08 CMP  Yeah. We should have ...
09 20 53 11 CDR  Don't know it, until you do it.
09 20 53 12 LMP  ... --
09 20 53 13 CDR  We ought to recommend that to the 17 guys.
09 20 53 15 CMP  The trouble is, you know, you try to talk to the guys before the flight about this and -- ...
09 20 53 17 CDR  ... about a year before the flight.
09 20 53 20 CMP  -- things like how you defecate, how ... you have to be. They ain't gonna listen.
09 20 53 26 CDR  Why, no.
09 20 53 28 LMP  ...?
09 20 53 29 CMP  What else ... ... probably won't pay any attention. ... 
09 20 53 36 LMP  The only - I did listen to Stu Roosa on that thing ... He said get naked and be prepared to get stuff all over your hands. And it happened. (Laughter)
09 20 53 46 SC  Just like he said, huh? There's no consolation in that.
09 20 53 50 CDR
Careful.

John, what can we do on the stowage or something that - maybe just to occupy my mind - -

Well, you know they got a geology debrief for you guys at 262 hours.

When is the press conference?

At 268.

...

And I really want to - I want to take some photographs of the - of the....

Okay.

And I would like to take photos ... while you guys eat - interior photos. ...?

Okay.

I really think - I need ... - the only thing that you could really have ... is plastic ...

You can't get that. I ... them my lightweight headset. I got to try that thing. Is there a way to get that? It's down there in the A-8, isn't it?

It's a pain.

I'm going to take mine off - -

- - ... supposed to be. They're absolutely worthless.

You want to wear these things for the press conference?

Think that's only way they can hear you.

Okay.

That's wh - one reason I've been wearing mine all the time is it's the only way I can get Houston.
The DSE won't pick up the lightweight set hardly at all, unless you do what Charlie is doing, otherwise you won't be ...

Probably be better if you --

Take off your neck.

... you in.

...?

Yeah.

Thank you.

...

Open?

How many did we have? ...

Wonder why they wouldn't be happy just to have a press conference on the radio?

Too ... of the ...

Oh, is that right?

I don't know - I don't know how we're going to set this thing up.

You can set it right back here on this bracket, John.

Oh, yeah.

And point it right - it'll - and point it to the LEB, and we can all three get in the picture.

I'll get in the ... while you guys can get in the picture, okay?

That's at 262 - 262 you say we got a geology debriefing?
Where does this here go, I wonder? I wonder if they think that this thing is supposed to stay in here with a --

Yeah.

-- pressure suit.

That'll go.

Oh, I'm sure it will. I just -- ... like ... have had it in there because actually it won't go ... --

... a box of ...?

Oh, man! Going to be ...

Hey, let me - let me - Okay, Charlie --

That's your friend.

Charlie, don't stomp it like that. Let me see if I can get this in there. Okay?

I think you can now. ... I got some ... going in there. Well, I'll just let them float by you.

I know what I'm gonna do - brush up my teeth.

... (laughter).

No, I don't have the urge yet, you guys. It'll be a couple of more hours. Right in the middle of the press conference.

Right.

Well, we got to sign off now.

TIME SKIP

We're just trying to give you some time to hunt for the peanut butter.
09 21 14 11 CMP ... 
09 21 14 12 LMP No, I don't. They want John on biomed. Me tonight. 
09 21 14 26 CDR You know, when I put my biomed on, my heart starts hurting ...
09 21 14 36 LMP Why don't we stick the pills down the Volkswagen pouch, Ken?
09 21 14 42 CDR I'm going to get in my seat to put this biomed on so it won't interfere with anybody.
09 21 14 50 CMP Okay.
09 21 14 51 LMP Hey, John.
09 21 14 52 CDR If it won't interfere with anybody, I will.
09 21 14 54 LMP Hey, John. Why don't you quit getting up out - in your seat? Nice place to put the biomed on.
09 21 15 00 CDR That's right; my heart feels good.
09 21 15 09 CMP ... get outside on EVA ...
09 21 15 16 CDR (Laughter) Shall we tell them that?
09 21 15 20 LMP To what, did he say?
09 21 15 38 CDR Charlie, you going to have to help me position these.
09 21 15 40 LMP Okay; I'll be glad to.
09 21 15 52 LMP The little dealies are right here.
09 21 15 54 CDR Oh, yeah?
09 21 15 55 LMP On the other end. Right - right here are the stickums, and the - and the sponges are in here.
09 21 16 39 LMP (Sneeze, sneeze) There I go again.
09 21 16 49 CDR Don't hurt your eyes, Charlie - -
09 21 16 50 CC ... whenever you're ready for the geology, ...
09 21 16 58 CMP Ready, John?

09 21 16 59 CDR Yeah, we're ready.

09 21 17 01 CC Okay. Our first question here on the portable magnetometer - I forgot to re - I forgot to ask you. It was my omission. I was wondering what the temp label on the top - on the electronics box read, if you remember.

09 21 17 20 CDR Tony, you got to be kidding.

09 21 17 25 CC I was afraid of that.

09 21 17 29 LMP (Laughter) You got to be kidding.

09 21 17 33 CC Okay. And for Charlie there, we'd like to verify that on the third EVA when he was driving out to station 11 with the polarizer on, that he used nominal camera settings. He didn't allow for the polarizer.

09 21 17 51 LMP I did just what was on the top of the camera, Tony. Filter - I used 5.6 at 1/25, in the right position.

09 21 18 02 CC Okay. That's fine - that's great - that's what we needed to know. Okay. The next question we'll - we'll get when we get the rocks back, but I think - Well, maybe the best way to do this is to describe a theory that's coming up as a result of the rocks you've - that you saw there. It looks as if - or - a possibility is that an older theory that was discarded a few years ago may be the right one, that the Cayley is an outer fluidized ejecta from Imbrium. Fra Mauro would be an inner ring, and then Imbrium sculpture would be outside of that, and then the Cayley would be sort of slosh that filled up all the valleys farther on out. But some of the questions that the geologists are - are pressing here is something that might help them define that. And a lot of it is that they're just - can't wait for the rocks to get back. But anyway, at station 11, you described some rocks you thought to be tuff. Looking back at station 5 and 6, after seeing these at 11, do you think you might have seen the same kind of rock there? What we're thinking about is where you described the - the square crystals and the needlelike crystals in clasts. And
also, in the same question, were these crystals by themselves or were these - I mean, were the clasts single crystals or were the crystals in clasts?

Recalling station 11, the - the rocks - that big rock in particular was a two-rock breccia, and - I feel. And within the - within the bluish-black matrix, which made up one clast, one of the rock types, there were needlelike crystals in that. And the - the white matrix also had crystals in it.

Okay. And how - how does - how did those rocks compare to what you saw at station 5 - 5 and 6?

I knew they were going to ask these questions. I - may be - Tony, I'm afraid I'm not going to do any better with the answer to these questions than I do on the average field-geology trip where you got 10 stations.

And the rocks - -

Understand.

You know, the rocks that we were picking up at 5 and 6, that was a long time before station 11 and - and I - -

Understand. Don't worry about it.

-- I can't remember what the dang rocks looked like, to be honest with you.

We're gonna have an antenna switch.

I think there were some of the same, John.

Yeah, but I mean it's entirely speculative to answer a question like that on - -

TIME SKIP

The rock was facing - the side we saw them on was away from North Ray.
You need some help with that, John?

I'll make it, I think. It's run off somewhere.

Okay. And - Stand by.

Okay. Charlie, just before you left the - or during the LM closeout time, you started to make a remark about the change in character between the regolith - between the LM area and Stone Mountain, and somehow we got interrupted there and you didn't finish your statement. I wonder if you could finish what you were going to say - if you happen to remember? Can you characterize the difference in regolith between the LM area and Stone Mountain?

Stand by 1 on that one. Did -

Okay.

What you say, Charlie?

Those two regoliths seemed to be pretty - pretty much the same, sort of loosely consolidated and you sink right in. The one that I thought was impressive was up at North Ray where you - where it was very shallow, and you didn't sink in at all. Did you - do you remember anything being different about the two regoliths - between the LM and Stone?

No, I sure don't. We never stopped between the LM -

No. I mean between - say, up on Stone Mountain and at the LM.

Well, the one up at Stone Mountain was clearly a - We just sunk in more because of a lot of downslope debris -

Yeah.

-- in there. I'm sure of that.

Yeah. Tony, I think that - We're just sitting here trying to decide - recall, and I - right now the only impression is that you tended to sink in more up on Stone Mountain, which could be downslope movement of the particles, and - it was a - just
very loosely consolidated up there. You - everywhere you'd - you'd step, you'd - you'd sink in a couple of inches. And on the slopes around the LM it was the same way. And even, in fact, where we landed. Up around the ALSEP side, it was very loosely consolidated and as you walked you could - your foot would leave quite a imprint. And once we had pretty well turned over the surface around the LM and up on Stone, it would look like freshly raked ground and - to me. Stone Mountain - Smoky Mountain or, excuse me, North Ray wasn't like that at all. It was very thin regolith and, as we commented, yet we had a tough time raking because it was so rocky right un - within a couple of centimeters of the top of the regolith. Over.

Okay. Understand. I think your downslope movement there on Stone was probably - probably right. Although that wouldn't explain why it was harder at 5 and 6 than at 4. Well, anyway. Next question here - On that half-orange-sized rock that you put on the LFM, wonder if you could estimate - estimate how common that type rock was around.

Well, John picked up one just like it up on - It was a grab sample up on Sto - yeah, Stone Mountain. And it - and it - and it was one of the crystalline rocks with that sugary crystalline texture to it.

Like whitish rock?

Huh?

It was the whitish rock?

Yeah. And it was one of those whitish rocks that was a little dusty. I think - I think it's fairly common. We'll just have to see when we get the samples back, but it was my impression it was one of the three predominant rock types there.

Okay. Understand. And the soil at station 8 - was it white underneath the top surface like you described up at station 4 and a lot of other stations?

I can't remember. I don't think so. Do you remember that, John?
We kicked - we kicked some of that and I - I can't remember whether it was or not at station 8.

Okay.

I think it - Anyway, we sampled a soil sample there, and it is in the - it's in - it's in the box somewhere. But I can't - I certainly can't remember whether it was a - white underneath or not.

Okay. Understand. And just subjectively, could you compare - now that you've been up fairly close to Smoky and on Stone - could you compare the two - two structures?

They looked the same to us.

Okay. Well, that's --

And I --

-- all of the geology questions.

Okay, I wouldn't be surprised but what they aren't the same. When Ken and I and Charlie looked at it in this real low Sun angle, I - I guess that's - As far as geometric form, it certainly looked - it was the hummocky material from the Descartes region is - is the way it looked. Right across Smoky - right through that whole region, it looked like a single unit, and - and I guess that would be my interpretation of it at this point. But it's sure speculation, but I would guess that. And I - I wouldn't be surprised but what that we don't find a lot of these rock types from one region very close to another region being about the same.

Yeah, Tony, that was - I was just going - to add to that I was just - I had the same impression. Looking at the - the South Ray, with the black and white streaks up the wall - up on the interior of the crater, and also at Baby Ray, being very stark in contrast. And then at North Ray, having that same impression but more subdued. And the rocks appearing to be very similar --
<table>
<thead>
<tr>
<th>Time</th>
<th>Caller</th>
<th>Role</th>
<th>Transcript</th>
</tr>
</thead>
<tbody>
<tr>
<td>09 21 52 37</td>
<td>LMP</td>
<td>See how that stuff powders off on your fingers. Look at that. Look at that white come off. Then that leaves that crystal. Now, you got nothing left but the crystal.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 10</td>
<td>CDR</td>
<td>Slosh from Imbrium. What a bunch of bull. (Laughter)</td>
<td></td>
</tr>
<tr>
<td>09 21 53 16</td>
<td>LMP</td>
<td>I wouldn't believe that in a million years.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 20</td>
<td>CDR</td>
<td>Yeah.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 25</td>
<td>LMP</td>
<td>They got - they got a new model for the - the Cayley. They said it - Oops! - they say it's slosh - it's a slosh from Imbrium.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 40</td>
<td>CMP</td>
<td>Bull.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 41</td>
<td>LMP</td>
<td>That's my opinion, too.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 44</td>
<td>CMP</td>
<td>That - If it is, then that's a slosh all over the back side of the Moon.</td>
<td></td>
</tr>
<tr>
<td>09 21 53 48</td>
<td>LMP</td>
<td>Yeah. John and I were just talking. Our - my theory is that the Cayley - We did see some endogenic craters and that - and that - the Cayley is really a tuff breccia - the - the - the plain, and it - because the crystals in this tuff are the same - like this one right here - looked the same as those big rocks that we found up at North Ray and also in the adja - in the secondary craters out of South Ray. So underneath, you could hypothesize a model, and the rocks might prove me entirely wrong - -</td>
<td></td>
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<tr>
<td>09 21 54 24</td>
<td>CC</td>
<td>16, Houston. I've got a few deletions in your Flight Plan.</td>
<td></td>
</tr>
<tr>
<td>09 21 54 29</td>
<td>LMP</td>
<td>- - you could hypothesize - -</td>
<td></td>
</tr>
<tr>
<td>09 21 54 30</td>
<td>CDR</td>
<td>Hey, there you go.</td>
<td></td>
</tr>
<tr>
<td>09 21 54 31</td>
<td>LMP</td>
<td>- - a model of an underlying - -</td>
<td></td>
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<tr>
<td>09 21 54 32</td>
<td>CDR</td>
<td>Just a second.</td>
<td></td>
</tr>
<tr>
<td>09 21 54 33</td>
<td>LMP</td>
<td>- - crystalline basement.</td>
<td></td>
</tr>
<tr>
<td>09 21 54 34</td>
<td>CDR</td>
<td>You got a pencil, Charlie?</td>
<td></td>
</tr>
</tbody>
</table>
09 21 54 35 LMP  
Huh? Yeah.

09 21 54 36 CMP  
...

09 21 54 37 CDR  
Huh?

09 21 54 38 CMP  
...

09 21 54 39 LMP  
No, it's not, either. Somebody swiped it.

09 21 54 45 CMP  
I just don't find any ... basement rock anywhere ...

09 21 54 50 LMP  
I'm not - I'm not - I'm not saying total basement; I'm just saying --

09 21 54 54 CDR  
Okay. Go ahead.

09 21 54 55 LMP  
-- crystalline rock. And they were crystalline, Ken, just a sugar --

09 21 54 58 CC  
Okay, at 266 hours.

09 21 55 00 LMP  
Huh? They were not breccias, I guarantee you.

09 21 55 06 CDR  
266 hours. Go.

09 21 55 08 CMP  
...

09 21 55 10 CC  
Roger. Delete "GAMMA RAY, SHIELD, OFF." And ... --

09 21 55 13 LMP  
You could see the cry - that rock was a homogeneous rock, and you could see the crys - you could hold it out, and you could see the crystals.

09 21 55 19 CC  
-- delete that whole line where it refers to the "GAMMA RAY, GAINSTEP, on," et cetera.

09 21 55 25 LMP  
Just tells me that I found a rock that's a crystalline rock, and it's not a breccia in the true sense of the word.

09 21 55 32 CDR  
That's deleted.

09 21 55 33 LMP  
That somewhere down there --

09 21 55 34 CMP  
... breccia. (Laughter) ... --
Okay. And at 268 hours, at the top of the page —

That's right, but that is not the —

Go ahead.

... say accretion ... never have ... down there —

... comment.

Do what?

... never had ... accretion ... —

Okay. Go ahead.

Well, accretion does mean molten.

That's all of them for right now.

...

Huh?

Okay.

...

I'll tell you what I saw.

Okay. I'm coming ... Maybe I'm just getting ...

Huh?

... be another ... difficult.

Okay —

Oh, sure.

We'll be awaiting your call.

But in the — in the — in the small little model of the 12 kilometer —

Where else would we be?
-- the 12 kilometers that we visited, that is -- that is a hypothesis that could -- could work. That might not hold true for anywhere else but right there.

... hypothesis? You have to prove it if it's a hypothesis.

I know - I'm saying - it could be totally wrong that - and it's not even a hypothesis, it's a -- an impression I have right now - that -- and the impression could be proved totally wrong when they look at the rocks.

Observations in the rocks we picked up.

That the rocks in that South Ray ejecta are the same as the rocks at North Ray. So at least to the depth that they penetrated, there was some crystalline rocks at least to those depths -- at those depths. The rocks came out, and there they are; they got to come from somewhere. And then, covering this -- all this, and probably --

(Yawn)

-- predating, at least predating the -- the -- the event, the South Ray event, there was a volcanic episode of -- of -- of pretty pyroclastic nature that created a tuff breccia, and the clasts in the brecc -- in the tuff are the same as the rocks -- as the crystalline rocks that you brought back from the secondary craters.

... hypothesis ...

Well, I think they've oversimplified the thing.

They do.

The first thing, I think, is that probably that whole area was a big impact thing to start with, see? So then on top of that then happens all these
things that Charlie's talking about, and then after that - a while later - happens the Imbrium event.

Yeah.

And I don't think the Imbrium event had beans to do with what went on there. Because I don't think any of those rocks look anything like what they - those guys got up on the -

Me either. The Fra Mauro --

Fra Mauro or anything.

The rocks are totally different. None of them - they don't - we did not see one rock that looked like any of the other Apollo rocks, not one. Not one!

We'll tell them that today at the press conference.

Well, I can say it in truths. I don't think.

I don't, either.

Ken, some time when it's convenient - anytime you can get to it, we'd like to get a film status.

They want a film status, Ken, anytime you can get to it.

... 

Okay, Henry, he'll - Thank you.

Roger. No rush on that, Charlie. Just whenever you work it in.

Okay. You mean you want him to pull out every magazine and see how it's doing, or what do you want?

Let me see how detailed they want it.

And ask why! I mean, because we got some of these things stowed where you wouldn't believe. (Laughter) It's not going to be too easy. We're going to have to take the entry stowage apart to get at them.
We don't want to unstow anything. If he — if he's got it written down up there somewhere, that would be satisfactory; whatever his records show. If he doesn't, let's just forget about it.

Okay. Understand.

Hey, Henry, what are you looking for?

Roger.

What are you looking for, Henry? Maybe I can — I can help. If you're looking for mags that have film on them, I — that might not be so hard to track down, but — do you — do you just want to know what pictures we took?

We got — 

... doing that?

... medical kit back. I'm gonna get the salve out of there and give my arm another dose.

How's it looking? Staph got to it yet?

It's just — it ain't gonna — it ain't gonna get infected.

In an environ — 

It's already infected.

In an environment like this?

It already is infected.

I would expect the staph germs run around here two or three times a day, just taking a big bite out of it (laughter).

That stuff's supposed to be pretty good, isn't it?

No, it ain't worth a darn.
09 22 13 38 CDR ... 
09 22 13 39 LMP It ain't worth it.
09 22 13 40 CMP Sure?
09 22 13 41 LMP Yeah. All it is is some mild antiseptic. That's all it is.
09 22 13 47 CMP Oh, ... local antibiotics get absorbed in the tissues [sic] and all that stuff.
09 22 13 58 LMP ...?
09 22 14 02 CC 16, your tape recorder is running forward.
09 22 14 04 CMP Okay; thank you, Henry.
09 22 14 45 CDR Watch your foot there, Charlie.
09 22 14 47 LMP Wait a minute, John. You got to put this back in there.
09 22 14 51 CDR Oh.
09 22 14 53 LMP There you go.
09 22 14 54 CDR I think I'm losing my mind.
09 22 14 59 CMP Houston. We're having to take drastic measures. Our commander has lost his mind.
09 22 15 11 LMP ... --
09 22 15 13 CDR Take over the ship and go to Mars.
09 22 15 14 LMP I'm good at this. Turn off the lights (laughter).
09 22 15 20 CDR The only reason we're doing this experiment is because Charlie excels at it (laughter).
09 22 15 24 CMP My feelings are hurt. I can see them, too, a little.
09 22 15 28 CDR Man, I don't - I have been looking for those darn things. Maybe I'm looking too hard or something. I can't see anything. It's really frustrating.

CONFIDENTIAL
TIME SKIP

09 23 16 07 CDR ..., Ken.
09 23 16 08 CMP Oh, yeah. I'll get it.
09 23 16 10 LMP We ought to clean this. This hose has gotten filthy.
09 23 16 15 CMP What's filthy?
09 23 16 16 LMP That hose - that inlet hose on my side -
09 23 16 18 CDR ..., some - tape?
09 23 16 19 LMP Need a piece of tape.
09 23 16 21 CDR I'll get it for you, Charlie, ...
09 23 16 23 LMP Okay.
09 23 16 24 CMP You got the Flight Plan or something?
09 23 16 25 LMP John's got it.
09 23 16 33 CMP And John's got a pencil, bet you.
09 23 16 34 CDR Yeah, I got the pencil you bet me. We ain't got too many pencils. I hope we can get back without too many more Flight Plan changes.
09 23 16 42 CMP (Laughter)
09 23 16 52 CDR Shucks, I don't see the tape. There it is. We should have brought the tape over from the LM.
09 23 16 57 CMP It's right down here.
09 23 16 58 LMP I know it. I forgot it. Oh, ...
09 23 17 07 LMP Here you go, John.
09 23 17 11 CMP Hank, what was the jet you wanted to have me turn off?
09 23 17 14  CDR  B3?
09 23 17 16  CC  Roger. Bravo 1 so it won't fire in the SIM bay --
09 23 17 17  CMP  Bravo 1.
09 23 17 18  CC  -- if you used Bravo 2 and Delta 1 for roll, you'll be okay just to leave that configuration and maneuver on to the next attitude.
09 23 17 36  CMP  You want to use Bravo 2 and Delta 1. Is that affirmative?
09 23 17 44  CC  ... affirmative.
09 23 17 48  CDR  When do we get to dump urine, man? I got to dump so bad I can taste it.
09 23 17 54  LMP  Why don't you go in that - squirt it in that white bag?
09 23 17 55  CDR  Okay.
09 23 17 57  LMP  It's a while before we get to dump.
09 23 17 59  CDR  I recall.
09 23 18 02  CMP  Okay, Hank. They - that's not the jet configuration they gave us this morning because I did have the SIM bay jets - No, I'll have to look up those jets I had this morning, but Bravo I was one of the ones I had turned on.
09 23 18 23  CC  Roger. We understand that, Ken. The reason is that when we stop the PTC, the - we're - in the configuration you had, you'd probably use - you'd have to use Bravo 1 to stop it, and it would fire into the SIM bay. It probably never fired during PTC.
09 23 18 45  CMP  Okay. I see what you mean.
09 23 18 46  LMP  Boy, you have been frugal on the gas, Ken.
09 23 18 47  CMP  It ain't stopping. How come?
09 23 18 56  CDR  What ain't stopping, Ken?
09 23 18 59  CMP  Oh, you can't do that. That's right.
Hey, we get to dump here in just a minute, John.

What time?

In about 50 minutes.

How nice.

That's gonna be minus 40 and YAW 90.

On the high gain?

Yeah.

Wonder what we got.

It's REACQ.

From REACQ to NARROW.

Okay.

(Yawn)

Now, you went and changed dead band to 2 degrees in there ... --

That's right, I did.

Oh.

For this. And I didn't know whether that - what that'd do - they said to change NOUN 79 dead band to 2 degrees. I didn't know what number that was.

That's good. You did it right.

When's the press conference? It's a long ways from now, isn't it - 4 hours?

(Yawn) Yeah.

Hank, this one you want to do as a normal PTC, or do you want to use --

TIME SKIP
09 23 57 04 CDR When's that old exercise period start?
09 23 57 06 CMP I think next hour.
09 23 57 08 CDR Yeah. Hardly wait to get ahold of that Exer-Genie; I'm gonna tear it to pieces.
09 23 57 24 CDR Must be getting near the Earth; my sinuses are starting to bother me again.
09 23 57 37 CMP How about let's do some water dumps.
09 23 57 40 CDR Hey, yeah. Can we do that now?
09 23 57 45 CMP ... It says we can purge the oxygen from the fuel cell, urine dump, waste water dump - -
09 23 57 52 CDR Okay, what you want to set on here? It's reading 65 now. We're supposed to purge to what, 49?
09 23 57 57 CMP Forty-nine. So that's only 15 percent.
09 23 58 00 CDR Fifteen percent at 5 minutes?
09 23 58 02 CMP Five percent a minute.
09 23 58 04 CDR Three minutes? You want to put 3 minutes - I'll put 2-1/2 on there.
09 23 58 07 CMP Yeah.
09 23 58 09 CDR Is it running? Times 10?
09 23 58 11 CMP I think you need to - All righty.
09 23 58 19 CDR Okay.
09 23 58 20 CMP And open her up.
09 23 58 36 CDR Okay, that's under way.
09 23 58 54 CDR Here, let me put your - your little bag in there.
09 23 58 58 CMP Okay. Thank you. And let's see. I'll get a little oxygen purge going here.
09 23 59 08 IMP What time does the urine dump start?
Oh, flowing right now.

Let's wait until - let's do these things one at a time. They're gonna try to get something out of that. Let's at least give them a halfway chance.

I don't want to give them a halfway chance. I don't think they deserve it, Ken. You're just being overly nice to them. You want to look out the window and see if you can do it, or -

Okay. Just a second, I'll - Sure will. Okay, I got the first oxygen under way.

It's - it's raining!

Man, is it ever raining.

Man, is it ever. We'll leave the window open; that'll be a clue something's going on out there.

(Singing) It's raining, it's pouring. Well, I need some music to dump urine by.
DAY 11

10 00 00 02 CDR Music to dump by; I was just gonna suggest that.
10 00 00 05 CMP What kind of music is fitting, though?
10 00 00 08 CDR You might try the -
10 00 00 13 CMP Oh, heck, I think it got knocked out on the - It did. That battery!
10 00 00 19 CDR Where do they keep those?
10 00 00 21 CMP They go in a little bag. We finished that one, anyhow. They go in a little bag up here. I think they're in that far side with the little bitty Bull Durham sack.
10 00 00 32 CDR In here?
10 00 00 33 CMP Yeah, I think so. The little drawstring in the top?
10 00 00 42 CDR Yep. Are these the new ones or the old ones? There you go.
10 00 00 49 CMP I think we need another 2 minutes.
10 00 00 53 CDR The old ones have been thrown away, so we won't get them confused. Another 2 minutes to dump, right?
10 00 01 01 CMP Yeah.
10 00 01 04 CDR Going down to 60 percent now. Only supposed to go to 49, didn't you say?
10 00 01 10 CMP Yeah. What kind of music is a good music to dump by?
10 00 01 15 CDR (Singing) Music to dump by - How's your oxygen purge going?
10 00 01 29 CMP It's about time for the first one to come off.
10 00 01 31 CDR Okay.
10 00 01 33 CMP Put the second one on.
Put the second one on. That's oxygen, right?

Right. Okay.

It's on.

Okay.

Think this is ... popular music sandwiched on the end ... where it is.

If they'd have had the same problems we had on Apollo 8 - Borman was going out of his mind - he'd have shot himself.

I don't really blame him.

16, Houston. We show you 55 percent on the waste tank. I'll give you a call at 50.

We're watching it, Henry.

He knows from past experience it ain't good enough.

It ain't good enough from past experience is what you're saying?

I'm not saying that at all, John.

Okay.

Just thought I would help if I could.

You are, Hank. We're just teasing.

Looks like 49 to me.

Okay, turn it off.

Looks like 49 to us. Go; don't talk about it.

Roger. We show about 50 now.

I can't find the switch.

MARK; 50 percent.

Got it? John?
10 00 03 09 CDR Yeah. Okay, she's shut down.

10 00 03 18 LMP Got that ...

10 00 03 20 CMP No, not yet. It's only 1 minute. Okay, there's 2 minutes. Off.

10 00 03 33 CDR Okay.

10 00 03 34 CMP Number 3. Go.

10 00 03 35 CDR ...

10 00 03 50 CMP That's really a beautiful sight, though.

10 00 03 51 CDR It really is.

10 00 03 53 CMP You know what that reminds me of? You know these things that people have ... these little desk things and all with the - the fluid and a whole bunch of - -

10 00 04 01 CDR Looks to me like - -

10 00 04 02 CMP - - particles in it that looks like snow, and, you can turn it over and it stirs it all up? That's just what that looks like to me.

10 00 04 07 CDR Looks to me like snowing at night in bright light.

10 00 04 10 CMP Yeah. It's really beautiful. I hope those - those stereo pictures might show that. I hope so. I really want to do that part of the experiment right today, because I think that would be a beautiful picture to show. I guess we can get on with the urine dump.

10 00 04 36 LMP I'll get out of ... I got it.

10 00 04 41 CMP Why don't you dump my little bag first? You need a mark on that?

10 00 04 53 LMP What do you want to do, Ken, first?

10 00 04 55 CMP Dump my little bag first.
--- ... these circuit breakers ... ---

... dump ...

That's affirmative.

... switch to off, then ...

Okay. I'm gonna turn the dump valve off and change filters.

Okay, back to dump.

Going back to dump.

It's at 50 now.

Yeah, it doesn't seem to be making much difference, Charlie. In fact, that's good to hear. When you went back to dump, it - it got pretty good.

Yeah, but it's not dumping like it was officially, you know, that big range.

Yeah, well, that's a function of Sun angle.

Okay. Maybe that's it. The error - that's a function of Sun angle on the ... Okay. We'll buy that. You know, I was surprised how little stuff there was on that urine bottle, when I was out there.

Oh, yeah. We took pictures of it.

No, it was up in ... ---

... another bag ...

Okay, we're starting another bag.

Oh, hey, there's one that'll look good, the dark shadow. You can see a lot more.

Yeah, you can see a lot.

We're still losing ... ---

Bag's empty.
Bag's empty.

Maybe that's what we should have done before the EVA, Charlie, was to have a big water dump, so it wouldn't have looked so black.

(Laughter) Well, I'll put a little water in your ... (laughter).

If the headshrink would like to listen to that, that way we wouldn't be scared.

That's right (laughter). I'm proud to hear you guys were a little nervous about something around here. I thought y'all were completely fearless there for a while.

I've had more high heart rates in the last 2 weeks than I have in my whole life.

Pretty exciting business.

The thing that galls me about these shrinks and everybody else is - just like the way they tackle zero g in the body. Instead of fighting the thing and trying to make you live in a protected environment, you ought to learn to live in the environment you're in.

Yeah.

Let man adapt to zero g. Quit trying to force his body to stay in one-g condition, because it isn't gonna work.

But if you provide him with one g, it ain't gonna work. I've been trying to tell them that. I told them, listen, if you want a guy to stay healthy in zero g that can - so he can hack it when he gets back, you gotta give him that one-g feel.

Right. And there's no future in that. That negates all the reasons for going into zero g.

Well, and there's - you know - there's places on a spacecraft you could make it on, where you could put a - you could - you could put some ... - -
Yeah, but it's not productive. You'd have to spend 6 hours, 8 hours a day doing that.

You'd have to spend a lot of time in your zero --

Well, just - just getting adapted to one g. (Laughter) You know, who - who needs it? I bet you the old bod is gonna taper off here and settle down and be just happy as a clam. So all it means is when you come home, you're gonna be kind of like a vegetable for a while, if it gets real bad.

Yeah.

And you just learn to live with that. The only place I see a hazard is in recovery. If you had to really exert yourself --

Then that's really what we'd do, you watch.

I think I'd find a way to do that (laughter).

You watch. You may have the opportunity tomorrow or the next day.

That's right.

Yeah, recovery is just a different environment. We do have not much of it.

What do you mean, John?

I mean, once you get in the ship, you're in danger of sinking. (Laughter) That's what I mean, Charlie.

You're what? You're in danger of sinking? Oh. I tell you, I --

You don't have to worry about space, but you've got to worry about swimming.

Yeah, I - I ain't so impressed with - I ain't going to be breathing easy until my fanny is on that ship.

I ain't either. I never have been impressed by the way those guys pick you out of the water.
Well, I - I'll actually feel pretty good when they get a collar around this boat.

Yeah, me too.

Until they get a collar around this thing, I ain't going to be very comfortable, because my experiences with the stable II egress from this son of a gun have always been bad (laughter).

That's so pretty. That's just beautiful. Somebody would think you're nuts if you said there's nothing prettier than urine dumps. (Laughter)

They're going to wonder why we have a million pictures of those ... just fabulous.

The problem is, people have been setting focuses wrong, for one thing. What - what is the proper intensity to set this thing? I think these particles are real bright.

They are.

You keep a focus setting very close.

Yeah.

I wonder if - No, our TV just doesn't have the resolution to show that kind of stuff. It's a shame.

Do we have another eat period before TV?

Yeah.

About time for me to dump my bag down there?

Oh, yeah; just a minute.

I don't want to ask you to do that, because it - because it's kind of Rube Goldberg.

Dumping water?
10 00 22 51 CMP Yeah. Let's turn the heaters off, okay?
10 00 22 58 CDR I don't want the - You want me to turn them off now, right?
10 00 23 01 CMP Yeah.
10 00 23 02 CDR Okay.
10 00 23 04 CMP Now you can stop and do the hydrogen purge.
10 00 23 05 CDR You mean really stop, and --
10 00 23 06 CMP ... stop ... nominal. (Laughter) Okay.
10 00 23 11 CDR Where's the Exer-Genie?
10 00 23 13 CMP It's in my TSB.
10 00 23 15 CDR Is it still, huh?
10 00 23 18 CMP Yeah. I used it several times when I was solo. Finally worked out a pretty good routine. But I have absolutely no confidence (laughter) in those guys, because they'll let you do anything --
10 00 23 30 CDR ISS light.
10 00 23 32 CMP Could you cut - No. Okay. Okay.
10 00 23 44 LMP Temporary ISS?
10 00 23 45 CDR Right.
10 00 23 46 CMP 37777.
10 00 23 47 CDR CDU failed.
10 00 23 50 CMP Okay.
10 00 23 52 CDR Okay, Houston, we've got an ISS light and a 37777, and the --
10 00 24 01 CC ...
10 00 24 03 CDR Okay, the eight ball didn't move. It's a CDU fail light's what it is.
10 00 24 13 CMP 82, that's good. 130, that's good ... Okay, NOUN 20s all look pretty good.

10 00 24 22 CDR Yeah, ... all look --

10 00 24 23 CMP Okay.

10 00 24 33 CMP See if you hit that switch button accidentally.

10 00 24 35 CDR It's there. Okay, no switches were being touched at the time.

10 00 24 45 LMP Must have been a glitch, huh? One of the glitches?

10 00 24 49 CMP I'm glad it wasn't the middle gimbal, for a change.

10 00 24 51 LMP What gimbal was it?

10 00 24 53 CMP You can't tell.

10 00 24 57 LMP Are we in att hold?

10 00 24 58 CMP I am now.

10 00 24 59 CDR Gonna reset --

10 00 25 00 CC ...

10 00 25 05 CDR Want me to repeat that program alarm? Okay, program alarm reset.

10 00 25 21 CMP (Laughter) Oh.

10 00 25 25 CDR A CDU failed transient, huh?

10 00 25 28 CMP Well, let's not outguess it. We did that once, maybe. Maybe all our flap was for naught. Maybe we ought to ... (Laughter) The nice thing about this, John, is that with the CDUs out, we can still do a perfectly good entry.

10 00 25 47 CDR You'll have to gimbal.

10 00 25 49 CMP That's right.

10 00 25 50 LMP With what?

10 00 25 51 CMP G&N controlled entry.
You can?
I sure can.
Good.
He can do it with G&N controls.
How do you do that?
CDUs only talk to the computer.
Yeah.

They don't talk to the eight ball. And it - it thinks inertially. The platform just sits there and it does its thing, and it takes those accelerometers and integrates them and says, man, you need to go a little long. And if you needed to go long, you ought to have 112 degrees bank, and we just roll 112 and we'll plop it right in the same place the computer --

You'd have to adapt it.
Yeah. But it's got the same accuracy that the G&N has.
We already found that out, didn't we?
I hate to tell you, but that brought on a "Shhh."
(Laughter)
We'd better hurry. We got to give a TV show in --
(Laughter)
-- in 3 hours.
Three hours?
Yeah, thanks.
Do you want to dump your stuff down here, Ken?
Yeah, I guess.
Or do you want me to do it?

Let me stop and take a second look. That sure got my attention. I thought John was playing games —

I turned around and looked at that, and I saw the PGNS light and the ISS light on down there.

Well, at this point, I feel pretty comfortable even without the PGNS. Because ain't nobody going to NO-GO entry.

That's for sure.

At least not up my watch.

I'd sure like — like to have that guidance working, though.

Well, got to have a little stick time.

It's a mighty big ocean.

(Laughter) I would like for it to come in automatically, too, Charlie; don't worry. My desire to be a hero does not mean I want to fly manually, just to prove you can do it.

Now, Ken, you can do it. And I want you to prove it. (Laughter)

We will — if we need to, we will put it down right there, but I'd just as soon go automatic. I believe in computers.

Yeah, I believe in computers, too.

That — that warning light was like going in the gym, Ken. (Laughter) Automatic constipation reliever (laughter).

Man, I'll tell you, the way I've been — the way I've been having to go lately (laughter). I'm really getting worried; if I were in the gym now, I would never stop.
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<td>LMP</td>
<td>Are you going to dump that thing through a filter and everything, Ken?</td>
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<tr>
<td>10 00 28 19</td>
<td>CMP</td>
<td>No. I'm going to dump it through the little filter.</td>
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<tr>
<td>10 00 28 22</td>
<td>CDR</td>
<td>Okay.</td>
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<tr>
<td>10 00 28 23</td>
<td>CMP</td>
<td>I got to use the other end of that big filter --</td>
</tr>
<tr>
<td>10 00 28 25</td>
<td>LMP</td>
<td>Close it.</td>
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<tr>
<td>10 00 28 26</td>
<td>CMP</td>
<td>-- of the urine hose here.</td>
</tr>
<tr>
<td>10 00 28 31</td>
<td>CDR</td>
<td>Now promise me you're not going to clog up the urine tube. You ain't gonna promise me that, are you? (Laughter)</td>
</tr>
<tr>
<td>10 00 28 38</td>
<td>LMP</td>
<td>John?</td>
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<tr>
<td>10 00 28 40</td>
<td>CDR</td>
<td>Yeah?</td>
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<tr>
<td>10 00 28 41</td>
<td>LMP</td>
<td>This is the last dump anyway.</td>
</tr>
<tr>
<td>10 00 28 43</td>
<td>CC</td>
<td>... --</td>
</tr>
<tr>
<td>10 00 28 44</td>
<td>CMP</td>
<td>Have - have - ask him to hold on.</td>
</tr>
<tr>
<td>10 00 28 47</td>
<td>CC</td>
<td>-- ...</td>
</tr>
<tr>
<td>10 00 28 50</td>
<td>CMP</td>
<td>Ask him to hold on and we'll be there. And the Mal Procedures are up there in the little ... box.</td>
</tr>
<tr>
<td>10 00 28 55</td>
<td>LMP</td>
<td>Okay. Stand by.</td>
</tr>
<tr>
<td>10 00 28 58</td>
<td>CMP</td>
<td>That - they're in that box that's so hard to get to, Charlie.</td>
</tr>
<tr>
<td>10 00 29 00</td>
<td>LMP</td>
<td>Yeah, I know.</td>
</tr>
<tr>
<td>10 00 29 01</td>
<td>CMP</td>
<td>That's normal. Gosh. Who turned the lights off? We got a burned out light in one of the pumps down here. Let's see, scissors. Hold that for a second.</td>
</tr>
<tr>
<td>10 00 29 17</td>
<td>LMP</td>
<td>Can you reach it?</td>
</tr>
<tr>
<td>10 00 29 21</td>
<td>CDR</td>
<td>What could that be about?</td>
</tr>
</tbody>
</table>
Could what be about? The first thing I'd do is run a P52 and see if it knows where it is.

No, it's a - The REFSMMAT flag is still set.

We can check all those - -

The angles are good; it's got to know where it is, doesn't it? Better just keep you eye on that flag - -

Yeah, you - you could - -

-- auto -- auto transient wouldn't kill the REFSMMAT flag, would it?

Why don't we just go through this procedure and see what it says.

Okay.

Let me take care of all those things in an orderly, thought-out fashion.

Yeah, okay. Why don't I just move over here, and ... - -

How's the dump looking?

Still dumping.

Man, on the - Look at that! Look at that!

You're dumping like crazy.

It worked.

There it goes again.

Okay, we're in SCS mode. It doesn't matter.

Watch it. Okay, we just had the program alarm again.

... first and two.

Here you go, Ken.
... 

Here you go, John.

Okay, I'll get it in a second. I got that purge --

Again?

Yeah.

Drive us crazy.

Well, if it's a bit failure, we can avoid that by going around it. Let me get in there and work on that thing for a moment.

Okay, I'm turning this thing off and it's not - the hose isn't hooked up to anything, Charlie.

What - what - what - what G&W? Number 6, is that the one that --

Yeah. That's the one. Why don't you let me in there?

Why don't you let me slide in there, Charlie?

Oh, excuse me.

No, you're okay.

Reach it?

Yeah. Hey, John?

Yeah?

They slide in there.

In here?

Yeah.

Okay. Okay, the program alarm resets. This is a nuisance.

Well, let's - We've got nothing else to do.
The answer is transient ISS condition.

Okay.

Program alarm reset.

Okay.

SPACERCAFT CONTROL, SCS. And - Okay, then it says alarm code. No, the ... came off. It just came on again. Alarm code, ICDU to A/D check.

Did we get both the ISS and the program alarm?

Yeah.

I have P on the --

Every - every time?

Every time to my - Yeah.

Okay, I did - I haven't seen the ISS light.

Well, I - it is on down there.

That's the PGNS light down there --

No, there's an I --

Oh, what's it look like?

-- right there ... --

I only saw the --

-- my ISS light wouldn't come on, and so --

... Every time?

Every time.

Okay.

I've been watching it, because it goes out --
Does everybody --
-- which is why you --
Okay, but it goes out.
I don't give a darn; I seen it.
All right, John. I'm not saying it didn't come on, I'm saying it goes out as soon as the condition goes away.
Okay. Well, it's been going out just like that, too.
Okay. So it means that - right there, you know that it's a - it's a hardware-caused thing and not a software. And let her do --
Okay, ... again?
That's strange. Let's - let's do this thing, even if it only takes us to block 5.
... get an answer.
Okay, Hank. When we go into number 6 procedure, we come down and the logical answer out of block 2 is that the - the - you can reset the program lights, and the ISS light goes off all on its own; it's only on for a very short period of time. And that says that the transient condition stops. I guess we could take a look at - going down through the "No" path and try a block 6, but I'd like to have some concurrence on that before we do it.
You had some bad comm there. I understand you want us to go to block 6.
Okay, let's do - let's do - why don't you do a VERB 16 NOUN 23?
Y'all don't need the old IMP for that.
... and count. Yeah, before we started on that, we decided to take a look at 16 20 and it seems to be counting in all three axes, and they agree with what's on the FDAI.

And the SCS.

We're going to start in the block 40 now. And I'm going on the VOX so I can talk and read at the same time.

Say again, Hank. You - you're blocked out right in the middle.

I - I repeat, the FDAI and the NOUN 20s look like they're in as close agreement as I can read.

You can't tell the degree on FDAI down here anyway. I mean, there's that much dispersion in the instrumentation. You know that. Idiots.

Okay, can we proceed?

Okay, we ... and it's counting again and it's going back to the same numbers. No, it just blanked again. Let's see here. Maybe I was premature.

What happened there?

That's where it zeroed. Yeah, it - it's still showing about the same numbers, Hank. The biggest change was in the - No, they're all - they're all ball park, within readability, from one reading to the other. Okay, so out of that, I come up with a "Yes" answer and I'm going - looking at block 12.

Want to load that?

I guess in order to do this block 12, I have to be in CMC CONTROL; is that not correct?
Okay, I have no displacement. I did a VERB 43 ENTER, and then I loaded R-1, -2, and -3. And I got no needle displacement. Is there another ENTER required or something?

Okay. There's VERB 43 ENTER, plus 00250 ENTER, plus 00333 ENTER, plus 00333 ENTER. And the needles pulsed out and right back to zero.

That's correct.

What did he say?

Said stand by a little bit and they'll digest this.

Oh. Okay.

Let me --

Well, the very first thing to do is to just find out if I have a good alignment. It could well be the detec - the detection circuit.

What - what angle are we, Ken?

180 roll, 40 degrees yaw, and 130 degrees in pitch.

You know, lots of times when those things happen, it depends on - you can just be in a certain attitude and it'll happen --

Yeah, yeah, yeah. Sorry - sorry you got to isolate that to a bit when it's --

Yeah.
-- giving you the problems, so you don't have -- which one -- which attitudes to avoid.

It's just like a sim (laughter); 24 hours out instead of 2 ... --

Yeah, ... --

Yeah, translunar coast sim, transearth coast (laughter).

Well, I'd sure rather have these problems here than in lunar orbit.

Me, too.

You'd better believe it. Yeah, did we -- would -- would we still be in lunar orbit?

No, we'd be on the way home --

No, we'd have been on the way home.

-- but 48 hours away instead of --

I sure hope that that doesn't prove -- You know, that's like McDivitt looking at that -- what was it that happened there, and you could see he really made the right decision when he decided to delay the launch even though the information that made it the right decision occurred after he made his decision. (Laughter)

Yeah, I get a chuckle out of that.

Fortunately, he's -- he's the kind of a guy that's ... used to kidding, though. Other people, I think, might believe that kind of reasoning.

I wonder what the good boss is going to go do? He must have a -- I would think running -- running ASPO would be enough of a -- of a challenge to be worth staying around for. He must have an awfully good job offer.

Any good job offer would be better than that.
What? Running the program? Why do you say that?
His hair is gonna turn gray ...
That's what makes it a challenge. (Laughter)
His ulcer is what makes it --
That's going to be true in any job you go to. There's probably more talented people working in MSC, and working with NASA, than in any other organization, per capita, unless you get some little group like Bellcomm or something where -- and they got their share of them. Strange.
(Heavy breathing) ... over there.
Hey, what have you got that thing set on?
... I'm talking --
...
Okay. Would you like for me to try it in the CMC CONTROL, and then I'll go to ACCEL COMMAND so we don't get any attitudes.
I'll read it up to you, Ken. VERB 43E, load R-1, plus 2 - plus 00250; in R-2, plus 00333 ENTER. Whoa! Look at the eight ball.
As soon as you (laughter) ENTER, the needles - they -
Funny thing, Hank. As soon as I hit ENTER, they pulse out and it looks like they go where they belong, and then as soon as it comes back, it just goes out and comes right back.
Is that normal?
No.
You ever run it before?
Yes, sir.
Okay.
<table>
<thead>
<tr>
<th>Time</th>
<th>User</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 00 45 33 CMP</td>
<td>No, they should go out and stay until you zero them.</td>
<td></td>
</tr>
<tr>
<td>10 00 45 36 LMP</td>
<td>That's what I would think.</td>
<td></td>
</tr>
<tr>
<td>10 00 45 40 CMP</td>
<td>Yeah, I've run this procedure before. It's -</td>
<td></td>
</tr>
<tr>
<td>10 00 45 46 LMP</td>
<td>What is that an indication of, when it goes out?</td>
<td></td>
</tr>
<tr>
<td>10 00 45 48 CMP</td>
<td>Our digital-to-analog section has failed, and we can check that by seeing - Let's see - What - what uses the D-to-A's? The gimbals? The gimbal drive unit uses D-to-A's.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 05 CDR</td>
<td>No, don't turn the ... gimbals on, Ken.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 09 CMP</td>
<td>Well, John. The - the reason it's important to you is that this is the way you also coarse align the platform.</td>
<td></td>
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<tr>
<td>10 00 46 14 CDR</td>
<td>I don't want to coarse align the platform ...</td>
<td></td>
</tr>
<tr>
<td>10 00 46 18 LMP</td>
<td>Got to get - got to get entry REFSMMAT.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 20 CDR</td>
<td>Oh, I know.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 22 CMP</td>
<td>Okay. But that's --</td>
<td></td>
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<tr>
<td>10 00 46 24 CDR</td>
<td>...</td>
<td></td>
</tr>
<tr>
<td>10 00 46 25 CMP</td>
<td>-- that's something you got to start very, very early on.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 28 CDR</td>
<td>I know that.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 29 LMP</td>
<td>Why don't we do that?</td>
<td></td>
</tr>
<tr>
<td>10 00 46 30 CMP</td>
<td>Yeah, but only if you plan to do it.</td>
<td></td>
</tr>
<tr>
<td>10 00 46 34 CDR</td>
<td>Yeah, that's what I say --</td>
<td></td>
</tr>
<tr>
<td>10 00 46 35 CMP</td>
<td>Yeah, I mean, that can also --</td>
<td></td>
</tr>
<tr>
<td>10 00 46 36 CDR</td>
<td>-- in order to finish this loop, we got - we got to fine align the platform.</td>
<td></td>
</tr>
</tbody>
</table>
Yeah. Well, what I would like to do is to find out if we've lost that loop. Like right now, even if - even if the gimbals ..., I'm not sure I would be willing to try to get the coarse align.

Yeah, but we've got 24 hours to find that out anyway.

Hey, John, the only other thing besides the coarse align loop that I can think of that - that uses the D-to-A section -

Yeah. That's what it says over there. Is that what you want?

No, I don't. It didn't even mention TVC here, but I'm sure --

... D to A.

-- that's how it works. Coarse align there. Can't do that. Can't do that, because it will affect the loads. Oh, wait. Yeah, we can try something like that.

Are you sure we want to stay in this ..., Ken?

Beg your pardon?

Okay.

Sure I want to stay in what?

In CMC. Okay, it wasn't flying. It didn't before.

Yeah.

It's a transient condition now anyhow. Maybe it'll get untransient later on. Hank, looks like one other thing that would check the D-to-A's would be - How about if I load a - just a - a NOUN 22 of all zeros? And then call up a VERB 62?

That would give you an attitude 202?

Yeah.

That ... what he said.
10 00 48 14 CC  
...  
10 00 48 19 CMP  
Okay.  
10 00 48 25 LMP  
You say it looks like D-to-A is working there, Ken? Or is it gone completely?  
10 00 48 30 CMP  
I don't know.  
10 00 48 32 CDR  
Nobody knows.  
10 00 48 33 CMP  
I can't tell.  
10 00 48 34 CDR  
Charlie, ... --  
10 00 48 36 CMP  
I can't think of how a D-to-A could have caused that red alarm the way it came up.  
10 00 48 46 LMP  
Yeah.  
10 00 48 47 CDR  
If it's in zero gravity, some kind of mechanical bit in there - something could be bouncing up against it, hit it, and then go back --  
10 00 48 54 LMP  
If it doesn't get it again.  
10 00 48 55 CMP  
I'm more inclined to believe that we had a transient warning in the - in the warning circuit.  
10 00 49 03 CDR  
Three of them?  
10 00 49 05 CMP  
Yeah.  
10 00 49 06 LMP  
I don't believe that.  
10 00 49 07 CMP  
What's the difference if three - Whatever causes transients anywhere --  
10 00 49 10 LMP  
Yeah, ... --  
10 00 49 11 CMP  
-- why is it most likely in one circuit than another?  
10 00 49 15 LMP  
It's not; I didn't mean that.  
10 00 49 17 CMP  
You were just --  
10 00 49 18 LMP  
I just --
If you had one and it never reoccurred, I'd agree, but we already had one --

No, it - it's a hardware thing that causes --

Is this what - is this what you had before?

No. No.

You're probably thinking we got something different than what you had then.

Well, I'd be bored if I didn't.

I'm bored already, and I'm ... --

Anybody got a Pentel or something?

- - ... be back behind -

(Laughter) ... Why, you want to use it to write on, or --

Yeah, I want to write on that I defecated at 200 and whatever it is.

Hey, Mabel, when you transcribe the tape, will you record that, please?

Yeah, I don't have a pencil, so will you tell the doc --

Here. (Laughter) That's a heck of a note.

-- what belongs to me. (Laughter)

Charlie?

Yeah? Slide her this way.

There you go.

Oh, I got it. Thanks. (Laughter)

I can't believe we --

You keep losing it.
Day 11  

10 00 50 11  CMP  -- the dingaling things we're doing on this mission. Oh.

10 00 50 25  CMP  Was Henry on the night when I got - got all my transients? I'm gonna have that guy fired.

10 00 50 31  CDR  Heart rate, about 80.

10 00 50 34  LMP  Here you go, Ken.

10 00 50 35  CMP  Yeah, but that was - that had nothing to do with the Exer-Genie.

10 00 50 39  CDR  (Laughter) The Exer-Genie was your pacifier.

10 00 50 44  LMP  Well, I believe you, Ken. If you say that you can make - you can make an entry without the G - G&N. The - the CMC looks good, though, huh?

10 00 50 52  CMP  Yeah, it looks good.

10 00 50 54  LMP  Good.

10 00 50 56  CMP  But I'll tell you, at 6g's, when that thing comes up with an ISS warning light, even if you're planning for it, it's going to cause your pitty-pat to titter or whatever it does. We're gonna see - try Gemini-ing this time.

10 00 51 22  CMP  Hank was on, with my gimbal that didn't work. Hank's on today. I don't think it was Hank that had the first night, though. That guy's gonna get fired. (Laughter)

10 00 51 40  CDR  Got up to 90.

10 00 51 43  CMP  I was in here exercising one day and the doc says, "All right, that's real good. You got your heart rate to 90." And I had just finished checking it, 72. (Laughter) Yeah, I wrote in the - I had just finished writing in the Flight Plan. I - I worked really hard, I thought, and I got it up to 72. And the doc says, "Hey, that's real good. You've - got a heart rate of 90." You dingdongs. That shows how crummy your gear is, anyhow. If he had 90 that day, he should have broken his cardiopack yesterday.
What happened yesterday?

Every time Charlie would say how black it was, I'd look out there and my pitty-pat would be all rpm and no torque.

Well, I guarantee you, it sure was black. (Laughter)

That other one wasn't so bad, was it, you guys?

That was one of your better ones, Charlie. (Laughter)

Why couldn't you do those during dinner instead of the others?

Well, I don't have ISS lights to get me excited (laughter). I been working on that all --

... ISS light experience. Sure. We don't want you to --

I been working on that all morning.

... warning light stuff; we can't afford it. (Laughter)

I ought to tell Hank. Never believe what Charlie did when the ISS warning light came on.

Had a 17-second void. Why don't you log that --

Okay.

-- along with it. Make it 18 seconds.

Okay. (Laughter) An 18 seconder.

Yeah.

And the GET is something like 265:39.

You is logged.

Thanks. I can't believe it. It's worse than any sim.

We sure have had our share of sim problems.
Day 11

10 00 54 20 CDR  ...  Good.
10 00 54 30 LMP  Are we in the exercise period now?
10 00 54 31 CMP  Yeah.
10 00 54 32 CDR  What do you think I'm doing, Charlie? I fell behind when he gets an ISS light.
10 00 54 35 LMP  (Laughter)
10 00 54 44 LMP  Does the - does the D-to-A thing look like it's working, Ken? Or does it still have to pass that test?
10 00 55 00 CMP  No. They - they don't want me to play and find out.
10 00 55 02 LMP  Oh.
10 00 55 03 CDR  That's right. You don't - -
10 00 55 05 CMP  I'm gonna play just like I did on that sim, though. I'm gonna give them some time and if they don't come up with an answer, I'm gonna go find out.
10 00 55 12 CDR  ..., you know.
10 00 55 15 CMP  They can complain all they want to. That's the day I ain't running a training course for G&C.
10 00 55 38 CMP  Quit hogging the exercise period, John.
10 00 55 39 CDR  Well, ...
10 00 55 40 LMP  How much have we got?
10 00 55 43 CMP  We got another - Charlie's got to get his in there and I got to get in mine in there.
10 00 55 45 CDR  One more pull and I'll give it to you.
10 00 55 48 CMP  I was on - I was on about - I was working 10 minutes on my arms, 10 minutes on my legs, and then 10 minutes back on my arms again, and I - -
10 00 55 56 CC  ...
10 00 55 57 CMP  Go ahead.
... --

10 00 56 16 CMP Who's got my pencil?
10 00 56 18 CC -- ...

10 00 56 28 CMP Okay. I have done this in the simulator and it - it did work, and we'll try this one in just a second. Okay, I'll need my pencil back, you thief.
10 00 56 38 LMP Okay.
10 00 56 40 CMP Okay. You want to set - you want to kill the DAP as the number 1 step.
10 00 56 46 CC ...
10 00 56 48 CDR Over here, where the ... is.
10 00 56 50 CMP Okay, and then you want to go back and go through step 12.
10 00 56 57 CC ...
10 00 56 59 CMP Okay, that's in work. I have 11101, 01111, okay. Zero. That's good. Just - just hit 1's.
10 00 57 22 CDR PRO?
10 00 57 23 CMP PRO.
10 00 57 24 CDR PRO. PRO.
10 00 57 28 CMP Okay, I have to do a VERB 46 on this. Now, that was one of the - the no-no's we had the other night. Is that okay?
10 00 57 40 CC ...
10 00 57 42 CMP Okay, just during EMP. Thank you.
10 00 58 13 LMP There it goes.
10 00 58 14 CMP Okay, and now that's working like a champ.
10 00 58 17 CDR Yeah, it works just like it's supposed to now.
10 00 58 23 CC ...
Okay, very good. I've done this thing in the CMS and I had the DAP on. There must be some other special condition where that -

That says that D-to-A ain't it.

Yeah. You can see, this - this ain't at all conclusive because this is all - -

Okay.

-- based on -- this is all based on assumption up here, that you - that you couldn't get the lights off. We really had a transient condition.

I know we did.

So anything we find down here is only suggestive --

Okay. Okay, it's suggestive, but in the - in the final analysis --

Ken, we'd like for you to activate the DAP again on a VERB 48, and 1 in digit A, and then a VERB 46.

In the final analysis what, John?

You can't tell visually whether the FDAI is - is reading and all that - you can't tell - you can't tell this right here by eyeball. You'd have to run - you'd have to run a P52 to tell that.

That's right. I agree with you. Hank, we'd like to - I'd like to run a P52 here and see - see what kind of torquing angles we get. That will tell us whether or not we really been having any kind of a - of a hangup in the A-to-D section. As short as it was, we couldn't have gotten very far off in attitude.

Roger. We don't think it moved.

Oh. Say again? We were in PTC at the time, so there was bound to be some rates going at the time. The fact that the VERB 40 didn't change anything shows that --
10 01 00 24 CC 16, Houston. Our SIM bay's gonna get too cold if we don't change attitudes. We'd like for you to roll to 280 degrees and then do the P52.

10 01 00 33 CMP Okay, I'll roll to 280. I'll do a --

10 01 00 37 CDR The first thing you got to do is ...  

10 01 00 39 CMP They're close.

10 01 00 45 LMP You through with your exerciser, John?

10 01 00 47 CDR Yeah, here.

10 01 00 48 CMP Okay, 280 is over here.

10 01 00 54 LMP I got it.

10 01 01 24 LMP Charlie, you're so strong.

10 01 01 27 CDR Who's giving the big sighs? You guys are huffing and puffing like it's on --

10 01 01 30 LMP I just started.

10 01 01 31 CDR What are you supposed to do? You're supposed to put it on --

10 01 01 33 CMP What - what did you set it on, though?

10 01 01 34 CDR I don't know. Whatever it took.

10 01 01 36 CMP (Laughter)

10 01 01 39 CDR Well, ... --

10 01 01 40 CMP Is it up all the way?

10 01 01 42 LMP Well, I don't have no idea.

10 01 01 45 CDR Well, Charlie, if that's the thing that you were going to do --

10 01 01 47 LMP How do you do it?

10 01 01 48 CDR Well, I did it like that, but I've never done it like you're doing it.
How'd you do it?
... both.
I don't think it matters.
Not if you don't care anymore.
(Heavy breathing)
Like if it was one of those 0.15-degree things. That's the only way you gonna tell, is do a --
52.
-- ... I -- I forget how that thing is. I forget what the bits are in the CDUs, but they're like --
Plus 4 point --
-- 22-1/2 sticks in my mind, or 11-1/4, or plus 5-3/4. We sure didn't have 11-1/4 when we were --
Well, almost. The only one you could tell with the naked eye ... degree.
(Heavy breathing) ... degrees in here.
Yeah, ... if you can believe what kind of eight ball you got here.

The spec value on the eight ball is ... --
Well, shoot, just 1.
-- 210.
One and one-half?
Yeah.
... specs.
We're doing a lot better than specs, aren't we?
10 01 03 10 CDR Yeah.

10 01 03 11 CMP We think it's - I've been watching it, and it's just isn't off more than a degree.

10 01 03 18 CDR Yeah, that's one thing that hacked me about this whole business. Here we are flying a platform that's accurate to a hundredth of a degree, and we don't have a display to where we can tell it. You know?

10 01 03 31 CMP You need a vernier.

10 01 03 32 CDR You need - you need - you need fine displays if you're gonna fly something like this, and tell us beforehand.

10 01 03 36 CMP Yep.

10 01 03 38 CDR Same way we shut down the Saturn.

10 01 03 40 CMP ...

10 01 03 41 CDR ... could make it ... display where you could manually shut the mother off. ... Just put it on the - in there - little line knocked off, and say shut down. They chew your tail off if you say anything.

10 01 03 56 CMP Oh, yeah. Put it in there with - The thing was, when they built those things, they didn't have those kind of uses in mind.

10 01 04 02 CDR No, they had some stupid use in mind. You can bet on that. ...

10 01 04 06 CMP Hey! (Laughter)

10 01 04 08 CDR It's working, but we got to check it out. It comes up very shortly, I understand. Some time today.

10 01 04 13 CMP Yeah. Let's see what -

10 01 04 16 LMP What comes up very shortly? Check what out?
Houston, we just wanted you to know that the heart rates you're seeing or not seeing are due to the exercise period, not the ISS lights, although that could be a factor.

Roger. We copy.

The Surgeon, I think, had come to the conclusion you must be exercising.

That's because he doesn't understand ISS lights.

He just doesn't know what an ISS light will do to a boy.

(Laughter)

My PRD is floating.

That's mine.

... want to defecate. Go down there.

Yeah, if there's one kind of malfunction that I really don't like, it's these transient things. They keep you all keyed up -

... come on all day, you know? ... never see them again.

Yeah, I know. That's what worries you most. That's that engine that burps then runs.

Whew!

Sweating, Charlie?

Starting to get hot.

Yeah, I start sweating; that's my problem. Had to quit because I ain't - we ain't got any room to sweat in here.

John, the Surgeon says your heart rate hit a peak of 114 during the exercise period.

Well, I was timing it myself. Only got up to 100. You'd better check it over.
Your gear is a cardboard - probably a cardboard table with little tick marks in it. I can't believe, on that last LBNP test that they ran on our last physical, I ended up with a 30 - 38 heart rate laying on this table.

Thirty-eight? Mine's never been - I think 48 was the lowest I've ever been.

Bet I ain't been that low on this flight. I always thought it was probably --

I bet you that - I bet you when you were sleeping, it was that low.

I wonder. Man, I tell you, every time I turn around I - I'm paying attention to - little battery compartment that reads 2.8.

It does?

Yeah. No, I'm sorry. 2.6. Excuse me.

It's all my fault.

I don't think they got that psyched out, really.

They think that they do. You got to be careful of that one because that's the one that - We return that gear, and their analysis is subject to checking.

(Laughter) You know, you'd be wrong about the gimbal motors ...

Right. They'll have a very positive report about the gimbal motors. (Laughter)

Yeah. There's always three answers to every question. One one guy knows, the one the other guy knows, and the one that's right.

Charlie --

Why don't you whip off a 52, there, John?

You want me to do it?
10 01 08 47 CMP
Sure.

10 01 08 49 CDR
If anybody can do it, I can.

10 01 08 56 CC
Ken, our pitch has got off a little bit. We need about 120 degrees in pitch also.

10 01 09 02 CMP
Is that for a thermal reasons, Hank?

10 01 09 06 CC
That's affirmative.

10 01 09 09 CMP
You weenie. I don't believe that.

10 01 09 13 CDR
Well, they got - I think I got data. I don't know that their thermal rationale is right.

10 01 09 22 CMP
Okay, now it'll be a second here before I get to that attitude.

10 01 09 42 CDR
Hey, you got you some stick time, Ken? ... Charlie.

10 01 09 57 CMP
He'd be lucky if he can see anything through that telescope. I don't know. The Sun's at our back, so maybe he can.

10 01 10 04 CC
Ken, you want to keep an eye on your roll.

10 01 10 07 CMP
Well, how about telling me what attitude you precisely would like.

10 01 10 16 CC
280, 120, and 040.

10 01 10 21 CMP
Okay; I can do that.

10 01 10 32 CDR
Yeah, I see stars. Why don't you close up the - can you close up the ..., you guys?

10 01 10 36 CMP
Yeah, I'll close up the hatch for you. I can't believe the difference in 280 and 284 means a hill of beans - in this big marshmallow.

10 01 11 22 CDR
Well, I could see stars there for a while.

10 01 11 34 CMP
Okay.

10 01 11 45 LMP
Okay. Say when, Ken.
If you can take you some shots, well - let me use the DSKY here. It's a better reference. I'll probably go ahead and do it and then I'll probably get a better hack on the attitude here.

We got two stars out there and I don't know what they could be.

Probably Alpha and Beta Centauri.

... probably right. Is that where we're pointed now ...?

Yeah.

That's what they are. ...

You don't have Atria next to it?

No, I can't see it. Ken, let me do it. Okay?

No, wait a minute, John. I - we'll use the DSKY.

Okay, now I got all kind of stars up here. There's 1, 2, 3, 4, 5, 6, 7. I don't know what any of them are.

... Say when, Ken.

I'll give you the program ..., John.

He really didn't mean to just fly over to 280 roll.

He really didn't mean to do that?

No. He meant go to a specific attitude. He just didn't bother to say what it was.

I thought he gave you 120.

Yeah, after I asked for it. I could have gone there the first time just as easy.

Oh, yeah.

(Sneeze) Excuse me. (Sneeze)
... and Beta Centauri?
It is?
Yeah, ...
You can get Menkent ... All right. Now we're going to throw ourselves to attitude rate ATT RATE 2, LIMIT CYCLE, ON.
... sort of oriented --
... power must be on.
Are we - are we oriented up north?
Towards the south.
Towards the south.
Okay, the first one is star 21.
Star 21. Gonna have to go to ZERO OPTICS, Ken.
Yep.
ZERO to OFF. ... You'll have to turn the OPTICS power on before you're going to get anything.
Okay.
Turn the OPTICS power on first.
Yeah; power on.
Okay; now ZERO the OPTICS.
They're ZEROed.
You did it after the OPTICS power was turned on?
No, before.
No, you got to do it after. Because that's the only way the computer gets its discrete.
You go to OFF and then back to ZERO, right?

Yeah. After the power's on. You have an SCS; you can go to MANUAL when the drive is finished. Whenever you feel like it, as a matter of fact.

If I go to OFF, that program light hasn't been on ...

Huh?

That program light?

What about it?

... was on. Do I go back to ZERO ...

No, no - as long as you've been in there 15 seconds. And we'll just check it here.

Okay, that's close enough.

Okay, it's your computer.

Twenty-one.

Want me to do - try one?

Yes, sir.

Twenty-one -

MARK, 21 is now marked. Okay, now I know where I'm at. Yeah, we're down to about - Okay, fine.

(Laughter) I told you we were pointing south.

I know you told me that, but I didn't see any stars out there.

There you go. CMC. Spica.

Phew! Boy, it's really getting bad, Ken.

It's right in the --

TIME SKIP
10 03 10 39 SC (Whistling)
10 03 10 40 CC 16, Houston. You can check out the TV now.
10 03 10 45 LMP Okay. Thank you. With any luck, it'll break.
       Turn the monitor on.
10 03 10 52 CDR Monitor's on. That's not ... It's ... --
10 03 10 59 CMP You don't have the power on yet.
10 03 11 01 LMP Yeah, I do. I got it in STANDBY.
10 03 11 03 CMP You got the TV switch on?
10 03 11 05 LMP Yeah. I got it to S-BAND AUX TV and to STANDBY.
       We ought to be getting a picture on the monitor.
10 03 11 12 CMP There it comes. I see us --
10 03 11 13 LMP Takes a few seconds for it to warm up.
10 03 11 16 CDR What - what do you see on the monitor?
10 03 11 21 CMP Looks to me like -
10 03 11 24 CDR It's taking a nice picture of the wire.
10 03 11 29 LMP Okay, you got - let me have ... --
10 03 11 30 CMP Why don't you let me get the brightness to bring
       on the monitor.
10 03 11 32 LMP Okay.
10 03 11 33 CMP I hope that's what it is. Maybe you need to stop
       down the aperture.
10 03 11 38 CDR Back on again.
10 03 11 40 LMP That's what it is. Yeah. I don't know.
10 03 11 47 CMP You want me to adjust it?
10 03 11 49 LMP The brightness is too ...
10 03 12 02 SC (Whistling)
10 03 12 13 CDR Can you see this, Charlie? On the monitor?
10 03 12 19 LMP Oh. Yeah, you can see it.
10 03 12 22 CMP ... Oh, excuse me. I stepped on your tail.
10 03 12 27 CDR Didn't hurt it.
10 03 12 28 LMP Okay, Ken. Why don't you get in?
10 03 12 33 CDR Come on over here.
10 03 12 34 CMP I'm in the picture.
10 03 12 35 LMP No, you aren't. You just - your strut - the strut's in the way.
10 03 12 38 CMP Oh.
10 03 12 39 CDR See, that's the problem with it. To get three guys in the picture is really tough.
10 03 12 43 CMP I tell you what, I'll get in the tunnel and hang head down.
10 03 12 46 LMP That wouldn't be bad.
10 03 12 48 CDR It might work okay.
10 03 12 52 CMP I hope all the blood doesn't rush to my head.
10 03 12 54 CDR Yeah.
10 03 12 55 LMP That'd be a great picture, as a matter of fact.
10 03 13 04 LMP You think any --
10 03 13 05 CMP Huh! I think this'll work.
10 03 13 06 LMP Yeah, it will. It's gonna be great. But you got to get up a little bit. There you go.
10 03 13 11 CMP Get which way? How should --
10 03 13 12 LMP Higher up that way so you got --
10 03 13 13 CMP Higher up in the cone?
Yeah. Can you?

Like that?

Yeah, that's great.

Oh, yeah, I see. I got my head up against John.

That's too far.

Okay?

You see how you all think that looks.

Well, that looks like a good picture. Wish I knew what it was.

Get the wire out in front of the camera.

It's the wire, yeah.

Now what - Can you slide down some, John?

Yeah.

Let's see, maybe the - can you slide the - center the picture a little bit better?

Yeah, why don't you all take the monitor over this way out of the - out of the field of view. Which way you want it to - -

That's really gonna be a good picture, isn't it?

Yeah, which way you want it to go?

Yeah.

Push the lens - up a little. Right there.

Okay.

How's that? Now, why don't you come get in the picture and see -

Okay; let me tighten this thing down - -

I think you - I think you -
I wouldn't even mess with it. It ain't gonna move.

Okay. ... the old urine hose?

(Laughter) Okay, I've --

Okay, now. Get the water ... down.

I got to move the camera over - let's see if I can --

Just let Charlie slide over.

Is that gonna be enough?

Sure. There we go.

Okay. (Laughter)

There we go. We can put the monitor right here.

Yeah.

Yeah. Let me take - let me just take --

Maybe we all ought to slide down a little, and then - and then Ken can --

Yeah. There we go.

Now you come down a little.

I'm - I'm in good shape. This is comfortable here. I can stay here; I couldn't stay where I was. Can you read that from here? I'll pull my tail up. You can read it from that way.

Is it - is it live TV?

Yeah.

No, it's not. It's not on - it is going to be, but it's not now.

I got ... --

Then it will be --
Day 11

10 03 14 56  LMP  Yeah.
10 03 14 57  CDR  -- in the future.
10 03 14 58  LMP  I got to go to TRANSMIT.
10 03 14 59  CMP  Okay. You want to get the tape out of there, and I'll tape it? Or how about if I just --
10 03 15 04  CDR  Tape what?
10 03 15 05  LMP  Let me -- I'll ... --
10 03 15 06  CMP  Here, here. How about this?
10 03 15 08  LMP  Okay; wherever -- wherever you can look at it. You know more about that than I do.
10 03 15 11  CMP  Smell. It's ...
10 03 15 12  LMP  Oh, that's the Velcro.
10 03 15 13  CMP  Yeah.
10 03 15 14  LMP  Wait a minute. Let me get un - unraveled a little bit --
10 03 15 16  CMP  Let me get some of this cord out of there.
10 03 15 17  LMP  There we go.
10 03 15 20  CMP  Let me get - Let's see. Yeah, there's what I need. Man, right up here on the ceiling. Now, get you a picture that's about oriented the way you see it. Can you see that?
10 03 15 37  LMP  Yeah. Uh-huh.
10 03 15 40  CMP  That's got too much torque in it.
10 03 15 43  LMP  There; it's going to stay.
10 03 15 45  CMP  Okay.
10 03 15 50  LMP  Well, now what do we do? Tell them we're all ready to go --
Okay; right in the middle of this little exercise, the ISS warning light comes on.

There will be a lot of ... there.

Boy, that's more elbows than you've ever seen in one small screen.

Tell them we're ready to go.

Okay, Houston, we got the gear all checked out ready to go whenever you are.

... We'll get down a little bit so Ken can ... --

Let's see, I wonder if that --

... we've got just under 8 minutes to go.

Yeah. I believe that helps - or hurts.

I think it helps to have it up.

Turn it - have it up?

Yeah.

Yeah. I think you're right.

You have any fixed ones over here that we could put on?

Yeah.

Okay, let me try that.

That help?

I couldn't see it ... on the picture, but - Yeah, I think --

Yeah, it did help.

I think it did.
Yeah. Try not to hit the strut. Hey, that's going to be neat. First time anybody's ever hung upside down before.

Can you read Mr. D. there, John? I can drop it on down ... --

Yeah. Oh, no; that's fine.

Okay. Why don't you practice that, John?

(Laughter)

There's nothing so far removed from us so as to be beyond our reach nor - or so hidden that we cannot discover it.

And here we sit --

... minutes.

- - testing his theories with what we been doing.

Just a second.

Excuse me.

I'll just sit here the whole time scratching my rear.

Oh, you ... (laughter).

Adjust up your arm. Hey, wouldn't you know the TV studio turns out to be the head also.

Phew! That urine is beginning to smell real good, isn't it?

Oh, boy. You wonder, why would anyone build a spacecraft with everything located in the john?

Where else could they put it?

Well, I might get one more exercise period in tonight before I go to bed.

I think that's a good idea.

There you go.
... we're going to snocker them on that bike tomorrow.

I feel great. I really do, but I don't know how I feel - I'm going to feel when I hit the ground.

I got a feeling that hitting the ground is going to be just like the adaptation of hitting orbit.

Not the same.

Like you felt like you'd always been there.

Yeah.

Now I didn't quite have that feeling (laughter).

It's a great picture.

Yeah; of course, the one that goes down isn't that good.

... 

Hey, Hank, do you have a list of questions? Are you going to be reading the questions up?

That's affirmative.

Okay; thank you.

Boy, ... I like to do that.

Let's see, what time - Where's the Flight Plan?

Right up there, Ken (yawn). It's supposed to be 268:10 or something like that.

Yeah, we've got about 2 minutes to go. I can't see a clock.

It's right over there.

It's ... here --

It's 268:02.

No, 08.
Day 11

10 03 20 12 CMP Oh, 06 here. Back in stable II again.
10 03 20 22 CMP Now it's back to ... We can forget about that.
10 03 20 34 CMP EMS entry check.
10 03 20 37 CDR (Yawn) Coming up?
10 03 20 39 CMP Yes, sir. And then we get ready for those Skylab contamination photos; we'll get those out of the way. And I'll do my weight measurements at the same time, just before we get to it. And then we go do some entry stowage. How does that sound?
10 03 20 57 CDR Sounds pretty good.
10 03 21 02 LMP Okay; there's two PPKs back there. I got one up here, and the rest of them --
10 03 21 07 CDR We catalog all of that on the entry stowage.
10 03 21 10 CMP And there's a bunch in there?
10 03 21 12 LMP Oh, you do?
10 03 21 13 CMP Man, I tell you, there's more PPKs around this place than you can imagine.
10 03 21 24 CMP We have an eat period, then a rest period, and then we come out and we have 6 hours to entry.
10 03 21 49 CMP Well, I tell you that --
10 03 22 04 CDR Ohhh. You know what I ought to -- As a precaution, I almost feel like pulse torquing that platform tomorrow.
10 03 22 13 LMP I sure would. How long does it take?
10 03 22 14 CDR I don't know ... though.
10 03 22 17 CMP Well, you got to go --
10 03 22 18 LMP 80 degrees --
10 03 22 19 CDR Yeah --
10 03 22 20 LMP At least.
10 03 22 21  CDR  - - ... 80 degrees.
10 03 22 22  LMP  At least.
10 03 22 23  CDR  I don't know what the pitch has to do.
10 03 22 27  CMP  It's going to be a - it could be a 12 - 14-minute torque, but the --
10 03 22 34  LMP  Well, we've got plenty of time. Four hours before entry. And you get another one on downstream.
10 03 22 52  CDR  And we could - and we could maneuver the vehicle to ... the stars. I mean, there's no doubt in my mind what you ... see. You can recognize the patterns out here.
10 03 23 07  CMP  Well, what I did the other night works like a champ.
10 03 23 10  CDR  It sure does. Man, it worked like a champ. Sure a good way to do it.
10 03 23 15  CMP  Yeah --
10 03 23 16  CDR  Let's do that.
10 03 23 17  CMP  You never - you never get screwed up that way. You can't miss the Sun; you can't miss the Moon.
10 03 23 23  CDR  Let's do that.
10 03 23 24  CMP  Yeah. The accuracy you get was - well, enough to get auto optics to put the stars down. No, it's in the sextant.
10 03 23 31  CDR  You still ... --
10 03 23 32  CMP  No sense in fooling around wasting time looking for --
10 03 23 34  CDR  Well, let's do - let's do that then.
10 03 23 36  LMP  Do what?
10 03 23 38  CDR  That.
The thing I'm worried about is if you coarse align, and it doesn't work, then what have you got?

Well, let's align the SCS like we did before.

Do it just like you've been doing except torque - except pulse torquing. Why don't you do that?

That's awfully ... If you coarse align, and it doesn't work, I don't know what kind of a failure mode that leaves you in.

Okay. They're about to come up. Why don't you give me the Flight Plan? (Yawn)

I'll just stuff it up here.

Okay.

Let me get up about like this. That'll be halfway between you and Ken.

Okay.

... Try and slide in there. There you go. That's good.

I - I --

16, Houston. We're about ready to go here. You want to try to bring up the TV?

Okay; it's in work. Going to TRANSMIT. Doesn't show. Okay. Then ... better go to TRANSMIT.

Yeah. You know that's a way to get to the patch in there. If you just - if you just drive up towards that camera, Charlie, that one on your patch flows right up and looks great. That's a good way to end it.

Okay.

Once you reach over for the TRANSMIT switch, you just got to try to keep that --

Okay. We've got a picture now.
Apollo 16, the questions in this press conference have been prepared by newsmen covering the flight here at the Manned Spacecraft Center. I'm going to read them to you exactly as worded by the newsmen and in a priority specified by them. Question number 1 for John Young: A couple of times you were on hot mike and didn't know it, but how could a nice Florida boy like you say what you did about citrus fruit?

That's a very good question. Wait until you drink it day and night for 2 weeks, and - and let me know what you think. And for lunch, too. I have - I have an orange grove --

Question number 2 --

- - I have an orange grove down in Florida, too, so I do like citrus, but citrus drinks are something else.
Question 2: When the CSM circularization burn could not be performed on schedule, did you think you wouldn't be able to land on the Moon?

Yeah, I thought we all had serious doubts about whether we were going to be able to do it or not.

Question number 3 in three parts. Were you surprised at the rocks and other formations at the Cayley site?

You want me to take that one?

I think we were. The - the original impression had been mostly volcanics to look for, and I don't think we've found the - the highest percentage of volcanics as we had originally anticipated. So the rocks that we found were unique, that we'd never seen before in any of the lunar samples, we feel, and so it was a surprise.

Do you think your geological training properly prepared you to describe them?

I think so, under the circumstances. You see, most of the rocks are - were dust covered apparently by the - by the - the two impacts, North Ray and South Ray. It had just thrown a big blanket of dust out across there, and we saw very few rocks that were clean um - until we cut into them. And you don't want to take too much time to stop and whack off a piece of rock, because that's pretty hard to do in a pressure suit. So we were just describing them more by shape and softness and friability and things like that. And that really doesn't take a lot of training, but I think we've had adequate training to do this kind of a job.

Did you see anything specifically volcanic?

Tell them about the ...

As far as craters go, Hank, we think we saw two that had the shape we called endogenic - that had the shape of very subdued old cinder cones or something of that nature. They were - In other words,
they were - looked more like, well, sink holes, really, with the surrounding topography. They had no rim on them, and, to us, it looked like it might have been a source for some volcanic activity way, way back.

Question 4: Several times at North Ray you mentioned, "Don't get too close to the edge." Did you think that if you had fallen in, you wouldn't have been able to get out?

That's affirmative.

(Laughter) Yeah. You bet.

If we had fallen in, we would not have been able to get out. That's correct.

Question 5: The heat flow experiment you broke was successfully fixed in simulation, although it was complicated and took a great deal of time. Do you think you should have tried to fix it or do what you did?

I don't think we're qualified to make that decision. It was made by people on the ground that are far more qualified to do that sort of thing than we are. If - if we had been told to do that, we would have certainly done it.

Would you like to have been informed of the successful sinta - simulation and the trade-off factors involved?

I - I still don't think that that's our decision-making process up there on the surface.

Question 6: You've had a lot of equipment trouble during this mission. Is there a common thread running through all these problems for which you could suggest an explanation?

(Laughter) Why don't you take that one?

Yeah. I think space flight's kind of complicated. You got a lot of sophisticated equipment here that you're trying to get all working at one time. I
Think that's what we built a redundancy in for, and it seems to be paying off quite well.

10 03 31 12 CDR Yeah. I don't - I don't think there's any relation between any of these failures, one to another. I don't know. I don't think there's any common thread. I agree with Ken; it's very complicated gear. It has to run for long periods of time, and you've got to expect some times that it won't run, and you got to know how to fix it. And that's why they send us on these trips.

10 03 31 40 CC Question 7 for Ken: Your observations of the landing site. Did you see the lunar module or the Rover, and did you see any differences between Cayley and Descartes?

10 03 31 51 CMP Okay; that's - that's two distinct questions. First thing, did I see it? We never pointed the sextant at the landing site according to the Flight Plan because of the alterations we had. And there were two occasions, once when I thought I had caught a glint of light, which I could not recognize as the LM but which came from the location where I think the LM probably was sitting. And that was very close to the position on my map that you folks read up to me. And once, as the Rover was starting up on Stone Mountain, I just happened to be looking as they went by, and I think you were on the shift, Hank, and told me that they were hitting Stone Mountain. And I looked over there, and about that time I got another little flash of light, which is about all, with the 10-power optics we have, that - that I think you could expect to see. And at no time could you see something you could identify.

10 03 32 44 LMP Probably was us.

10 03 32 48 CC The second part of that question was: Did you see any differences between Cayley and Descartes?

10 03 32 54 CMP Yes, I think there's a - distinctly different morphology involved in these two units. Our preflight training is a little different in impression than what I think I saw; and, again, we have, like I say, a 10-power resolution. I think the - the real
answer of what this material is, is going to lay in analyzing the data postflight. We have some good film records, and I think the - when you put that together with the rocks we picked up, we'll have a pretty powerful story that'll explain a lot of things we don't know now. But I think that there are sections of material we called Descartes, particularly the material that makes up Stone and Smoky, and that stuff runs all the way south down to the old Descartes Crater for which the region is named. And that does look texturally entirely different from the Cayley formation.

Question number 8, again for Ken: What were your impressions of the back side of the Moon, and were there any surprises?

Well, the impression of the back side is something I tried to collect from the time we got there until the time we left. And I'm still mulling that over in my mind. I've got a lot of transcripts we're going to have to read before I can psych it all out. But, in general, the impression I have is that the material on the back side, when you look at it on as small a detail as I could look, looks to me like it's very much like the material we find on the front side surrounding most of the big craters. The thing that looks different is that the back side is devoid of these large basins. We don't have the large mares; there's very little mare. In fact, at the back side, the only mare we saw was really post-TEI, when we could look back and see a bigger area. But our groundtrack didn't pass over any mare in the daylight, so it took awhile to psych that out. But I think that was the major difference was the absence of these large basins. And, on the back side, did we see surprises?

Well, we went up looking for - with a suspicion that we might find material similar to the Descartes formation located in several areas of the back side, and, indeed, I think we did. I think we saw an awful lot. I think we saw a lot that looks exactly like the Cayley. And I think the things that I saw that were - probably the most surprising thing was the - on the side of a crater called Guyot, which is just to the north and a little west of King Crater, which is right about the eastern limb of the
Moon when you look at it from the Earth, we saw a big hole, I'll call it a crater, in the side of this - of the wall of this crater, and it appeared that there was material oozing out. And on our last couple of revs, we passed almost directly overhead, and it looked like it was filled with a pool of material, and this material had run down the side. And that's a formation typical of things you see like in Hawaii, something I had not seen anywhere else on the Moon, nor have I seen a picture of it.

Question number 9 for John and Charlie: At the tag end of EVA-3, you appeared to be having a high-jump competition. Who won, and how high do you think you jumped?

(Laughter) No, no, we weren't having a competition. We were just showing you some of the things you could do with a 360-pound mass that only weighs 60 pounds, even slowed down, if you will, by the pressure suit. And I don't think anybody won; we were just demonstrating what you could do with the suit.

I don't have any idea how we - -

Question 10 - - how high we jumped. You'll have to look at the TV. Maybe - maybe a foot or 2 feet.

It was too high for me.

They still get a picture?

Ask them if they got a picture.

You all got a picture, Hank?

Could you explain the circumstances surrounding the failure of the lunar module ascent stage to deorbit?

(Laughter) A loaded one.
I think that has to be worked out when we've looked at all the data on the ground and discuss it with the flight controllers. At the present time, I have no idea.

No, I don't either.

Hank, could you verify that you still have a picture?

Question 11: To what extent - -

We've lost our monitor, and just like to make sure there's nothing wrong with the camera.

We have a good picture.

Thank you.

Question 11: To what extent did fatigue affect your performance? For example, do you feel that you would have been capable of a full 7-hour EVA-3, lift-off, and IM jettison all in the same day?

I think that'd been pushing it a little.

That's a bad question.

We could have probably --

.. --

We could probably have done it, but I think that'd really been pushing it.

Question 12 for each of you: What do you hope to tell your grandchildren as your most memorable moment of your trip to the Moon?

Well, I'll start with that one, Hank. I had two impressions. The - the first is the dazzling beauty of Descartes - the surface. It was just one of the most awe-inspiring sights I've ever seen. And, secondly, on the EVA, when you look away from the Earth - or the Moon - it's just the utter blackness of space. It really is black out there.

Time number 53 he's said that that. Go ahead, Ken.
Thanks. Well, I guess I'm next then. I - I thought of - I knew someone would ask that question, and I've been asking that question, too. And I don't think I can put down an impression. There's so many that we've crammed in in the last 12 days. And it seems like each one comes on top of the other one, and the immediate response that you come up with is "That's the most fantastic thing I've ever seen." In - in a lot of respects, it really is. There - there have been so many events and so many sights that, in my case, I'm going to have to sit and think about this one for a long time before I could ever pick out one, and then I'm not sure I'll ever be able to say that there was a unique thing, or a most memorable event. The whole thing has been a - just one series of very impressive, and I hate to use the word, but I don't know anything else except to say, "It's fantastic."

I think Ken's got the answer. I think we've seen as much in - in 10 days as most people see in 10 lifetimes. And we certainly have enjoyed it.

Question 13: From an astronaut's point of view, would you discuss the possible operational difficulties, besides language, to be overcome in the proposed Joint U.S./U.S.S.R. manned space flight? And would you have any suggestions to make?

(Laughter) From an astronaut's point of view, I'd - I would not feel qualified to discuss it, other than to say that if language is the problem, I'll be glad to learn Russian. I think Charlie and Ken feel the same way.

Question 14: Did the potassium in your diet affect the taste of the food, and did it cause any other problems?

That's a very good question, and I - I'm not sure we're qualified to - to say. We'll have to get back and talk to everybody. I - I don't - I don't think it - I didn't notice it being in there as far as taste was concerned. And I don't think anybody else did.
No. Yeah. This is one of those things where you have to wait and take a look at - in our postflight medicals and see what they come up with as our body potassium level, because that's really the part that they're trying to work on, and I'm afraid the guys on the ground have a lot more data than we have on our physical condition, other than the fact that we know we feel good.

Yeah. I think - I think we've been very fortunate to do as much of the mission as we have, considering how much we got slowed down there. And I don't know whether potassium had anything to do with it or not, but if it did, I'm sure grateful that we were taking it.

Question 15 for John: What did you mean when you said morale went up a couple of hundred percent after that successful TEI? Was it low?

(Laughter) Was your morale low before TEI?

(Laughter) Yes - No, not particularly. It's just - it would sure be low if you didn't get off the TEI burn, I can tell you that.

(Laughter)

What can you say to a question like that?

(Laughter) Yeah.

Question 16 for each of you: Based on your experience, do you have any recommendations right now for the crew of Apollo 17?

Okay, I'll handle it. Yeah. I recommend they enjoy it as much as we did. I'm sure they will, because, I tell you, we really have - we really have had a lot of sights to see. I'll admit that, in a lot of cases, we worked hard, and - and I suppose the people on the ground were able to tell that. But we got all the support in the world from the MCC-Houston. I - I mean, I could tell, from every decision that came up from the ground, that - that there was a lot of work put into it. And all around the country that there were a lot of wheels
turning and people working late hours and solving these problems. And I'm just really happy that Ken, Charlie, and myself got to do this. And I think it's a wonderful experience.

That was the last question, John. We thank you very much, and thank you for the kind comments.

Why don't you read ... --

-- ... say the words?

Okay.

Why don't you say --

Well, let me just say one thing, Hank, and that is - Mr. Descartes said it. He said, "There's nothing so far removed from us as to be beyond our reach, or so hidden that we cannot discover it." And you all know that Descartes was the French mathematician and philosopher for whom the region was named. And I guess, really, the story of our mission so far is we've been out testing his theory. My personal assessment of where we are right now, as soon as we get the rocks back in the LRL, we'll be making headway toward proving he was right.

Good show, John.

Okay. Hank, as the LEB sinks slowly into the distance --

Good show. Right on.

-- we'll say good bye.

Right on. Beautiful.

Yeah, thank you.

Well, it wasn't bad.

Was your morale low before TEI?

(Laughter)
That was a good answer: it sure - it sure would have been if they hadn't. (Laughter)

Oh, anyone who asks a question like that, there isn't an answer for.

Yeah.

Houston, 16.

Go ahead.

Okay. Hank, do you want S-BAND AUX back to SCI?

I knew - I knew those remarks about orange juice were going to come back to haunt me.

Okay; you got it.

Okay.

Okay, we take the power off; the monitor's off.

Nice job there, guys.

Thank you, sir.

Was that the boss?

Yeah.

Okay. Camera coming down.

Okay; I don't put it up then, if you don't mind, again.

That sounds good.

Put the Flight Plan back there.

... give us ACCEPT, ... new state vector.

Roger.

They got it.
How come you're standing on your head?

Stable II again, eh?

Dang gummit.

Yeah, you're right; it is stable II again.

I don't remember you saying that, John, on hot mike.

Oh, yeah. Oh, yeah!

(Laughter)

... I was on hot mike quite a bit.

It was on the - while we were sitting there coasting around waiting for a decision.

Oh, yeah.

And you were drinking the orange juice, and John said something about that, and I thought, "Oh, shoot, I hope that isn't hot mike." That's why - I think I called and asked you, and you said something about you were on hot mike to me but not to the ground.

No. Most of the time, we were hot mike to the ground. We had DOWN VOICE BACKUP. Dadgum Fendell - BIOMED, OFF - He was trying to improve his circuit margin, so he was --

Here, I got to wad that up in a small ball, so -

... this?

Yeah, I'll coil it when I get down there. I'll see how big the hole is. That is, if I can find my way down there. Gee, I'm turned around. Here I am going back up in the tunnel again.

I may never get my equilibrium.

I don't know if that was the fairest estimate or not. That's my feeling on it. I think - with the complete EVA and going through LM jett, would really be pushing it.
We - we ... did that.

That's basically what we did.

I know it.

Apollo 16, looks like we're getting some stratification in the H₂ tanks. Would you take the H₂ fans on for a minute and then back off again?

Well, this is where the ... comes.

I don't like the idea of doing any of those evolutions.

I don't either.

In a - in a 24-hour day. That's dumb.

Three filters.

Yeah.

Okay. And then it says, "The 70-millimeter mag, LM from, three in a bag." Transfer three in a bag. Okay, you got those, huh? Tape cassette kit.

... Do what?

... Where's that?

It's in here ...

Oh, yeah, yeah. Yeah, I know where that is.

Most of this stuff that we need to stow is in F-1 and F-2, I think.

...
Okay, we'll --


That's right. I think we're in a heap of trouble, myself (laughter).

Why?

Because I don't believe we're gonna make it through this list before reentry.

Okay, here we go.


No. It isn't listed in section I. The tape cassette kit.

Got that.

The tape recorder batteries, 11 in the bag?

Okay, ...

Okay.

...

Yeah, they're not in there. We looked.

Nothing in there but the 16s.

...

Well, they aren't in here, Ken.

...

What is it?

Huh?

What is it that rattles?

...
Yeah, it's in - I saw that - it's in R - it's up there in the corner in R -

Okay.

That far one. Nah. Nah. Nah. That one with the --

Here you go.

-- biostack in it.

... okay.

And the next one is the inflight exerciser, and that's coming over to you.

... Yeah.

That's the one?

Yeah. That's what it says.

...

Yeah. It's - it's on the way.

Here you go.

It says, "EMU maintenance kit."

It's here.

"Inflight exerciser," that's in there. "Water - H₂ gas separators, two in a bag."

... Okay.

...

Okay. "Snag line in the bag with a strap," that's in there. "PGA interconnects, three in the bag."

Oh, shoot.
What are we looking for?

The interconnects. Three of them.

Sure don't see them in here, Ken.

Here's the interconnect bag.

Yeah.

Well, I'll see.

I don't know where that goes - section III, I guess.

Okay.

Okay. "Urine filter assembly, three in a bag."

Well, I ain't gonna worry about our lousy filters. What difference does it make? They don't weigh 10 pounds. "Side of A-8 in a bag."

That's all in A-8?

That's it.

Okay. ...

Yeah. You know, they - they don't want anything in those things.

"Side of A-8 in bag." Ah. "Vacuum hose - vacuum brush."
... Yeah.
... No, don't we have the vacuum hose?
... No, vacuum hose - vacuum brush, it says.
"Urine hose with adapters and two straps."
Side of A-8?
Yes, sir.
Okay. Here - here you go.
"EVA guards; left, center, and right, with straps."
They're in there. And the "Unipole - Unipod pole assembly"...
Wait a minute. Wait a minute.
They're in. ... The unipoles are here. The guards are here.
Okay. The vacuum brush is there?
No. Jettisoned.
We threw that away.
Okay. Jettisoned with the LM.
Okay. Now what?
Okay, A-9 - "Lunar sample in bag."
Nine - the samples in bag.
"B-1, 3-inch mapping camera mag."
Mag.
10 07 58 42  CDR  B-2 -
10 07 58 43  CMP  B-2?
10 07 58 46  CDR  Yeah.
10 07 58 47  CMP  The 35-millimeter camera?
10 07 58 48  CDR  Yeah. You want to work - you want to work on - what do you want to work on? A-1?
10 07 58 53  CMP  Yeah. I ... A-1 there ... I think ...  
10 07 58 56  CDR  Okay. A-1, "16-millimeter mags, seven in two bags."
10 07 59 09  LMP  Here's three.
10 07 59 11  CMP  Have you got some of those?
10 07 59 12  LMP  I've got the cam - I got GG on the camera.
10 07 59 17  CMP  Okay. I need LL.
10 07 59 19  CDR  What do you need LL for? Okay, so we gonna miss one - one mag.
10 07 59 29  CMP  Is that all?
10 07 59 30  CDR  Yeah.
10 07 59 31  CMP  ... Okay, I have - I have ... millimeter ...  
10 07 59 44  CDR  Okay. "70-millimeter mags, two" --
10 07 59 52  CMP  ...  
10 07 59 57  CDR  It's really bad.
10 08 00 19  CMP  Okay. ...  
10 08 00 32  CDR  The what? Yeah. Wait a minute. I was just looking back to the Flight Plan to see what we're supposed to be doing right now - 272:46. ...  
10 08 00 49  CMP  ...  
10 08 00 51  LMP  Yeah. Houston, 16.
Go ahead, 16.

Pete, we're busy with this entry stowage. Could you keep us on the Flight Plan if something comes up?

Okay. Will do.

Thank you. Okay. Go ahead, John.

There's - 16 millimeters.

We got that.

...  

Okay. And then, "70-millimeter mags, two in the bag."

I got one with three.

There's two here.

Take three, then. Well, ain't th - this is all of them. This is the last magazines we got out.

... three.

You want these or not?

Yes.

Okay. Here you go.

...  

Yeah. Three. Okay, the "Interval timer."

Where's that?

Over there on your - Here it is, right here.

Not any more, it's not.

Here you go, Ken.

...  

What are we timing now?
Day 11

10 08 02 35 CMP ...ialog.
10 08 02 37 LMP Nah. I don't need it.
10 08 02 41 CDR The "Voice recorder."
10 08 02 47 LMP That's the tape recorder?
10 08 02 48 CDR Yeah.
10 08 02 49 LMP Let's see. That's up here in the -
10 08 02 51 CDR Here you are. I got it.
10 08 02 52 LMP Okay.
10 08 02 56 CDR "Remote control cable with --

TIME SKIP

10 08 14 42 CMP ...dialog.
10 08 14 45 LMP That didn't come out of the LM.
10 08 14 50 CDR Maybe they're up in U --
10 08 14 51 CMP ...dialog.
10 08 14 52 LMP That did.
10 08 14 53 CDR -- maybe they're up in U-2.
10 08 14 54 LMP No, they're down here, John. This other one right there, Ken. I think. Yeah. No, that's ours. No, wait a minute.
10 08 15 24 LMP Yeah, but I don't -
10 08 15 28 CMP ...dialog.
10 08 15 29 LMP No, huh-uh.
10 08 15 32 CMP Ones down here, I don't think are ...
10 08 15 34 LMP Weren't they - weren't these over there ...?
Some of them were.

Yeah.

Okay, the thing looks sort of like - this might be it right here. I don't think it really matters; a PPK is a PPK. The trouble is the guy who tied this tied it so dadgum tight.

Okay, here's the flag kit.

Okay. And here's a PPK, and how - can you get this - load this one of mine - this was a pocket item of mine - will that go in there? If not, I'll put it in my pocket. I'll leave it up here in R-2. Huh? Yeah, okay.

Okay, you got 274, about, there, Pete.

Okay, John. Thank you.

I - I'll get it, Charlie.

"LM 16-millimeter camera." Here you go, and it's got bracket and everything. Lens - you want all that? It just says the camera.

It just says, "LM 16-millimeter camera."

Okay, that was up here in U - -

Where was the LM - all that other stuff at? In one of the U's?
10 08 17 35 LMP Yeah, it was in U-2 back here.
10 08 17 38 CDR Don't say nothing about the ...
10 08 17 42 LMP Here you go, Ken.
10 08 17 43 CDR Nothing in U-2 like that. That's where it was.
10 08 17 51 LMP I got it out. Okay, "Contamination and contamination photo equipment."
10 08 17 59 CDR The DSEA - where is that? The DS --
10 08 18 03 LMP It's in the ISA, I think, John. We'll just leave it there.
10 08 18 09 CDR Okay, so we've got the rest of this. Yeah.
10 08 18 15 LMP No, no, I'm doing that talking.
10 08 18 18 CDR On top of A-1 goes the lunar sample in decon bag.
10 08 18 22 CMP ... 
10 08 18 23 CDR Yep. I'm sorry, you're through. I tell you, they don't want nothing in those lower compartments. I think they float the spacecraft or something, I don't know what.
10 08 18 49 CDR It doesn't even say which sample is in the decon bag, that's what gets me.
10 08 18 53 LMP It's the one - it's on the decon bag, John. It says stow on top of A-9. It's the -
10 08 18 57 CMP ... whole bunch of them ...
10 08 19 01 CDR A-7?
10 08 19 05 CMP ...
10 08 19 10 LMP ... Well, that wasn't what they said when I sent them across.
10 08 19 15 CMP ...
10 08 19 20 CDR Which way?
10 08 19 21 CMP  Plus-Y.
10 08 19 22 CDR  Plus-Y.
10 08 19 25 CMP  ... Okay, ... out.
10 08 19 30 CDR  What is that?
10 08 19 37 CMP  ...
10 08 19 41 CDR  I think that goes somewhere like A-9 or something.
10 08 19 55 CMP  ... this thing ...
10 08 19 58 CDR  What's that?
10 08 20 00 CMP  ... bag ... middle of the floor ...
10 08 20 16 LMP  There's one up here you can reach, Ken.
10 08 20 18 CMP  Huh?
10 08 20 19 LMP  Here's one right here you can reach.
10 08 20 20 CMP  ...
10 08 20 21 LMP  Yeah.
10 08 20 22 CMP  ... bag ...
10 08 20 27 LMP  Yeah, I know it. This one barely - barely sticks out. Well, I can hook it on the side - I can hook it on the side - there - there we go.
10 08 21 12 LMP  I'll get it loose. Okay. Huh? Oh, excuse me. I thought you meant you had the wrong bag. Okay.
10 08 22 44 LMP  Ken, those two PPKs you took out of A-7 - can we put these two that were in U-1 back in there? The ones that were in U-1.
10 08 22 53 CMP  ... I don't know, Charlie, ... I wouldn't think so.
10 08 22 57 LMP  Okay.
10 08 22 58 CMP  Want to put them down here before I close this up?
10 08 23 01 LMP  Do you have room in A-7 - I mean in A-1 for these?
Oh, that's okay, we'll just leave them in U-1.

Yeah.

That's right, that's...

I sure didn't see you. You want a flashlight, Ken?

Do you want to see it, in other words.

Shine in your face.

I can't think of any.

No.

I'm gonna take this cabin fan filter off, okay?

I'll just pull it reasonably tight.

Is that okay, you guys?

..., Charlie, ...

Okay. Well, I was just trying to help. It should be stowed in U-2.

..., got a bag to put it in ... take it down ...

I have a bag right here.

Oh, okay. All right.
Okay. Want to go up to - what do you want to start on next? A-2? Okay. "PPK, two, and flag kit, one."

Two of them and a flag kit.

That's what it says. It's been written in here.

This ORDEAL, where does it stow, John? It goes down on the bottom, it doesn't go in U-1 ...

Yeah.

The FCS.

Okay. That's trash. That's in the trash bag?

Yeah.

"Tissue dispenser, four."

Okay. Tiedown rope bag?

It's in the cockpit up here. Don't we want to leave that out?

Yeah. The heel restraint bag?

Okay. PPK, two, and flag kit, one, is all that is left.
Okay.

Okay; ISA on top of A-2. ISA and decon bag.

Yeah, I believe it is one of the biggest.

It says - it should say on there, doesn't it?

Well, Ken, it always did back in the old days, I -

It doesn't say - no - it didn't - Well, we went through that the other night. It ain't worth it again.

Oh, you - John?

Huh?

Put your seat pin up.

Sure.

I was reading those others ... --

Yeah, okay.

-- ... Darn thing. I got it out like nothing's business and it isn't going back in. Yeah.

Well, it looks like it, because the connector fits in there. Other than that, it wouldn't fit.

Yeah, I think the face is up in the - the face is up in the -
... hold this right there.

Okay. Now it says "Front" - that's all of A-2. It says, "Front of A-3 - A-6, core stem in bag." And we'll leave it where it is.

A-3?

A-6.

What's in there?

Core stem in bag.

... Yeah.

... What?

... Oh, yeah. There you go.

As soon as I figure out what is keeping it from going in there, I'll get it.

I'm just wasting my time. I can't get it. I don't know how you can get in there and do it. I'll tell you what. I'm going off comm. Charlie, watch the store and I'll get it. It makes me mad.

That's a - I can't tell what it's doing. I'm looking at it.

Well, I ...

Yeah, I guess you better, I can't get the -

What do you want me to put in the suit bag? (Laughter) Oh, shoot.
Hey, John, here. You hold the store and I'll get the thing back there. Oops, excuse me. Everywhere we look there's tissues everywhere. But when you want to - when you want one, you can't find it.

... 

No, you never would. I ain't sure you'll do it in zero g, either.

Okay, that's in.

You gonna leave those core stems where they are, Ken, or bring them over here?

... 

Okay. I thought that seemed like a pretty good spot to me.

Yeah, ...

This goes in the PGA bag, Charlie.

What?

How's it coming?

This goes in the PGA bag?

What was it you wanted to put in the PGA bag?

I've already got it.

Oh, okay. What do you think?

...

You got it. Beautiful. ... never get it out.

...

You know, Ken, the core stems go right here but how - I don't know how they tie down.

I think you strap them.
Yeah.

...

Oh, that's the way they do it, yeah. Man, is this thing filthy.

...

I don't know. Let's see, maybe if we did it this way. Oh, that's the way you do it, I bet you. Take the straps this way like this - like this? And then snap it to the top here, because it'll - it'll fit then.

...

You can't hack it up there? Those are - they're really bad. Let's see - Wrap it around once like this one. Take it around - there you go. Now. There you go. Okay, that ought to be it, yeah. Yeah, I don't think this is gonna quite hack it. Why don't we just leave that one? Make this -

No.

Okay, John.

Okay, what do you want to work on next? Top of A-2 says, "ISA decon bag." De - ISA decon bag, you got that?

... here. Yeah, yeah, yeah. ..., yeah. ...

16, we think we may have stratification in H_2 tanks 1 and 2. Would you give us about 1 minute on the fans?

Roger. H_2 tanks 1 and 2; 1 minute on the fans.

They said that this morning. One, 2.

Okay, it says, "In front of A-3 and A-6, core stem in bag."

We got it.
Day 11

10 08 40 53  CDR  Got it?
10 08 40 54  LMP  Yeah.
10 08 40 55  CDR  It says, "Fire extinguisher on the side of A-3."
10 08 40 57  CMP  Yeah.
10 08 40 58  CDR  "CO₂ absorbers, four, in A-3. CO₂ absorbers, four, in A-4. CO₂ absorbers, four, in A-5. A-6, urine bags, three, with overwraps. Retention straps, two; vacuum cleaner, side of A-6. Rock bags, two" - That's no, we put those rock bags -
10 08 41 18  CMP  ...
10 08 41 22  LMP  It'd have to be.
10 08 41 26  CDR  It's in A-6? What kind of rock bag is it?
10 08 41 41  CMP  ...
10 08 41 44  CDR  There ain't no rock bags in it? Those - weren't those the padded samples, Charlie?
10 08 41 51  LMP  Oh, yeah, those were in the - yeah, that's right, those are in the ISA.
10 08 41 56  CDR  Pardon?
10 08 41 57  LMP  They are in one of the other collection bags.
10 08 41 59  CDR  Samples in other bag, right? Okay, it says, "Dosimeter taped to bottom" - of something.
10 08 42 11  CMP  ...
10 08 42 13  CDR  Yeah.
10 08 42 15  CMP  ...
10 08 42 16  CDR  I don't know.
10 08 42 22  LMP  What does it say? You have it written in, Ken; "Dosimeter taped to bottom."
No, I don't think Ken wrote this thing. Don't worry about the dosimeter.

I don't know where it is. It says, "Rock bags" - there are no dosimeters on those rocks.

... want that.

Yeah.

I don't know what that means. I wouldn't worry about it.

Okay, me, too. "Fecal collection assembly in bag, 18, three Skylab in A-7."

That's what they say.

Okay.

There's this one to jettison to the LM, Ken, I put up here in U-1 - to replace the LCGs.

Okay, the OPS. "Vacuum cleaner decon bag, vacuum bag, vacuum cleaner power cables."

Vacuum bag went in the LM.

Vacuum cleaner ...

(Laughter) ...

Oh, it is?

Oh, yeah.
Vacuum cleaner power cable.

You want to stow that, Ken? With the food in it?

Well, ...

...

What's the matter?

He's urinating

Oh. Shoot, Ken.

16, we noticed the cabin pressure drop about a tenth and the O2 flow go up a little bit. Are you doing something that might have caused that?

Negative. Sure not.

We were just laying here.

Okay. And also we have a maneuver for you. We'd like you to do the VERB 49 maneuver to the X-ray pointing thermal attitude Cyg X-1. It's at 273:15 in your Flight Plan, but I'll read you the angles, if you want.

Appreciate it.

Check off —

... it's 278, 295, and 310.

They noticed the cabin go down about a tenth and the O2 flow come up, and they was wondering if we were doing anything.

... HIGH-GAIN angles are PITCH, 11; and YAW, 330.

Roger. PITCH, 11; YAW, 330; attitude 278, 295, and 310.

That's affirmative.

Okay. We're going there now.
Okay. And we're watching the cabin pressure. It's steady again now.

Okay, Pete. It looks about like where it's been to us. We think it's been hanging a little bit below 5.

Yeah. That's affirmative, and EECOM says that could be the cabin regs making up that's causing what he's seeing.

Okay.

I think it's doing it now, Ken.

... making up ...

Yeah.

Yeah, I think while we had that hole open, we saw no increase in O₂ flow and we thought it was very strange at the time. There was no increase at all, and maybe now the cabin regs decided to make it up a little.

... You want some more, Ken?

Some more ... to - to pack.

I know. I got to tinkle, too. (Laughter) Bad.

... 7 ... is what I'm telling you. Okay.

A-7 is a bad compartment to get into.

Okay, it says, "E - E - vacuum cleaner power cable."
Man, I sure don't either, come to think of it.

... Yeah.

You think this is it?

Yeah, ...

I think that's where we put it, as a matter of fact.

...

That's where we put it. Okay. Let me continue.

... finish up.

Okay. EVA - EVA equipment container.

Go ahead.

Pressure control valve.

All that equipment ...

All that's there.

And it's in A-7, right?

Yep.

We already checked that yesterday. EV gloves and wrist tether in accessory bag - for the CMP is in there, right?

... one ...

Where are they going to go?

... tunnel.

They're up in the tunnel, I think, Ken.

You want to put this up there, John? Let's turn it around.

...
That's the wrong one. I should have known.

Okay, Houston. You want us to dump the OPS again? We're - would like to finally stow it, and we can dump it now if you want.

Okay. We would like to use the OPS to get the cabin up to 5.6, and then leave it in bleed flow through the sleep period.

0 - okay. Dump the OPS, Ken, up to - to get the cabin up to 5.6 and then leave it in bleed flow.

Whatever that means.

I don't know how you do that.

I would think.

Yeah.

I don't know. I think that's how it is. That bleed flow means leaving the - the hose in the port and leave it on, right?

Stand by a minute, John. I'll check.

How much is in there, Ken?

16, we need you to check that dump in the hatch where you just made the Skylab dump from. We're still showing a little high on the O2 flow.

Well, we checked it. It's all closed.

Flow just went to 0.2 here, Pete.

Yeah. Roger. EECOM's just calling it. We're seeing it drop off here now.

Dingalings.
<table>
<thead>
<tr>
<th>Time</th>
<th>Operator</th>
<th>Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 08 52 17</td>
<td>LMP</td>
<td>That sure looks tight. I guess I could switch to ...</td>
</tr>
<tr>
<td>10 08 52 21</td>
<td>CC</td>
<td>Okay. On the OPS configuration, we wanted the OPS connector locked in the stowage plate and turn the OPS ACTUATOR to ON. ...</td>
</tr>
<tr>
<td>10 08 52 30</td>
<td>CDR</td>
<td>I understand.</td>
</tr>
<tr>
<td>10 08 52 31</td>
<td>LMP</td>
<td>It is 5.2.</td>
</tr>
<tr>
<td>10 08 52 33</td>
<td>CC</td>
<td>... the cabin up.</td>
</tr>
<tr>
<td>10 08 52 35</td>
<td>CDR</td>
<td>Okay. Okay. That's what we'll do.</td>
</tr>
<tr>
<td>10 08 53 31</td>
<td>LMP</td>
<td>How did I get so tangled up here?</td>
</tr>
<tr>
<td>10 08 53 33</td>
<td>CC</td>
<td>Charlie, how did you get so tangled up there? (Laughter) 5 - 5.3, Ken. I don't think it's going to get up there. What's - what's on the - what's - -</td>
</tr>
<tr>
<td>10 08 53 47</td>
<td>CMP</td>
<td>...</td>
</tr>
<tr>
<td>10 08 53 50</td>
<td>CDR</td>
<td>Well, that's what they said.</td>
</tr>
<tr>
<td>10 08 53 52</td>
<td>LMP</td>
<td>No, they didn't say that. They said they had it - -</td>
</tr>
<tr>
<td>10 08 53 55</td>
<td>CDR</td>
<td>They said they wanted us to check and make sure we closed the port. Not only did he close it, he sealed it with a kiss. Right?</td>
</tr>
<tr>
<td>10 08 54 15</td>
<td>LMP</td>
<td>If that's all the leak is, we got it made.</td>
</tr>
<tr>
<td>10 08 54 18</td>
<td>CDR</td>
<td>Right.</td>
</tr>
<tr>
<td>10 08 54 20</td>
<td>CC</td>
<td>16, on the HIGH GAIN, I think the angles we called up are wrong. Let's go PITCH, 55; YAW, 323.</td>
</tr>
<tr>
<td>10 08 54 30</td>
<td>CDR</td>
<td>Did you get those angles?</td>
</tr>
<tr>
<td>10 08 54 31</td>
<td>LMP</td>
<td>Yeah, I got them.</td>
</tr>
<tr>
<td>10 08 54 42</td>
<td>CDR</td>
<td>Okay. We're at the Sco X-1 attitude, as you know.</td>
</tr>
<tr>
<td>10 08 54 50</td>
<td>CC</td>
<td>Roger. And go WIDE on the HIGH GAIN.</td>
</tr>
<tr>
<td>10 08 55 04</td>
<td>LMP</td>
<td>Pete, it doesn't seem to be acquiring in REACQ, and I stepped it through.</td>
</tr>
</tbody>
</table>
Okay. And, Charlie, did you copy to try 55 degrees on PITCH and 323 on YAW? And the first set of angles we called up were not correct.

Okay. My mistake.

No, Charlie. That was our mistake. The first set of angles we called up were wrong.

Okay; 55 and 323.

Affirmative.

... put it on the eight ball and ... let it ...

Okay. That's reading to --
XY

DAY 12

11 01 08 48 LMP -- SET. Tape is running. Standing by for 289:58, Separation Checklist.
11 01 09 57 CMP Think they've slipped.
11 01 10 20 CMP Okay, they've given us this. Is there any reason why we shouldn't -
11 01 10 23 CDR Houston, have you got the PIPA incorporated?
11 01 10 26 CMP Yeah.
11 01 10 28 CC ... affirmative.
11 01 10 30 CDR Okay, we're going to BLOCK.
11 01 10 31 CMP It is BLOCK.
11 01 10 33 CDR Okay. Well, let's go.
11 01 10 39 LMP Okay, we're a few minutes out. CB ELS/CM-SM SEP, two, close.
11 01 10 44 CDR Circuit breaker.
11 01 10 45 CMP Yeah. That's CM-SM SEP, one, two, closed.
11 01 10 48 LMP PRIMARY GLYCOL TO RAD, BYPASS, PULL.
11 01 10 53 CMP Want to do this early? We're about a minute ...
11 01 10 55 LMP We're about a minute up.
11 01 10 57 CDR ... glycol.
11 01 10 58 CMP BYPASS is pulled. Okay, now.
11 01 11 01 LMP REPRESS PACKAGE, FILL, to 865. It already is; I just checked it. Then ON.
11 01 11 06 CMP REPRESS PACKAGE you want ON.
11 01 11 08 LMP Yeah.
11 01 11 09 CMP Okay. Okay, it's ON.
11 01 11 12 LMP  O_2 SERVICE MODULE SUPPLY valve, OFF.
11 01 11 15 CMP  SERVICE MODULE SUPPLY is OFF.
11 01 11 16 LMP  SURGE TANK, ON; verify.
11 01 11 18 CMP  SURGE TANK is ON.
11 01 11 19 LMP  CABIN PRESSURE RELIEF valve, two, to NORMAL.
11 01 11 25 CMP  Two, NORMAL; okay.
11 01 11 27 LMP  ABORT SYSTEM PROPELLANT, RCS COMMAND; verify.
11 01 11 30 CMP  Yep.
11 01 11 31 LMP  SERVICE MODULE RCS SECONDARY PROPELLANT FUEL PRESSURE, four, OPEN.
11 01 11 36 CDR  Yeah.
11 01 11 37 LMP  Verify that.
11 01 11 38 CDR  SECONDARY ...
11 01 11 40 LMP  VHF AM A and B going off. Okay, Hank, your VHF is off. I'm turning off the fuel pumps now.
          HIGH GAIN ANTENNA POWER is coming OFF. FUEL CELL PUMPS, three, OFF. Gonna get some MAS here, probably, in a little bit. FUEL CELL 2 MAIN A coming OFF. It is. Verify loads balanced; 1 and 3 perfectly balanced. Batteries picked up the load. Okay, CB ECS RAD CONTROL/HEATERS, two, open. RAD CONTROL; they are open. CB RADS HEATERS OVERLOAD, two, open. They're open. WASTE H_2O DUMP - are open. POTABLE H_2O HEATER -
11 01 12 34 CMP  Off. It's right here.
11 01 12 37 LMP  Okay; yeah.
11 01 12 38 CMP  GLYCOL TEMP IN to MANUAL.
11 01 12 41 LMP  It is. It has been.
11 01 12 42 CMP  It has been.
Day 12

11 01 12 44  LMP  Okay.
11 01 12 45  CDR  Okay, now let's put in that thing.
11 01 12 49  LMP  GLYCOL TEMP IN -
11 01 12 51  CMP  Okay, we do a VERB 25 NOUN 7 ENTER - -
11 01 12 56  CDR  ENTER.
11 01 12 57  CMP  Seven - 5 - -
11 01 12 58  CDR  ENTER.
11 01 12 59  CMP  ENTER; 1 -
11 01 13 01  CMP/CDR  ENTER; 0 ENTER.
11 01 13 03  CDR  Go.
11 01 13 04  LMP  I thought it was after you called P61.
11 01 13 06  CDR  ... for.
11 01 13 07  CMP  Okay, we have knocked down the average g flag.
11 01 13 10  CDR  ... 4.
11 01 13 13  CC  Roger.
11 01 13 15  CMP  Okay, you want to call P61.
11 01 13 17  CDR  Let's see now; that's - we're 23 minutes to go. Think that's - think that's too much - too long for the integration?
11 01 13 24  CMP  What's it supposed to be, 18:30?
11 01 13 26  CDR  That's ... - -
11 01 13 27  LMP  We're supposed to have a flashing 06 61 at 18:30.
11 01 13 31  CMP  Want to go at 20?
11 01 13 34  CDR  Yeah.
Okay, at 20, it'd be about 290:02, but make it 03.

Okay.

Well, we've got a --

We got 3 minutes --

Three minutes to go -- 4 minutes, actually, John.

Yeah.

Okay (sigh).

Okay, Ken, when we hit the .05G time, I'll -- I'll call .05G - time, mark, and remind you of the roll and the .05G switch.

All right, sir.

Okay?

Thank you.

Okay, now, down on the flashing 06 61, we got a VERB 21 NOUN 46 has to be set.

Yes, sir.

Okay. That's after sep --

... that's -- Yeah, that's the next 06 61.

Yeah.

Okay, horizon check comes up at 290:06:30. ... 15 minutes.

That clock is off again.

Oh, let's call it up.

Okay; go.

Agh, we did kill that dang thing.
(Laughter) I wondered if you had enough courage to sit there; I'm not sure I did.

Well. Okay, let's check the numbers, Charlie.

Minus 000.71. That's good.

Yeah.

Minus 156.18. That's good.

Good.

And the heads down. That's good.

PRO.

PRO.

7.62g's.

Oh, shoot.

This says 7.1 on the pad.

36188.

Okay, this says 36196.

Minus 6.68.

This says 6.54.

Okay.

Okay, that - this can change to the integration as you come around.

Yeah, we integrated out too far away.

Yeah. Go ahead --

... PRO.

1071.
Okay, 1051. We'll take it.

It's close.

36272.

Twenty-one minutes to .05G; 23 ... 24 - Yep, that all looks pretty - pretty reasonable. Shall we?

Yeah. ... to separate.

Okay, that's where we stand by.

Okay, at 17 minutes, that's 290:06:31 - 3 minutes from now.

Okay, but you probably ought to yaw about 45 degrees now anyway.

Yeah.

Yeah. Are you ready to do that now?

Okay, manual attitude --

You're looking good coming up on sep.

MANUAL ATTITUDE, three, RATE COMMAND.

I have three in RATE COMMAND.

ATT DEAD BAND, MIN.

DEAD BAND's MIN.

RATE, HIGH.

RATE's HIGH.

SPACECRAFT CONTROL to SCS.

SCS.

Yaw 45 out.

Left?
11 01 18 00  LMP  Left.
11 01 18 02  CMP  Okay, my BMAGs are uncaged.
11 01 18 04  LMP  BMAGs, ATT 1/RATE 2.
11 01 18 06  CMP  Yeah; not until I get out there.
11 01 18 08  LMP  Okay; yeah.
11 01 18 28  CMP  Verify to STANDBY.
11 01 18 47  LMP  We should have a horizon check at 17 minutes also.
11 01 18 50  CMP  Okay. That really, I guess, should have been done before I yawed.
11 01 18 56  LMP  This is the same time as the yaw.
11 01 18 58  CMP  Yeah.
11 01 18 59  LMP  Same time as separation, exactly.
11 01 19 01  CDR  You can't see the horizon start.
11 01 19 24  CDR  Okay, yaw at 45 degrees out of plane.
11 01 19 28  LMP  BMAGs, ATT 1/RATE 2?
11 01 19 31  CMP  ATT 1/RATE 2.
11 01 19 32  LMP  I verify the MAIN BUS TIES are on.
11 01 19 35  CMP  Okay. Verify that the GLYCOL was pulled?
11 01 19 38  LMP  Okay, verify GLYCOL, BYPASS?
11 01 19 41  CMP  That affirm.
11 01 19 42  LMP  EMS MODE to STANDBY, verify.
11 01 19 44  CMP  That's verified.
11 01 19 46  LMP  Okay, the CM RCS LOGIC, on, up.
11 01 19 49  CMP  CM RCS LOGIC is on.
Okay, we --

Turn up the lights.

Yes, sir. John --

The reason is because you can't see out once we --

Yeah.

-- ... in here.

Yeah. That's -- that's a good plan.

Okay.

Now we've got 17 minutes. We're coming up -- or on 17. We separate at 15, at 290:08:31. We'll hold off on the logic until 17. Okay?

The logic?

SECS LOGIC, two, on, up, verify.

That's verified.

Verified.

Okay. SECS PYRO ARM, two, to arm at 17. Okay?

Okay. And that's coming up in 10 seconds?

Ten seconds.

Okay.

Okay, SECS PYRO ARM, two, arm.

Two armed.

Okay, at 15, which is 290:08:31, we separate. CM/SM SEP, two, on.

This time, John, you can hit any switch up there.

... (laughter).
Just that row.

Okay. Tell me when, Charlie, ...

I will. We got a minute and a half.

Okay, we're a minute and a half to CS/SM [sic] sep.

Okay, you got your hand controller locked, but it's armed.

It's locked.

Okay.

We got all the scissors down and everything, didn't we?

I sure hope so, Charlie (laughter).

Okay, nothing up in here that I see. No screwdrivers or anything - tools. Okay. Within a minute.

Should be a loud bang.

Man, will it ever.

Fifteen seconds, John.

Say when.

Okay.

3, 2, 1 -

SEPARATE. There we go.

What's the MASTER ... for?

That's just - got to go to caution and warning.

Putting them in ... --

Separation, Houston.

Roger.
Man, it really went, didn't it? MANUAL ATTITUDE, three, MIN IMPULSE.

Yeah.

BMAGs, RATE 2.

RATE 2.

C&W mode, COMMAND MODULE; RCS TRANSFER, COMMAND MODULE - -

... down here, 16.

Go.

-- CM RCS LOGIC, OFF. Check --

CM RCS LOGIC is OFF.

-- pressures. They're good.

Okay. Oh. How's the cabin pressure?

Great.

Okay.

Hanging in there. Batteries are looking good; they picked up all the load. Battery compartment's looking good.

I was sure proud to hear that big bang.

Me, too.

Okay, EMS - Yaw back to zero.

Going back.

Okay, the bu - bus voltages is hanging super - 28.

Boy, there's a lot of stuff out there.

Yaw back to ze - Okay?

I'm going back to zero, Charlie.
11 01 23 31 LMP Pitch to entry attitude.
11 01 23 37 CMP Okay, was I supposed to put EMS --
11 01 23 38 LMP 153.
11 01 23 39 CMP Okay, was I supposed to put the EMS to - NORMAL yet? I mean --
11 01 23 43 LMP Yeah. EMS data, verify?
11 01 23 45 CMP It's 1051 and 36276.
11 01 23 50 LMP EMS FUNCTION, ENTRY.
11 01 23 53 CMP It's ENTRY.
11 01 23 54 LMP EMS MODE -
11 01 23 55 LMP/CDR NORMAL.
11 01 23 56 CMP NORMAL.
11 01 23 57 LMP Verify the filter down on .05G.
11 01 23 59 CMP That's verified.
11 01 24 00 LMP Okay, when you get to attitude, you can PRO to activate the entry ja - DAF.
11 01 24 05 CMP Okay. No; wait a minute. We're not in attitude.
11 01 24 08 CDR ...
11 01 24 09 LMP We got to pitch to 152.
11 01 24 11 CMP Well, you can PRO on that anyhow. Where - where do we do our thing here?
11 01 24 14 CDR Right here.
11 01 24 15 CMP Between - between these two steps, right?
11 01 24 16 CDR Yeah.
11 01 24 17 CMP Okay.
It's all right. I'm in SCS, so it's okay.
Okay, VERB 21.
NOUN 46.
21, NOUN 46.
ENTER.
3000 ENTER.
30,000.
30,000.
Okay. There you go. ENTER.
Done.
Okay, Houston, we have the -
... We're venting something.
We have the bit 3 set in 21 46.
... you're looking good.
We're venting something. Maybe it's the steam duct.
Yeah, the water - water boils --
I want to - going to the right and that thing - I
looked up again and it turned around and went back
to the left.
Okay, the water boiling ... it right back. Yeah.
Very definitely.
Yeah, we're boiling.
I didn't remember anyone ever mentioning that.
That isn't in the simulator.
That doesn't do it very much. Got to be very
sensitive.
Okay, 153 on the attitude.

Yes, sir.

You there?

No, no. Keep going (laughter).

Okay. Checking them off.

Okay.

Keeping you honest.

That's fair.

I nev - I thought I'd see the service module out the side, but it's - never did see it.

You want a 06 22?

Say again?

You want the 06 22?

06 22.

When you do that, you get the CMC guidance.

Oh, oh.

The X-axis is beyond 45 degrees out of velocity vector.

I'll probably get that. Go ahead.

Didn't get it; P63.

Okay, we've got P64 up; she's looking good.

63.

63.

63, I mean.

Roger; P63.
11 01 26 07  CDR    Scared.
11 01 26 09  CMP    Okay, how far are we from EI?
11 01 26 11  LMP    Okay, we're at --
11 01 26 12  CMP    Eight minutes?
11 01 26 13  LMP    No, we're at 11 minutes.
11 01 26 15  CMP    Eleven minutes.
11 01 26 16  LMP    And - about 11 minutes and 15 seconds.
11 01 26 18  CMP    The horizon will be about - Well, I've already missed the horizon. Okay.
11 01 26 22  LMP    Yeah. You can't tell with all those particles out there.
11 01 26 27  CMP    What? The horizon's out there?
11 01 26 28  LMP    Yeah. I mean what's stars and what's --
11 01 26 31  CDR    It ain't lit.
11 01 26 32  CMP    No, the horizon's gonna be ...
11 01 26 33  LMP    It ain't lit.
11 01 26 34  CMP    Well, when I find the Moon, I'm going to know where the horizon is. It'll be just below it.
11 01 26 40  LMP    What's pitch attitude, Ken?
11 01 26 42  CMP    We're about 210.
11 01 26 44  LMP    Okay.
11 01 26 46  CMP    Look - look at that, John. Look how fast that comes down.
11 01 26 51  CDR    Yeah, it - it ...
11 01 26 53  CMP    You don't have to be too terribly sensitive to see that. That's the first place where the simulator hasn't been just like this thing.
Well, sometimes it - water boils and sometimes it don't.

(Laughter) Okay.

Okay, at - when we get to 06 64, FDAI SCALE, 5/5.

Okay, I --

Okay.

I won't be there for a minute. I'll tell you when I get there.

Okay, fine.

You know, this is the first time we've had particles around us that color. Now I got some red ones and some yellow ones.

That's nice.

I knew you'd like that.

Yeah, I like that, baby.

It also takes the pitch out, but it's not as effective as the - the yaw.

Come on, baby, hang in there.

We've got a zillion particles.

Everything looking good so far.

Yeah.

I do like to hear those things go. Very nice feeling.

Six minutes away.

Six minutes?

About, yeah.

No.
11 01 28 21 CDR  Ten ... --
11 01 28 22 CMP  ... --
11 01 28 23 CDR  Ten, yeah.
11 01 28 24 LMP  Be 9 minutes.
11 01 28 28 CMP  What you got that camera set on, Charlie?
11 01 28 30 LMP  I've got it on f/11, just what the checklist says.
11 01 28 32 CMP  Yeah.
11 01 28 33 LMP  Wh --
11 01 28 34 CMP  I was just thinking - I don't know why I didn't think of this before, but I bet you could get moonset on that thing. Give a little burst as the Moon goes down.
11 01 28 43 LMP  Okay. Okay, I'll set it to about 6 frames a second.
11 01 28 51 CMP  What - what's it normally on?
11 01 28 52 LMP  Twelve.
11 01 28 53 CMP  Twelve.
11 01 28 55 LMP  Hey, that's a nice red particle out there.
11 01 28 57 CMP  Yeah, there's a lot of color.
11 01 29 05 CMP  Want another antenna?
11 01 29 08 LMP  Houston, 16; our signal strength's down. You want another antenna? Should be a good one. I think they've got ground - ground problems.
11 01 29 23 CC  Apollo 16, Houston. We're reading you.
11 01 29 26 LMP  Okay, it looks like your up-link's a little weak, Hank; we're down to - we're getting a lot of scratchiness.
Roger. We're hearing the same.

It's ARIA is what it is.

It's - yeah - how about that? They work!

What works?

ARIA. That wasn't Hank.

Yeah, it was.

..., 16. We're coming through ARIA now.

Yeah, it was. That's Hank.

Really?

Yeah.

... y'all have heard ... on ARIA.

Okay; you sounded pretty good then.

Seven g's.

(Laughter) It's going to feel it.

It's gonna hurt. It really is, I bet you.

Yep.

Try not to get any surprises. I guess - no one's ever talked about them coming down.

No.

Don't let any dust get in your eyes; there's a lot floating around here.

And, Apollo 16, Houston. We do not have telemetry.

Okay; we're looking good, Hank.

(Laughter) We'll give you our status. I guess they can't get anything through ARIA.
Still don't see the Moon.

It won't show up until it - it's moving. It isn't, but we are - moving very rapidly in central angle now.

Yeah.

And when it comes, it's going to go down - it only takes like a second or two to set.

Don't know what --

Okay, we got the attitude yet?

Not quite,

-- ... what good that does you.

What that does for you? If you lose your attitude reference, you can go find the Moon and that just gives you an idea what time that thing ought to set. And then you know where the horizon is. And you can uncage a BMAG there and then pitch 30 degrees and you're - you're near it.

Oh, okay. That simple, I'd buy it.

3000 miles to go, gang; 33,971 feet a second, Charlie.

3000 miles to go?

Yep.

Gyah! We're hauling it. I'll tell you, babe, we're hauling it.

We're still accelerating.

Yeah, we're starting to pick up speed now.

You can feel it go faster.

Is that to touchdown --

I feel it --
or is that to EI?

-- ... I'm heavy.

Huh?

Is that 3000 miles to EI?

Touchdown --

That's 3000 miles to touchdown.

Oh.

They always say the --

... SET is 290 --

-- the last 3000 is the hardest. They don't say it. I just made it up.

I see. That's very good.

We don't want to come up with any more of those little things.

(Laughter) Yeah. I get the last 10,000 feet.

We there yet, Ken?

(Laughter) No.

Well, hurry up.

(Laughter) What have we got to do?

Well, you got 5 minutes.

Okay. I got 10 degrees.

Okay, good.

What are we going to do when we get here?

Just make me comfortable.

(Laughter)
(Laughter) Hang in there. 153 is the attitude.

Yes, sir.

That's the only thing I know this morning.

That's really all you've got to know.

We've got a couple of things to do, really; FDAI SCALE and ROT CONTROL POWER.

Okay, ROT CONTROL POWER - what are you going to do with that? I got ...

DIRECT, two, MAIN A/MAIN B.

Yeah, I did that before sep.

... data back and you're looking good.

Roger.

(Singing) Da-da-da-da-da.

Okay, wind my watch.

Yeah, I had to put that on my postsleep checklist because I never remember to wind it. I can't believe - program like this and you got to have a self - can't have a self-winding watch.

Digital manpower at work.

There's something basic about telling time that seems to be very difficult. Okay, I'm at attitude, Charlie.

Okay. FDAI SCALE, 5/5.

Okay, going to 5/5.

Okay. Now we just stay hanging in here - until .05G.

Okay, and I want to start my wristwatch at .05. I don't know what good that'll do me. I mean at RRT. I'll - I'll set this thing; it just might work. Maybe it'll be sympathetic. It did it on TEI, much to my amazement.
Okay, we got 3 minutes to RRT.

Now, the Moon's already set according to this.

No, 292 - Yeah, it is - too - I never saw it.

No, we weren't in attitude.

Okay.

We were in attitude for entry, not for watching moonset.

Okay, I'm back to 12 frames a second, then.

Okay. Okay, all I've got to do is get these guys back to RATE COMMAND and go to CMC, and I'll do that soon as we start to pick up a little aerodynamics.

Okay, we're about a minute out.

A minute -

A minute -

And a half.

And ENTRY in NORMAL?

Yes, sir.

Got both regs on the line?

Roger.

Pyros are armed.

Yep.

CM/SM SEP switch - circuit breakers are in.

Yep.

Think of anything else.

I got to get these.
Yeah. Yeah, okay; that's at .05G. You - you also .05G switch and EMS ROLL switch.

Okay.

Okay, and SPACECRAFT CONTROL - SC MCC [sic]. You got four to get --

..., Houston. You're still looking good.

Roger.

You're 1 minute out.

You might get a little this early because --

I think I'm starting to pick up some aero.

Yeah, they -

That's the horizon. Look at that.

Get back in the cockpit, Charlie.

Okay.

Okay, the needle's coming off the peg. That's doing good work.

Yeah, it's right on.

Okay.

Thirty seconds to RRT.

And call at RRT.

Okay; 15 seconds.

Watch it diverge there.

Six seconds, 5 seconds - 2, 1 -

MARK; RRT. Watch is started.

Clock's running. Okay, I'm going to RATE COMMAND.
<table>
<thead>
<tr>
<th>Time</th>
<th>LMP</th>
<th>CDR</th>
<th>CMP</th>
<th>MS</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 01 37 39</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>And SPACECRAFT CONTROL to CMC.</td>
</tr>
<tr>
<td>11 01 37 43</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Better get it back; get that needle back.</td>
</tr>
<tr>
<td>11 01 37 44</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay, we got some - glow - -</td>
</tr>
<tr>
<td>11 01 37 46</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay, get your ... Look at the glow.</td>
</tr>
<tr>
<td>11 01 37 48</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Give it ...</td>
</tr>
<tr>
<td>11 01 37 49</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>It's got it. CMC has control.</td>
</tr>
<tr>
<td>11 01 37 50</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay.</td>
</tr>
<tr>
<td>11 01 37 51</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Okay. Hundredth of a g --</td>
</tr>
<tr>
<td>11 01 37 53</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>Camera's started.</td>
</tr>
<tr>
<td>11 01 37 55</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>One - -</td>
</tr>
<tr>
<td>11 01 37 56</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>200.</td>
</tr>
<tr>
<td>11 01 37 57</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>Twenty-three.</td>
</tr>
<tr>
<td>11 01 37 58</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Tape [?] four.</td>
</tr>
<tr>
<td>11 01 37 59</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>.05G -</td>
</tr>
<tr>
<td>11 01 38 00</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>MARK.</td>
</tr>
<tr>
<td>11 01 38 01</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Six, 7 - -</td>
</tr>
<tr>
<td>11 01 38 02</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay, EMS and .05G ROLL.</td>
</tr>
<tr>
<td>11 01 38 03</td>
<td>LMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay.</td>
</tr>
<tr>
<td>11 01 38 05</td>
<td>MS</td>
<td></td>
<td></td>
<td></td>
<td>Here we go.</td>
</tr>
<tr>
<td>11 01 38 07</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>Okay, 0.12g's - -</td>
</tr>
<tr>
<td>11 01 38 08</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>Beautiful.</td>
</tr>
<tr>
<td>11 01 38 09</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>0.17, 0.24, 0.34.</td>
</tr>
<tr>
<td>11 01 38 14</td>
<td>CMP</td>
<td></td>
<td></td>
<td></td>
<td>Okay.</td>
</tr>
<tr>
<td>11 01 38 15</td>
<td>CDR</td>
<td></td>
<td></td>
<td></td>
<td>0.5; okay, 0.7.</td>
</tr>
</tbody>
</table>

**CONFIDENTIAL**
11 01 38 19 CMP Coming up on 1 - -
11 01 38 20 CDR 1.0, 1.3, 2, 2.8 - -
11 01 38 32 LMP That's just 2?
11 01 38 33 CMP No, that's 4.
11 01 38 34 CDR 4.
11 01 38 38 CMP/CDR 5.
11 01 38 40 CMP Right on. There's 6.
11 01 38 42 LMP 6.
11 01 38 48 CDR 6.9; 7.
11 01 38 54 CMP It's easing off.
11 01 38 57 CDR 7. Comp for roll.
11 01 38 59 CMP Good.
11 01 39 00 CDR Plus 53.
11 01 39 01 CMP Circle it.
11 01 39 02 CDR Plus 90.
11 01 39 03 CMP Good.
11 01 39 04 CDR Plus 164.
11 01 39 05 CMP Outstanding.
11 01 39 06 MS ... 
11 01 39 08 CMP Doing good work; 5g's.
11 01 39 11 CDR 5g's; 4.9.
11 01 39 14 CMP Outstanding machine! Something's on my window.
11 01 39 20 CDR Guess that's Mylar over there.
11 01 39 21 LMP Mylar.

CONFIDENTIAL
11 01 39 23 CMP 4g's; D₀.
11 01 39 24 CDR Plus 190, plus 87 -
11 01 39 27 CMP Good work.
11 01 39 28 CDR Plus 53.
11 01 39 29 CMP Fly, you booger.
11 01 39 34 CDR Okay, we're subcirc.
11 01 39 36 CMP Oh, yeah; are we?
11 01 39 37 LMP Yeah; subcirc.
11 01 39 38 CMP My watch is - my - -
11 01 39 39 CDR Comp for plus 1.
11 01 39 41 CMP Okay.
11 01 39 42 LMP And roll.
11 01 39 44 CMP Doing good work, machine. How's the - -
11 01 39 51 CDR - - ... north - -
11 01 39 52 CMP How's the pressures?
11 01 39 53 CDR - - and 11.7 -
11 01 39 55 LMP Pressures are looking good in the RCS.
11 01 39 57 CDR Twenty-five overshoot; 34 overshoot; comp for lift down; 74 degrees right; 75 degrees right.
11 01 40 03 CMP Okay, I'll just copy it, John. No sweat; we are sitting right in here. Beautiful machine. EMS and G&N are converging. We're down to 2-1/2g's.
11 01 40 18 SC (Coughing)
11 01 40 20 CDR Plus 68; plus 69. Reversing roll.
11 01 40 24 CMP Outstanding.
11 01 40 25 CDR It went --
11 01 40 26 CMP Good decision.
11 01 40 27 CDR -- 23 north; now it's going back south.
11 01 40 28 CMP Good decision. 82; good show.
11 01 40 32 CDR Okay, what time you got, Charlie?
11 01 40 35 LMP I got 3 minutes -
11 01 40 36 LMP MARK.
11 01 40 37 CDR Okay.
11 01 40 38 LMP We haven't entered blackout yet.
11 01 40 39 CDR Yeah. Ahh.
11 01 40 41 LMP 03:31.
11 01 40 42 CMP Outstanding!
11 01 40 43 CDR Okay, the RCS pressures are looking good. They're at 3000 --
11 01 40 45 LMP 27:02; we in blackout?
11 01 40 49 CDR Minus 86 --
11 01 40 50 CMP It's gonna start pulling that range off.
11 01 40 51 CDR Minus 84.
11 01 40 53 CMP It's gonna pull another 4g's here pretty soon.
11 01 40 54 CDR Gonna get another big g here, huh?
11 01 40 56 CMP Yeah.
11 01 40 58 CDR Minus 80.
11 01 41 00 CMP Okay, we -
11 01 41 02 CDR
  Minus 77; minus 76 -
11 01 41 06 LMP
  Okay, we ... blackout right on time.
11 01 41 08 CDR
  Okay.
11 01 41 09 LMP
  Got signal strength.
11 01 41 10 CDR
  Houston, we're out of the first blackout there.
11 01 41 15 CMP
  Okay, the g's are going to be building up again.
11 01 41 17 LMP
  Okay.
11 01 41 22 CDR
  Minus 50 - -
11 01 41 23 CMP
  ... up.
11 01 41 24 CDR
  Minus 50.
11 01 41 25 CMP
  Fine.
11 01 41 26 CDR
  Minus 50; minus 48; minus 48.
11 01 41 29 CMP
  Fine.
11 01 41 30 CDR
  Minus 48.
11 01 41 31 CMP
  Good, good.
11 01 41 32 CDR
  Zero down range.
11 01 41 33 LMP
  Coming up on - 4 minutes.
11 01 41 35 CDR
  Roger; loud and clear.
11 01 41 37 CMP
  Okay - -
11 01 41 38 CDR
  Minus 49.
11 01 41 39 CMP
  Okay, don't bother to read the angles.
11 01 41 41 CDR
  Okay.
11 01 41 43 LMP
  Okay, passed - we passed 4 minutes.
All right. This thing is almost as smooth as I'd fly it.

(Chuckle) Beautiful.

I'm glad, mmm. But I'm willing to concede.

What's the g's now?

Coming up on 3.

Okay.

You're going to get maybe another half --

04:30 --

-- and that's about it.

MARK.

It's doing all the right things. It's gonna have to give you another half a g.

Man, that EMS would have gotten home.

Isn't that something?

Coming up on 5.

Reversing.

Good show.

Supposed to. Man, it hoses it out, I'll tell you.

Oh.

... --

You know, I didn't think we were having many g's --

Five minutes.

-- until I tried to raise my head (chuckle).

Yeah.
Man, 2g's felt like a ton.
You're sitting on 3.

Okay.

... steady as a rock.

Plus 70.

Steering looks a champion.

Yeah, it looks good.

It's gonna dig in a little more.

Man, if this don't get you back to one g, nothing will.

I know it.

Oh, beautiful!

Okay, m - on my mark, it'll be 05:30.

MARK; 05:30.

Okay. Looks to me like that little guy is just gonna do a super job.

... Land us right on the sh - the ship.

Okay, coming up on 6 minutes. We should be at 90K momentarily.

Okay.

Look out, Ticonderoga, we're gonna hit you.

Okay, 6 minutes. Steam pressure's not pegging on time.

It's not?

No.
Okay, I think we're just about to the transonic region.

Okay. Okay, there comes the - there comes the steam pressure.

Okay, I'm stopping the DAC. Okay, changing to f/8. Okay, steam pressure's pegged.

Okay, we're through 90K.

Okay, 90K.

Through 90K, Houston.

Okay, stand by for 50K.

There's a little transonics.

Yeah.

That was premature. Okay, I'm off the peg with the altimeter.

Okay.

Altimeter's off the peg.

Give me a call at 50K.

Stand by.

Go to - go to BOOST/ENTRY - -

BOOST/ENTRY.

MARK; 50K.

BOOST/ENTRY.

BOOST/ENTRY on two sides. Okay.
Okay. At 30K, we want ELS LOGIC and ELS, AUTO.

Okay. Coming up on 40. That's the relief valves.

Okay.

Give me a ---

At 35K.

Okay.

I'll start the camera.

I think that's too bright of a setting.

Yeah.

Okay, get ---

Okay, ... ---

30K.

Okay, ELS LOGIC; ELS, AUTO ---

... LOGIC and AUTO.

Okay, stand by for 24.

Standing by. Give it ...

There's one.

There you go.

The APEX COVER.

There go the drogues.

Hang on. They're out. I see two of them.

Ohhh, you beauties.

Man, are they whopping.
Man, what a ride.
Okay, stand by. Okay, BOOST/EN -
Huh?
Looks like the cabin's coming up.
Yeah, I can smell it.
Cabin's coming up.
Okay. We're stabilizing. You want me to go to BOOST/EN --
No, no. You're okay. Cabin's coming up.
Okay. Man, I didn't expect that.
Man, those beauties are out there.
They are really - must have a load on them. Okay, and the next one I want to get is the mains.
Yeah.
Roger. Drogues are looking good.
Okay, it's gonna drop away and you get two reef --
That's right.
Okay, they are --
There they go. There go the mains --
-- ... are out. ... --
MA, O₂ FLOW. Okay, we got three reefed.
Okay, stand by --
-- ... is off.
Okay, we've dereefed.
Day 12

11 01 46 27 CMP  I see one --
11 01 46 28 LMP  I see three big ones.
11 01 46 29 CMP  -- two, three. They're -- now they're dereefed.
11 01 46 31 LMP  Now they go. There they go. All three open.
11 01 46 33 CMP  Ohhh, beauties.
11 01 46 34 CDR  Okay, let's turn off the propellant.
11 01 46 35 CMP  Okay.
11 01 46 36 LMP  Okay --
11 01 46 37 CMP  Okay, read the checklist.
11 01 46 38 LMP  One -- 1 second --
11 01 46 39 CMP  Read your checklist.
11 01 46 40 LMP  SURGE TANK, O_2, OFF.
11 01 46 41 CMP  SURGE TANK O_2 is OFF.
11 01 46 43 LMP  REPRESS PACKAGE, OFF.
11 01 46 45 CMP  REPRESS PACKAGE is OFF.
11 01 46 46 LMP  I'm going to RECOVERY; A to SIMPLEX, and BEACON is ON. Okay --
11 01 46 52 CMP  ... see that.
11 01 46 53 CDR  Recovery, this is Apollo 16.
11 01 46 54 LMP  Go to DUMP.
11 01 46 55 CMP  DUMP?
11 01 46 56 CDR  DUMP.
11 01 46 57 R-1  Apollo 16, this is Recovery. Welcome back; go ahead.
11 01 47 01 CDR  Roger. We're showing point -- minus 0.72, 156.28 west.
Okay, I'm putting the DAC under the couch.

Okay.

With a miss of 1.6 miles.

Okay, CB FLIGHT/POST LANDING, four, close. Close three, four, close --

Ah, you beauties.

This is Recovery. Roger; and what's your condition? Over.

MAIN A and MAIN B, open --

Outstanding.

(Laughter) It's super! Hey, I didn't hear you -

Tico, ELS.

Charlie, I didn't hear you.

Tico, ELS has visual.

You're calling off the checklist!

Roger.

I ain't answering them.

It's my side.

Okay.

Okay.

All right.

Just get that one to DUMP.

Okay.

Okay.

Let's close these valves.
CM RCS PROPELLANT at 3K. We want those closed.

(Coughing)

... Swim's ... visual —

...

That's what I said.

Roger.

I know, but John didn't want to until 3.

Oh, let's get those closed.

Okay, we're safe.

Okay.

Tico, this is Recovery. Did you receive the Apollo 16 report? All three chutes are fine. They are looking good as they're coming down. Over.

Ticonderoga; Roger.

Okay, we're coming through 5500, Charlie.

Okay; 3K's the next one.

Affirmative; copy.

Whew! (Cleared throat) That's what I call a thrill.

That is something.

Isn't that?

Say, you can't top that.

Isn't that - isn't that something?

You gonna bleep the controller?

Yeah, that's at 800 feet —

---
I'll read it out, okay?

We may hit the water at 800 feet.

Well, wait a minute. That thing's --

No, we aren't even above the clouds - we're still above the clouds.

Well, they don't know what 2000 scattered is out here.

Yeah, ...

I could see the clouds; they're in the water.

(Chuckle) Get you head back in here.

(Chuckle) I'm all right. I just want to make sure we don't hit nobody.

You're in DUMP, huh?

Yeah, one's in DUMP.

That certainly is beautiful.

Tico, this is Photo. All main chutes are deployed. There is no sway on the module. It's coming down, straight down.

Okay, that's ... --

Roger.

-- likely to be in stable I.

(Coughing)

You might think about positioning for landing?

I'm - I'm in.

... clips?

Well, mine won't work, but my feet are up straight.

Okay.
Okay, give me a hack at 3K, Ken.
All right; 3200.
Okay.
Let's call that 3.
Okay. PROPELLANT RCM - RCS PROPELLANT, OFF.
They're OFF.
They're OFF.
FLOODs, POST LANDING.
FLOODs to POST LANDING.
Okay, we wait --
They're on.
Okay, we wait until 800.
Okay, Houston, we're passing down through 2800 now.
Hey, I don't believe that within 500.
Helicopter just went right over us.
Is that right?
Yeah.
And we - have the helicopters out the window.
Man! Umm! Whew!
You just can't describe something like that, that 2g's.
Okay, there's 2000.
Okay; 800 feet is what we're waiting on.
Let's leave - let's leave that one.
11 01 50 06 CDR Yeah, let's --
11 01 50 07 CMP I don't want to end up in the water with my dump valve open.
11 01 50 10 CDR Okay, they'll splash in there anyway. You can close them ... Okay, go ahead and do it, Ken.
11 01 50 16 CMP Okay, I'm closing --
11 01 50 18 LMP What are you supposed to close?
11 01 50 19 CDR I don't know - I don't know if you should close them.
11 01 50 20 CMP Well, you --
11 01 50 21 LMP Wait --
11 01 50 22 CDR -- ... gonna get a negative pressure.
11 01 50 23 LMP At 800 feet - Wait - yeah, at 800 feet, close them. We're - we're - there's the helicopter out --
11 01 50 27 CMP Okay.
11 01 50 28 LMP We're looking good.
11 01 50 29 CMP Okay.
11 01 50 30 LMP Okay, we're still --
11 01 50 31 ELS Tico, this is ELS. We have the two drogue chutes in sight --
11 01 50 35 CMP There's 1000.
11 01 50 36 LMP Okay --
11 01 50 37 ELS -- ... they are due south of the command module.
11 01 50 40 TIC Roger.
11 01 50 41 CMP 900.
11 01 50 42 ELS And up about 3000 feet ...
11 01 50 44 LMP  CABIN PRESS RELIEFS, CLOSE.
11 01 50 45 CMP           Two, CLOSED.
11 01 50 46 LMP  Okay, command - plus or minus yaw for 1 second, direct.
11 01 50 50 Tic           Roger.
11 01 50 52 LMP           There you go.
11 01 50 53 CMP           Okay, that's done.
11 01 50 54 LMP           Okay - -
11 01 50 55 Cdr           Okay, the yaw has been put in.
11 01 50 56 Lmp           -- MAIN BUS TIES coming OFF.

END OF TRANSCRIPT