APOLLO 11 - ONBOARD VOICE TRANSCRIPTION
APOLLO 11
ONBOARD VOICE
TRANSCRIPTION
(U)
RECORDED ON THE
COMMAND MODULE
ONBOARD RECORDER
DATA STORAGE EQUIPMENT
(DSE)
August 1969

GROUP 4
DOWNGRADED AT 3 YEAR INTERVALS
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AFT CENTER
XAS
Apollo 11
Onboard Voice Transcription

July 16 – 24, 1969

MANNED SPACECRAFT CENTER
HOUSTON, TEXAS
INTRODUCTION

This is the transcription of the Apollo 11 flightcrew communications as recorded on the command module (CM) data storage equipment (DSE), and subsequently transmitted (dumped) to Manned Space Flight Network stations. Magnetic tapes containing dumped voice and onboard recorded ground elapsed time (GET) were forwarded to the NASA Manned Spacecraft Center, Houston, Texas. Transcription of these tapes was managed by David M. Goldenbaum, Test Division, Apollo Spacecraft Program Office, to whom questions regarding this document should be referred.

The Apollo 11 mission was flown July 16 to July 24, 1969.

Communicators in the text are identified as follows:

**Command module:**

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<tr>
<th>Abbreviation</th>
<th>Role Description</th>
<th>Name</th>
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<tbody>
<tr>
<td>CDR</td>
<td>Commander</td>
<td>Neil A. Armstrong</td>
</tr>
<tr>
<td>CMP</td>
<td>Command module pilot</td>
<td>Michael Collins</td>
</tr>
<tr>
<td>LMP</td>
<td>Lunar module pilot</td>
<td>Edwin E. Aldrin, Jr.</td>
</tr>
<tr>
<td>SC</td>
<td>Unidentifiable crewmember</td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td>Multiple (simultaneous) speakers</td>
<td></td>
</tr>
</tbody>
</table>

**Mission Control Center:**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Role Description</th>
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<tbody>
<tr>
<td>CC</td>
<td>Capsule Communicator (CAP COMM)</td>
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</table>

In the text, a series of three dots (...) is used to designate those portions of the communications which 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.
00 00 28 53 LMP  How are we doing on that time, anybody? Neil, are you sort of master of
ceremonies on time, yet?

00 00 29 00 CDR  Well, I didn't ... 

00 00 29 22 LMP  (Singing) Okay, your DRINKING WATER SUPPLY valve is ON.

00 00 29 27 CMP  How about this ... circuit configuration? GLYCOL RESERVOIR BYPASS valve
OPEN?

00 00 29 33 CDR  (Cough) ... BYPASS is OPEN.

00 00 29 38 CMP  RESERVOIR OUT valve CLOSED?

00 00 29 40 CDR  OUT's CLOSED.

00 00 29 41 CMP  IN valve CLOSED?

00 00 29 42 CDR  IN's CLOSED.

00 00 29 43 CMP  ECS RADIATOR FLOW CONTROL, PRIMARY.

00 00 29 48 LMP  ... 

00 00 29 51 CMP  Hey, Buzz?

00 00 29 52 LMP  Yes.

00 00 29 53 CMP  How would you like the camera?

00 00 29 55 LMP  Okay.

00 00 29 56 CMP  PRIMARY GLYCOL TO RADIATOR valve, NORMAL.

00 00 29 59 LMP  Why don't I leave the dark slide - -

00 00 30 01 CDR  Are we ready for that, you think? What's the time?

00 00 30 04 LMP  30 minutes. ... 

00 00 30 08 CDR  ... to NORMAL, and check the radiator.

00 00 30 13 CMP  It will take awhile, that's - -

00 00 30 16 LMP  Okay, now, is that normal for the discharge pressure to zap down low and to do
that? Do you think, Mike?

00 00 30 23 CMP  What's that? I'm sorry, I wasn't listening.

00 00 30 25 LMP  When Neil sends the GLYCOL RADIATORS to NORMAL, temporarily, it - -

00 00 30 31 CDR  It drops?

00 00 30 33 LMP  Yes.

00 00 30 34 CMP  The temperature done that?

00 00 30 35 CDR/LMP  No, the pressure.
00 00 30 36  CMP  Yes, pressure - you might get a little drop in it, I don't really know, but it came back up.

00 00 30 38  LMP  Yes, it goes back up.

00 00 30 39  CMP  Alright, Buzz, here's one Hasselblad for you.

00 00 30 40  CDR  Coming around the right-hand couch.

00 00 30 42  LMP  That seems okay.

00 00 30 44  CMP  Buzz?

00 00 30 45  LMP  Yes, just a second.

00 00 30 47  CMP  Okay. I'll just let go of it, Buzz; it will be hanging over here in the air. Coming up - it's occupying my couch.

00 00 31 03  LMP  Okay.

00 00 31 05  CMP  Just leave the dark slide with it?

00 00 31 08  LMP  Well, I thought about . . . the dark slide or something, and then I thought we might need it later for a magazine change; so, I left it with it.

00 00 31 25  CMP  Well, I know there's an orange dot on this . . . somewhere.

00 00 32 05  LMP  That looks just a couple of degrees still above the -

00 00 32 19  CMP  Buzz, did you ever get that camera?

00 00 32 21  LMP  Yes.

00 00 32 23  CMP  Okay.

00 00 32 44  CDR  Now, look.

00 00 32 46  CMP  Yes, I guess it's 5 minutes after you do this before . . .

00 00 32 55  LMP  It's coming down, but it's - -

00 00 32 56  CDR  Is it?

00 00 32 57  LMP  - - as I said before, that's -

00 00 33 06  CDR  It looks like that's about equal to the limit pressure.

00 00 33 07  CMP  Yes, they're about - they're just about the same now.

00 00 33 11  CDR  Not getting much out of the radiator.

00 00 33 18  CMP  Okay, Buzz, are you ready for 16 millimeter?

00 00 33 20  LMP  Yes. How about a bracket?

00 00 33 22  CMP  Let - Neil will give you the bracket.

00 00 33 40  CDR  And the bracket - bracket slide -

00 00 33 47  CMP  Okay, Buzz, I'm going to have to do something about your couch. You mind sliding over to mine?
00 00 33 52 LMP No, that's fine.
00 00 33 54 CMP Could you - -
00 00 33 55 LMP Can you work on that strap?
00 00 33 56 CMP Oh, yes, I will. Sure will. The - the one that your strut's off . . . instrument panel.

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00 00 34 01 LMP Yes. . .
00 00 34 54 CMP And your . . .
00 00 35 09 CDR That temperature's coming down a little bit now.
00 00 35 14 LMP Yes.
00 00 35 41 LMP Now, let's see. You got an 18 millimeter on here, right?
00 00 35 44 CMP Yes.
00 00 35 46 LMP So - Do I push the thing all the way up? Is that right?
00 00 35 50 CMP Yes.
00 00 35 51 LMP About with that white mark?
00 00 35 52 CMP Yes, one's for the 18, and one's for the 75; I - I think just as long it looks like it's out and . . . the window, that's the main thing.
00 00 36 40 CDR Did you get a secondary radiator leak check?
00 00 36 43 LMP Yes, we did that.
00 00 36 44 CDR Okay. We're not hearing them, but we're . . . Tananarive.
00 00 36 48 CMP Are we on SIMPLEX A?
00 00 36 49 CDR We're on SIMPLEX A.
00 00 36 51 LMP We're on SIMPLEX A, but we're not due over Tananarive for another couple of seconds.
00 00 36 56 CDR Okay.
00 00 36 58 CMP What - . . . time is 36 something - -
00 00 37 00 LMP Am I set up on VHF? Can you tell . . . ?
00 00 37 11 CMP Yes, just a second. Just a second - Your MASTER is ON; your INTERCOM is N; your VHF is ON; your PAD COMM is OFF; your S-BAND is ON; and you're in INTERCOM/PUSH-TO-TALK, so you're all squared away, except for maybe VOLUME dial.

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00 00 37 29 LMP Okay.
00 00 37 31 CDR Now, Buzz, this item here at Canaries. LOS, 23:36; POTABLE WATER HEATER, MAIN A - -
00 00 37 38  LMP  Yes, I got that.
00 00 37 39  CDR  - - PCM BIT RATE, LOW - -
00 00 37 40  LMP  I got that.
00 00 37 41  CDR  - - You got all that, okay. Okay, when was the - -
00 00 37 44  LMP  And the purge check's complete, and I'm working my way down to ECS.
00 00 37 50  CDR  Okay.
00 00 37 51  CMP  I'm having a hell of a time maintaining my body position down here; I keep floating up.
00 00 37 56  LMP  Well, there's such a great tendency to - to try and put a little force ... want to stay there. Just forget about all that and go wherever you want.
00 00 38 11  CDR  Okay, I got the SYSTEMS TEST meter set up on 4-B and ... attitude ... 
00 00 38 18  LMP  4-B, okay.
00 00 38 19  CMP  What are you reading?
00 00 38 20  CDR  I'm reading 3.50.
00 00 38 26  LMP  ... our attitude quantities ... 
00 00 38 36  CC  Houston, Apollo 11.
00 00 38 41  CDR  Hello, Houston; Apollo ll.
00 00 38 46  CMP  OPTICS ZERO is OFF. I'm going to jettison the ... cover - -
00 00 38 50  CC  Apollo 11, Apollo 11; this is Houston through Tananarive. Over.

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00 00 38 56  CDR  Hello, Houston; Apollo 11. Go ahead.
00 00 39 03  LMP  Houston. Apollo 11, read you on VHF A SIMPLEX. How do you read? Over.
00 00 39 09  CC  Roger, 11; this is Houston. We're reading you loud and fairly clearly. For your information, Tananarive radar shows you in a 103.0 by 103.0 orbit. Over.
00 00 39 24  LMP  Beautiful.
00 00 39 26  CC  We concur.
00 00 39 30  CDR  Well, we're just coming into the terminator, here.
00 00 39 40  CMP  I jettisoned the optics; I hope they went. Did you see them go?
00 00 39 44  LMP  I heard a little something, but I - -
00 00 39 47  CMP  Don't want to miss that.
00 00 39 48  LMP  No.
00 00 39 55  CMP  Can't really tell here. I think I'm seeing the horizon - out there, but I'm ... far from being dark-adapted; it's hard to tell -
00 00 40 08  LMP  ... a double blind on this?
00 00 40 12 CMP Yes. What were those Z-30 angles? 0.22, isn't it?
00 00 40 18 LMP That's right, plus.
00 00 40 19 CMP Sure's a big one, isn't it? Okay, well, I'm standing by to do this - -
00 00 40 28 LMP Got A and B down.
00 00 40 32 CMP - - IMU align. Unstow the optics handles. Anybody wants any of that claptrap out of R-1, now is the time to say it.
00 00 40 47 LMP Give me that little circular Job.

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00 00 40 52 CMP Alright, I'll - I'll look for it, Buzz. Let me get these - optics handles. I guess I really didn't mean what I said right when I said it a little while . . . Oh, I knew there was something messed up.
00 00 41 09 LMP You say you had about 3-point-something volts up there?
00 00 41 12 CMP Yes. . . . and on the . . .
00 00 41 17 LMP 3.4?
00 00 41 19 CMP 3.45, something like that - -
00 00 41 20 LMP Oh, that's - that's the minimum. 3.4, 4.1. And you can whip it over to 4-A, if - -
00 00 41 28 CMP Okay, 4-A is 3.8. Okay.
00 00 41 38 LMP No, 4-A.
00 00 41 41 CMP 4-A?
00 00 41 42 LMP Yes.
00 00 41 43 CMP And 3.8.
00 00 41 44 CC Apollo 11, this is Houston. 1 minute to LOS Tananarive; AOS Carnarvon is at 52:15. Over.
00 00 41 53 CDR Apollo 11, Roger.
00 00 41 56 LMP 52:15.
00 00 41 57 CDR You want some of these lights down further, Mark - Mike?
00 00 42 04 CMP Don't worry about it for the time being; I'm potting around with handholds right now, Neil. . . .
00 00 42 13 LMP That battery compartment pressure, Mike, it ought to be less that 1.5. However, it says NA until first vent.
00 00 42 21 CMP Okay.
00 00 42 22 LMP It's greater than 1.5; that vent - vent -

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00 00 42 25 CMP Well, we haven't even done it yet.
00 00 42 27  LMP  . .
00 00 42 28  CMP  Yes.
00 00 43 13  CDR  Man, we are in the dark, now.
00 00 43 25  CMP  You got any reading off that REPRESS O2 to be greater than 8  . .
00 00 43 37  LMP  We got - No, not quite that much. That's that crazy gage.
00 00 43 48  CDR  Okay, can I have the   . . . now?
00 00 43 53  LMP  Yes, you got it. . . . 50 degrees . . .
00 00 44 06  CDR  . . . here is your acid test.
00 00 44 10  CMP  Okay, what did he say 52 -
00 00 44 11  CDR  52 . . . percent, about.
00 00 44 15  CMP  As I say, I can't see . . . Let me know if you want me to - come back . . .
00 00 44 52  CMP  It's - Menkent.
00 00 44 58  LMP  . . . ball on that pad - it's maintaining about 39 degrees, Mike.
00 00 45 02  CMP  Yes, I noticed that. Before, it was maintaining less than that; it was abnormally low. I almost asked them about it during boost, and then I decided to heck with it. Damn, it'll be hard to see through these optics . . . down a little bit. Okay, proceed to Menkent. There she goes - Menkent.
00 00 45 31  CMP  Menkent - God, what a star.
00 00 45 35  LMP  Nobody in their right - -
00 00 45 36  CMP  Menkent's good - -
00 00 45 37  LMP  - - nobody in their right mind would pick that one.

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00 00 45 38  CMP  - - Menkent's a good star.
00 00 45 40  LMP  Hey, I sure wish you'd get out that - that star chart.
00 00 45 45  CDR  Can't see a thing, huh?
00 00 45 46  CMP  No. It's in the - -
00 00 45 48  CDR  Did you look in the telescope?
00 00 45 49  CMP  - - in the sextant. Yes, but I can't see it in the telescope; in the sextant - I can't.
00 00 45 53  CDR  Okay.
00 00 45 54  CMP  I believe it's at the angle we have to mark on it.
00 00 46 06  LMP  It's a little on the chilly side in the cabin. Would you like - -
00 00 46 08  CDR  Feels comfortable to me.
00 00 46 09  LMP  - - would you like it a little warmer, anybody?
00 00 46 10  CDR     I don't think so; I think it's a little on the - -
00 00 46 13  LMP     . . .
00 00 46 16  CDR     It sure doesn't look - sure doesn't feel like - Actually, it may be a little - it may be a little warm.
00 00 46 20  LMP     Well, my - my feet are a little chilly; see, it's 47. Okay, 37 is - -
00 00 46 26  CMP     No, that's - -
00 00 46 27  LMP     - - is Nunki. What?
00 00 46 30  CMP     Okay. Hey, Buzz?
00 00 46 31  LMP     What?
00 00 46 32  CMP     Did you write down any marks on 30 and on 37?
00 00 46 35  LMP     I was going to mark on 37, and that's Nunki; 30 and 37?

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00 00 46 39  CMP     Yes, sir.
00 00 46 43  LMP     30 -
00 00 46 45  CDR     I can see some stars. Well, maybe I . . .
00 00 46 53  CMP     Okay, again, looking through the telescope, I'm absolutely unable to tell if it's Nunki, but I have it in the sextant - so let's mark on it.
00 00 47 18  CMP     . . . you guys would appreciate doing this with old G&N men.
00 00 47 24  CDR     0.01.
00 00 47 26  CMP     0.01, alright. - Shoot, I forget, I think that's gray Gienah.
00 00 47 29  CDR     Cup of coffee around here later on when you get a little time.
00 00 47 34  LMP     You like that, Neil? You want us to record that star?
00 00 47 40  CMP     I got it, I got it; go ahead.
00 00 47 41  LMP     Let's see, what's tearing me up is we're going to ORB rate on this damn booster, and the rate is very evident.
00 00 47 48  CMP     Okay, Z torque is plus 0.152 instead of 150; I suppose that's close enough. Now then, you got those numbers written down, Buzz?
00 00 48 01  LMP     Copy.
00 00 48 02  CMP     Okay. Now I - I - If I remember right, I think you're just supposed to torque without further ado. We give them the time at which we torque. So, as soon as you got them written down, let me know and I'll proceed and you can mark the time.
00 00 48 13  LMP     I've got it.
00 00 48 14  CMP     Okay, here we go. Proceed - torque.
00 00 48 15  LMP     48:15.
Okay, now I'm going to verify with the third star, and let's see what that star's going to be. Star number 34.

Atria.

- is Atria. You might note that, Buzz, also. I think...

Yes, I think that's the third star; it'll say somewhere in that checklist. Proceed to Atria. Alright, if IMU is realigned, realign the GDC.

0.1 degree. Probably GDC's off a lot more than that.

Okay, and Atria is there in the sextant. Well, you know, it's not right in the middle of the sextant. Of course, I guess - I don't know what - Have you ever heard any rules on what constitutes a good third star check?

No, all you're really doing is seeing that you've got the right stars, it seems to me.

It's there, but it's not dab-smack in the middle of the sextant; it's off, I would guess - 0.02 or some crazy number like that. Alright, having done that, VERB 37, ENTER; ... ENTER, and I'm going OPTICS ZERO and MANUAL, and cranking up the floodlights down here.

God, I'll tell you, the visibility through that telescope is a big disappointment.

It's...

Okay, Buzz, got all that good stuff?

GDC's realigned, okay -

Reticle brightness ... I don't know anything about that. ... Stow optics eyepieces, okay, that's in work.

And ... out there right now. ...?, Buzz?

Neil, I haven't been looking out - My eyes aren't very well adapted.

You got your light on.

Yes, look at those bright ones down here.

Lightning! Is that lightning out your window?

No, I haven't seen any lightning.

Hell, that must be lightning. Either that or it's the ... You know, no matter how many times I put these optics eyepieces - -

I just saw something. Maybe it is the ... They said that Borman's ... could see it; they couldn't hear it, but they could see it alright -

Yes.

No matter how many times I put these optics eyepieces in their box, it doesn't seem right.
00 00 51 45  CMP   0.01, God damn it! Now that's enough to piss a body off.
00 00 51 51  CDR   ... that time.
00 00 51 53  LMP   S-band noise.
00 00 51 57  CDR   We're about to get - 10 seconds until acquisition.
00 00 51 59  LMP   Okay.
00 00 52 02  CMP   Okay, and my optics eyepieces are stowed.
00 00 52 09  CDR   You want me to take your checklist, Mike, and kind of skim through it?
00 00 52 16  CMP   It says here, coming up on Carnarvon LOS at - -
00 01 04 44  CMP   Let - let me tell them about the TV . . .
00 01 04 47  CMP   Roger, Bruce. Thank you. We've got it all hooked up. We have not yet turned it on; we're ready to do that now.
00 01 05 02  CMP   Okay, you think we can do that?
00 01 05 04  LMP   That's fine with us.
00 01 05 05  CDR   This one here?
00 01 05 17  LMP   Tell them that we've got nothing to do here but recheck it here for the next 20 minutes or so.
00 01 05 26  LMP   Okay. I'm ready to turn the TV on. Play with it. . . . flashlight . . . hook it up . . .
00 01 06 00  CDR   Want a - . . .? Mike?
00 01 06 01  LMP   No.
00 01 06 04  CMP   Yes, I'd love one, Neil; thank you. I just stuck it in my pocket.
00 01 06 15  CMP   Can I give you the wrapping back?
00 01 06 18  CDR   (Laughing) Now that is a problem, trying to find - -
00 01 06 21  CMP   It's a gooey one. Gooey when the paper doesn't want to come off, but thanks anyway.
00 01 06 54  LMP   What was you doing? (Laughter)
00 01 06 57  CMP   I don't know . . . I almost lost it. I figured I'd really go along with the . . . and put some of that ointment on - so slick that I rubbed my ring off (laughter).
00 01 07 08  LMP   Is that right?
00 01 07 09  CMP   Yes.
00 01 07 18  CMP   Have we got any daylight? I can't see outside at all.
00 01 07 22  CDR   Nothing yet, . . .
00 01 07 26  LMP   How are you going to rig that up, Michael?
Well, Buzz, I'm going to hold it out that hatch window.
Handhold it?
Yes - yes, yes, handhold it; don't dick with that.
Buzz can hold it, and you're going to run the monitor; have you run . . .?
Yes.
Mike, how about this thing?
REPRESS - let's see, it's supposed to be - 865.
Go ahead.
And it - it kind of varies - not 865, but it's - 830.
. . .
Well, I don't know how - that ought to . . .
I can turn - turn it on FILL for a minute, if you like. That's what we need to do, I think.
Maybe the . . . this son of a bitch is working or not.
You got the power switches turned on up there at the - -
Yes. . . .
Let's get into the Hasselblad . . . get the right settings on it.
Okay.
Is Goldstone the only station that's going to get this?
Yes, that's all. That's the only one that's got a scanner converter. We've only got about 4 minutes, looks like.

That must be doing something.
Yes.
How long - -
You got it on infinity for one thing; let me put it down here.
- - how long is it supposed to take to - -
. . .?
No, no, it's the one with the . . .
Okay, it's - it's working somewhat; it's just the question of not enough light in here when I get it.
Yes.
00 01 10 07  LMP  . . . It's, I think, working okay.
00 01 10 10  CDR  We ought to be coming out into the daylight here in a little bit. Get it all shaped up?
00 01 10 22  LMP  I think it's fine. Now the one thing I forget about this is this zoom.
00 01 10 30  CMP  Do we want to write on this what - what we're taking pictures of? 0.5 millimeter.
00 01 10 46  LMP  Who knows about zoom lenses? This lens goes from 12.5 millimeters to 75; I assume that's the same nomenclature as on a camera. Right, 75 is zoom - -
00 01 10 58  CDR  I would think so.
00 01 10 59  LMP  - - and 12.5 is wide angle. The only thing that confuses me is that it says for vehicle to vehicle - We want to be zoom on 12.5. I guess they just want to make sure you got the other vehicle in view. Probably . . . telephoto.
00 01 11 15  CMP  Okay, well, then, I'll put the zoom on 12.5.
00 01 11 18  LMP  Okay. You didn't touch this lighting?

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00 01 11 21  CMP  No, I didn't . . . Minimum . . .
00 01 11 29  LMP  I've got bright.
00 01 11 32  CMP  Focus, I'll put it at infinity, and the f-stop for vehicle to vehicle is - -
00 01 11 58  CDR  Not much light in here.
00 01 12 02  CMP  - - f:2.8.
00 01 12 04  LMP  What?
00 01 12 09  CMP  Okay. I - I'll show what it looks like inside of the cabin.
00 01 12 27  LMP  Okay, this looks alright, I think.
00 01 12 30  CMP  Point that at Neil or point it at somebody who's in the light. Yes, we'll get it. . . . You want to see the monitor?
00 01 12 41  LMP  . . .
00 01 12 43  CMP  Yes. You want to see the monitor?
00 01 12 49  CDR  Is this all ready to go; I'm going to put it back over here. It's over here under your stuff. Now, it seems to me if Buzz wants his camera to drift up, so what I ought to do is probably - Hey, Buzz.
00 01 13 02  LMP  Yes.
00 01 13 07  CDR  Hey, it seemed to stick pretty well if you stood it up on the - with the lens kind of pointing out. There are two pieces of Velcro over there.
00 01 13 14  LMP  Okay.
00 01 13 16  CDR  There are two pieces on the back of them . . .
00 01 13 17  LMP  You think so, huh?
00 01 13 18  CDR  Yes, over, just a little up toward the . . .
Now, . . . - It's rolling around, so I can start looking outside, upside down.

I don't know, I think we'd almost be better just by looking at the monitor, Buzz.

Yes, yes, but this way I think I'll know how to - know which way to move it.

Are you going the right way for those hoses? It looks to me like you ought to roll over the other way.

Hey, there's something. How's that window?

When you get around there, Buzz, I'll give you the briefing (laughter). You just slid out of your - -

I was out of my . . .

Handkerchief or something - -

Where do we have to go to get a tissue?

All the way down to the . . .

How about - using a piece of cloth, like - -

While I'm here, let me - -

What - what - do you want a tissue for?

Hey, that's a good idea. We can get rid of that stuff - -

. . .

- - that's a good idea; good head.

Brilliant . . .

I got your checklist, Mike; you want it back?

Yes, I'll take it back, Neil - Thank you, just put it here.

No, you got Buzz's checklist here. You gave me BUZZ'S.

Excuse me.

. . . I'd rather have my own.

How does the checklist look to you, Neil? You happy with it?

Yes, it looks fine to me.

Good.

I'll take your word for it, but the SPS and ECS and the EPS are now on . . .

. . .

Yes, I'll do that. Are you ready for me to hand you your light test?
00 01 16 16  LMP   No, one-handed snap. . . . I'm in the center now.
00 01 16 28  CMP   Okay, Buzz, the - -
00 01 16 29  LMP   Alright, I'll put yours on the left.
00 01 16 32  CMP   It doesn't matter, they're all good - far as I'm concerned, one's like another.
00 01 16 37  LMP   As a matter of fact, I'll put yours on the right.
00 01 16 38  CMP   Okay.
00 01 16 40  LMP   . . .
00 01 16 43  CMP   This 16-millimeter camera, Buzz, with the 18-millimeter lens - you got it shoved all the way up toward the window. I think we can - on this bracket.
00 01 16 52  LMP   Yes.
00 01 16 53  CDR   Okay, that was correct. You - you were asking about that.
00 01 16 58  CMP   And you have 6 frames per second, and it's color; you got 15 minutes worth - 6 frames a second, f8, infinity, 1/250th.
00 01 17 20  LMP   Okay. The only question is, how much do we want to indicate on that?

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00 01 17 31  LMP   Outside of it - on the magazine?
00 01 17 36  CMP   Yes.
00 01 17 41  CDR   How does zero g feel? Your head feel funny, anybody, or anything like that?
00 01 17 44  CMP   No, I don't know, it just feels like we're going around upside down.
00 01 17 46  LMP   . . . I don't know - even feel that.
00 01 17 49  CDR   I feel the horizon coming up.
00 01 17 52  CMP   Oh, yes.
00 01 17 54  CDR   Buzz, are you ready to - -
00 01 17 55  CMP   . . . 90 degrees the wrong way - -
00 01 17 58  CDR   - - are you ready for this briefing? Buzz?
00 01 18 00  LMP   Yes, let me get this.
00 01 18 01  CDR   Oh! Okay.
00 01 18 04  CMP   Oh, yes, stand by for sunrise.
00 01 18 09  CDR   Say, we got the rookie with us; he hasn't seen so many of those.
00 01 18 23  CDR   (Laughter) Okay. 30 seconds.
00 01 18 30  CMP   Oh, no, there is a possibility.
00 01 18 33  CDR   We haven't got too many of them on this flight, so you might as well enjoy it while you can. Buzz, how are you doing?
Okay, go ahead and talk.

Okay, I'd like to show this to you while I'm talking. It works like a camera. It has the - The f-stop control is right here, and you set it on f:22 which, of course, lets in the smallest amount of light, and that's a safety precaution. Now, later you'll probably find that you want to go away from f:22. Okay? Under zoom - Your zoom control, can you see? The zoom is the middle one, and it's 12.5 millimeters on the middle one - See the 12.5 millimeters? That's the zoom.

Yes.

Focus is on infinity. You ought to just leave that on infinity; no doubt about that. Now, the zoom, they may want you to zoom in on the horizon a little bit, or the land or whatever. I'd start out with a wide angle at 12.5, and I'd start out with this on f:22 just for protection against getting too much light in. In all likelihood, you'll have to change that a little bit.

I think that - that's going to do it.

Yes, that looks good. I don't see how that can miss.

Jesus Christ, look at that horizon!

Isn't that something?

Got mine. Is it ballpoint, or is it . . .?

Yes, ballpoint. Here it is. I mean felt tip.

. . . much embarrassed to say they've lost a Hasselblad. I seem to be prone to that.

And we're about 7 minutes away, so we got about 7 minutes of practice time.

I've looked - I've looked everywhere over here for that Hasselblad, and I just don't see it.

You can go to your . . .

It's too late for sunrise, anyway.
I know; but I'm worried about - -
But you want to get it before TLI.
- - I know it. That's what I'm worried about.
Neil, could you look around over there?
I don't know if we want to go through any wild contortions looking for it - Do we have to throw some other switches?
No, the switches are all thrown.
. . . under you.
Buzz, you don't see the Hasselblad anywhere down below?
Let me go on a little expedition here. Has somebody . . .?
I've looked already.
Ah! Here it is.
Find it?
Yes.
Beautiful.
It was floating in the aft bulkhead.
On your side?
I got a way on it - of keeping it.
I got a little horizon. Man, look at that!
Looks like what you have to do to this, is not hold it against the window, because it's going to pick up - -
How's the monitor, working okay for you? Anything I can do to help?
. . .
I found a spot that really . . . my window.
Yes, it looks like . . . I got my - -
Trees and a forest down there; it looks like trees and a forest or something. Looks like snow and trees. Fantastic. I have no conception of where we're pointed or which way we're going or a crapping thing, but it's a beautiful low pressure cell out here.
Yes, go ahead and take a picture. Keep your . . . down.
Beautiful low pressure.
Must be past Hawaii by now. 01:28 is AOS.
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00 01 25 22  CDR  Buzz, how's it going there, the monitor giving you good service?
00 01 25 25  LMP  Not yet - flicking an awful lot.
00 01 25 26  CDR  Well, that's . . . - It looks to me like you're home free. Just remember now, you're going to have to get that f-stop probably off 22, maybe not - focus stays on infinity and the zoom beats me. You can take your choice, you can zoom with that thing all the way in if you take it fairly slowly.
00 01 25 44  LMP  Sun is bright, isn't it? . . . It's a pretty nice camera, to tell you the truth.

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00 01 26 00  CDR  I think you probably want sort of a wide angle - -
00 01 26 07  LMP  Yes, I think . . . would be something . . .
00 01 26 20  LMP  Well, if I take normal to the window, it's going to be . . . , . . .?
00 01 26 26  CDR  Yes, that would be pretty nice.
00 01 26 41  CDR  Getting a little of the rim there?
00 01 26 44  CMP  To get a little more view, you have to move down - away from -
00 01 27 18  CDR  Now, how we doing checklist-wise? Let's make sure we don't screw up and forget - -
00 01 27 22  CMP  I'm working on the attitude reference check right now.
00 01 27 29  LMP  Now, do we need to do anything else to configure this for . . . receiver?
00 01 27 32  CDR  No, far as I know it's all up to them.
00 01 27 50  LMP  Oh, shoot; they're going to - Let's see, they're going to have to send us up a TLI pad, TLI abort, and a P37 pad. They're all right here in this little book; don't forget to remind me of that.
00 01 28 02  CMP  Okay, that's good.
00 01 28 14  LMP  How do you think we can . . .?
00 01 28 17  CDR  Yes, you can fold it flat; would that help you?
00 01 28 19  LMP  Yes.
00 01 28 20  CDR  That's pull - pull - -
00 01 28 28  CMP  See that, Buzz? You're a TV expert.
00 01 28 48  CMP  Now, the next big thing we got to do is, after the attitude reference check, is extend the docking probe. No big thing. Copy down a bunch of pads and then you got your RCS hotfire.
00 01 29 08  CMP  That booster, when that thing - -

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00 01 29 09  CC  Apollo 11, this is Houston through Guaymas. Over.
00 01 29 14  CDR  Roger, Houston. Reading you loud and clear.
00 01 29 16  CC  Reading you the same. Coming up on AOS Goldstone.
00 01 29 19  CDR  Roger.
00 01 29 21  CDR  It should be right now, Buzz.
00 01 29 27  LMP  Cecil B. De Aldrin is standing by for instructions.
00 01 29 32  CC  Houston. Roger.
00 01 29 40  CDR  Okay, and I got pads, need to extend the probe, and do an SM RCS hotfire.
00 01 29 49  CMP  That's right, that's the same way I read it. I don't know what this is, coming up.
00 01 29 53  CDR  When you - when you come up on this SECS LOGIC - and MSFN GO for pyro arm, don't forget to get an okay from them before you send the . . . out.
00 01 30 09  LMP  Wow, I hope they get that; that's pretty.
00 01 30 11  CDR  With the sun glaring like it is, you're - you're correct on the f:22, I'm sure. It might be part of the - -
00 01 53 56  CC  - - and the launch - vehicle guidance are both looking to be in good shape. We estimate you have better than a 99-percent probability of a guidance cut-off on the launch vehicle. So, things are apparently holding in very well. For your information, MLA received approximately 1 minute of a usable TV picture; so, apparently the system is working. You're a little over a minute from LOS at Canary; AOS Tananarive is 2 hours 9 minutes and 18 seconds. Over.
00 01 54 34  CMP  Roger. We like those 99 numbers. Thank you.
00 01 54 38  CC  Roger. Out.
00 01 54 39  CDR  Okay.

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00 01 54 40  CMP  Now, let's see. We want to go to the suit circuit - -
00 01 54 44  LMP  Yes, I'll get the suit circuit if I can find that valve.
00 01 54 50  CMP  Okay, let's see, that's the EDS POWER, ON.
00 01 54 54  LMP  Oh, that thing is hard.
00 01 54 59  CMP  What - what do we want here - -
00 01 55 00  LMP  Suit's closed.
00 01 55 01  CMP  - - on that VERB 48?
00 01 55 10  CDR  Ready for EDS POWER, ON, you think?
00 01 55 13  CMP  EDS POWER, up and ON, yes.
00 01 55 17  CDR  Okay, it's ON.
00 01 55 20  CMP  EMS FUNCTION, OFF, verify.
00 01 55 22  CDR  EMS FUNCTION, OFF.
00 01 55 23  CMP  MODE, STANDBY - EMS MODE, STANDBY.
Onboard Voice Transcription

00 01 55 28 CDR Okay, it’s at STANDBY.
00 01 55 30 CMP EMS FUNCTION, DELTA-V; set range VHF A.
00 01 55 32 CDR Okay.
00 01 55 33 CMP Set for 1586.8.
00 01 55 34 CDR Okay.
00 01 55 38 CMP Then go to NORMAL. Anybody know what we’re doing with VERB 48 up there?
00 01 55 54 CMP What are we supposed to be putting in there?
00 01 55 58 CDR . . .
00 01 56 08 LMP I wonder what the hell that is?
00 01 56 22 CMP Just verify you got a 3 there?

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00 01 56 25 LMP I guess so, that’s what you need.
00 01 56 30 CMP That’s all you need.
00 01 56 31 LMP Yes.
00 01 56 32 CMP I don’t know what that entry is in the checklist.
00 01 56 33 CDR It doesn’t matter what the other numbers are.
00 01 56 36 CMP No, I mean any - any other weights or anything?
00 01 56 38 LMP No.
00 01 56 39 CMP Doesn’t seem to me, for the pad we got, we - we want to load in any - -
00 01 56 43 LMP No.
00 01 56 44 CMP - - any of this - stuff. That’s what we got in there, anyway.
00 01 56 45 CDR Yes.
00 01 56 46 CMP Maybe we can change the weight, but that’s TLI plus 90; we got plenty of time.
00 01 56 56 CDR We don’t want to do that.
00 01 56 57 LMP No.
00 01 56 58 CMP It’s almost the same anyway.
00 01 57 00 CDR It’s about the same anyway, yes.
00 01 57 06 LMP Okay. You ready for the - your EMS MODE, NORMAL?
00 01 57 11 CDR NORMAL.
00 01 57 12 LMP EMS FUNCTION to DELTA-V TEST.
00 01 57 15 CDR That’s good; that light enough.
00 01 57 20 LMP . . .
00 01 57 21  CMP  Now, we want a GDC align.
00 01 57 24  CDR  Yes.

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00 01 57 25  CMP  Now, let's see - -
00 01 57 27  CDR  Minus 19.9.
00 01 57 29  CMP  That's alright - minus 0.1 to - can you write that one down?
00 01 57 34  CDR  It's real close.
00 01 57 37  CMP  Yes.
00 01 57 41  CDR  That's just about perfect.
00 01 57 44  LMP  Alright. EMS MODE, STANDBY.
00 01 57 48  CDR  STANDBY.
00 01 57 51  LMP  And EMS FUNCTION, DELTA-V, set. Set DELTA-VC. You got the number?
00 01 58 03  CMP  Yes. 10 4256.
00 01 58 10  CDR  4256? How about 4356?
00 01 58 16  LMP  That's right, 4356.
00 01 58 25  CDR  And how about ORDEAL? Does that go back, Buzz?
00 01 58 28  LMP  Yes.
00 01 58 35  CDR  I guess we got all of those -
00 01 58 49  CMP  Where did all those numbers come from?
00 01 58 54  CDR  Yes; much better.
00 01 58 57  CMP  They give us a new state vector?
00 01 59 00  CDR  Yes.
00 01 59 02  LMP  Yes, they did.
00 01 59 03  CDR  They did, yes.
00 01 59 04  CMP  No, that's VERB 66. . . . apogee - perigee.
00 01 59 25  LMP  I'll just put a question mark here about - not show our ignorance.

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00 01 59 32  CMP  Well, looks like we're picking up a little. That sound reasonable? 1166?
00 01 59 40  CDR  . . . the time, is that right?
00 01 59 41  LMP  The S-IVB?
00 01 59 45  CMP  Yes, you add about 4 or 5 miles to your orbit - apogee - perigee.
00 01 59 49  CDR Yes.
00 01 59 51  LMP Yes, that's too much.
00 01 59 54  CDR We're up to 6 . . .
00 02 00 00  LMP That thing . . . now, that may not be now; that may be at TLI.
00 02 00 18  LMP I don't have any reason not to believe it.
00 02 00 21  CDR No.
00 02 00 25  CMP If it isn't any good, we'll need another one anyway, huh? So, there isn't any point in saving the other one.
00 02 00 32  CDR Okay.
00 02 00 33  CMP VERB 66.
00 02 00 39  CDR Okay. 10 435.6.
00 02 00 52  LMP 10 435.6. Alright, go to EMS FUNCTION, DELTA-V.
00 02 01 00  CMP DELTA-V.
00 02 01 01  LMP GDC align is at - What's this "D"?
00 02 01 12  CDR Huh?
00 02 01 13  CMP That means . . .
00 02 01 15  LMP Oh.
00 02 01 16  CMP Won't get them on S-band.
00 02 01 17  LMP S what?

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00 02 01 19  CMP VHF.
00 02 01 20  LMP Okay. A SIMPLEX, it should be on.
00 02 01 23  CMP Set ORDEAL? Do something with it, anyway.
00 02 01 28  LMP Let's see, ORDEAL is - -
00 02 01 29  CMP What happened to that card that was here?
00 02 01 30  LMP I already fired it.
00 02 01 32  CDR What was that?
00 02 01 33  CMP Um hum.
00 02 01 34  CDR Saturn boost? This was a boost card.
00 02 01 38  LMP Okay.
00 02 01 39  CMP You can't have that.
00 02 01 42  LMP You don't want that one, do you?
00 02 01 43  CMP  No.
00 02 01 44  LMP  Trade it - for a good one.
00 02 01 55  CMP  How about some LM pointing angles?
00 02 02 03  LMP  Okay, let's do one more. We're going first opportunity, you think?
00 02 02 22  CMP  Burn time is 05 plus 47.
00 02 02 24  CDR  Yes.
00 02 02 27  CMP  And emergency shutdown, Neil, is plus 10 seconds; 10 minus 40 on the DELTA-VC, is that right?
00 02 02 32  LMP  Plus 6 seconds - plus 6.
00 02 02 39  CMP  And - no - no, I'm sure about that minus.
00 02 02 43  LMP  No, no, it's not; it's only . . .
00 02 02 45  CMP  No, it's plus 6 seconds and VI on the DSKY at G&N.

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00 02 02 58  CDR  I think that's going to show up here, isn't it?
00 02 03 01  LMP  What?
00 02 03 03  CDR  TLI?
00 02 03 04  CMP  The roll?
00 02 03 05  CDR  Burn . . .
00 02 03 06  CMP  They're in the damn flight plan; I don't think they're in the checklist.
00 02 03 27  LMP  Alright. You got ORDEAL set in some way?
00 02 03 30  CDR  ORDEAL is okay.
00 02 03 33  LMP  Well, do you want to get ahead on a few things?
00 02 03 38  CDR  Well, give me an example.
00 02 03 44  LMP  We don't need the sequence pyro arm yet, huh?
00 02 03 47  CDR  No. Don't want to do that until -
00 02 03 52  LMP  TRANS CONTROL POWER, ON?
00 02 03 54  CDR  It's ON.
00 02 03 55  LMP  ROT CONTROL POWER, NORMAL, two of them, AC/DC?
00 02 03 58  CDR  There you go.
00 02 03 59  LMP  DIRECT, two, MAIN A/MAIN B?
00 02 04 04  CDR  Okay.
00 02 04 12  LMP  LAUNCH VEHICLE indicators: GPI to S-II/S-IVB. GUIDANCE to IU.
00 02 04 24 LMP That IU?
00 02 04 26 CDR Yes.
00 02 04 27 CMP Have we got pyros armed?
00 02 04 28 CDR No.

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00 02 04 29 LMP No.
00 02 04 30 CMP Okay.
00 02 04 33 LMP CB, DIRECT ULLAGE, two of them, CLOSED.
00 02 04 38 CDR Better wait awhile on that.
00 02 04 44 LMP Okay, how about cranking the event timer to 51:00, then?
00 02 04 52 CDR What's burn time? Ignition time? 2 what?
00 02 04 59 CMP 35, 30 minutes.
00 02 05 03 LMP Well, that's going to be . . .
00 02 05 08 CDR Okay, I'll set up the event timer.
00 02 05 47 CDR Burn time is 05:20.
00 02 06 07 CMP DELTA-VI - going to be . . .
00 02 06 45 CMP Sure you got - you got your checklist here, haven't you? Yes.
00 02 06 48 LMP Yes, they put all this TLI crap in my checklist; even though I took it out, they put it back in.
00 02 06 52 CMP Well, Mattingly assured me that I was going to have a circular velocity versus altitude, you know, when they get me at 100 miles on the other side?
00 02 07 02 LMP It's not in here, either, I looked.
00 02 07 04 CMP Where would it be? It'd be right in here -
00 02 07 06 LMP I finally gave it to . . .
00 02 07 16 CMP Hey, that's - you know what the numbers are, roughly.
00 02 07 24 CDR 25 - 25 550 at a 100 miles - something like that, it changes, probably - -
00 02 07 31 CMP Yes, but this was to be - What do you have on this side to give you that on the other side?

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00 02 07 49 LMP I'm running a little bit on the warm side; how are you guys . . . along?
00 02 07 53 CDR Probably a tad on the warm side.
00 02 07 59 LMP Suit and cabin pressures both look - I guess we should be cool.
00 02 08 06 CDR Should be about 100 . . . - okay -
00 02 08 10  LMP  Water - boiling - ... potable ...  
00 02 08 18  CMP  Fuel cells ... water. It goes to potable tank first and then we - we get it.  
00 02 08 24  LMP  Oh - stop there?  
00 02 08 25  CMP  Yes.  
00 02 08 26  CDR  Coming into the terminator.  
00 02 08 46  CMP  Gee, I'm really disappointed over those optics; that telescope is horrible. Maybe it'll get better with practice - or adaptation, or what have you.  
00 02 09 38  CDR  Gee, I almost went to sleep then.  
00 02 09 40  CMP  Me, too; I'm taking a little rest.  
00 02 10 48  CDR  Okay, let me align the GDC.  

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00 02 10 56  CC  Apollo 11, Apollo 11, this is Houston standing by through Tananarive. Over.  
00 02 11 03  CDR  Houston, Apollo 11. Roger.  
00 02 11 05  CC  Roger. Reading you loud and clear.  
00 02 11 10  LMP  You get the pyro armed?  
00 02 11 12  CDR  No, I haven't. Just a second, I'll be right with you.  
00 02 11 24  LMP  Get 51 on the event timer?  
00 02 11 34  CMP  We stopped boiling water.  
00 02 11 37  LMP  That's good.  
00 02 11 41  CDR  Old son of a gun.  
00 02 11 46  LMP  Okay on the temperatures.  
00 02 11 50  CMP  Looks like the setting on the AUTO thing is such that it just runs a little cold.  
00 02 11 56  CDR  Yes, that's right. That's - that's what I think, too.  
00 02 12 05  CMP  ... have a feeling I have a ball in here.  
00 02 12 09  CDR  Okay, the GDC is - is aligned. Ready to proceed.
00 02 12 15   LMP   Okay. We've got the VERB 48 in, VERB 83, ORDEAL set, and SEQUENCE PYRO ARM.

00 02 12 26   CDR   Okay. Stand by for a blast. One's ON. Two's ON.

00 02 12 35   LMP   Houston, Apollo 11. We have the pyros armed.

00 02 12 40   CC    This is Houston. Roger; out.

00 02 12 39   CDR   Okay.

00 02 12 41   LMP   TRANS CONTROL POWER's ON. ROT CONTROL POWER, NORMAL, two, AC/DC.

00 02 12 45   CDR   They're all up.

00 02 12 46   LMP   DIRECT? MAIN A/MAIN B.

00 02 12 49   CDR   DIRECT.

00 02 12 50   LMP   S-II/S-IVB.

00 02 12 52   CDR   Check.

00 02 12 53   LMP   GUIDANCE, IU?

00 02 12 54   CDR   IU, yes.

00 02 12 55   LMP   Circuit breakers, DIRECT ULLAGE, two, CLOSED.

00 02 13 01   CDR   Okay.

00 02 13 02   LMP   And the event timer's set.

00 02 13 06   CMP   Now, why don't you - why don't you put ORDEAL on 200/LUNAR?

00 02 13 15   CDR   Alright.

00 02 13 17   CMP   Maybe you can start figuring out what the hell that ought to be.

00 02 13 32   CMP   I guess - leave them on INERTIAL for the time being.

00 02 13 45   CDR   Beyond my ability to - compute here right now.

00 02 14 10   CDR   . . . ?

00 02 14 27   LMP   You're not worried now on that thing.

00 02 14 29   CMP   When the motor lights up, he's worried.

00 02 14 38   CDR   . . . 190, 110 degrees.

00 02 14 50   CMP   Got a long way around, yet.

00 02 15 23   CC    Apollo 11, this is Houston. 1 minute to LOS Tananarive; AOS at Carnarvon, 02:25:30.

00 02 15 35   LMP   Roger.

00 02 15 36   CDR   02:25:30.
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00 02 15 37 LMP Yes. 02:25. . . .

00 02 15 58 CMP Why did they do that? That should be up here, before 02:35.

00 02 16 10 LMP I don't know. It's screwed up in here anyway.

00 02 16 29 CDR Well, weren't they giving us two abort pads before?

00 02 16 33 CMP No, TLI plus 90 and TLI plus 4 hours. And now the TLI plus 4 hours is TLI plus 5 hours, P37.

00 02 16 44 CDR Oh, is that right?

00 02 16 45 CMP Yes. Got them on the same page.

00 02 16 49 CDR Yes, they're on the same page.

00 02 17 29 CMP Going to have to break your . . . here, I mean - yourLMPhandhold.

00 02 17 35 LMP Oh, my G&N handhold; don't do that. . . . managed to hang on to it, . . . up there.

00 02 17 44 CMP Holding against the . . . - the couch.

00 02 18 13 CMP Well, let's see . . .

00 02 18 35 CMP Think I was that slow punching the clock?

00 02 18 39 LMP Huh?

00 02 18 40 CMP I wonder if I was that slow getting everything going? I ought to have given them a second or . . .

00 02 18 56 LMP It didn't seem to me as though there was a tremendous cue; there's no doubt that you were moving, but to say exactly what the precise time was when you started to move, I think you'd call it whenever the thing started vibrating.

00 02 19 12 CMP Yes, I didn't know when the hell we were airborne; I just took his word for it. It was sure shaking, rattling, and rolling, son of a bitch!

00 02 19 46 LMP Wake me up at TLI, somebody.

00 02 19 50 CDR Another 15 minutes, just time to sleep.

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00 02 19 52 CMP You need to get out the alarm clock.

00 02 20 06 CDR I don't know, I think I'll just put my window guard up.

00 02 20 12 CMP Yes.

00 02 20 32 CMP Whopseedoo, we picked up an S-band. No noise.

00 02 20 45 CDR What's VERB 85 going to tell me - if I call that up, Mike?

00 02 20 50 CMP It tells you range - range rate in C, which is the angle between your - optics line of sight and the horizon, depending on what - -
00 02 21 03  CDR  What's that little bump in the ... somebody?
00 02 21 06  CMP  That's me; I - I'm thrashing around over here a little bit.
00 02 21 08  LMP  I - if you wonder, I stuffed my launch checklist and - in the little gap between the -
00 02 21 19  CMP  You don't have a launch checklist.
00 02 21 22  LMP  My cue card.
00 02 21 23  CMP  Oh.
00 02 21 24  LMP  In between the - the Y-Y strut and the wall over here, to keep it from bouncing around.
00 02 21 31  CMP  Oh.
00 02 21 32  LMP  . . .
00 02 21 34  CMP  Yes, that says 58-1/2 degrees, huh?
00 02 21 40  CDR  Yes.
00 02 21 42  CMP  . . . 57-1/2 isn't that something like that? Now wait a minute.
00 02 21 50  CDR  Yes, 57-1/2 degrees.
00 02 21 52  CMP  I guess they're . . . about on the horizon anyway. Yes, okay.

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00 02 21 55  CDR  Huh?
00 02 21 56  CMP  Buzz, I put 39.5 volts over here; that's a reminder on the battery check - real good on the wall. Okay, Neil, now TLI - I'm going to write on the wall here - TLI - nominal is 05 plus 47; and 6 seconds later, it's 05 plus 53. And you want me to let you know when that is; I'll yell "cut-off" at that time.
00 02 22 27  CDR  Okay.
00 02 22 38  CMP  Now, we want to get what that time's going to be up there. Is that alright, Neil?
00 02 22 43  CDR  Yes, that's right. 05:53, I want it yelled.
00 02 22 45  CMP  Okay. I'll yell "cut-off," huh?
00 02 22 57  CDR  Yes, I guess. And I'll cut off if the G&N says - -
00 02 23 04  CMP  Agreed.
00 02 23 05  CDR  - - we're overburned.
00 02 23 06  LMP  That's right.
00 02 23 39  CMP  You got that TRANSLUNAR switched to INJECT, huh?
00 02 23 41  CDR  Yes, to INJECT.
00 02 23 47  LMP  EDS POWER, you got ON?
00 02 23 49  CDR  EDS POWER is ON.
00 02 23 53  LMP  PYROs are ARMED?
00 02 23 55  CDR  PYROs are - four breakers are in, and switches are up.
00 02 24 06  LMP  Okay, on this thing here, we should be reading 02:41:01, shutdown, and -
00 02 24 14  CDR  Add 6 seconds to it?
00 02 24 15  LMP  Yes. At 07, cut-off.
00 02 24 48  LMP  BLOCK, BLOCK. SPACECRAFT CONTROL to SCS?

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00 02 24 53  CDR  It is.
00 02 24 57  LMP  Tank pressures looking alright?
00 02 25 02  CDR  Tank pressures are looking good.
00 02 43 18  CC  Apollo 11, this is Houston. Slightly less than 1 minute to ignition, and everything is GO.
00 02 43 42  CDR  Okay, 59:25 - and this light will go off at 42 -
00 02 43 53  CMP  Time is based on tracking data; let me know when you start it up.
00 02 43 54  LMP  Okay.
00 02 43 59  CDR  When you feel it, that's when it is.
00 02 44 01  LMP  Okay, this light is out - know any of it any more.
00 02 44 09  CDR  Okay, we're operate - 59:59.
00 02 44 16  LMP  There we go; thrust.
00 02 44 18  CDR  IGNITION. Call it at 15.
00 02 44 22  CMP  Okay.
00 02 44 26  CDR  Whew!
00 02 44 27  CC  We confirm ignition, and the thrust is GO.
00 02 44 33  CDR  Pressures look good.
00 02 44 37  CMP  Flashes out window number 5.
00 02 44 38  MS  . . .
00 02 44 40  CMP  I'm not sure whether that's - it could be lightning, or it could be something to do with the engine -
00 02 44 59  CMP  Continual flashes . . .
00 02 45 09  LMP  About 2 degrees off in the pitch . . .
00 02 45 12  CDR  Yes, wouldn't worry too much about that.
Apollo 11, this is Houston. At 1 minute, trajectory and guidance look good, and the stage is good. Over.

Apollo 11. Roger.

Don't look out window 1. If you're - if it looks like what I see out window 5, you don't want to look at it (laughter).

I don't see anything.

Why?

These flashes out here - -

Oh, I see a little flashing out there, yes.

You see that? Buzz is usually looking - just watch window 5 for a second. See it?

Yes, yes. Damn, everything's - just kind of sparks flying out there.

Yes, that's - Oopsedo.

Man, that really - -

That's PU shift?

I don't know, but it sure put a little blip in there at 2 minutes; I think it increased in thrust.

That's the PU shift?

Apollo 11, this is Houston. Thrust is good; everything's still looking good.

That's about like a pitch change rather than an acceleration increase. Did it feel that way to you?

Okay. We got a lighted horizon at 2-1/2 minutes. Pretty horizon.

A fairly smooth ride, you know; it's just a little tiny bit rattly, but nothing like Stafford's - H-dot looks great. Don't bet you could do any better.

I'm sure I couldn't. I'd do worse because I'd be a - a full degree off from where it is right now.

Don't sweat that. 3 minutes.

3 minutes. What we got, about one g, Neil?

Pressures are good - -

Yes, we've got 3 feet per second - -

Just under one g.

Mike, we're within 3 feet per second on the card H-dot.

Fantastic. And it's shaking everything a little bit.

Shaking at 3 minutes.
00 02 47 35  CDR  Okay.
00 02 47 36  LMP  I hope that camera doesn't fall on your face.
00 02 47 38  CMP  I checked it; it's locked in there pretty well. Won't hurt this visor -
00 02 47 43  CDR  03:30 coming up - Should be 5.5, and it is 5.5.
00 02 47 53  CMP  Nice ride.
00 02 47 54  CC  Apollo 11, this is Houston. At 3-1/2 minutes, you're still looking good. Your predicted cut-off is right on the nominal.
00 02 48 04  CDR  Roger. Apollo 11's GO.
00 02 48 07  CMP  I see a bright star out there, must be Venus. Forgot to memorize John Mayer's views out the window well enough to say that's Venus or not, but it's sure bright.
00 02 48 17  LMP  What would you do about it?
00 02 48 18  CMP  Nothing.
00 02 48 19  CDR  4 minutes -

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00 02 48 20  CMP  Tell you what - that's Venus.
00 02 48 22  LMP  10 feet per second off on H-dot -
00 02 48 25  CMP  . . . , that's about where it is.
00 02 48 27  LMP  Here comes the old sun.
00 02 48 29  CMP  Gee, that's going to be bright.
00 02 48 31  CDR  Glad I got my card up.
00 02 48 32  CMP  I'm glad you had - you do too, Neil; that was a good idea, a hell of a good idea. I can't see - well, my tapes are . . . I can't . . . see very much.
00 02 48 42  CDR  Coming up on 04:30. How you look, Buzz?
00 02 48 49  LMP  Looks good. Oh, about 14 feet per second right now. The altitude's very good. We ought to get a real good 5-minute cut at the . . .
00 02 49 12  LMP  You guys agree with my mark; we'll be 5 minutes?
00 02 49 14  CMP  Okay.
00 02 49 15  CDR  Just a second.
00 02 49 16  CMP  5 minutes.
00 02 49 17  LMP  MARK.
00 02 49 18  CC  Apollo 11, this is Houston. You are GO at 5 minutes.
00 02 49 21  CDR  Roger. We're GO.
00 02 49 23  LMP  Okay, we're just a little bit low on time.
00 02 49 25  CMP  Right on it.
00 02 49 27  CDR  . . . yaw.
00 02 49 33  CMP  . . . do that?
00 02 49 34  CDR  Yes, we better do that.
00 02 49 37  CMP  5 - 5 seconds -

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00 02 49 40  LMP  What kind of g we pulling?
00 02 49 42  CDR  We got a 1.2 or 3 - 1.3, maybe.
00 02 49 46  CMP  Gee, feels a lot more than that already.
00 02 49 51  LMP  Okay, 6 - okay, about 5 seconds to nominal.
00 02 50 03  CMP/LMP  Here we go -
00 02 50 06  CDR  We have cut-off.
00 02 50 09  LMP  3.3 on the DELTA - -
00 02 50 12  CDR  The DELTA-VC on the EMS: 3.3.
00 02 50 14  CMP  Beautiful. EMS FUNCTION, OFF.
00 02 50 17  CDR  OFF.
00 02 50 19  CMP  SECS PYRO ARM, two, SAFE.
00 02 50 22  CDR  I got out - I got out of kilter here; let's go back and let Buzz pick up on it. You're just a little bit ahead of yourself on the checklist.
00 02 50 29  CMP  Okay.
00 02 50 30  CDR  Okay, Houston, you read 11?
00 02 50 35  CMP  Buzz, forget I read anything in the checklist.
00 02 50 38  LMP  Yes - -
00 02 50 39  CDR  Not getting any answer -
00 02 50 41  CMP  Okay, let's go to IU ACCEPT here. Now, . . .
00 02 50 56  CMP  Why don't you try to get up high - -
00 02 50 59  CDR  SCS TVC SERV0 POWER 1, OFF.
00 02 51 00  LMP  Okay.
00 02 51 01  CDR  You want to get Houston on the radio if you can?
00 02 51 02  LMP  Yes.

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00 02 51 03  CDR  PCM BIT RATE, LOW.
00 02 51 04  CMP  PCM BIT RATE is LOW - -
00 03 16 27  LMP  - - two, ARMED.
00 03 16 28  CMP  Two, ARMED.
00 03 16 29  LMP  CMC MODE, AUTO.
00 03 16 30  CMP  AUTO.
00 03 16 31  LMP  Start the digital event timer.
00 03 16 33  CMP  Okay, start.
00 03 16 36  LMP  And we're going to translate plus X and hold.
00 03 16 37  CMP  Yes.
00 03 16 38  LMP  CM/ LAUNCH VEHICLE SEP pushbutton?
00 03 16 39  CMP  Yes.
00 03 16 40  LMP  Watch the tank pressure and the engine light.
00 03 16 43  CMP  Are you on tank pressures? You are.
00 03 16 47  LMP  And you're going to go to 100.8?
00 03 16 49  CMP  Yes.
00 03 16 53  LMP  You want to -
00 03 16 54  CMP  Here we go.
00 03 16 55  CDR  Okay, Houston; we're about to SEP.
00 03 16 58  CMP  Thrusting -
00 03 16 59  CC  This is Houston. We copy.
00 03 17 00  CDR  SEP.
00 03 17 03  LMP  Look at that trash.
00 03 17 05  CDR  SEP complete.

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00 03 17 07  LMP  Got DELTA-V?
00 03 17 08  CMP  Okay, got 0.7; I'm going to stop there and - -
00 03 17 11  LMP  . . . go to RELEASE; DELTA-V indicator minus 100.8 - -
00 03 17 14  CMP  Okay.
00 03 17 15  LMP  - - SERVICE MODULE RCS PROPELLANT, verify eight of them gray.
00 03 17 18  CMP  Okay, you got problems there. Get the . . . - there you go.
00 03 17 22  CDR  I'll get them.
00 03 17 23  LMP  Okay, okay.
00 03 17 26  CMP  What else? Did - -
00 03 17 27  LMP  CM - -
00 03 17 28  CDR  PRIMARY and SECONDARY PROPELLANT B went barber pole at SEP.
00 03 17 36  CC  That was SECONDARY PROPELLANT on quad - quad Bravo?
00 03 17 41  CDR  Quad Bravo, yes; both the PRIMARY and SECONDARY talkbacks went barber pole.
00 03 17 45  CMP  . . . three, OPEN.
00 03 17 47  LMP  Okay, your - -
00 03 17 50  CC  Roger; we copy.
00 03 17 51  LMP  - - - This is the one that . . . 0.5, right? Is it - Mike, you key a VERB 62?
00 03 17 57  CMP  Yes.
00 03 17 58  LMP  PROCEED and you're pitching?
00 03 18 00  CDR  She's pitching.
00 03 18 02  CMP  Trying - to turn itself off again; look at this.
00 03 18 05  CDR  Is it holding it this time?
00 03 18 06  CMP  Watch, it'll probably go back to RATE COMMAND.
00 03 18 10  CDR  That slows it down?
00 03 18 11  CMP  . . . keeps pitching.
00 03 18 15  LMP  Your MAN ATT, PITCH, to ACCEL COMMAND?
00 03 18 19  CDR  It went to RATE; Okay, I see a SLA panel going out.
00 03 18 23  LMP  Okay, you got to get a pitch rate in there -
00 03 18 30  CDR  See that SLA panel?
00 03 18 35  LMP  Is it flying - yet?
00 03 18 37  CMP  It's alright. She's darn well unbelievable - something.
00 03 18 47  CDR  I see it . . .
00 03 18 50  LMP  Do I need some circuit breaker in to get - -
00 03 18 52  CDR  I see another - No, that's alright.
00 03 18 54  LMP  - - to get this camera going? Mike?
00 03 18 57  CMP  No, you need the power on over there, though.
00 03 19 00  LMP  I turned it on.
00 03 19 01  CDR  I got it . . . beautiful.
00 03 19 02  CMP  You sure you have the right power switch on?
00 03 19 03  CDR  Boy, that's - -
00 03 19 04  LMP  Yes.
00 03 19 05  CMP  You got him?
00 03 19 06  CDR  Yes, Mike.
00 03 19 06  LMP  No, I don't.
00 03 19 07  CMP  To the right over here.
00 03 19 08  CDR  Can you see him?

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00 03 19 09  LMP  No, I don't see - -
00 03 19 10  CDR  He's a little bit to our right.
00 03 19 11  LMP  Okay, I see him.
00 03 19 12  CDR  We need about a 5-degree right, and we need to stop our - -
00 03 19 16  CMP  Okay. We'll stop here.
00 03 19 18  CDR  -- . . . and we're pretty far away from him, too.
00 03 19 25  CMP  Okay, watch it, we should be stopping here.
00 03 19 40  LMP  How long do we want to run this film?
00 03 19 46  CDR  How does he look, Mike?
00 03 19 47  CMP  He's - he's fine.
00 03 19 52  CDR  Okay, you got 100.4 now.
00 03 19 54  CMP  Yes, I know; those numbers don't mean anything. They were 99-something when we turned around; don't ask me why. I thrusted toward him quite a bit, and I don't know why those numbers were screwed up, but they were.
00 03 20 13  CDR  Buzz, how does he look to you; looks like he's getting closer to me.
00 03 20 15  CMP  . . . get the BMAG?
00 03 20 18  LMP  Okay.
00 03 20 19  CDR  Yes, it looks like he's drifting down just a tad, and he's supposed to be.
00 03 20 22  CMP  How are our eight gray talkbacks; they still good?
00 03 20 29  CDR  Very good.
00 03 20 43  CMP  Flies like a spacecraft instead of a simulator. Hope that's good.
00 03 20 52  CDR  Sure beautiful. I hope you got some pictures, Buzz.

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00 03 20 55  LMP  I got the 16 millimeter going - -
00 03 20 56  CDR  Is it going?
00 03 20 57  LMP  - - 16 frames at f:8 - -
00 03 20 58  CDR  Good.
00 03 21 01  LMP  - - 70, 1/250th, . . .
00 03 21 03  CDR  Beautiful.
00 03 21 05  LMP  It really looks nice, doesn't it?
00 03 21 08  CMP  Hey, we're closing in a leisurely fashion.
00 03 21 12  LMP  Hey, how long does this . . .?
00 03 21 16  CMP  It's on the - it's printed - -
00 03 21 18  CDR  Yes.
00 03 21 19  CMP  - - yes, it's six frames at 15; I suggest toward the end you probably goosie it up a little bit.
00 03 21 23  LMP  You want to get the whole thing?
00 03 21 24  CDR  I don't care - . . . tell by looking at . . .
00 03 21 32  LMP  The thing is, with this sitting there, I can't get much with the Hasselblad. That window's no good, I'm afraid.
00 03 21 46  CDR  Can I hold something for you?
00 03 21 49  LMP  Take a couple of . . .
00 03 21 54  CMP  Yes, you might look - if you're looking for something to do, you might just look over my panel 1 and 8 and all that and make sure all the switches are - to your liking
00 03 22 05  CDR  I'll do it.
00 03 22 06  LMP  . . .
00 03 22 15  CDR  Be sure that your RCS is working anyway.

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00 03 22 23  LMP  How far out are you, Mike?
00 03 22 25  CMP  I'm still quite a ways. That's definitely a SLA panel - there's no doubt about that. Sure looks like . . . panel. That stuff's hitting from the S-IVB from us. Gees, look it - that one thing just hit the - gyro package on the S-band antenna.
00 03 22 46  LMP  Yes, things occasionally come scooting out.
00 03 22 52  CMP  . . .
00 03 22 53  LMP  And, occasionally, you know, a little piece of something hits the - what do you call that - covering? The whole LM quivers every so often. All - all the surface of it, Neil, you know, just kind of shakes like that.
00 03 23 12  CDR  Yes?
00 03 23 13  LMP  Just in one spot; it's not being hit. I hope it doesn't come in . . . - -
00 03 23 17  CMP  Stand by; we're getting pretty close.
00 03 23 20  CDR  Just from the APS firing, you think?
00 03 23 25  CMP  Stand by; we're closing.
00 03 24 40  LMP  Okay - -
00 03 24 41  CDR  We don't have too much - -
00 03 24 43  LMP  - - BMAG MODE, three - You should stabilize and align CM - BMAG MODE, three, to ATT 1/RATE 2?
00 03 24 49  CMP  Okay.
00 03 24 50  LMP  And we're - translated plus X. That CAPTURE PROBE, EXTEND/RELEASE, you've done that; CMC MODE, FREE?
00 03 24 54  CDR  Yes, sir.
00 03 24 55  CMP  Yes.
00 03 24 57  LMP  Allow probe to damp spacecraft oscillations?
00 03 24 58  CDR  We did that.

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00 03 24 59  LMP  Yes, you've done that. DOCKING PROBE, RETRACT, PRIMARY 1?
00 03 25 01  CMP  We did that.
00 03 25 03  LMP  Alright, after dock - -
00 03 25 20  LMP  - - EXTEND/RELEASE, to OFF?
00 03 25 21  CDR  DOCKING PROBE, EXTEND/RELEASE, to OFF, I did that. DOCKING PROBE, RETRACT, . . . to OFF.
00 03 25 27  LMP  Okay, DOCKING PROBE, RETRACT, two of them, OFF?
00 03 25 30  CDR  No, no, wait a minute. It says "DOCKING PROBE, EXTEND/RELEASE, to OFF," huh?
00 03 25 34  LMP  Yes.
00 03 25 35  CDR  Okay.
00 03 25 36  LMP  Alright, let's go. DOCKING PROBE, RETRACT, two of them, OFF?
00 03 25 38  CDR/CMP  Yes, they're OFF.
00 03 25 40  LMP  Alright. Circuit breakers: DOCKING PROBE, two, OPEN.
00 03 25 45  CDR  DOCKING PROBE, two, OPEN.
00 03 25 47  LMP  Okay, PCM BIT RATE is LOW. Postdocking: it says RATE, HIGH; ATT DEADBAND, MAX.
00 03 25 56  CMP  RATE, HIGH; ATT DEADBAND, MAX.
00 03 25 58  LMP  COAS POWER, OFF.
COAS POWER, OFF.

... get this to stop ...

Yes, that wasn't the smoothest docking I've ever done.

Well, it felt good from here.

I mean the - I mean the whole - I mean the gas consumption would be a lot more than I would have guessed, you know? I thought I could about equal the simulator in ... and I didn't - I bet you I used - I hate to quote a number, but I've been down around 30-some pounds in the simulator, and I'll bet this was 50, 60 pounds, something like that. Hate to quote a number.

How do the - Speaking of that, how do the service module RCS quantities look?

Well, Buzz is fooling around with that - Let me just - -

They - they're all 90 except B, which is above 90.

Should be. Can't ever tell on 3 -

No, C and D are ... 3, anyway.

Okay -

Well, I got to go in there and dick - -

I'm not sure that we're getting - -

Well, Buzz is getting COMM right now.

Yes, let Buzz do his high-gain thing, and I'll get ready to go dick with the tunnel.

Sure is squiggly, isn't it? It really wanders all over, doesn't it?

Neil, where do you put this guy - usually?

I - clip it to that - clip up there beside the COAS - you see - -

Okay.

- - see those clips up there, one of those. It's got a snap right here that's pretty good.

I think I can get it now - ...

Okay, Buzz, how am I doing on the checklist?

Well, I'm trying to - -

You're at the high gain - -

- - you're at postdocking; I'm trying to get the high gain going - and I'm having a little trouble - ... trouble.

That's MANUAL -
00 03 28 33 CMP Whatever you do, take some pictures.
00 03 28 35 CDR That should be on wide beam or . . . ?
00 03 28 38 LMP Wide.
00 03 28 40 CDR Okay.
00 03 28 42 LMP Hey, if you're through there, give me that VERB 64.
00 03 28 47 CMP What? Okay.
00 03 28 48 CDR I'm amazed how it just wanders around for a given setting; you notice that?
00 03 28 55 CMP There - it sounds like we got it now. There's your VERB 64.
00 03 28 58 CDR We got signal strength.
00 03 29 00 CMP Okay. You have to really be on MANUAL for those things to be indicating correctly.
00 03 29 05 CDR He was but - -
00 03 29 06 CMP Okay.
00 03 29 07 CDR - - this one was just kind of wandering around there - with no - -
00 03 29 13 LMP As soon as I went down to HIGH GAIN was when the signal strength came up.
00 03 29 16 CMP Okay, . . . man.
00 03 29 21 CC Apollo 11 - -
DAY 4

APOLLO 11 - Onboard Voice Transcription

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03 03 39 38 CC . . .
03 03 40 17 CMP Optics . . . are up?
03 03 40 19 CDR Yes.
03 03 40 25 LMP Okay, 41:23; 1 minute to LOS. Mark that.
03 03 40 33 CC Apollo 11, this is Houston. . . .
03 03 40 40 CDR Roger. Everything looks okay up here.
03 03 40 48 LMP How much time have we got, Mike?
03 03 40 51 CMP 9 minutes.
03 03 41 13 LMP Well, let's let them look at the main bus ties coming on, alright?
03 03 41 17 CMP Sure.
03 03 41 19 LMP What time is it?
03 03 41 20 CMP 8-1/2 minutes.
03 03 41 23 LMP How soon are we going to - -
03 03 41 24 CDR . . . take 2.
03 03 41 25 LMP 1 second early. Okay. MAIN BUS TIES - -
03 03 41 28 CDR Okay.
03 03 41 29 CMP I'm going to turn my S-BAND VOLUME down, so you can . . .
03 03 41 33 CDR DOWN VOICE BACKUP.
03 03 41 39 LMP MAIN BUS TIE A coming ON. Have you got TVC GIMBAL DRIVE - PITCH and YAW, to AUTO, huh?
03 03 41 46 CMP TVC GIMBAL DRIVE, PITCH and YAW, to AUTO.
03 03 41 55 LMP Okay, TVC - -

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03 03 41 57 CMP He's not going to have the sun in your eyes - I mean, on this thing, why don't we . . .?
03 03 42 00 LMP Is that right?
03 03 42 01 CDR Now, you may have the sun in your eyes coming around the corner; now, you've got your patch ready in case you want it?
03 03 42 05 CMP Got it right here.
03 03 42 08 LMP Okay, TVC SERVO POWER 1, to AC 1,
03 03 42 11 CMP TVC SERVO POWER 1, to AC 1.
03 03 42 15 LMP 2 to AC 2.
03 03 42 16 CDR Look the other way.
03 03 42 18 CMP 2 to AC 2.
03 03 42 20 LMP TRANSLATIONAL CONTROL POWER, ON.
03 03 42 24 CMP TRANSLATIONAL CONTROL POWER is ON.
03 03 42 27 LMP ROTATION CONTROL POWER, NORMAL, number 2, to AC.
03 03 42 33 CMP Okay, stand by. ROTATIONAL CONTROL POWER is NORMAL, number 2, to AC.
03 03 42 47 LMP ROTATION HAND CONTROLLER, number 2, ARMED.
03 03 43 01 CMP ROTATIONAL HAND CONTROLLER, number 2, is ARMED.
03 03 43 07 LMP It's going to have to get up pretty high to . . . Alright, time check.
03 03 43 14 CDR Okay, we've got 6-1/2.
03 03 43 21 CMP MARK it -
03 03 43 22 CMP 6-1/2.
03 03 44 05 LMP 10-minutes difference whether we . . ., huh? That's a lot of time.
03 03 44 10 CMP Yes.
03 03 44 16 LMP Now, what do we do? Turn up - Where did the noise come from?
03 03 44 20 CDR VHF or the S-band?
03 03 44 23 LMP I don't know.
03 03 44 24 CMP VHF, I think. It's a woo-woo noise.
03 03 44 28 LMP Woo-oo, what time is it?
03 03 44 29 CMP I turned my S-BAND VOLUME down to get rid of that background noise; now don't forget for us to turn it back up on the other side.
03 03 44 36 LMP What time you got?
03 03 44 37 CMP It's coming up on 5 minutes to TIG; I'll give you a mark.
03 03 44 41 LMP Alright. Start giving me PITCH 1, YAW 1.
03 03 44 44 CMP Okay, here comes PITCH 1.
03 03 44 46 LMP Got it.
03 03 44 47 CMP Here comes YAW 1.
03 03 44 49 LMP Got it.
03 03 44 50 CMP MARK -
03 03 44 51 CMP 5 minutes to TIG.
03 03 44 52 LMP Alright. TRANSLATION HAND CONTROLLER's counterclockwise - clockwise.
Hey, are you - are you on your INTERCOM switch? INTERCOM/PUSH-TO-TALK and all that?

Yes, yes.

Okay. Alright. TRANSLATIONAL CONTROLLER's - - going TVC.

- - clockwise - that's verified. Alright, secondary TVC check; GIMBAL MOTORS, PITCH 2, YAW 2, ON.

PITCH 2, MARK.

Got it.

YAW 2, MARK.

Got it.

Okay.

Set GPI trim.

Plus - -

Okay, it's set.

- - 1.0, minus 0.2.

Yes, it's set. Verify MTVC.

Verified.

THC, NEUTRAL.

NEUTRAL.

Verify GPI return to zero, zero.

Verified.

ROT CONTROL POWER, NORMAL, number 2, to AC/DC.

AC/DC.

SPACECRAFT CONTROL, CMC, verify.

CMC.

Okay. Now you got an option of trimming or bypassing.

Let's bypass.

Alright. BMAG MODE, three, to ATT 1/RATE 2.

Okay, we're going to - Did you say after ENTER?
Before ENTER.
Okay, ATT 1/RATE 2; BMAG’s in shape.
ENTER.
ENTER.
Verify SPACECRAFT CONTROL, CMC.
CMC.
Accept this with a PROCEED.
PROCEED. You ready to go?
Yes. Up, down, zero. Up, down, zero. . . . OFF and the . . . OFF.
3 minutes. 3 - -
ROTATIONAL CONTROL POWER, DIRECT, two of them, to MAIN A/MAIN B.
ROTATIONAL CONTROL POWER, DIRECT, MAIN A/MAIN B.
Okay. SPS HELIUM VALVES, verified AUTO, barber pole; LIMIT CYCLE, OFF.
Okay.
FDAI scale, 50/15.
Alright.
Stand by for 2 minutes; then we'll have DELTA-V THRUST B, ON, okay?
That's right. Guess we want to turn it on at 2 minutes - Want to wait awhile?
You already asked them that and they said turn it on at 2 minutes.
I never saw any lights, so they never saw a signal so everything looks good. Put it on 2 minutes and be ready to turn it off.
Okay. I'll be ready. Coming up on 2 minutes.
MARK -
Go on, nothing happened.
TRANSLATION CONTROLLER, ARMED.
Okay.
ROTATION CONTROLLER, ARMED.
Okay.
TAPE RECORDER . . . RESET it - -
Tape recorder’s running, right?

Tape recorder is running. You verify the EMS set up to 81, is it, huh?

Yes, I got to go to horizontal at 35.

. . .

- - 35, 30 seconds, yes.

I’ll proceed on the 99.

Alright. 60 -

You’re going to watch the - go gray - -

Right.

- - and the ball valve.

Right.

35 seconds; DSKY’s blank, EMS MODE, NORMAL. Okay.

Yes, the moon is there, boy - in all its splendor.

Man, it’s a - -

Plaster of paris gray to me.

Man, look at it.

Don’t look at it; here we come up - -

Okay.

- - . . . to TIG.

8 seconds.

99 -

CMPCMP PROCEED.

Stand by for TIG.

Got B mode - -

Burning; we’re looking good.

- - A, here comes B - B, I mean, THRUST A -

CMPCMPMARK.

Got them.

Got them both? Okay, now what’s your - read your chamber pressure?

It’s good. 95, 95.

PUGS is oscillating around. Okay, we’re steering.
95 seconds in, it says go DECREASE, and we're . . .

You're in pretty good; your gimbals are working a little bit more busily than I would have guessed, but everything's looking good.

EMS and G&N CALS together.

Okay.

Pitch trim is up at 1.5 degrees, cycling about that, which is a little bit off the SIM value. Yaw trim is cycling about zero. Chamber pressure - -

. . .

- is 95.

Right, going INCREASE.

Yes, you're into - a minute into it. Yes.

Well, it's still below zero, I just - -

I'll bet you we're never going to catch up. Let's do it and see what happens.

Okay, that should be gray -

g feels sort of pleasant, doesn't it? We're measuring just a shadow over zero g on the g-meter.

Tank pressures are good.

Okay. The chamber pressure is holding steady as a rock. It's holding - it's building up a little bit, actually; it's up around 96 now. Gimbals are sure a little bit busier than I would have guessed.

That's a little more chamber pressure than they were predicting.

Yes, they're all plus 95.

We may - -

Shut down a little early.

- - shut down a little early.

What do you think about this crazy g-scale?

All your . . . look okay over there, Buzz?

Man, I'm not going to look at them.

Alright, probably a good rule.

How about that? It's running a couple up.

35 more seconds, and we'll be out of mode 2.
Chamber pressure continuing; it's up to about 97 - 98 percent.

Yes, there's a little pinging in there. That might have jammed; keep your arms off the cockpit, ... all day to look at that thing.

Look at that thing; that's just where I want it. What do you think about that? A tad low. We're not going to - match it - ... creep up. Okay? Pressure is on INCREASE - -

Tank pressures are still good.

Chamber pressure - -

Take a look at this.

- - is holding. Wandering off a little bit in roll; that's to be expected. Coming back.

Okay - -

We're well into mode 3.

- - it's going to be about 3 seconds early - cutoff.

Alright, cut-off nominal at 06:02; expect cut-off around 6 minutes even then, huh?

... 

Okay, the rates. We're ... all three axes are about 0.1 degree per second. APS is punting back and forth.

I'm predicting 05:58.

Okay.

4 seconds early.

Right now.

May be - might be 5 by the time I get my ... 

Okay, she's steering like a champ; chamber pressure sneaking up to 100.

Look at the ... 

... , didn't recognize it ... 

Pitch trim is holding a little over 2; it's oscillating between 2 and 2.4, roughly. Yaw trim is oscillating between minus 0.5 and zero. It's just sort of aimlessly wandering back and forth between those values. Rates are still wandering; they're deadbanding the rates in all three axes; they're plus or minus 0.1 a degree.

We're now predicting 5 seconds early, 05:57.

Chamber pressure is 100 psi even.
Ball number 1 and ball number 2 both right on value. Roll zero, pitch 225, roughly, and yaw 348; and hold.

Okay, going to get the DELTA-V switches OFF right at shutdown?

Shutdown, I'll get both DELTA-V THRUST, NORMAL switches, OFF.

10 seconds.

Okay. 9, 8, 7, 6, 5, 4, 3, - -

Ok.

Ball valves closed - -

50 seconds.

- - barber poles - -

Okay.

All four. Standing by for the gimbal motors.

Alright. PITCH 1 - OFF.

Got it.

YAW 1, OFF.

Got it.

PITCH 2, OFF.

Got it.

YAW 2, OFF.

Got it.

Got it.

Okay. TVC SERVO POWER 1 and 2, OFF.

1, OFF; 2, OFF.

MAIN BUS TIE is OFF.

Okay.

1, OFF; 2, OFF.

Man, man!

Alright.

Understand.

Look at the residuals. PROCEED.
03 03 56 20  CMP  PROCEED? Copy them down; we're not going to trim them.
03 03 56 22  MS  . . .
03 03 56 23  CMP  . . . minus 1, minus 1, plus 1. Jesus!
03 03 56 27  LMP  Got them.
03 03 56 29  CMP  I take back any bad things I ever said about M.I.T. - which I never have.
03 03 56 34  CDR  Okay, will you just leave them, now? They vary around.
03 03 56 35  LMP  Alright, get the EMS, too.
03 03 56 37  CMP  Okay, EMS says minus 6.8.
03 03 56 39  LMP  Got it. You got them on the . . . switches?
03 03 56 43  CMP  Minus 6.8 to the DELTA-V to B.
03 03 56 45  CDR  . . . flight plan.
03 03 56 47  LMP  Alright, no nulling residuals. EMS FUNCTION to OFF, we got that . . .?
03 03 56 51  CMP  1 minute - Neil's got it. We got it, minus 6.8. Okay, stand by on OFF on EMS. What else you got, Buzz, in the way of a checklist?
03 03 57 02  LMP  The EMS MODE, STANDBY?
03 03 57 04  CMP  STANDBY.
03 03 57 05  LMP  BMAG MODE, three, to RATE 2?
03 03 57 06  CMP  Three to RATE 2.
03 03 57 07  LMP  ATT DEADBAND, MAX?
03 03 57 08  CMP  ATT DEADBAND, MAX.
03 03 57 09  LMP  PCM BIT RATE, LOW?
03 03 57 13  LMP  ROTATION CONTROL POWER, DIRECT, two of them, OFF?

03 03 57 14  CMP  DIRECT, two, is OFF.
03 03 57 15  LMP  Circuit breakers - PITCH 1, PITCH 2, YAW 1, YAW 2, OPEN.
03 03 57 17  CMP  PITCH 1, PITCH 2, YAW 1, YAW 2, OPEN. Proceed.
03 03 57 21  LMP  Okay, proceed. Okay, VERB 82 in there. Go to P00. Well, that isn't what it says, but -
03 03 57 30  CMP  Well, it's good.
03 03 57 45  CDR  I think we're going to have to - Well, we'll leave this here anyway . . . magazine . . .
03 03 57 48  CMP  What goes in this VGX column?
03 03 57 53  LMP  That was the - that's the VGX residual at - before you spin.
03 03 58 00  CMP  Okay.
03 03 58 02  LMP  So just read the . . . A.
03 03 58 04  CMP  Alright.
03 03 58 10  CDR  That was a beautiful burn.
03 03 58 12  CMP  God damn, I guess.
03 03 58 14  LMP  Whoo! Well, I have to vote with the 10 crew, that thing is brown.
03 03 58 19  CDR  That was a beautiful burn.
03 03 58 20  CMP  Alright.
03 03 58 21  CDR  Looks tan to me.
03 03 58 23  LMP  But when I first saw it, at the other sun angle - -
03 03 58 24  CDR  Yes?
03 03 58 25  CMP  It looked gray.
03 03 58 26  LMP  - - it really looked gray.

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03 03 58 27  CDR  Yes.
03 03 58 28  CMP  More - more sun angle you get - -
03 03 58 29  LMP  It got more - more brown - with increasing sun angle.
03 03 58 35  CMP  Okay.
03 03 58 36  LMP  It's a long ways off.
03 03 58 37  CDR  Alright, let's - Okay, now we've got some things to do -
03 03 58 43  LMP  Okay, let's do them.
03 03 58 48  CDR  We got to do a VERB 66.
03 03 58 51  LMP  Hey, wait a minute - alright.
03 03 58 53  CMP  Buzz will want to do a VERB 82; now, I don't know what comes first here.
03 03 58 55  LMP  Yes, VERB 82.
03 03 59 08  CMP  Well, I don't know if we're 60 miles or not, but at least we haven't hit that mother.
03 03 59 11  LMP  Look at that! Look at that! 169.6 by 60.9.
03 03 59 15  CMP  Beautiful, beautiful, beautiful, beautiful!
03 03 59 17  LMP  What - what'd it say - -
03 03 59 18  CMP  You want to write that down or something?
03 03 59 19  LMP  - - 60.2.
Write it down just for the hell of it. 170 by 60, like gangbusters.

We only missed by a couple of tenths of a mile.

Hello, Moon; how's the old back side?

Well, it's - -

VERB 66, alright?

VERB 66.

We won't need that other vector ever again.

Now, we're - PCM, LOW, and we want to turn the TAPE RECORDER, OFF?

Yes, why - I don't care.

Okay.

Why don't you go PCM, LOW, and don't worry about the tape recorder; it's got 2 hours.

Okay.

Okay, we'll look at service module RCS - and SCS -

I want to look at the DAP again and enter a VERB 48, ENTER.

What was our . . . ?

1500.

Okay.

You got all your things logged now?

Yes, sir, I'm all logged.

Okay.

Now, it says what we do is roll 180 and pitch down 70.

That do it? Alrighty, let's go to SCS and do it.

And -

Don't waste all the gas, now.

. . . When I get around there, I'll pitch down 70, huh? What are we pitching down for, what, what, what - -

We're going to - what we're - -

I don't even know what we're doing.

(Laughter)
03 04 01 05  CDR    Well, we're going to roll over and pitch down so we're looking out the front windows, down at the - -
03 04 01 10  CMP    Oh, yes, okay.
03 04 01 11  CDR    Okay?
03 04 01 12  CMP    We can pitch down - . . . picture - -
03 04 01 13  LMP    . . . - -
03 04 01 14  CMP    - - can we take a picture - -
03 04 01 15  LMP    - - . . . pitch attitude.
03 04 01 16  CMP    Yes.
03 04 01 17  CDR    Now, we're going to have high gain, and then we're - -
03 04 01 18  CMP    How would you - -
03 04 01 19  CDR    - - going to be able to - -
03 04 01 20  CMP    - - like it with the - -
03 04 01 21  CDR    - - look at the moon ahead of us, coming out the window right now.
03 04 01 22  CMP    Can we see the earth horizon from here?
03 04 01 23  LMP    Well, we . . . - -
03 04 01 24  CDR    We should be able to . . .
03 04 01 25  LMP    - - . . . precise. What was the time we got on it, Neil?
03 04 01 28  CDR    Yes, we can - -
03 04 01 29  LMP    Neil?
03 04 01 31  CDR    What's that?

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03 04 01 32  LMP    What was the time we got on it?
03 04 01 34  CDR    Burn time?
03 04 01 38  LMP    No, no - -
03 04 01 39  CDR    Burn time or what?
03 04 01 41  CMP    We want the big camera, huh? Big lens or small one?
03 04 01 46  CDR    Oh, it doesn't really matter.
03 04 01 48  LMP    80 millimeter will probably be as good for - -
03 04 01 50  CMP    For the earth coming up?
03 04 01 51  CDR    No, for the earth - -
03 04 01 52  LMP    No, for the earth coming up, we want 250. Might take some - -
03 04 01 54  CDR  not sure we can get the earth coming up - -
03 04 01 55  LMP  might take some - some luck to get that, but - -
03 04 01 59  CMP  Here, you want -
03 04 02 03  CDR  Tape recorder still running?
03 04 02 04  LMP  Yes.
03 04 02 06  CMP  It doesn't matter, we've got 2 hours on that tape, and they don't care if you run out. As long as you're on BIT RATE, LOW.
03 04 02 18  LMP  Okay, infinity, at f:11 - and 1/250th, huh?
03 04 02 28  CMP  Okay, let me get my - let me get my gouge out here. I got my gouge - -
03 04 02 30  CDR  You might want to back off a half stop to get the earth -
03 04 02 33  CMP  Are you - you black and white or color?
03 04 02 35  LMP  Color.

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03 04 02 37  CMP  Alrighty.
03 04 02 38  LMP  Moon . . . , 5.6; earth . . . , 11; . . . terminator, 1.8 - -
03 04 02 44  CDR  You think it's on your - your spotmeter reading for the earth?
03 04 02 54  CMP  Which way are you maneuvering now, friend?
03 04 02 58  LMP  5.6 at - 5.6 at 1/250th is probably - -
03 04 03 01  CMP  Are you rolling?
03 04 03 02  CDR  Rolling?
03 04 03 03  CMP  You are, aren't you?
03 04 03 04  CDR  I'm rolling right.
03 04 03 07  CMP  Boy, they rate some rough country over there.
03 04 03 09  CDR  You might get it coming sideways here; stand by in case it does. What's the AOS time?
03 04 03 15  LMP  It was 15 with the burn. 15:23, something like that.
03 04 03 23  CMP  Just be with you in 10 seconds, Neil; I just want to get my - -
03 04 03 27  LMP  We ought to be able to get it - -
03 04 03 28  CMP  - - book put back together here.
03 04 03 29  LMP  - - a couple of good shots.
03 04 03 33  CMP  The earth's going to be over here?
03 04 03 35  CDR  AOS, 76:15. That's exact - -
03 04 03 38  LMP  Can you verify that you got the state vectors transferred with the VERB 83?
03 04 03 41 CDR I'll do that.
03 04 03 47 LMP Now, what else we got?

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03 04 03 49 CDR Coming up there.
03 04 03 53 LMP ... Eyeballing and chattering. We got the burn status report? That's all?
03 04 04 02 CMP Ready to go.
03 04 04 05 LMP Okay, that looks good. Give me a VERB - 64.
03 04 04 12 CDR What happened?
03 04 04 27 LMP Ought to wash this window over here - -
03 04 04 28 CDR You have a map so we can look at ... .
03 04 04 30 LMP Anybody got a - -
03 04 04 31 CMP Yes, it - -
03 04 04 32 LMP - - anybody got a Kleenex?
03 04 04 33 CDR Yes, I think I've got one. Here you go.
03 04 04 40 CMP Here's one; it's a little moist, though.
03 04 04 43 LMP ... .
03 04 04 49 CMP Well, one more ... burn.
03 04 04 53 LMP Two more.
03 04 04 57 CDR You got two more.
03 04 04 59 LMP Yes, ... got a few more.
03 04 05 05 CMP Look at those craters in a row. You see them right - going right out there?
03 04 05 07 CDR ... .
03 04 05 08 CMP Look at that line of them.
03 04 05 10 CDR ... .
03 04 05 13 LMP ... .

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03 04 05 15 CMP Something really peppered that one. There's a lot less variation in color than I would have thought, you know, looking down?
03 04 05 26 LMP Yes, but when you look down, you say it's brownish color?
03 04 05 29 CMP Sure.
03 04 05 32 LMP Oh, golly, let me have that camera back. There's a huge, magnificent crater over here. I wish we had the other lens on, but God, that's a big beauty. You want to look at that guy, Neil?
03 04 05 43  CDR    Yes, I see him.
03 04 05 45  LMP    He's coming your way.
03 04 05 48  CDR    That dark spot.
03 04 05 50  LMP    Oh, let me - here, let me - -
03 04 05 53  CMP    Well, there's no doubt that this is a little smaller than the earth - -
03 04 05 57  LMP    Look at that one.
03 04 05 58  CMP    - - would you look at that curvature?
03 04 06 01  LMP    Where is that dark spot?
03 04 06 02  CDR    The dark spot's right up here. You want to get the other lens on?
03 04 06 06  LMP    Yes.
03 04 06 07  CMP    Don't you want to get the earth coming up? It's going to be 9 minutes.
03 04 06 11  LMP    Yes, let's take some pictures here, first.
03 04 06 15  CMP    Well, don't miss that first one.
03 04 06 16  LMP    See how am I doing. Yes, you're right.
03 04 06 21  CDR    We'll need - we need to catch it about 10.
03 04 06 27  CMP    Shoot, you're going to have plenty of passes.

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03 04 06 30  LMP    Yes, right.
03 04 06 33  CMP    Plenty of earthrises, I guess.
03 04 06 37  CDR    Yes, we are.
03 04 06 38  CMP    Are we about there?
03 04 06 40  CDR    Boy, look at that . . . crater. You can probably see him right there.
03 04 06 44  CMP    Yes, that's what I was talking about just a minute ago. It's kind of hard to believe that that's volcanic and formed by some faulting, isn't it? I don't believe that - but it's such a perfect straight line.
03 04 07 05  CMP    Hope none of those meteors come by right now.
03 04 07 18  CMP    Let me look through the sextant, Neil.
03 04 07 41  CMP    Well, where's the freaking earth going to be now? I'm confused.
03 04 07 46  LMP    In plane, I hope.
03 04 07 50  CDR    How are you doing on your roll there?
03 04 07 52  LMP    Well, we got about another 60 degrees to go. When's AOS?
03 04 08 00  CDR    15 - we're 7 minutes away.
03 04 08 03  LMP    Okay.
03 04 08 37  CDR  What a spectacular view!
03 04 08 48  CMP  God, look at that moon!
03 04 09 20  CMP  Fantastic. Look back there behind us, sure looks like a gigantic crater; look at the mountains going around it. My gosh, they're monsters.
03 04 09 58  CDR  See that real big - -
03 04 10 01  CMP  Yes, there's a moose down here you just wouldn't believe. There's the biggest one yet. God, it's huge! It is enormous! It's so big I can't even get it in the window. You want to look at that? That's the biggest one you ever seen in your life. Neil? God, look at this central mountain peak.
03 04 10 23  MS  . . .
03 04 10 24  CMP  Isn't that a huge one?
03 04 10 26  CDR  Look at the . . . Did you get some pictures of that?
03 04 10 29  CMP  Yes, I just took one. Can take another one here when he gets around a little better. It's fantastic!
03 04 10 35  CDR  That's kind of a foggy window.
03 04 10 37  CMP  That's a horrible window. It's too bad we have to shoot through this one, but - Oh, boy, you could spend a lifetime just geologizing that one crater alone, you know that?
03 04 10 51  CDR  You could.
03 04 10 53  CMP  That's not how I'd like to spend my lifetime, but - picture that. Beautiful!
03 04 11 01  LMP  Yes, there's a big mother over here, too.
03 04 11 07  CMP  Come on now, Buzz, don't refer to them as big mothers; give them some scientific name.
03 04 11 17  LMP  It sure looks like a lot of them have slumped down.
03 04 11 20  CMP  A slumping big mother. Well, you see those every once in a while.
03 04 11 26  LMP  Most of them are slumping. The bigger they are, the more they slump - that's a truism, isn't it?
03 04 11 41  LMP  That is, the older they get.
03 04 11 50  CDR  Well, we're at 180 degrees, and now we're going to want to stop that and start a slow pitchdown. We want to go - -
03 04 11 59  LMP  We're not going to see the earth come up over the horizon.

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03 04 12 02  CDR  - - about 70 degrees.
03 04 12 03  CMP  It says pitchdown or pitchup?
03 04 12 04  CDR Pitchdown, so we're looking forward.
03 04 12 06  CMP Pitchdown, so we're looking forward, alright. I wonder what kind of a rate we ought to - -
03 04 12 11  LMP We got 4 minutes to get down.
03 04 12 13  CMP Alright.
03 04 12 14  LMP Never make it. There's a couple of new craters.
03 04 12 25  CDR There's a good view of that -
03 04 12 29  LMP Look warm down there, Neil?
03 04 12 32  CDR I sure can't tell.
03 04 12 35  LMP Looks hotter than hell to me. Boy, look at the size of that one.
03 04 12 47  CMP Golly! Whooh! Get another picture of that big fellow.
03 04 12 51  CDR Yes. I'm going to take one out here of him.
03 04 12 59  LMP I've got an Easter egg coming up, gentlemen.
03 04 13 02  CDR That's good. Gosh, it's 1 o'clock already.
03 04 13 07  LMP Hey, you know, we got a TV show at -
03 04 13 14  MS . . .
03 04 13 15  CMP Huh?
03 04 13 16  CDR The next REV around, that is.
03 04 13 18  LMP Before LOI 2.
03 04 13 20  CDR Yes.
03 04 13 24  CMP Could you give me a gimbal angle to pitch to?

03 04 13 26  CDR What are you going to do on that one?
03 04 13 29  CMP Oh, I guess - get 10 pictures of the moon.
03 04 13 36  LMP What did you want, Mike?
03 04 13 39  CMP A gimbal angle to pitch to - if it's pitchdown 70 - why, let's see, from 226, that's 70, that's 296?
03 04 13 54  LMP Yes, you were at 2 -
03 04 13 58  CMP 296, I would guess. How many minutes we got - to AOS?
03 04 14 08  CDR About another minute and a half.
03 04 14 09  LMP (Coughing)
03 04 14 17  CMP I rolled to slow - doubt that we'll make it. Oh, look what I got . . .
03 04 14 32  CMP Golly damn! A geologist up here would just go crazy.
03 04 14 40  LMP    You want the flight plan?
03 04 14 43  CDR    Yes, please.
03 04 14 57  CMP    Okay, we shouldn't take any more pictures on this roll until earth comes, I don't think; this is - -
03 04 15 01  CDR    About out?
03 04 15 02  CMP    - - just about out and it's on our last color roll, so we'll switch to black and white as soon as we get to earth.
03 04 15 07  CDR    We might make it in time.
03 04 15 09  CMP    Yes.
03 04 15 13  LMP    There it is, it's coming up!
03 04 15 15  CMP    What?
03 04 15 16  LMP    The earth. See it?

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03 04 15 17  CMP    Yes. Beautiful.
03 04 15 21  LMP    It's halfway up.
03 04 15 23  CDR    We ought to have AOS now.
03 04 15 25  CMP    You got your - -
03 04 15 26  LMP    Right over the L.M.
03 04 15 28  CDR    Are you set up?
03 04 15 30  LMP    Just about to be cut off by the L.M. Boy, does that ever look beautiful in the sextant.
03 04 15 36  CMP    Have you got - -
03 04 15 37  CDR    Okay, how about MSFN -
03 04 15 39  CMP/LMP  You got them.
03 04 15 42  CDR    We're in OMNI - -
03 04 15 45  LMP    DOWN VOICE BACKUP.
03 04 15 46  CDR    - - Bravo.
03 04 15 48  CC     Apollo 11, Apollo 11, this is Houston. Do you read? Over.
03 04 15 52  LMP    Yes, we sure do, Houston. The LOI 1 burn just nominal as all getout, and everything's looking good.
03 04 16 00  CC     Apollo 11, Apollo 11 - -
03 05 41 15  CMP    That's why I'm trying to get it out.
03 05 42 16  CDR    No alignment this REV, huh?
03 05 43 02  LMP    Mike, I guess the name of the game is to go back to - B OMNI?
03 05 43 10  CMP   Huh?
03 05 43 12  LMP   Go back to B in OMNI?

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03 05 43 17  CMP   Well, let's see - when we come over the hill next time, we're supposed to have them on the high gain, I think.
03 05 43 25  CDR   Not sure of that.
03 05 43 29  CMP   . . .
03 05 43 31  LMP   Did you use this thing?
03 05 43 33  CDR   No.
03 05 43 34  LMP   Well, let's get rid of it then; I can't see a crapping . . .
03 05 44 26  LMP   77:44 - okay, - LOS is right on schedule.
03 05 44 35  CMP   77:50, we'll be at the prime meridian; now, I can set that map up so it'll tell us where we are.
03 05 44 43  CDR   Okay.
03 05 44 45  LMP   We - we're ahead on this eat period - we're behind on the last eat period or something. We got a . . .
03 05 45 15  CMP   I think, Buzz, if you put - put the HIGH GAIN to MANUAL and go pitch 20 - yaw 360 - pitch minus 20, I guess - -
03 05 45 26  LMP   Minus 20; yes, that would be better.
03 05 45 28  CMP   - - and yaw 360 - -
03 05 45 29  LMP   That's okay assuming I'm at the right attitude, but I ain't going to be at the right attitude - not without wasting a lot of gas. Put -
03 05 45 36  CMP   That's fine, but -
03 05 45 42  CDR   If you did, it would be very interesting that way.
03 05 45 46  LMP   Yes. Oh, crap.
03 05 45 55  CDR   We get HIGH GAIN and we get TV at the same time - -
03 05 45 58  CMP   Well, I better start maneuvering then; doggone it, I've been yawed out of plane somehow. Let's see,

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we're pitched down - we want to pitch back up - pitched down, doggone it. ACCEL COMMAND, pitch down.

03 05 46 17  CDR   Okay, well - are we going to unlock the camera store and get all that claptrap put together?
03 05 46 23  LMP   Yes.
03 05 46 24  CDR   Okay.
03 05 46 42  LMP  Which window you want to operate out of, so I can figure out how to put the monitor on?

03 05 46 48  CDR  Well, I suppose the best one would be the center window, don't you think?

03 05 46 57  LMP  Probably, I don’t know; wait until we get into attitude.

03 05 47 01  CDR  Get into attitude - see what we think.

03 05 48 19  CMP  Oh, shit; this pitch here is no good; 32, huh? Pitch 315 I want to be at, huh?

Alright. They keep - all they do is they say ORB rate and that little attitude right there and right there applies to the rest of this page, all of that page, and over to this page.

03 05 48 46  CDR  Okay, so that’s the one we’ll do.

03 05 48 50  CMP  Okay, that’s the way I’m rolling.

03 05 48 51  CDR  And we’ll take the - we’ll have HIGH GAIN - -

03 05 48 54  CMP  Yes.

03 05 48 55  CDR  - - and we’ll get the camera out of the center window, if that looks reasonable.

03 05 49 02  CMP  Okay.

03 05 49 06  CDR  We’ll have to give them pictures of the moon.

03 05 49 07  CMP  . . . I’ve been plotting on them . . . 50:05.

03 05 49 14  CDR  We’ll have a gouge as to where we are.

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03 05 49 22  CMP  55 -

03 05 50 35  LMP  Outside, huh? Alright, the switch is set for outside.

03 05 50 41  CMP  Could I have that map that y’all were looking at before, that lunar map? Thank you.

03 05 51 03  CDR  Hmm - here comes the moon.

03 05 51 16  LMP  Really beautiful.

03 05 51 29  CDR  Hey, you - -

03 05 51 30  CMP  I wonder where we are.

03 05 51 31  CDR  - - we’re going to stop here pretty soon, right?

03 05 51 33  CMP  Yes, at 315.

03 05 51 41  SC  (Whistling)

03 05 51 56  CMP  Man, that’s really -

03 05 51 58  CDR  It really looks gray to me now.

03 05 52 07  CDR  . . .?

03 05 52 10  LMP  . . . right down toward the ground here.
03 06 22 10  CDR  and you could be busy getting up supplies if you . . .
03 06 22 16  CMP  About a minute from AOS.
03 06 22 19  LMP  Okay, let's get out of this; let me get VERB 62. Okay, Mike?
03 06 22 22  CMP  Oh, I really need these . . ., Buzz; I really need these goddam . . .
03 06 22 26  LMP  Well, we're not going to have much of a TV unless we get high gain.
03 06 22 30  CMP  Alright.
03 06 22 32  LMP  I'll give it back to you - . . .

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03 06 22 50  CDR  You got yourself some rates going about like what you want?
03 06 22 55  LMP  You got - you got high gain right now, I mean the angles, right now.
03 06 23 00  CMP  And we're 23 - we're 30 seconds from AOS, so those angles should be okay. You reading them?
03 06 23 08  CDR  Minus 30 pitch - -
03 06 23 10  CMP  Yes.
03 06 23 11  CDR  - - 150 yaw, okay.
03 06 23 12  LMP  No, that's not 150 - that's 15. Isn't it?
03 06 23 14  CDR  Just a second. Yes, minus - I'm sorry, minus 31 and plus 15. Right. You got it?
03 06 23 27  CMP  Yes.
03 06 23 34  CDR  I don't know what f-stop I ought to be at - Well - See what it's doing, Mike?
03 06 23 42  CMP  . . .
03 06 23 44  CDR  The flicker I don't know about, the white dot is - -
03 06 23 47  LMP  Yes, the flicker - -
03 06 23 48  CDR  - - the flicker is what I'm - Nothing I can - -
03 06 23 50  CMP  Okay, we got it solid.
03 06 23 52  CDR  - - nothing you can do about the flicker.
03 06 23 55  CMP  Got it solid on AUTO.
03 06 24 07  LMP  Houston, Apollo 11. Are you picking up our signal okay?
03 07 48 01  CMP  Another 5 minutes, Neil babe.
03 07 48 05  CDR  Okay.

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03 07 48 20  LMP  This pitch angle is quite a bit off nominal; 196 instead of 212.
03 07 48 24  CMP  Umm.
03 07 48 26  LMP    16 degrees.
03 07 48 28  CMP    Yes, Shaffer screwed up - got to get his eccentric orbit.
03 07 49 21  CMP    We is there.
03 07 49 27  CDR    Okay, I think I got Denebola in sight; let me look at the - Sure enough, I do. And it's good enough in the telescope; let me check it through the sextant. It's even in the sextant.
03 07 49 41  CMP    Beautiful! Fantastic!
03 07 49 44  LMP    Let's burn.
03 07 49 45  CDR    That's MANUAL and ZERO - ZERO and MANUAL.
03 07 49 51  CMP    We done paid our debt to society; we done made a star check. 79:50 -
03 07 49 58  CDR    It used to be that you couldn't get control on LOI 2; that any burn, any attitude you made was safer than the regular attitude, but that isn't true any more.
03 07 50 07  LMP    Yes.
03 07 50 09  CMP    Okay, we got the OPTICS, ZERO?
03 07 50 14  LMP    Yes, I'm sure it is.
03 07 50 16  CMP    And we're not going to do any VERB 41, NOUN 91, any of that stuff - -
03 07 50 20  LMP    No    . . .
03 07 50 21  CMP    - - so you can - enter on this one.
03 07 50 26  CDR    Okay. OPTICS, ZERO, ZERO, huh?
03 07 50 29  CMP    No!

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03 07 50 31  CDR    Supposed to be 0.7.
03 07 50 32  CMP    Oh.
03 07 50 33  CDR    Okay?
03 07 50 35  CMP    VERB 37, ENTER; 40, ENTER.
03 07 50 46  CMP    How does that look?
03 07 50 48  CDR    Looks beautiful. You enter on it, huh?
03 07 50 51  CMP    No. Leave it there.
03 07 50 52  CDR    Alright.
03 07 50 56  CMP    Align spacecraft roll, GDC ALIGN.
03 07 51 06  CDR    Yes, here we go - - - doesn't look bad.
03 07 51 10  CMP    No, I just got through aligning it a little while ago.
03 07 51 42  CMP    Okay, GDC's aligned.
03 07 51 46  CDR    OkaY.
03 07 51 48  LMP    Check the circuit breakers.
03 07 51 50  CMP    Alright. I got - -
03 07 51 54  LMP    SCS circuit breakers.
03 07 51 56  CMP    SCS; they're all in.
03 07 51 58  LMP    SPS, 12, closed.
03 07 52 00  CMP    SPS, 12 of them.
03 07 52 02  LMP    ATT DEADBAND, MINIMUM.
03 07 52 04  CMP    MINIMUM.
03 07 52 05  LMP    RATE, LOW?
03 07 52 06  CMP    RATE, LOW.
03 07 52 07  LMP    LIMIT CYCLE, ON?

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03 07 52 08  CMP    ON.
03 07 52 11  LMP    MAN ATT, three, to RATE COMMAND.
03 07 52 14  CMP    Okay, MANUAL ATTITUDE, three, RATE COMMAND. And - sunrise.
03 07 52 23  LMP    Sunrise's going to be 52:10 - and I missed . . .
03 07 52 31  LMP    MAN ATT, three, to RATE COMMAND, you got that?
03 07 52 33  CMP    Three, RATE COMMAND.
03 07 52 34  LMP    BMAG MODE, three of them, to RATE 2.
03 07 52 35  CMP    Three to RATE 2.
03 07 52 36  LMP    ROT CONTROL POWER, DIRECT, two of them, OFF.
03 07 52 38  CMP    OFF - OFF.
03 07 52 41  LMP    SCS TVC, two, to RATE COMMAND.
03 07 52 44  CMP    Two to RATE COMMAND.
03 07 52 45  LMP    TVC GIMBAL DRIVE, PITCH and YAW, AUTO.
03 07 52 49  CMP    PITCH and YAW, AUTO.
03 07 52 52  LMP    Okay, what time do you have?
03 07 52 54  CMP    Okay, we've got - 18 minutes, roughly.
03 07 53 04  LMP    That TVC gimbal drive's taking up the power?
03 07 53 09  CMP    TVC - -
03 07 53 10  LMP    Putting out?
03 07 53 11  CMP  - - SERVO POWER?
03 07 53 12  LMP  No. The TVC GIMBAL DRIVE, PITCH and YAW, to AUTO. That didn't do anything, did it?
03 07 53 19  CMP  No. No, that didn't do a thing; servo power's what takes it.
03 07 53 28  CDR  You know not to leave them on too long.

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03 07 53 42  LMP  19 seconds to ullage; two jets.
03 07 53 45  CMP  Okay, 19 seconds, two jets.
03 07 53 50  LMP  A valves only.
03 07 53 52  CMP  Okay.
03 07 54 06  LMP  What did you get out of P30 as far as HA and HP?
03 07 54 10  CDR  I got the right numbers.
03 07 54 12  LMP  65.7, 53.7?
03 07 54 16  CDR  You got these?
03 07 54 23  LMP  Yes. 65.6, 54.6. . . . should get those up.
03 07 54 29  CDR  . . .
03 07 56 21  LMP  Now, let's see, we can take off the 16-millimeter magazines and the 70-millimeter magazines.
03 07 56 44  CMP  I've got your stopwatch.
03 07 57 46  CDR  Okay, burn time is - -
03 07 57 49  CMP  Light the motor.
03 07 57 50  CDR  - - 17 and 1 second overburn, almost . . . minutes.
03 07 57 57  CMP  Do it right here.
03 07 58 07  LMP  When's TIG?
03 07 58 09  CMP  11.
03 07 58 10  CDR  80:11:36.
03 07 58 22  CMP  17 seconds - 17 plus 1, huh?
03 07 58 49  LMP  Those little - fluorescent things on there must be from the heat and transfer.
03 07 58 54  CDR  Where are they? On the command module?
03 07 58 56  LMP  No.

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03 07 58 57  CDR  On the LM?
03 07 58 58 LMP No.
03 07 58 59 CDR I don't know, but the command modul's got about . . .
03 07 59 01 LMP Little fluorescent - circles?
03 07 59 04 CDR There's one of them.
03 07 59 07 LMP There's some in a lot of failures.
03 07 59 10 CMP The only thing is all the engineering that went into those damn things, too. There's a lot of time and money down the pipe.
03 07 59 15 LMP I mean, this big monstrosity out here, it fails -
03 07 59 17 CDR Hey, we're coming up - You can see the horizon -
03 07 59 38 CMP See if that looks pretty good - through the sextant and see if that doesn't come up.
03 07 59 47 CMP Zap.
03 08 00 05 CMP Poor old LM is contaminated; it's got urine particles all over it; and, the way the light's shining here, they look yellow. You know, those little - I guess it probably is a little - solid now, the - everything else has boiled off and it's left a little solid.
03 08 00 23 CDR . . ., huh?
03 08 00 26 LMP . . . solid urine particles are . . .
03 08 00 29 CDR I guess.
03 08 00 34 LMP Wait until the back contam - forward contamination people hear about that.
03 08 00 38 CDR Yes.
03 08 00 41 LMP No more urine dumps on the way to the moon. Put it all in a nice little bag and -

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03 08 00 58 CMP You're not - you've got plenty of black and white film, don't you?
03 08 01 01 CDR Yes, plenty of black and white film.
03 08 01 04 LMP . . . terminator, 4.
03 08 01 07 CMP Use as much as you want of anything you want. 80 millimeter, 250, it's all good.
03 08 01 20 CMP We got 20 minutes until TIG. Oh, excuse me, 10 minutes - 10 minutes until TIG, excuse me. A little over 10 - 80:11 - -
03 08 01 31 LMP Give me a call at about 7 minutes to go.
03 08 01 35 CMP Okay, right now -
03 08 01 36 CMP MARK it.
03 08 01 41 LMP Yes, siree; that there is rough - rough terrain.
03 08 01 54 LMP I've got kind of an idea that I'm going to be getting a picture of that - . . .
03 08 02 44  LMP  ... all those characters back there.
03 08 03 16  CMP  8 minutes until TIG.
03 08 03 48  LMP  Boy, there's a crater right in the side of the wall.
03 08 03 54  CMP  It's a much bigger crater, and I'll be damned if it doesn't look like it just went in sideways.
03 08 04 02  CDR  Okay, 7 minutes. Okay?
03 08 04 13  LMP  ... going to do it -
03 08 04 18  CMP  Buzz, you want to read us that checklist; we'll use my panel chart. Which checklist would you like?
03 08 04 32  LMP  Alright, MAIN BUS TIES coming ON.
03 08 04 34  CMP  Okay. 7 minutes -
03 08 04 37  CMP  MARK.

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03 08 04 40  CMP  AC's ON - DC's ON.
03 08 04 46  LMP  TVC SERVO POWER, number 1, AC 1.
03 08 04 48  CMP  AC 1.
03 08 04 50  LMP  TVC 2, AC 2.
03 08 04 51  CMP  AC 2.
03 08 04 52  LMP  TRANSPORT CONTROL POWER, ON.
03 08 04 54  CMP  TRANSPORTATION CONTROL POWER.
03 08 04 56  LMP  ROTATION CONTROL POWER, NORMAL, number 2, to AC.
03 08 04 58  CMP  AC.
03 08 05 01  LMP  ROTATIONAL HAND CONTROLLER, number 2, ARMED.
03 08 05 05  CMP  Number 2, ARMED.
03 08 05 16  LMP  Oh, I see those current - current ... went down on the fuel cells ... right down here.
03 08 05 24  CMP  The batteries are carrying the -
03 08 05 34  CDR  6 minutes.
03 08 05 52  CMP  About ready for a gimbal motor or two?
03 08 05 55  LMP  Alright. Let's try - PITCH 1, YAW 1.
03 08 05 58  CMP  Here comes PITCH 1 -
03 08 05 59  CMP  MARK it.
03 08 06 00  LMP  Got it.
03 08 06 01 CMP YAW 1 -
03 08 06 02 CMP MARK it.
03 08 06 03 LMP Got it.
03 08 06 04 CMP Okay.

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03 08 06 05 LMP TRANSLATION CONTROLLER, clockwise.
03 08 06 06 CMP Clockwise.
03 08 06 07 LMP Verify no MTVC.
03 08 06 11 CMP Verified.
03 08 06 12 LMP Alright.
03 08 06 14 CMP GIMBAL MOTORS, PITCH 2 and YAW 2, ON. PITCH 2 -
03 08 06 17 CMP MARK it.
03 08 06 18 LMP Got it.
03 08 06 19 CMP YAW 2 -
03 08 06 20 CMP MARK it.
03 08 06 21 LMP Got it.
03 08 06 23 CMP Set GPI trim.
03 08 06 26 CMP Okay, what numbers do we use?
03 08 06 31 CDR 166 - and let me see - and minus 0.81.
03 08 06 43 CMP Plus 166 and minus 0.81?
03 08 06 47 CDR Yes.
03 08 06 48 CMP Verify MTVC. Okay, there's trim set -
03 08 06 53 CDR See if we nulled residuals and all that. . . . - -
03 08 06 55 CMP MTVC is verified.
03 08 06 58 CDR - - . . . time on it - what? Okay.
03 08 07 01 LMP Alright, TRANSLATION CONTROLLER, NEUTRAL.
03 08 07 04 CMP NEUTRAL.
03 08 07 06 LMP Verify GPI returns to zero, zero.
03 08 07 08 CMP Verified.

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03 08 07 09 LMP ROT CONTROL POWER, number 2 - ROT CONTROL POWER, NORMAL, number 2, to AC/DC.
03 08 07 14 CMP AC/DC.
03 08 07 15 LMP SPACECRAFT CONTROL, CMC, verify.
03 08 07 17 CMP CMC verified. How are the needles, Buzz? Showing up good?
03 08 07 21 LMP No, we don't need it yet. Alright, BMAG MODE, three of them, to ATT 1/RATE 2.
03 08 07 24 CMP ATT 1/RATE 2.
03 08 07 26 LMP ENTER.
03 08 07 28 CMP ENTER.
03 08 07 29 LMP You got a 204?
03 08 07 30 CMP Yes.
03 08 07 31 LMP SPACECRAFT CONTROL, CMC and AUTO, huh?
03 08 07 33 CMP Yes.
03 08 07 34 LMP Alright.
03 08 07 35 CMP And we got 4 minutes until TIG.
03 08 07 48 CMP Which way's it shaking, can you tell? Pitch and yaw?
08 08 07 54 CDR I don't know; it goes up more on the yaw needle than the pitch needle, but I'm not sure that's indicative of anything except needle sensitivity.
03 08 08 01 CMP Okay, did it go to . . . ?
03 08 08 02 CDR Yes, it did. . . . OFF and the . . . OFF.
03 08 08 12 LMP ROTATION CONTROL POWER, DIRECT, two of them, to MAIN A/MAIN B.

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03 08 08 17 CMP MAIN A/MAIN B.
03 08 08 20 LMP SPS HELIUM VALUES, verified AUTO; LIMIT CYCLE, OFF.
03 08 08 26 CMP LIMIT CYCLE, OFF.
03 08 08 27 LMP FDAI SCALE, 50/15.
03 08 08 28 CMP Okay.
03 08 08 30 LMP At 2 minutes, A is coming on - DELTA-V THRUST, A.
03 08 08 33 CMP Okay. And that's all we use is A. 3 minutes to go.
03 08 08 46 LMP I like the neat way he's got his - safety belt on - . . . should be about in the right place.
03 08 09 05 CDR . . . belt for transposition and docking . . .
03 08 09 11 CMP Okay, coming up on 2 minutes; I'll get DELTA-V THRUST, NORMAL, A, ON, and that's the only bank we'll use.
03 08 09 38 CMP DELTA-V THRUST, NORMAL, A, is ON.
03 08 09 41 LMP TRANSLATION CONTROL, ARMED.
03 08 09 42 CMP ARMED.
03 08 09 44 LMP ROTATION CONTROL, ARMED?
03 08 09 45 CMP ARMED.
03 08 09 48 LMP TAPE RECORDER - COMMAND RESET.
03 08 10 01 LMP - - BIT RATE, FORWARD.
03 08 10 05 CMP Okay, 19 seconds ullage this time.
03 08 10 55 CMP Okay, stand by for . . .
03 08 11 03 MS . . .
03 08 11 07 LMP EMS MODE to NORMAL?
03 08 11 08 CMP EMS MODE, NORMAL. Stand by for ullage. . . .

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03 08 11 17 LMP 20, 19 -
03 08 11 19 CMP Ullage.
03 08 11 21 LMP You got the ullage?
03 08 11 22 CMP Yes.
03 08 11 23 LMP Okay. . . . ?
03 08 11 27 CMP Yes. Whoops -
03 08 11 29 LMP You want this . . . ? Alright.
03 08 11 32 CMP . . . and THRUST B.
03 08 11 37 LMP A?
03 08 11 39 CMP A, open.
03 08 11 44 CDR She's holding - she's holding - . . . looks good.
03 08 11 50 CMP She's all over.
03 08 11 51 CDR Okay, stand by for shutdown -
03 08 11 53 CDR SHUTDOWN.
03 08 11 54 LMP Shutdown, two valves, closed; two, barber pole.
03 08 11 56 CDR Okay, DELTA-V THRUST, NORMAL, A, is OFF; stand by for the GIMBAL MOTORS, OFF.
03 08 12 00 CMP PITCH 1, OFF -
03 08 12 01 CMP MARK.
03 08 12 02 LMP  Got it.
03 08 12 03 CMP  YAW 1, OFF -
03 08 12 04 LMP  MARK.
03 08 12 05 LMP  Got it.
03 08 12 06 CMP  PITCH 2, OFF -
03 08 12 07 CMP  MARK.

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03 08 12 08 LMP  Got it.
03 08 12 09 CMP  YAW 2, OFF -
03 08 12 10 CMP  MARK.
03 08 12 11 LMP  Got it.
03 08 12 12 CMP  Four GIMBAL MOTORS, OFF.
03 08 12 13 CMP/LMP  TVC SERVO POWER, OFF.
03 08 12 14 CMP  Both OFF.
03 08 12 15 CDR  MAIN BUS TIES; AC, OFF - DC, OFF.
03 08 12 18 LMP  Verified.
03 08 12 20 CMP  Proceed - and look at these -
03 08 12 28 CDR  . . .?
03 08 12 29 LMP  No, we don't need that.
03 08 12 33 CDR  Pretty nice-looking engine. . . .
03 08 12 40 CMP  0.3 zero, and zero is . . .
03 08 12 43 LMP  Alright. Get the EMS FUNCTION, OFF - How about going
ATT DEADBAND, MAX?
03 08 12 47 CMP  Okay, we're - we're in DAP control.
03 08 12 52 LMP  Alright, EMS FUNCTION, OFF; you got the DELTA-VC?
03 08 12 55 CDR  Yes - . . .
03 08 12 56 LMP  EMS MODE, STAND BY?
03 08 12 57 CMP  Okay.
03 08 12 58 LMP  BMAG MODE, three, to RATE 2?
03 08 12 59 CMP  Three to RATE 2.
03 08 13 00 LMP  ATT DEADBAND, MAX?
03 08 13 02 LMP PCM BIT RATE going to LOW. ROT CONTROL POWER, DIRECT, two of them, OFF.

03 08 13 04 CMP OFF.

03 08 13 05 LMP Circuit breakers, PITCH 1, YAW 1, PITCH 2, YAW 2, OPEN? Proceed and go to VERB 82. No!

03 08 13 21 CMP Why not?

03 08 13 22 LMP That isn't what it says - it says ... and go to P00 - -

03 08 13 25 CDR You get this -

03 08 13 28 LMP - - I want to get the circuit breakers -

03 08 13 32 CMP Up to ..., and I want to get AVERAGE g off, there we go, it's in P00 - VERB 82.

03 08 13 42 LMP All those listening to the tape, please report that - we need a change in the checklist.

03 08 13 47 CDR 66.1 by 54.4; now you can't beat that.

03 08 13 51 LMP No, this is about - -

03 08 13 52 CMP That's right downtown.

03 08 13 55 LMP - - this is 65.7 - -

03 08 13 57 CMP By 54 point - -

03 08 14 00 LMP We're more elliptic now, huh?

03 08 14 05 CMP That's about as close as you're going to get.

03 08 14 07 LMP Yes, I bet we never get circular.

03 08 14 10 CDR Hey, have you got any more circuit breakers - I mean any more switches for me?

03 08 14 14 LMP No. When everybody likes this one, why don't you try VERB 83 or a VERB 66 or a - suit yourself. See how much ... you put in.

03 08 14 33 CMP 158.

03 08 14 36 LMP 15.8, huh?

03 08 14 37 CDR 158.

03 08 14 40 LMP Or 158, that's about right. Okay.

03 08 14 43 CMP Everybody happy with that?

03 08 14 44 LMP That's reasonable.

03 08 14 46 CMP VERB 66; want to have a vote on VERB 66?

03 08 14 49 CDR No!
03 08 14 50  CMP  Everybody in favor of VERB 66 raise their right arm.
03 08 14 51  LMP  Yes, yes.
03 08 14 57  LMP  Okay, check it again. . . . Well, let's see; we didn't gain any on the old PUGS that time; we're still 0.2 behind.
03 08 15 14  CDR  Oh, I suspect you're right; we probably never will.
03 08 15 17  LMP  No. Ne should have wrapped that thing up during . . .
03 08 15 24  CDR  Check the increase that time?
03 08 15 26  LMP  Huh?
03 08 15 27  CDR  Did you check the increase that time?
03 08 15 29  LMP  If it increased, it's going to stay increased from now on.
03 08 15 33  CDR  Okay.
03 08 15 34  LMP  But I waited for it to start an upward trend on the first burn.
03 08 15 37  CDR  Understand; that's alright.
03 08 15 41  CMP  Alright - back to the flight plan.
03 08 15 45  CDR  . . . 33, as I remember it - the right number - -
03 08 15 52  LMP  . . .
03 08 15 56  CMP  Yes, roll 180, pitch down 81, ORB rate. God damn, here comes the draft again.
03 08 16 11  CDR  Okay, we're supposed to start charging battery A.
03 08 16 18  CMP  Charge battery A, huh?
03 08 16 22  CDR  Let's see what we have; SPS monitor check - -
03 08 16 30  CMP  Two breakers out there; two breakers out there - BAT B, BAT B, BAT A, you say - Neil?
03 08 16 42  CDR  BAT A, yes - if you please. Charging BAT A, then on to - -
03 08 16 48  LMP  Then roll 180, and then we'll talk about this pitchdown, alright?
03 08 16 52  CDR  Then you might as well go to your - 293 INERTIAL, I guess.
03 08 17 05  CMP  Man, that's a gas waster. Soon as I get around here, I'll start it. We'll pass through ORB rate at some point. Takes forever and a day to get around here.
03 08 17 31  LMP  It's going to be a long time before that battery gets back up to 39-1/2 volts.
03 08 17 45  LMP  We done plumb tuckered that one out.
03 08 17 49  CDR  LOI 1 could've got to it, I imagine.
03 08 17 52  CMP  Yes.
03 08 18 14  LMP  Are you going to maintain ORB rate?
Yes, I guess so. It's going to be sort of a passthrough ORB rate kind of thing because, see if I whip - do it in a hurry, why I got to pitch down 80 degrees, stop the pitch, or stop almost all of it, except for the ORB rate amount. That's going to waste a hell of a lot of gas.

Do we have to do anything - to the O2 to pressurize the LM?

No, we haven't - small enough - DELTA-P -

That's 0.9.

0.9?

Yes.

Yes, we have to build up pressure a little bit.

Build up that cabin pressure just a little bit, and I'll start the DIRECT O2 valve, OPEN.

It says observe the lunar surface.

That's what it says you ought to supposed to be doing.

It's brown; it's brown.

Brown all around. There's no doubt which way that - little crater hit.

Here's that same one going by again, Neil, remember? That bright Job?

Yes.

Man, there's white stuff all over - and it's black right around the rim.

Hey, well, I'm - while this thing's rolling over, I'm going to take a pee; I'm going to go pee.

180, if you don't mind.

That's a spectacular crater.

Did you shoot some pictures while you were over there?

No, it's just going by - we'd better get it later; there will be better times. If the damn antenna isn't in the way -

Boy, there must be nothing more desolate than to be inside some of these small craters, these conical ones.

People that live in there probably never get out.

Yes, I think you're right. Boy, you can really see the slumping, though. Most of the - You can see where it's all gathered down in the bottom in the corner, you know, on the edge - where a lot of the white stuff has dribbled on down - and evidently it gets covered over after a while with a - a darker layer. There's always a certain amount of the white stuff right in the edges. Pretty characteristic of all of these - white conical ones.
Yes, you know, you can change the color of what you're looking at by moving your head to a different spot in the window - and looking in a different direction.

And that must be big . . . right down there.

I haven't heard any woo-woo's.

Is there something we should be woo-wooing about?

Wait until we get the VHF on, then we'll hear the woo-wooing.

Okay.

Man, I sure hate to say it based on looking through this monocular, but there's a white spot that's just like a crater - looks like an awful lot under these small fresh ones in the bottom of this rather old crater, but right in the center of it, it looks like instead of there being a crater, looks like it's a rock. . . . My eyes deceiving me.

How's our roll doing, Neil?

Oh, you got about 30 degrees to go.

Oh, boy!

Okay.

How far you going to roll?

Over and over.

Got that DIRECT O2 . . ., didn't you?

Yes, just a tiny bit.

Okay.

It'd be kind of interesting to see some of this dump go on straight from polar orbit. Wonder how long it's going to take before it impacts?

It obviously - is not really in polar orbit if it's going off - going off that way. Yes, it's inclined to the small angle.

Sure looks like it.

It's going straight out there through. That's real funny.

Son of a gun, that one's got a little - little curve on it.

Would you believe that, Neil? One went out and curved around like that. Can you explain that?

I guess it just glanced off another particle or something.

Oh, no, no, no, no; if it's curved.

It had a little bubble in it that came to the surface and went kapoom and - -

No - -

There's atmospheric drag up here.
APOLLO 11 - Onboard Voice Transcription

03 08 25 47  CDR    - - departed it with a little DELTA-V.
03 08 25 49  LMP    I think what's really happening is - we're rolling and - it's changing the angle that
                     I'm looking out the window.
03 08 25 55  CMP    Let's see, I want to pitch down 80 degrees to - -    . . . 293, down 293, I believe
                     that, I wonder what rate would be reasonable -

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03 08 26 10  CDR    Okay, it's about 7 minutes until AOS.
03 08 26 17  CMP    Down 80 degrees in 7 minutes, that's - let's see, about 10 degrees per minute,
                     10 degrees per minute is -
03 08 26 31  CDR    . . . floating up here -
03 08 26 33  CMP    61    . . .
03 08 26 38  LMP    Well, Mike probably let him out.
03 08 26 45  CMP    Okay, that ought to almost get it there and, damn, I don't want to see any more
                     than that.
03 08 26 58  LMP    You can open the battery . . . pad.
03 08 27 11  CMP    That ought to be enough.
03 08 27 31  LMP    . . .
03 08 28 02  CMP    Alright, where are we? We're pitching down. Gee, it's too bad we can't stop right
                     here and observe the earth come up. You know, we ought to get that picture one
                     time.
03 08 28 20  CDR    We probably can do it. You could stop it right here if you wanted to spend the
gas.
03 08 28 25  CMP    Yes. That's the only trouble, the doggone gas. What are you on?
03 08 28 42  CMP    A picture looking out over the LM as well.
03 08 28 45  CDR    Yes.
03 08 28 46  LMP    Shouldn't be a bad picture. Why don't we stop it?
03 08 28 48  CMP    Okay.
03 08 28 56  CDR    We ought to be able to get high gain from this attitude, shouldn't we?
03 08 29 10  CDR    Think we ought to get the long lens on, Mike?
03 08 29 12  CMP    Yes, we ought to get the 250 - we ought to do it at 250.

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03 08 29 14  CDR    You've got 4 minutes; that's plenty, Now, we're going to want to - -
03 08 29 22  CMP    Are we at a good enough attitude? I hope so. We are out this window, babe, but
                     we're not out that one. If the earth is right there, that's where it's coming up, huh?
                     Better be.
03 08 29 34  CDR    You want color?
03 08 29 35 CMP Ah - -
03 08 29 37 CDR We better have color.
03 08 29 38 CMP Yes, we want color.
03 08 29 49 LMP I got a clean window over here so don't sweat that one too much.
03 08 29 53 CMP 250 - hand me your camera, Neil, and I'll change it.
03 08 29 59 CDR Who's got the Hasselblad?
03 08 30 07 LMP Probably over there on the shelf.
03 08 30 09 CDR We got it. First quad is in - back is - -
03 08 30 14 LMP That wall of that crater looks pasty through the sextant. Great big chunks of white stuff that just slumped down.
03 08 30 29 CDR Did you get - . . .? If you get too far over here, we may have to watch our pitch angle. We're good right now.
03 08 30 40 LMP . . .
03 08 30 41 CDR ORB rate -
03 08 30 45 CMP No, we're not ORB rate.
03 08 30 48 CDR The earth's going to be coming ORB rate at us.
03 08 30 53 CMP . . .
03 08 31 01 CDR Okay. Let's see, I've got to pitch up a tad then . . .

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03 08 31 06 CMP Okay, I've still got f:8 and . . .
03 08 31 10 CDR 250th at f:8, I think we can do it, and infinity.
03 08 31 16 CMP I don't know; what's the matter with where you had it?
03 08 31 19 CDR Oh, son of a gun! (Laughter) We're going backwards. Oh, well.
03 08 31 28 LMP Oh dear. Dumbkopf!
03 08 31 32 CMP That's it, I think, there, Neil - so pitch down.
03 08 31 36 LMP Prior planning prevents poor performance.
03 08 31 38 CDR Thank you. Is that right, Buzz?
03 08 31 40 CMP All that - Where'd you ever hear that one, Buzz?
03 08 31 45 LMP I can't think.
03 08 32 12 LMP Oh, that's a bright one; I got to get that one . . .
03 08 32 16 CMP No lie!
03 08 32 25 CDR 150 - you don't want to take too many on this.
03 08 32 30 CMP No. Might as well put the other one back on.
Well, you might save that for some earth shots.

Wow!

... 

You got it, huh?

I think it focused the second one a little bit better. I think it's beautiful. Just fabulous. Not really sure what you're looking at - but there's some mighty big fresh rocks down in that crater.

The walls actually look pockmarked. Sure enough, and they're not filled in. Pockmarked and it looks like somebody's painted white paint vertically down the edges and then it's been eaten away.

... that one ... into the LM.

Here is the earth. Hey, I got the view over here.

I guess I'd better get the high gain off, hadn't I?

Did it just come up?

Yes.

We need that ... 

Do we still got high gain?

Yes.

It's says minus 67 and zero.

Minus 67 and zero.

And zero.

Okay, MANUAL - and - AUTO - medium. There we go. Can't make up his mind between zero and - 360. Okay, we got them.

Okay.

Apollo 11, Houston. ...

Do you want to talk to them?

Roger, Houston. Burn status report follows: DELTA-TIG zero; burn time, 17; angle through the pad values, DELTA-VGX was plus 0.3; VGY, minus 0.0; VGZ minus 0.1; DELTA-VC, minus 5.2; fuel, 362; OX, 364; unbalance, plus 50, and a postburn NOUN 94, 66.1 by - -

Well, they look like they were made to go - That's - that's it, isn't it? Weren't they made to put here so you stow them by putting them on here instead of the way we do it?
Then we only have to decide what - what's supposed to go here.

I . . . two of them.

Both of those - those things are in here.

. . . worry about nothing goes in there . . .

Hello, Apollo 11, Houston. We've played back the LOI 2 burn. It looks really good to us. The systems were all good. We got an orbit on the limited amount of tracking at 65.4 by a 53.9. Over.

Sounds good, Houston.

I need that film now.

Okay.

. . .

Okay, want to get film. It's a long trip to the film container.

You want something?

Oh, shoot. I'm going to have trouble getting in there.

How's it going, Neil? You getting any?

. . .

Well - Buzz, the 70-millimeter container's only got one black and white and one color in it - Isn't it supposed to - -

That's - that's not - that's mine.

You've got the wrong one.

No, that's not the right one.

The one - -

The one you want, Neil, is way over here in - R-13.

No, it's not in there; it was on my girth shelf.

Okay.

Oh, okay, there it is. Did you get that one put back?

No, but I will.

Okay, appreciate it. I had it in my mind that - our - -

You want to do something to the polarizing filter, Neil?

Uh - -

I'll stick it up there on the ceiling. There's a - -
03 09 45 02  CDR - - not really.
03 09 45 03  CMP - - we got room for it up there.
03 09 45 29  CMP You want the 16-millimeter while you're down here, Neil?
03 09 45 31  CDR Yes.
03 09 45 32  CMP The 16-millimeter bag as well?
03 09 45 33  CDR Yes, I'll take that one, too.
03 09 45 36  LMP Okay.
03 09 45 59  CMP Well, that - damn stuff won't stick. Haven't got a piece of Velcro on there yet.
03 09 46 10  CDR You're not . . .
03 09 47 34  CMP Man, can't you stop some of that racket up there?
03 09 47 38  LMP Huh?
03 09 47 52  CMP That's the S-band - you turn your volumes down.
03 09 48 06  SC (Coughing)

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03 09 48 17  CMP Is that better on the S-band?
03 09 48 19  CDR Yes.
03 09 48 20  LMP Yes.
03 09 48 21  CMP Okay.
03 09 48 50  SC (Sneeze)
03 09 48 51  LMP There's one that's got mission rules in it - but I can't place - at the moment, put my hands on it. . . .
03 09 50 10  LMP It's a NO-GO - GO/NO-GO - the one one I'm looking for. Hey, that's beautiful.
03 09 50 28  CDR Like this?
03 09 50 31  LMP Yes.
03 09 50 33  CDR That's the one we made the changes in, right?
03 09 50 37  LMP Right.
03 09 50 40  CDR It may be up in the - in the command module, huh? Have you got another clip?
03 09 50 49  LMP For the window?
03 09 50 51  CDR I thought we might just stick my - activation checklist right - right there, and we'll be all ready coming in.
03 09 50 56  LMP Right here?
03 09 50 57  CDR Yes. . . .
We may be ending up with one more than we're authorized - one, two, three, four, five. Yes, one of these will be changed over to - As a matter of fact, I stole one from Mike - but one of them we'll change over to the - -

I'll go check around up here.

Oh, wait a minute, here it is. I got it.

I don't think the - -

This other one got changed.

No, it didn't.

You want to do that?

Yes, I can do that.

And in the meantime - Let's see, where'd the film go?

Now, the thing that would be nice to find out is if - how well - go - the 80-millimeter - with the film pack on it - in color.

You do put these in with this dark slide in, don't you? Is that right?

Which one you got? 60? 60 you do, and the 80 you - . . .

Yes, dark slide in.

It'll lock it the other way. That - that side - it'll pull it closed.

Alright. . . . for telling me.

Boy, that thing goes all over, doesn't it? Maybe we ought to - do these the other way around.

Neil, we got two magazines, two color, A . . . - one of them is R and the other is S.

Yes.

I'm going to put the R in the reserve camera.

Okay.

And the S in the surface camera.

Good idea.

Even though we're going to use them the other way.

Do you want to try it out in there?

I guess we could open the window here, just as well.

The window's all - frosted over.
03 09 57 04 CDR  Is it?
03 09 57 06 LMP  Well, I hate to stick my finger on it; I'm not sure which side it's on.
03 09 57 09 CDR  We'll have to - have to turn the heaters on tomorrow.
03 09 57 16 LMP  No, I think when the sun gets on them, it'll -. . . them. Yes, the one on your side is . . .
03 09 58 08 CDR  The black and white is magazine 2.
03 10 02 05 LMP  I don't guess there's any need to tape that up now.
03 10 02 18 LMP  We're on the back side now, right?
03 10 02 20 CDR  Yes, just come into - we're just coming into sunlight.
03 10 02 22 LMP  And we don't get the - contrast . . .
03 10 02 31 CDR  What's the mission time, Mike?
03 10 02 35 CMP  Just a second. About 82 hours even.
03 10 02 39 CDR/CMP  . . .
03 10 02 40 CMP  82:02.
03 10 02 42 LMP  Okay, when do you get your tracking?
03 10 02 44 CMP  In a little while.
03 10 02 47 LMP  About what time?
03 10 02 52 CMP  About another half hour.
03 10 02 56 LMP  Before 83 hours?
03 10 03 06 CDR  Wasn't like this yesterday - must be because the sun was on it.
03 10 03 24 LMP  Boy, look at that big mother coming up there. Looks like we're heading for - . . . over the horizon.
03 10 04 22 LMP  I don't think there's any place except in the - in here, that it says anything about 16-millimeter footage -
03 10 04 33 CDR  In the card, right?
03 10 04 35 LMP  No, I'm thinking about for the descent. Here we are; 16 millimeter, HC-EX, f/4, 500, infinity, 6 frames per second. Okay.
03 10 05 14 CDR  You got the flight plan handy, Mike?
03 10 05 16 CMP  Yes, I have; just a second.
03 10 05 19 CDR  I don't want it up here; I just want you to - when you get a chance, to read off the items that are on there, make sure we got them.
03 10 05 26  CMP  It says perform housekeeping chores, stow helmets, stowage bags; unstow mirror, checklist, and disposal assembly. Stow interim stowage assembly, unstow and configure for use 16 millimeter, HC-EX, f:4, 500, infinity, 6 frames per second. That’s all it says - on that page. That’s where we are now. The next thing is an hour from now when we transfer to LM power and activate the COMM.

03 10 06 04  LMP  12 feet per second - half an hour.

03 10 06 15  CMP  Did you say something about taking pictures right now?

03 10 06 18  CDR  No, no; stop the camera.

03 10 06 21  CMP  Yes, I know, I don’t think it’d take a very good picture right now.

03 10 06 29  LMP  One thing, when you get way up here, you can - see a lot more of that secondary strut.

03 10 06 39  CMP  No, that thing - that’s holding up those damn baffles.

03 10 06 51  LMP  Well, if we could get a towel, we could get us a couple of fair-to-middling pictures out of here.

03 10 06 59  CDR  Alright. You want one?

03 10 07 01  LMP  Yes. Maybe - Some of it will come off, anyway.

03 10 09 05  LMP  Hand me a towel when you get a chance.

03 10 09 14  CDR  . . . left window . . .

03 10 09 49  CDR  This one’s getting pretty well cleared off over here on the left.

03 10 10 03  LMP  You want the COAS in the forward window for undocking, huh? And you don’t want the filter attached? I stuck it up here.

03 10 11 03  LMP  All that’ll do is warm it up.

03 10 11 42  LMP  When do we have AOS?

03 10 11 50  CDR  Well, we - we should have AOS in - oh - 16 - 18 - in about another 20 minutes.

03 10 12 44  LMP  Alright, then, I think - the way we’re sitting, why, we’re going to be able to get a picture - of the earth coming right up there. What do you think about that?

03 10 14 07  CMP  Unique feature - photography (laughter). . . . on the top of it.

03 10 14 34  LMP  What have you been using, 5.6 at 1/250th?

03 10 14 52  CMP  Yes. . . .

03 10 15 10  LMP  What do you know, it works!

03 10 15 18  CDR  I could sure get the stop watch, huh?

03 10 15 22  LMP  Yes, you have the exact time to AOS - because I don’t have my watch - set up for that.

03 10 15 29  CDR  . . .

03 10 15 30  LMP  . . .
03 10 15 32 CMP I'm just fooling around; what do you need - AOS time? AOS is going to be - well, let's see - 82:30 - about 15 minutes from now.

03 10 15 50 LMP Okay. I'll get another good picture of what comes along. Well, hell, I guess we might as well load the other camera and make sure it works, too, huh?

03 10 16 00 CDR Adjust the - chronometer and put the cables in it, huh?

03 10 16 05 LMP Yes.

03 10 16 06 CMP Well, look, if we load this one - if I put the film on this one, and take a picture or two, well, I'll have to take it back off again; that's the only trouble. I won't have to, but it doesn't stow as neatly. If you don't mind doing - powered descent with the camera in there, I think that's probably alright. Well, wait a minute, I bet I could put this one loaded where the other one goes -

03 10 16 47 CDR Where have you hid the shaving cream, Mike?

03 10 18 12 CDR No wonder - . . .

03 10 18 20 CMP Uh, . . .

03 10 18 25 CDR . . . that's the reason - -

03 10 18 26 CMP No, I don't think you know; I don't think you know; I don't see how you know.

03 10 18 30 LMP Hey, Neil, you see any need for keeping this thing?

03 10 18 33 CDR What's that?

03 10 18 34 LMP In the LM, this cover for the camera. Think about that for a while - I got it loaded, and I don't see any need to ever change it. If it works now - I guess if it quits before we actually went EVA, why there might be some reason to. 5.6 at 250th, huh?

03 10 20 01 LMP Now, a few pictures of that and one of earthrise and - and then we'll stow it.

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03 10 21 45 LMP Well, I can't do anything until we transfer to LM power.

03 10 22 10 CDR Do you know where the shaving cream is?

03 10 22 13 CMP Shaving cream?

03 10 22 17 CDR Yes.

03 10 22 18 CMP Yes, I sure do; it's - -

03 10 22 19 LMP In the penlight.

03 10 22 21 CMP - - in the penlight compartment, huh?

03 10 22 53 LMP How about this thing; you see any need to - to keep that in the LM?

03 10 23 07 LMP Neil, what did you do with the - . . . camera back sight?

03 10 23 12 CDR I haven't had it.

03 10 23 13 LMP Okay. What do you think about that?
03 10 23 16  CDR  I can't think of any reason why we might use it.
03 10 23 18  LMP  Well, there's a COAS - dust cover that I think fits in the same category, don't you? The thing that you got to move out to put the COAS in?
03 10 24 05  CMP  He's shaving.
03 10 24 36  CMP  I'm through with the flight plan, Neil, if you want it.
03 10 24 41  CDR  . . .
03 10 24 56  CDR  . . . razor?
03 10 24 58  CMP  The razor should be in there with the shaving cream, isn't it?
03 10 25 01  CDR  No - -
03 10 25 02  CMP  It wasn't?
03 10 25 03  CDR  - - . . . shaving cream.

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03 10 25 04  CMP  The razor wasn't in there?
03 10 25 06  CDR  The razor's in here, and I think the shaving cream was when I pulled it out, but - -
03 10 25 11  LMP  How much time to AOS, Mike?
03 10 25 15  CMP  82:30 - about 5 minutes.
03 10 28 42  LMP  Don't know what I'm doing with VHF B on.
03 10 28 52  LMP  Hey, Mike?
03 10 28 53  CMP  Yes.
03 10 28 57  LMP  You got VHF B available?
03 10 28 59  CMP  What? Say again?
03 10 29 05  LMP  I don't know. According to this lousy thing, I'm powering up VHF B - T/R.
03 10 29 11  CMP  Not right now, not for another half hour or so.
03 10 29 13  LMP  No, I know, but - Are you going to have your VHF on?
03 10 29 21  CMP  If I'm going to record your data, I am.
03 10 29 30  LMP  Well, it doesn't say doodly squat about recording data.
03 10 30 30  LMP  . . . coming up now.
03 10 31 54  CDR  Did you get them?
03 10 31 56  LMP  No, sure didn't.
03 10 32 05  CDR  Yes.
03 10 32 07  LMP  But I can't see . . . - I see the earth, but it's a lousy picture.
03 10 32 27  CMP  Could you wait just 1? I'm right in the middle of the event-timer setting.
03 10 32 41  CMP  Okay, Houston. We'll be doing P22 in just a couple of minutes here.

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03 10 32 46  LMP  You want to come in, Neil? Going in?
03 10 33 59  LMP  Want back up?
03 10 34 00  CDR  No.
03 10 34 01  LMP  Here's your shaving cream.
03 10 34 03  CMP  My only problem is I'm going to come over here and grab a switch and arm this hand controller.
03 10 34 07  CDR  Alright. I'll be out of your way.
03 10 34 08  CMP  Okeydoke. I'll tell you what you could do, if you're not doing anything else, is supposed to take five marks 30 seconds apart. When I take the first one, you can take a hack and see - -
03 10 34 26  CDR  Okay.
03 10 34 27  CMP  - - whether I'm spaced properly or not, you know what I mean?
03 10 34 28  CDR  Yes.
03 10 34 29  CMP  Coach me along on when to take mark number 2, mark number 3, 4, 5.
03 10 34 51  CMP  And could you give me a hack on the MDC mission timer? It's going up to 35 minutes. Ready - -
03 10 35 00  CMP  MARK it.
03 10 35 05  CDR  35 minutes.
03 10 35 06  CMP  Okay, that's good. That program alarm is normal; it will reach that when the trunnion gets down below 50 degrees.
03 10 35 21  CDR  Okay.
03 10 35 23  CMP  All I'm doing is waiting for - the time; everything else is done.
03 10 35 46  CDR  You holding inertial, Mike?
03 10 35 47  CMP  Yes.

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03 10 35 50  LMP  No wonder the earth isn't moving.
03 10 36 06  CMP  Ho-hum, ho-hum. I only got set up for this thing about an hour early (laughter). Better late than never; better early than late.
03 10 37 04  CMP  . . . should be coming over the horizon here pretty soon.
03 10 37 08  LMP  What should be?
03 10 37 14  CMP  01d A-1. 01d A-1.
03 10 37 20  CMP  Now, we'll see if you can find something that looks like A-1.
03 10 37 23  LMP  I got the earth down by the strut.
03 10 37 56  LMP  The problem with this window is, Neil, I think it's too cold in here.
03 10 37 59  CMP  Neil, I'm going to get up here and get pitch - MANUAL ATTITUDE PITCH to
                  ACCEL COMMAND. Those hand controllers are armed, so beware.
03 10 38 02  CDR  Okay.
03 10 41 25  CMP  If I'd known you were going to be here, I'd of incorporated you into the
                  procedures.
03 10 41 30  CDR  Keep looking through the periscope, then.
03 10 41 32  CMP  What I need is - 0.3 to 0.5 on this thing, closer to 3. I'd get it, but you - -
03 10 41 40  CDR  I'll watch.
03 10 41 41  CMP  - - just as a doublecheck - -
03 10 41 42  CDR  I'll watch.
03 10 42 11  CMP  The preflight - ... 
03 10 42 55  CDR  That ... is working.
03 10 42 56  CMP  Okay, fine.
03 10 43 31  CMP  Okay, MARK it -

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03 10 43 32  CMP  Number 1. They're 30-second marks.
03 10 43 35  CDR  Check.
03 10 43 47  CDR  15.
03 10 43 50  CMP  How many?
03 10 43 51  CDR  15 - 20 - 25 - 30 -
03 10 44 02  CMP  MARK it -
03 10 44 03  CMP  Number 2.
03 10 44 04  CDR  Okay.
03 10 44 05  CMP  I have a feeling somehow I got to do these ... 
03 10 44 16  CDR  15 -
03 10 44 17  CMP  Okay.
03 10 44 26  CDR  25 -
03 10 44 31  CMP  MARK it -
03 10 44 32  CMP  Number 3.
03 10 44 33  CDR  Okay.
03 10 44 46  CDR  15 - 20 - 25 -
03 10 45 00 CMP MARK it -
03 10 45 01 CMP Number 4.
03 10 45 02 CDR Okay.
03 10 45 16 CDR 15 - 20 - 25 -
03 10 45 29 CMP MARK it -
03 10 45 30 CMP Number 5.
03 10 45 32 CDR Okay.
03 10 45 33 CMP . . .
03 10 45 43 CMP . . .
03 10 45 50 CDR Check.
03 10 45 51 CMP Checklist says - You're going to go blind doing this - . . . 06 71 - confirm 7000; 06 89 confirm . . . 320 7000 . . . -
03 10 46 08 CDR Just leave it; keep pitching?
03 10 46 10 CMP Yes. But I don't know why we're getting that thrust rate there, maybe the . . . getting unhappy - -
03 10 46 16 CDR . . . look at that roll and stuff . . . that yaw . . .
03 10 46 21 CMP Yes. It's Just like the simulator, remember that?
03 10 46 24 CDR Yes.
03 10 46 26 CMP It's . . .
03 10 46 27 CDR We're yawing pretty good. 0.4, I'd say - -
03 10 46 31 CMP We're going to have to check that out.
03 10 46 34 CDR - - towards gimbal lock.
03 10 46 35 CMP Toward gimbal lock?
03 10 46 37 CDR It's only gone 10 degrees towards gimbal lock.
03 10 46 40 CMP Well, that's a pretty good error. I don't know why in the hell it does that.
03 10 46 48 CMP Would you like to control the . . .? I'd say we're going to keep pitching for quite a while.
03 10 46 59 CMP Houston, Apollo 11.
03 10 47 05 CMP Roger. Are you copying NOUN 129 on your downlink? If you've had enough time, I'll proceed.
03 10 47 35 CMP Look, what gimbal angle was that when - on the pitch - when that activity started, just out of curiosity?
03 10 47 40 CDR Oh, must have been around - 210.
03 10 47 50  CMP  Just like the simulator.
03 10 48 00  CMP  Okay, now, the flight plan says where we want to stop . . ., that says so right here - pitch 229 is where we want to stop.
03 10 48 07  CDR  Okay, we've gone by that, however, quite a ways.
03 10 48 10  CMP  I'm sorry, let's stop, then.
03 10 48 12  LMP  Is that local vertical?
03 10 48 14  CMP  No.
03 10 48 21  CDR  Okay. And after those pictures, . . . lunar surface.
03 10 48 26  CMP  You want to go back to 229 or what?
03 10 48 29  CDR  Let me see the flight plan just a second. Yes.
03 10 48 41  CMP  Might as well just - just let it stop itself, Neil.
03 10 48 47  CDR  I've got to - look at the - -
03 10 48 50  CMP  Yes, go ahead.
03 10 48 52  CDR  - - the . . . . . . like - gangbusters?
03 10 48 57  CMP  . . . 225 is . . .
03 10 49 12  CMP  MARK -
03 10 49 13  CMP  02009.
03 10 49 23  CMP  MARK -
03 10 49 24  CMP  22590. Minus 00177.
03 10 50 00  CMP  Okay. So much for that.
03 10 50 28  LMP  A beautiful view out here, Neil.
03 10 50 34  CDR  . . .
03 10 50 51  LMP  What's the GET?
03 10 50 55  CMP  It's 82:51.

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03 10 51 35  CMP  There's Mount Marilyn.
03 10 51 36  CDR  Yes.
03 10 51 55  CMP  Okay, we didn't waste any gas by doing what we did, but what we wasted gas by was that goddamn DAP activity; I don't understand that. just like the simulator.
03 10 52 09  CDR  Sure enough.
03 10 52 13  CMP  You got a good view there, Neil?
03 10 52 15  CDR  Yes, I sure do.
03 10 52 18 CMP Houston, Apollo 11.

03 10 52 25 CMP All that procedure for P22 seemed to work very well. The only thing that was a little odd is that there was some DAP thruster activity. I had pitch in ACCEL COMMAND, and roll and yaw in RATE COMMAND, and somehow roll and yaw got excited, and DAP went into a flurry of thruster firing. We've noticed the same thing in the CMS and had just written it off as a CMS peculiarity.

03 10 53 02 CMP Okay.

03 10 53 34 CMP Well, one P22 out of the way. Ho, ho, ho!

03 10 53 40 CDR What were the results?

03 10 53 42 CMP Well - -

03 10 53 43 CDR Or could you tell?

03 10 53 44 CMP - - they're sort of inconclusive because I marked - see, they gave me -

03 10 53 52 CMP That's in work, Houston. Hey, how about holding this for just a little bit?

03 10 53 55 CDR Yes, let's hold this attitude a little bit; I want to look at the - -

03 10 54 00 CMP Boy, that's beautiful out there, isn't it?

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03 10 54 01 CDR - - TPI approach. Man, this is really something; you ought to look at this. You want to watch our approach into the landing site; you got to watch right through this window. We're coming over - we just passed Mount Marilyn. We're coming up on Maskelyne series here - straight out ahead, coming into the landing area.

03 10 54 21 CMP Houston, we're holding inertial a little while to study the approach to the landing zone.

03 10 54 39 CDR See the monocular -

03 10 54 41 CMP I don't either, . . .

03 10 54 44 CDR Is there one?

03 10 54 50 LMP Well, a crater - -

03 10 54 51 CMP There go Sidewinder and Diamondback. God, if you ever saw checkpoints in your life, those are it.

03 10 54 56 CDR But . . . we don't get to see them.

03 10 54 58 CMP You don't?

03 10 54 59 CDR No, we roll over right here at this little - well, you see Boot Hill coming up right here?

03 10 55 06 CMP Yes, yes, yes.

03 10 55 07 CDR And just beyond it that's - that crater right on track there, the big one?

03 10 55 11 CMP That's Mount Marilyn? Past Boot Hill?

03 10 55 13 LMP No, Duke Hill.

03 10 55 14 CMP Duke Hill?
No, I'm sorry . . . that's - -


Oh God, look at that Moltke; he's my favorite . . . Look at that son of a bitch. You see all those roads - triangular roads leading right past him?

Yes.

That's US 1, I guess, huh?

Yes.

There's crater 130 over there although I can't quite see - see 129, but I can't quite see 130.

Can you see . . . , Neil?

I'm not sure.

I think I can see it, for sure. Yes, I got it beautiful - I can - I got the whole landing site here.

That far?

The one that's shorter there?

Houston, this is Apollo LM in the Eagle - Apollo 11 in the Eagle, and I got a beautiful view of the whole landing area.

Roger. I can see the entire landing area from the position I'm in looking out the left window in the LM.

That's right.

Boy, that sure is eerie looking.

Isn't that something?

. . .

That's right.

Boy, that sure is eerie looking.

Isn't that something?

. . .

. . . enough of a shot down there, but you can't find a single spot on the surface that doesn't look . . . 1-degree sun angle, that's - that's just a lousy sun angle.

That's spectacular out there - Looks like you're flying right into the side of a mountain, doesn't it?

Yes, sure does.

I missed taking a picture of it, . . .

Well, that was good . . . Shall we go to maneuver, I mean to sleep attitude - anybody object to doin that?

That'd be alright.
Okay, I'm ready for you cats to transfer to LM power. What time GET you got?

80 - -

Get the . . ., Buzz.

- - 83 hours. You ready to do it?

. . .

You ready to do it?

Stand by. Yes, go ahead and do it.

Okay.

You got 83 hours right now, huh?

Yes, 83 hours, and we're on LM power.

Glycol pump.

Houston, Apollo 11. How do you read on high gain? Over.

Okay. You want wide beam, for some reason?

Will you cut my SUIT POWER and AUDIO, OFF, please?

Yes.

Okay, fine.

Okay, going OFF now.

We're starting our maneuver to sleep attitude; roll 82, pitch 229, yaw zero.

About ready to maneuver?

Go ahead.

Okay.

Yes?

You're past step 4?

Houston, 11.

What's the page?

Okay. We're on page - activation 12, 13, at step 4, verify descent talkbacks - gray, and they're barber pole.

Stand by. We've got it. We've just had - one circuit breaker out of position. We have them gray now.

Watch that.

Don't we want it dark?

I thought the lights were going out. Man, that voltage is really falling off.
Hey, Mike.
Yes.
... VHF ... circuit breaker ...
I can't hear you, Buzz.
He says, "Why don't you turn on VHF B, just for kicks."
Alright, I'll do it. You going to send me some data?
Yes, I'll get right to it.
Huh?
I'll get right to it.
Alright.
Soon as I get some COMM first.
Yes, because when I - because when I record your data, I'm on SIMPLEX A.
Yes, well, that's when you're talking at the same time.
Yes, okay. You want me just to turn up B now?
There's signal strength.
Hello, Houston, hello, Houston; this is Apollo 11, Eagle. Over.
A lot of static - on the command module S-band.
Well, we - we should still have him.
Houston, Apollo 11. Radio check on S-band.
I'm not getting them on -
Well, we're almost at sleep attitude; just stand by 1, and, as soon as we get there, I'll find out where they are. I'm going to dick with the DAP right now.
I've got nothing but static.
Houston, Apollo 11. Over.
Hey, Mike, you transmitting on B?
Mike, what are you transmitting on up there?
Say again.
What are you transmitting on up there?
I'm transmitting right now on OMNI A, but I'm about to get new high-gain angles; just 1 second. Okay; we're there.
03 11 10 16  CDR  How come I - he don't hear you on INTERCOM?
03 11 10 21  CMP  You should hear - -
03 11 10 22  LMP  Houston, Apollo 11; Apollo 11, Eagle. Over.
03 11 10 33  LMP  Roger. I read you about 4 by 4. Could you give me a short count, please?
03 11 10 37  CDR  Gees, I don't hear him.
03 11 10 43  CDR  We don't read them, Buzz.
03 11 10 46  CMP  He's - he's on LM S-band, Neil, apparently.
03 11 10 49  CDR  Oh.
03 11 10 50  CMP  Yes.
03 11 10 53  LMP  Roger. Are you copying my LOW BIT RATE? Over.
03 11 11 07  LMP  Roger. I'm all ready to switch to HIGH BIT RATE, if that's okay with you.
03 11 11 21  LMP  Standing by.
03 11 11 31  LMP  Houston, Eagle. Go ahead with the camera checkout. I'm still on low taps, and I assume there's no problem doing that. Over.
03 11 11 53  CMP  Houston, Columbia. How do you read on the high gain?
03 11 12 01  CMP  Blap.
03 11 12 07  CDR  Did you hear him answer?
03 11 12 09  CMP  No.
03 11 12 10  CDR  I didn't either. Buzz is reading him, though.
03 11 13 04  CMP  Houston, Columbia. How do you read on the high gain? Over.
03 11 13 18  CMP  Hey, how about asking them if they can hear me calling?

I don't believe they can hear you, Mike, ... sleep attitude.
Well, we're in sleep attitude, and I got the high-gain angles, and they should be good angles. And I'm locked on and I got about a half signal strength, and they can't hear me.
Houston, Eagle. ... high gain ...
No go.
What'd he say?
COMMAND RESET.
Okay.
... try him again.
Houston, Columbia. Reading you loud and clear.

Armstrong says it's the hatch and - if we leave the probe and drogue there, we'll save us some time tomorrow; I don't know if it's tolerable sleeping or not. I think what previous crews have been doing is reinstalling all that claptrap up in there.

But -

...What?

...Yes, forward's okay.

I don't think that would be too horrible sleeping down there.

It's for sure it's not going anywhere; this one's bolted down two places - and this one is - -

You can try it. If we could find a place to put our legs back in there, it'll be alright.

See - it's going to be hard to get into that - sampler there.

No - no, that's alright. That's the place for it.

(Sneeze)

Okay, lights went out - except for all those radioactive ones in there.

Well, COMM's good. Son of a bitch might work.

Sure it'll work. Anything in a pretty cockpit like that is bound to work.

Well, I propose leaving the probe and drogue in here overnight. Save all - doing all that claptrap in the morning.

It's okay with me.

Fine.

You through in the LM?

How's that going to affect - -

Sleeping!

- - sleeping?

I'll be glad to sleep over there, alright? I don't think it'll affect that; I'd rather sleep, I'd rather sleep with the probe and drogue than have to dick with it in the morning.

Alright, that's fine; I can have it there. I don't know how I'd get out, but - (laughter).

...
03 11 48 15  CMP  That's . . . alright.
03 11 48 25  LMP  Hey, you don't want to bring this one back? You on a weight-saving kick for the command module?
03 11 48 35  CDR  You want it?

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03 11 48 37  LMP  Sure, you - -
03 11 48 38  CDR  There's room for the Hasselblad.
03 11 48 39  LMP  - - you got stowage space?
03 11 48 42  CDR  You can have it if you want it.
03 11 48 45  LMP  You got a place to fix things that rattle around?
03 11 48 50  CMP  Sure. Like hatches? . . . if you'll take time to get out of the hallway.
03 11 49 01  LMP  Let's get some music.
03 11 49 03  CMP  Get out of my damn hallway, Aldrin, so I can put my hatch in and then we can all - -
03 11 49 06  LMP  How about these tapes?
03 11 49 09  CMP  Okay.
03 11 49 37  LMP  Okay; 95:50 IVT to the L.M. What time is it now?
03 11 49 44  CMP  83:53.
03 11 49 50  LMP  I figure that as being 12 hours. About time for a Lomotil, huh? Well, not quite.
03 11 50 37  LMP  How about the systems stuff - to put the machine to bed.
03 11 51 01  CMP  You go to REACQ and NARROW?
03 11 51 02  CDR  Yes.
03 11 51 05  CMP  So I guess the COMM's pretty well taken care of?
03 11 51 08  CDR  Yes.
03 11 51 09  CMP  Have you got the waste water dump?
03 11 51 10  CDR  No, I haven't done that, but I will.
03 11 51 12  CMP  Let's see, I imagine we want to go out of VOICE? Or not?
03 11 51 17  CDR  Very, very - -

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03 11 51 18  LMP  The whole bit they said.
03 11 51 24  CMP  Okay.
03 11 51 57  CMP  Lunar orbit asleep; (cough) S-BAND SQUELCH, ENABLE?
LMP I did it.
CMP Got that, huh?
LMP Yes.
CMP HIGH GAIN, REACQ, NARROW; antenna pitch angle - -
LMP Yes, I did that.
CMP - - that's all it says.
LMP Okay.
LMP Plus the normal configuration.
LMP Doesn't it say anything about DOWN VOICE BACKUP - or any of that stuff?
CMP (Cough)
CMP No.
LMP Okay.
CDR Waste water dump, we'll wait until 84 hours; they may have the vent modeled or some crazy thing like that, so I want to be at the right time.
LMP Alright.
LMP Alright.
CMP Well, let's see, normal lunar configuration. Well, it is DOWN VOICE BACKUP.
LMP Yes.
CMP Well, let's get going here. PRIMARY, PRIMARY, HIGH, VOICE, (cough) PCM, RANGE, DOWN VOICE BACKUP, AUX TAPE, OFF; TELEMETRY to DATA; and UP TIM COMMAND to NORMAL; VHF A and B, OFF; RECEIVE only, . . . ;
LMP PCM/ANALOG, RECORD, FORWARD, NORMAL, NORMAL - that's okay, LOW - PRIMARY, REACQ, and NARROW. Well, COMM's set.
LMP Good.
CDR I got to vacuum up some water and dump the waste water tank, and we're about set.
CMP Hey, I got a fuel cell - O2 - -
CDR Hey, our water's about all gone.
CMP Did they say anything about the O2 purge?
CDR Must have gone into the LM.
CMP Yes, I think it did; it went on the windows. They didn't say anything about it, huh?
LMP No.
CMP Well, I guess we'll do it then. Anybody get my - Well, heck, I guess we're really not through with them yet, are we?
03 11 54 36  CDR  I updated the LOS time in your -

03 11 54 39  CMP  Yes. I think I'll wait until we get them back again before doing the purge. Okay? Because, I don't know, maybe they want all that stuff done on the back side.

03 11 55 11  LMP  Well, I propose to give myself a little bit of a - a bath, but not to put that damn LCG on tonight. You never did ask them about the - about the . . ., huh? I sure haven't found them.

03 11 55 40  CMP  I think we ought to do that.

03 11 56 00  CMP  Neil, you still got that tissue dispenser, the empty one?

03 11 56 06  CMP  Thank you.

03 11 56 27  LMP  What's baseline altitude? . . . the altitude - descent altitude settings?

03 11 57 01  LMP  That's the - that's the last meal we eat before descent, huh?

03 11 57 12  LMP  Sure is.

03 11 57 26  CMP  Wowee!

03 11 57 27  LMP  95 - that's - 7 - got 10 hours. Whew!

03 11 57 44  LMP  Might whip out that piece of bread in there.

03 11 58 43  LMP  Through in the tunnel, Mike?

03 11 58 46  CMP  Through, yes.

03 11 58 47  LMP  Okay, I want to get the lights out then.

03 11 58 48  CMP  Okay, . . .

03 11 59 29  LMP  What are your dosimeters reading?

03 11 59 38  CMP  . . . up a little bit.

03 11 59 41  CDR  Mine says - 11012.

03 11 59 50  CMP  I can't read this little fart. Says 10013.

03 12 00 03  LMP  I think they all started out at even thousands. They had them each different so they could tell which was which.

03 12 01 13  LMP  Well, I don't know about you, but I think I'll raid the pantry for some bite-size stuff.

03 12 01 24  LMP  I don't know when we'll get a chance to use it maybe some time - -

03 12 01 26  CMP  Monoculars?

03 12 01 30  LMP  - - during the maneuvers.

03 12 01 32  CMP  Found it, huh?

03 12 01 34  CDR  We're going to take that into the LM.

03 12 01 36  CMP  Yes. Sure can.
CDR . . .

. . . - . . . novel and earn a million dollars.

CMP Amazing how quickly you adapt - Why, it doesn't seem weird at all to me to look out there and see the moon going by, you know?

SC (Laughter)

LMP Oh, that is weird - that crazy moon out there again, huh? Funny-looking thing.

CMP Buzz, this crazy bracket goes right here. It's probably right the hell in your way, isn't it?

LMP No, no.

CMP Not in your way?

LMP No, I can survive with that.

CMP Alright, let me put it up there; it'll be one less thing to do in the morning. It's in backwards, but I don't think -

CMP Well, if I don't need this thing anymore, I think I'll stow that one away. Systems are yours tomorrow?

CDR Yes.

CMP I don't know as we've got much to do; there's a purge.

CDR Is it 84 hours yet? Yes, it is; I'm going to dump the waste water.

CMP You dumping?

CDR Yes.

LMP (Cough) Boy, it's a dusty vehicle in here. Man! But that view approaching the landing site is just fantastic right out - right smack out the window, you know that?

CDR Yes.

LMP Except there's such a big shadow being cast by everything - -

CMP 1 or 2 degrees, Neil?

LMP - - that I really couldn't - -

CDR I think . . . - -

LMP - - I could identify the Cat's Paw and I could identify the pair of craters right at the end, but I couldn't really make out the backward V nor the three little curved ones on one side - -

CMP I didn't see the backwards either.

LMP - - but I could see the area where it all was, you know; and - -

CMP Yes, yes.
03 12 05 21 LMP - - it didn't go any farther back that this, and it didn't really go any farther forward than that - it really didn't. You know, it was rougher than a cob (laughter).

03 12 05 27 CMP Rougher than a cob, but I didn't see . . .

03 12 05 31 LMP Well, when you compare it with the surrounding areas, why it's - it's pretty reasonable.

03 12 07 21 CDR You want this somewhere?

03 12 07 23 CMP . . .

03 12 07 42 CDR If you don't mind, I'll put it on this big piece of Velcro over here by the fuel cell.

03 12 07 52 CMP Yes, that's a good place for it.

03 12 09 46 LMP Anybody for a barf bag?

03 12 11 08 LMP Can you think of any use for a slide rule in the LM, Neil?

03 12 11 19 LMP Huh?

03 12 11 27 CDR I can't think of any use for two of them.

03 12 11 31 LMP Okay.

03 12 15 24 LMP That COMM was so good I don't think I'd need those damn things . . .

03 12 16 29 CMP Anybody say anything about terminating battery current?

03 12 16 33 LMP No.

03 12 16 45 CMP You remember anything about that, Neil?

03 12 16 48 CDR No.

03 12 18 12 CMP Somebody's blue towels? Did I dislodge those by mistake or did you have those?

03 12 18 18 CDR No, don't believe I had them.

03 12 18 20 LMP I had them out, kind of floating around back here.

03 12 18 38 LMP Everything I think you could dislodge, they forgot to put Velcro on the damn thing.

03 12 19 31 CMP Could you - maybe reach back and - hand me that wrench right quick?

03 12 19 40 CDR Yes, I sure could. Sure could . . .

03 12 19 54 CMP You want me to swap one?

03 12 20 00 CDR No, I think I'll keep one for tonight.

03 12 20 03 CMP Okay.

03 12 20 26 CDR Thank you.

03 12 20 27 CMP You're welcome.

03 12 21 56 CMP You like this?
03 12 21 58 CDR Not much.

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03 12 22 04 CMP . . .?
03 12 22 27 LMP Want one?
03 12 22 29 CDR Yes.
03 12 22 30 LMP He's getting a . . . of that, huh?
03 12 22 34 CMP Well, I just want to make sure I'm through with the roll; I think I am.
03 12 22 42 CDR Can't figure out how you tell when one's gone. I think that was it.
03 12 22 50 CMP Oh, it stopped!
03 12 23 49 LMP It's a bear to get in and out of here.
03 12 23 54 CDR Think maybe it'd be easier if you . . . them right here.
03 13 12 01 CMP I have a bit of fruitcake left over from somewhere; if anybody wants some, here it is. . . .
03 13 12 25 CMP Let's have a little chewing gum. Anybody like some chewing gum?
03 13 12 39 CMP 40 - and 250.
03 13 12 54 SC 43 . . .
03 13 17 03 CDR - - 1000 pounds - . . .
03 13 17 07 CMP That'll bring some more junk back here.
03 13 18 46 CDR Couldn't have done better myself.
03 13 39 47 CMP It may be raunchy later.
03 13 39 56 LMP It may be? There's no doubt about it!
03 13 40 02 CDR Oh, I'll take a couple small ones.
03 13 40 05 CC Apollo 11, Houston. We have LOS coming up in 2 minutes now, and AOS will be at 86 plus 28 plus 15. Over.

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03 13 40 17 CDR We'll see you on the other side.
03 13 40 45 LMP Anybody have one?
03 13 40 47 CDR I'll have a little one.
03 13 40 48 LMP Okay. Here you are.
03 13 41 28 CMP Yes.
03 13 41 29 CDR Okay.
03 13 41 47 CMP I guess what I'm doing I should do with the paper towels.
CDR Everybody through with the water?
LMP Yes, go ahead.
LMP Ever find your box?
CMP No. Gosh, you remember when they told us about - about putting buttons on the seat of these pants?
CDR Everybody through with the water?
LMP Yes, go ahead.
LMP Ever find your box?
CMP No. Gosh, you remember when they told us about - about putting buttons on the seat of these pants?
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CDR Everybody through with the water?
LMP Yes, go ahead.
LMP Ever find your box?
CMP No. Gosh, you remember when they told us about - about putting buttons on the seat of these plants?
03 14 01 15  CDR  What?
03 14 01 17  LMP  I . . . you.
03 14 01 18  CDR  Oh.
03 14 01 19  LMP  ...?
03 14 01 20  CDR  Yes, yes.
03 14 01 50  LMP  Yes, I . . .

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03 14 02 08  CMP  Well, I thought today went pretty well. If tomorrow and the next day are like today, we'll be safe.
03 14 08 12  CDR  You got a crater coming up, Buzz? Right through here. I don't know if you can see it or not. If not, let me get a picture of it because it's really - got big . . . on the bottom of it. It don't look good.
03 14 08 29  CMP  It's out this way.
03 14 08 30  CDR  Go ahead, go ahead, go ahead, go ahead.
03 14 08 31  LMP  Shoot . . . here.
03 14 08 32  CMP  I'm not sure we should be shooting this - what we're shooting at or 1 point set; I guess you're alright - in this light stuff, I guess you're alright.
03 14 08 46  CDR  Okay, thank you.
03 14 08 49  LMP  Oops! . . .
03 14 13 39  CMP  What time is it, Neil, 88 hours, something like that?
03 14 13 42  CDR  86:13.
03 14 15 54  CDR  Doesn't it look like some of these crater walls had scallops inside like a design in a fan - like feathers.
03 14 16 05  LMP  Seashells.
03 14 16 06  CDR  Yes.
03 14 16 07  LMP  Like seashells - very pretty, very symmetrical.
03 14 17 37  CDR  Take along one of those craters.
03 14 17 57  CDR  I took overlapping pictures of all that . . .
03 14 18 03  LMP  Tomorrow, take - we're going to have to carry a lot of film to take as many pictures as they want.

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03 14 18 56  CMP  I'll tell you what we ought to do, . . .
03 14 18 59  LMP  Oh, okay, let me go do that.
03 14 19 51  LMP  Anybody know when AOS is?
03 14 20 07 CMP When is AOS?
03 14 20 09 LMP Yes. When is AOS ...?
03 14 20 18 LMP 86:38?
03 14 20 21 CMP I think it's ...
03 14 20 24 LMP Okay.
03 14 20 37 CDR ... along in here.
03 14 20 41 LMP Yes.
03 14 24 48 CMP Where the hell is the horizon with the world coming over it? I guess it's behind us, huh?
03 14 24 58 CDR Up there? We should be getting earthshine - earthrise features - should be coming up pretty soon.
03 14 25 10 CMP Black and white.
03 14 25 12 CDR There's a colored one right in there - I didn't think we put it there. ...
03 14 25 17 CMP Alright.
03 14 25 35 CDR There's this one - where's -
03 14 25 39 CMP The dark slide I think is right over there in the girth shelf.
03 14 25 42 CDR Oh, yes, I got it.
03 14 26 59 LMP That's - that's the one.
03 14 27 41 LMP Are we going to keep the ... lens on?
03 14 27 45 CMP ... getting earlier in time. Yes, that's best - better.

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03 14 28 14 CMP ...
03 14 28 23 CDR Got a MASTER ALARM coming on here.
03 14 28 48 CMP Your f:8 is 250 - at infinity?
03 14 28 52 LMP Yes.
03 14 28 53 CMP Good deal. Keep working, you got a lot of film.
03 14 29 36 CMP Well, it's ...
03 14 29 49 LMP And I was ...
03 14 29 52 CMP Good deal.
03 14 29 54 LMP ...
03 14 29 56 CMP Glad to hear it.
03 14 29 59 CDR Through?
03 14 30 01 LMP Yes - ...
03 14 30 04 CMP It's good ...
03 14 30 06 LMP Yes, I guess so. Nothing like filming your ...
03 14 30 22 LMP ... this field of view, it's mostly just blues - I keep getting mostly black and blue.
03 14 30 36 CMP Houston, Apollo 11. Over.
03 14 30 43 CMP Okay. We just appeared to get a solid lock for the last - oh, about a minute, the TUNE FOR MAX needles have been wandering up and down and the pitch and yaw needles have been wandering around, but it appears to have reacquired by itself solidly now. We're just filling - finishing up our fuel cell purge. Hydrogen on number 3 is the last to go off, and it'll be coming off in just a second.
03 14 31 15 LMP Huh? Is that right? Really should have looked.
03 14 31 51 CDR ... flow?
03 14 31 59 CMP RATE to HIGH, Neil.

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03 23 32 37 LMP I'll need to holler across to you to get the mission timers on. Do we want to check and get our two mission timers SYNC'd? What's this one read now? 82:50?
03 23 32 51 CDR 51, 52, 53, 54, 55, 56 - -
03 23 32 56 LMP Okay, this one is 1 second slow down in the IEB.
03 23 33 28 LMP Let's see, these things come in the command module don't they, those umbilicals?
03 23 33 34 CMP ... .
03 23 33 43 LMP Well, we don't want them.
03 23 33 50 CMP ... 
03 23 34 01 CDR Anyway, it compares.
03 23 34 04 CMP ... 
03 23 34 13 LMP Well, we couldn't do that without switching - well, you can have them in here all the time.
03 23 34 18 CMP ... there's no way for me ... probe and drogue ... docking ... 
03 23 34 32 CDR No, I can't think that that'd be of significance between them - because why would you ever care to whether you'd hook them up again, if you came back and docked?
03 23 35 29 LMP Here's this LCG check. "Verify ... stick visible in red or green band."
03 23 35 40 CDR Yes. Not ... as it should be.
03 23 35 47 LMP The red one comes out this far, and the green one's out further than that. The whole thing is only about that long. It's got to be in one or the other or you can't see it.
03 23 36 24 CDR Having any luck there, Michael?
03 23 36 27 CMP ...
You don't need to take - you're not taking your scissors over there?

No.

I've got . . .

. . . pad; I'm going to have to take a leak here.

Yes, I guess I'd better take that pocket - and the purse. Tell you what - How about putting those tissues in that box that's got that spare camera in it?

Okay.

It'll be right handy on your side over there. Now where did the tissue box go?

You want to see if the computer agrees with that mission timer?

I did already.

Okay.

Can you hand me that purse and the - that bag of mine - and the checklist?

And if you'll take me off of suit power.

Okay. SUIT POWER is OFF; AUDIO is OFF. Whoops - Sorry.

. . . I only have one . . . left.

Okay. Oh, let's see, one smell - blah.

(Humming)

Okay.

You want one?

Yes.

We've got a roll rate in; 0.3-degree roll rate. Now it's taking it out; now it's taking it back out the other way.

. . . Now, let's see.

I'll keep an eye on . . . for you.

. . . on here.
Okay, I'm going on.

Okay.

What's that?

Did you repress, huh?

How come you don't ... LM power?

Okay. Stand by. You're on LM power. What?

What did he say?

...  

Oh, what time is it? It's 95:54.

Now, switch from RATE, HIGH, to RATE, LOW. But that might make it better and maybe a little bit worse.

...  

I guess that's right then, Neil; it rattles across the deadband at a fairly high rate.

...  

Alright.

...  

Sure as hell is.

I can't get that ...  

This one - this one? That won't hurt it. ...  

Stand by for some MASTER ALARMS; I'm purging.
04 00 00 28  LMP  ...  
04 00 00 30  CDR  Oh, ... Mike.
04 00 00 34  CMP  It's 96 hours even. 96 even and coming up on 40 seconds. Ready -
04 00 00 40  CMP  MARK it.
04 00 00 48  LMP  ...
04 00 00 50  CMP  Okay, 96:01 - 5, 4, 3, 2, 1 -
04 00 01 00  CMP  MARK -
04 00 01 01  CMP  96:01.
04 00 01 03  LMP  3, 4, 5.
04 00 01 06  CMP  Good.
04 00 02 01  CMP  Okay, stand by for more thruster firing here.
04 00 04 06  CDR  Is this - -
04 00 04 09  CMP  No, this one's yours. You going to wear this for - -
04 00 04 11  CDR  ...  
04 00 04 12  CMP  Okay, I'm going to ... camera out of its way.
04 00 04 33  LMP  ...
04 00 04 40  CMP  Okay, I wouldn't be surprised ... all over this goddam stuff.
04 00 05 00  CMP  A three-ring circus. I got a fuel cell purge in progress and trying to set up cameras and brackets, watch an AUTO maneuver, and -
04 00 05 22  CMP  Jesus Christ!

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04 00 07 58  CMP  NORMAL, NORMAL.
04 00 09 19  CMP  Another MASTER ALARM coming.
04 00 10 52  CMP  Stand by for MASTER ALARM.
04 00 12 54  CMP  Neil, where's the voice tape recorder, you know?
04 00 12 59  CDR  Might be in the ...  
04 00 13 01  CMP  Okay. Oh, you son of a bitch, you! Gah!
04 00 13 10  CDR  ...  
04 00 16 17  CDR  ...?
04 00 16 18  CMP  Can't get it ... ; it's behind the ...  
04 00 16 27  CDR  Yes.
... hard time getting anything down here ...

Okay.

You got some things up there.

Neil, all this food and stuff up here, you going to take with you, or drink, or eat?

No, I'll take ...

Okay. Chewing gum, you want any of that?

... concerned ...

... concerned ...

Neil, I hate to bother you; could you get my solo book out of R-1 there?

What?

My solo book out of R-1.

Solo book?

Yes. Look - -

R-1?

Yes, it should be in R-1. Big frapping book, with a bunch of updates on the cover. Thank you, that's it. Appreciate it.

Neil, do you recall the highest rate you saw during this recent thruster activity? Did you say 0.4 or thereabouts?

What?

Do you recall the - any kind of body rates that you saw during that thruster activity? Didn't you say something about 0.4? Maybe - remember when the SCS was acting up?

Ah - -

Houston, Columbia. Over.

- - this is Houston. You can turn on the IMU. Over.

Houston, this is Columbia. Over.

Columbia, this is Houston. How do you read? Over.

Houston, Columbia. Reading you loud and clear. How me? Over.

Hey, Buzz? How about - -

Eagle, Houston. We'd like aft now and forward at AOS. Over.

Roger.

Apollo 11, Houston. 30 seconds to LOS. Both spacecraft looking good going over the hill. Out.
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04 01 34 46  CDR  Go ahead.
04 01 34 47  CMP  Roger. I'm getting ready to preload the probe. I'm going to disable all my roll thrusters. Would you please monitor my roll, your yaw?
04 01 34 54  CDR  Roger.
04 01 36 41  CMP  Eagle, Columbia.
04 01 36 43  CDR  Go ahead.
04 01 36 45  CMP  I got another "Verify capture latches engaged" on my checklist. I've already preloaded the probe; it's sort of silly, but sort of your option whether you want to verify they're engaged or not.
04 01 36 56  LMP  Okay, we got the hatch all latched up now, and we're getting ready for pressure-integrity check; so, why don't you go ahead?
04 01 37 04  CMP  Okay.
04 01 39 57  LMP  Mike, let us know how you're coming up there now and then.
04 01 40 01  CMP  I'm doing just fine. I've cocked eight out of the 12 docking latches, and everything is going nominally.
04 01 40 07  LMP  Okay.
04 01 41 14  CMP  All 12 docking latches are cocked.
04 01 41 17  LMP  Okay.
04 01 41 21  CMP  And I'm ready to button up the hatch.
04 01 46 46  LMP  Hey, Mike. Have you got the - got to the tunnel vent step yet?
04 01 46 52  CMP  I'm just coming to that. What can I do for you?
04 01 46 55  LMP  Well, we're waiting on you.

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04 01 46 56  CMP  Okay.
04 01 46 59  LMP  We're still ahead of the timeline, so take your time.
04 01 47 03  CMP  Okay.
04 01 47 14  CMP  Okay, I'm ready to go to LM tunnel vent.
04 01 48 13  LMP  You got it all vented now?
04 01 48 17  CMP  Negative, it's a slow process. I'm on VENT, but it's just going to take a little while here.
04 01 48 22  LMP  Roger. Just give us a call. We're pressing on with some other stuff.
04 01 48 26  CMP  Okay.
04 01 51 39  CMP  How's our attitude holding?
04 01 51 42  CDR  Looks good.
04 01 51 43  CMP  Okay, this - this thing's supposed to take about 8 minutes; we've got about 3 of them gone, so in about another 5 minutes, I should be able to turn my thrusters back on.
04 02 01 03  LMP  Moving in.
04 02 01 04  CDR  How you doing, Mike?
04 02 01 06  CMP  Doing just fine. The - Stand by, I'll give you the DELTA-P reading - 3.0; I need 3.5 before I can turn my thrusters back on.
04 02 01 16  LMP  Okay.
04 02 04 59  CMP  I've got a 3.5 psid now; I'm going to start a maneuver here in a few minutes to depressurize it.
04 02 05 05  LMP  Okay.
04 02 05 12  CMP  How you - how you guys doing?

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04 02 05 15  LMP  Okay. We're doing our regulator checks now.
04 02 05 21  CMP  So I heard.
04 02 07 21  CMP  I'm starting the maneuver.
04 02 12 08  LMP  How long you got - to end this maneuver, Mike?
04 02 12 12  CMP  Oh, about another 2 or 3 minutes we should be there - no, less than that.
04 02 14 02  CMP  We're there; we're at the new attitude.
04 02 14 07  CDR  Okay, we're going to put our gear down.
04 02 14 29  LMP  . . . MASTER ARM - -
04 02 14 34  CDR  Okay.
04 02 14 35  LMP  LANDING GEAR DEPLOY, FIRE.
04 02 14 37  CDR  Here we go, Mike.
04 02 14 46  LMP  Bam, it's out. Ain't no doubt about that.
04 02 14 50  CDR  And it's gray.
04 02 14 52  LMP  Alright. Your ED LOGIC POWER A, CLOSED.
04 02 14 57  CDR  LOGIC POWER A, CLOSED.
04 02 15 00  LMP  Alright, fire it again.
04 02 15 03  CDR  Okay.
04 02 15 05  LMP  Nothing happened, huh?
04 02 15 06  CDR  Right.
Okay, now - -
I heard it click.
Yes, so did I.
That relay, I suppose.
MASTER ARM, OFF.
It's OFF.
CB(11), ED LANDING GEAR FLAG, OPEN.
The gear went down okay, Mike.
Good deal.
Columbia -
Loud and clear.
Columbia, do you read Eagle?
Eagle, do you read Columbia?
Yes, I'm working on the high gain right now.
Okay, I'm reading him loud and clear.
You in the right attitude, Mike?
That's affirm.
Houston, Columbia. You're loud and clear.
Houston, Eagle. Over.
Buzz, you on the forward OMNI?
Houston, Eagle. Over.
Buzz, are you on the forward OMNI?
Roger. I am.
Houston, Columbia. Eagle is on the forward OMNI.
Columbia, go ahead.
Houston, Eagle. Go ahead.
Roger. I got you now. I fed in those angles for the S-band, and I couldn't get a lockon; it
appears as though the antenna would have to be looking through the LM in order to reach the earth. Over.
04 02 24 03  LMP  Roger. Ready to copy.
04 02 24 32  LMP  Roger. LM weight, 33627; CSM weight, 36651; pitch trim, 00470; roll trim, 00589. Over.
04 02 25 02  LMP  Roger. Understand.
04 02 25 12  CMP  Houston, Columbia. Do you read?
04 02 25 29  CMP  Roger. S-BAND VOICE to VOICE. How do you read now?
04 02 25 45  CMP  Houston, Columbia. Over.
04 02 25 53  CMP  Houston, Columbia in DOWN VOICE BACKUP. Do you read?
04 02 26 04  CMP  Affirmative. Columbia in DOWN VOICE BACKUP. How do you read me?
04 02 26 34  CMP  Houston, Columbia's in OMNI C, Charlie, DOWN VOICE BACKUP and, when you get a chance, could you look up the coordinates of 130 for me, please? I have conflicting information between my cue card and my flight plan. I'd like to know which coordinates you want me to use.
04 02 27 04  LMP  Houston, Eagle. Completed gear extension okay.
04 02 27 54  CMP  Thank you, Houston.
04 02 29 14  CMP  Yes, I had the coordinates loaded off the cue card which is - for crater 130.
04 02 31 29  CMP  Roger. Thank you.
04 02 33 11  LMP  Roger. We're just sitting around waiting for something to do. We need a state vector, a REFSMMAT before we can proceed on with the AGS.
04 02 33 54  LMP  Roger. We'll go ahead with the DAP and the throttle check since we don't have a gimbal drive test, okay?
04 02 35 31  CMP  Houston, Columbia. Those T1 and T2 times are still good, aren't they?
04 02 35 40  CMP  I say, the T1 and T2 times remain unchanged, affirmative?
04 02 35 53  CMP  Thank you.
04 02 37 56  LMP  Houston, Eagle.
04 02 38 03  LMP  Roger. In accordance with the - page 47, step 1, we had the guidance control in PGNS and MODE CONTROL, PGNS, AUTO; and, of course, the circuit breakers are not in on the thrusters yet, so when we started through the DAP and proceeded on NOUN 46 - and we're looking at NOUN 47 now - why, we got an RCS TCA light, and we've got four out of the eight other bright-colored red flags. I think that this is explained by the fact that we are in - PGNS and AUTO and just unable to fire the thrusters. Over.
04 02 39 21  LMP  Roger.
04 02 40 00  CDR  Houston, Eagle. Are you going to need the high gain before you can look at our GDA position indicators?
04 02 40 35  CDR  I can go to a high . . .
04 02 40 41  LMP  I can give you HIGH BIT RATE on the OMNI's if that will help you any.
04 02 40 59  CDR  Roger. Understand.
04 02 41 39  CMP  Boy, you just can't miss those checkpoints - those Diamondback and Sidewinder.
04 02 42 21  CMP  AUTO optics is pointed just a little bit north of crater 130; pointing north.

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04 02 44 13  LMP  Houston, Eagle. We're ready to pressurize the RCS. Over.
04 02 44 50  LMP  Roger.
04 02 44 57  LMP  That's affirmative; the landing gear is out and gray.
04 02 45 53  CMP  Houston, Columbia. I've completed my marks. I've gone ACCEL COMMAND in all three axes to prevent that thruster firing that last time.
04 02 46 47  CMP  Houston, Columbia. As soon as you have the necessary data on the downlink, let me know and I'll proceed.
04 02 46 59  CMP  Stand by, please.
04 02 47 02  CMP  I will.
04 02 47 21  CMP  Roger.
04 02 47 47  LMP  Roger. Looks good.
04 02 47 59  LMP  Ready to copy.
04 02 48 33  LMP  Roger. 224, plus 60267; 225, plus 58148; 226, plus 70312; 227, minus 50031. Over.
04 02 49 16  CMP  Eagle, Columbia. My P22 is complete. I'm continuing this maneuver to AGS CAL attitude.
04 02 49 26  LMP  Roger.
04 02 49 45  LMP  Roger. Columbia, Eagle. Have you about maneuvered there, yet?
04 02 49 52  CMP  Negative.
04 02 49 59  LMP  Houston, Eagle. Are those angles for after the maneuver that Columbia is going to make or are they for right now? Over.
04 02 50 14  CMP  We have about another 120 degrees to go, Buzz.
04 02 51 10  LMP  Houston, Eagle. I believe I've got you on the high-gain antenna now in HIGH BIT RATE. Over.

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04 02 52 30  CMP  You've got P00 and DATA.
04 02 52 40  LMP  Columbia.
04 03 29 11  CMP  Columbia, out.
04 03 29 16  CMP  All Columbia systems looking good.
It's nice and quiet over here, isn't it?

Eagle, you read Columbia?

Roger. Loud and clear.

Okay, everything's going well. Everything's quiet over on this side.

You bet.

Okay. I'm standing by to record your data anytime it's convenient for you; angles coming up in another 2 minutes.

Okay, I'm ready to go to B DATA now.

Roger and out.

Columbia, Eagle. How do you read?

Read you loud and clear, Buzz.

Very good.

... 

Mike, are you in AGS CAL attitude now?

That's affirm. I'm holding you there with the DAP, getting the deadband. When you get ready to do the AGS CAL, I will sort of quiet down the thruster firing and then hope to stop it altogether, but I don't even think that'll get it.

Okay. Well, I'm just about ready to do that. Whenever you're ready to let it go free, why just tell me.

Okay, it looks real quiet now; I'm ready to go right now.

Buzz, you copy?

Buzz, you copy?

Okay, Mike. Thanks.

Now, ... might check me on this, I - it's - I'm ready to go anytime you're ready.

Roger. We'll be ready to go in just a minute.

Okay, I'm starting my 5-minute rate - right now.

As a matter of interest, I appear to be drifting in my roll; I'm holding my pitch and yaw pretty constant, and I'm staying a good 15 degrees late in the program.

Roger.

Looks like a ...

Halfway through it, it looks like I have ... degrees in roll is about all.

Yes, those look like good ones right now.

Mike, what's your SEP time?
A few minutes.

GET of the separation burn is 100:39:50 even.

I haven’t gotten the updates for undocking time; I’m still carrying 100 hours 15 minutes, I guess, \ldots

I’m surprised they didn’t update it by 3 or 4 minutes to, you know, make that \DELTAV be in the same position that they wanted.

Yes, I agree.

So we’re about 3 minutes ahead of the printed flight plan; it might be wise to try to SEP about 3 minutes early, and we can give them a GET of SEP that’s precise whenever they want it.

I have 5 minutes and 15 seconds since we started. Attitude is holding very well.

Roger, Mike. Just hold it a little bit longer.

No sweat, I can hold it all day. Take your sweet time. How’s the Czar over there? He’s so quiet.

I didn’t know \ldots radio. \ldots I’ve ever seen a radio. All I can say is, “Beware the revolution.”

You cats take it easy on the lunar surface; if I hear you huffing and puffing, I’m going to start bitching at you.

Okay, Mike.

I just pressurized the DPS. \ldots looks okay, Mike.

Roger that.

Hey, Mike, can you see where our radar’s pointing now?

Well, it looks like it’s pointed right at my head; that’s hard south; so’s your radio beacon.

Okay. It should really - it should be pointing from the - you know, our forward axis? It should be pointing up at 40 degrees and, you know -

Okay. We’ve wandered back over the bellyband now - let me assure that AGS CAL.

\ldots

How’d the AGS CAL work out?

Oh, it danced around a little bit, but seemed to go right back to the original numbers.

Okay. I’m going to start a maneuver now to our undocking attitude.
Now the undock attitude and the SEP attitude ought to be the same, so I'm going
to go to what they gave me for the updated separation-burn attitude. That's just
about 7 degrees off, but it's in your flight plan for the undock attitude.

Okay.

When your rendezvous radar self-test is complete, let me know and I'll check out
my transponder.

Excuse me, Mike, what did you say?

I say, when your rendezvous radar self-test is complete, let me know and I'll check
out my transponder.

Yes, we're through with that now.

Thank you. I'm maneuvering the ... That transponder checked out. I hope they've got a nice, big, strong ... for
you.

Very good.

Hey, Mike, what would you recommend as a good setting on the 16 millimeter?

Well, what they recommend for you is f:8 at 1/250th and put it not on infinity, but
on 7 feet, which covers all the way from infinity down to a very short distance to
keep it in focus, and 6 frames per second, I guess.

Yes, what you say; f:8 at 1/250th?

Yes, f:8 at 1/250th. And after you get it all set up, check that f-stop again because
it slides and slips off with very little twist.

How about using, as an undocking time, 100 hours and 12 minutes? That suit your
fancy?

That'll be fine.

Okay.

What have you got for AOS, Mike?

I have 100 hours and 16 minutes.

Okay.

We got just about a minute to go; you guys all set?

Yes, I think we're about ready.

We're all set when you are, Mike.

15 seconds.

Okay, there you go. Beautiful!

... Looks like a good SEP.
04 04 12 19 CMP Looks good to me.
04 04 12 59 CDR Okay. I've killed my rate, Mike, so you drift out to the distance you like and then stop your rate.
04 04 13 13 CDR Starting my yaw.
04 04 13 30 CDR There's sure a better visual in the simulator.
04 04 13 38 CMP Okay. I picked up a little roll; I'm going to get rid of it.
04 04 14 22 CDR Okay with you if I start my pitch, or you think you're not far enough away yet, Mike?
04 04 14 31 CMP I'd prefer you stand by just a couple of seconds, Neil.
04 04 14 34 CDR Okay. I'll wait for when you're ready - when you think you've got your rates killed perfectly.

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04 04 14 39 CMP Okay. I'm still holding . . .
04 04 14 41 CDR . . .
04 04 15 26 CMP Okay; looks pretty good to me now.
04 04 15 30 CDR Okay.
04 04 16 34 CMP Just like in the simulator, you're drifting off to one side and down below a little bit.
04 04 16 39 CDR Yes.
04 04 17 06 CMP The gear are looking good; I've seen three of them.
04 04 17 11 CDR The MESA is not down, right?
04 04 17 14 CMP Say again.
04 04 17 15 CDR The MESA's still up?
04 04 17 19 CMP Yes,
04 04 17 20 CDR Good.
04 04 17 49 CMP Now, you're looking good.
04 04 17 59 LMP Roger. Eagle's undocked. The Eagle has wings. Looking good.
04 04 18 18 CMP Okay. You've got it, P00 and DATA.
04 04 18 39 CDR You check our tracking light, Mike?
04 04 18 44 CMP It came on.
04 04 18 56 CMP Camera's working beautifully.
04 04 19 00 CDR Track off?
04 04 19 04 CMP It's off.
04 04 19 05  CDR  I'm ready to start my yaw maneuver if it suits you, Mike.

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04 04 20 04  CDR  Does it look like you're going to be able to do this without firing any thrusters, Mike?
04 04 20 11  CMP  I'd have to fire laterally once or twice.
04 04 20 22  CMP  Very small.
04 04 20 26  LMP  Go ahead, Houston. Eagle is ready to copy.
04 04 21 49  LMP  Go ahead.
04 04 21 59  LMP  That's affirmative. Go ahead with the PDI.
04 04 24 46  LMP  Roger. Back to BLOCK and DOI: 101:36:14.07; minus 0075.8, plus all zeros, plus 0009.8; 0057.2; plus 0008.5, 0076.4, 030; 000, 293; minus 0075.9, plus all zeros, plus 0009.0; NA. Over.
04 04 25 39  LMP  Okay, PDI pad: 102:33:04.36; 09:50; minus 0002.1; 182, 287, 000; plus 56919. PDI less than 10: 105:12:30.00. PDI abort greater than 10: 103:40:00.00, 107:11:30.00. No PDI plus 12 abort: 102:44:37.00; plus 0122.3, minus all zeros, plus 0188.9; 0152.0, plus 0011.0, 0225.0, 046; 000, 190; plus 0118.7, plus 0000.0, plus 0191.1; 103:31:07.00; 105:12:30.00. Over.
04 04 29 00  CMP  Neil, I'm maneuvering in roll.
04 04 29 03  CDR  Roger. I see.
04 04 29 08  LMP  Houston, Eagle. Are you copying the fairly large numbers for range and range rate in - VERB 83? And did you - you just give us a state vector that changed one of the two vehicles? Over.
04 04 29 38  LMP  Okay. That explains the difference.
04 04 31 03  CDR  You want him to go to HIGH GAIN, YAW, zero or - say again the numbers.
04 04 31 17  CDR  Okay. YAW, zero; PITCH, minus 20, on the HIGH GAIN. Columbia.
04 04 31 24  CMP  Yes, I copy that, and I'll do it just as soon as I get to it.

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04 04 31 27  CDR  Okay, he says he'll do that as soon as he gets around there.
04 04 31 38  CMP  Okay, Neil, I'm all set for the SEP burn, and we're looking good on this phasing.
04 04 31 42  CDR  Okay.
04 04 32 38  CMP  Columbia, read you loud and clear. Houston, how me?
04 05 26 54  LMP  Burn time, 30 seconds.
04 05 28 44  LMP  Okay, state vector looks relatively good. . . .
04 05 29 01  CDR  Mike, how do you read?
04 05 29 10  LMP  Columbia, Eagle. How do you read?
04 05 29 12  CMP  Very good. How do you read me?
Very good. If you are ready, give the mark and we'll go to B DATA. Over.

Stand by 1. I'm . . .

Are you . . ?

63.

. . ; they look good.

Okay, let's switch to B DATA now.

Okay.

Eagle, Columbia.

Go ahead.

Columbia's . .

Eagle, Columbia. How's it going?

Mike, the burn's complete; it was on time - residuals are nulled, and AGS's free.

Beautiful.

Eagle, Columbia.

Go ahead.

Roger. I'm ready to go back to VHF RANGING configuration. Be alright?

Roger. Let's go now to VHF RANGING.

Over and out.

Okay.

And you got VERB 76 in?

Yes, 76 is in . . . locked up.

And we're . . . 7.5 . . .

Roger. That's just what we got, 7.6.

Okay.

P00?

8 minutes - -

We're in good shape - -

- - coming up on 8 minutes.

- - for . . . - -

HIGH BIT, 8 minutes.

You don't have an 8-minute mark.
04 05 44 18  CDR  67 feet per second. Go ahead with the . . .
04 05 44 23  LMP  Can’t beat that. Okay, through with that?
04 05 44 26  CDR  Yes. I like it.
04 05 44 31  LMP  Hold on to the . . . below.

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04 05 44 35  CDR  Okay. And I’ll pull the breakers - think we can . . . roll.
04 05 44 51  LMP  Yes.
04 05 45 03  LMP  Got them both?
04 05 45 05  CDR  What?
04 05 45 06  LMP  Got them both?
04 05 45 07  CDR  Yes. . . .
04 05 45 34  LMP  Okay, it . . .
04 05 45 42  CDR  Going to load the PDI plus 12, right?
04 05 45 52  LMP  Right.
04 05 45 54  CDR  Okay. I’m going to start pitching down to 125.
04 05 46 15  LMP  No PDI plus 12.
04 05 46 34  CMP  I have you right down . . . 65 feet per second.
04 05 46 38  CDR  Sounds good.
04 05 47 03  LMP  Okay, the camera is set. And ought to be ready to do the P52.
04 05 47 13  CDR  Yes.
04 05 47 15  LMP  Not going to be much of a drift check.
04 05 47 23  CDR  It - it torques them late enough to ensure that - . . . the drift check.
04 05 47 32  LMP  Sure seems like we’re going the wrong way.
04 05 47 42  LMP  How much do we got to go to pick it up?
04 05 47 46  CDR  Got to go - oh, half the moon to go, I guess.
04 05 48 05  CDR  Coming down already.
04 05 48 06  LMP  Okay. It’s got us 152; it’s 151; there’s . . . , okay? . . .

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04 05 48 44  LMP  There’s 52.
04 05 48 54  CDR  Got 8 minutes . . .
04 05 48 59  LMP  Now we can let us take - let it take us there.
No, wait; don't do that.

Why not?

I have to roll.

Yes, that's right.

In 2 more minutes.

Well, I did attitude.

Yes, you'll have to roll over; well, I guess I might as well do that.

Where's your watch? Got your stopwatch?

Got it in my pocket.

Well, the us over, huh?

... 

And, one thing I'd appreciate if you could - see if you could - find the-

What?

The map.

Yes. Which one do you want? I've got -

... 

That it? Where do you want it?

Trade you that for a piece of gum. There it is.

When do we have to get these? Alright, go on.

What do you mean by bringing - bringing CSM trash in here?

Well, that's stuff I had left over in my pocket.

You want ...?

Screen ... 

You in AUTO?

No, I'm not AUTO; I'll be there in just a minute.

312, it likes.

Well, we ought to proceed on that for a while.

Okay.

These clocks you can't move like you can some. Let me try and get that clock set for PDI. ... 33 ...
04 05 54 38  CMP   ... updates ...
04 05 54 47  CDR   Yes, we're keeping busy down here.
04 05 54 52  CMP   Okay.
04 05 55 54  LMP   Can't change this thing, once it gets going; like in the middle of a - -
04 05 56 00  CDR   You can't?
04 05 56 01  LMP   No.
04 05 56 08  CDR   PGNS MODE CONTROL in AUTO.
04 05 56 34  CDR   Okay. Well, I can . . . - the radar antenna.
04 05 56 46  LMP   No, that's the wrong circuit - that's . . .
04 05 56 53  CDR   There's the sun in the COAS.
04 05 56 57  LMP   In the COAS?
04 05 56 59  CDR   In the - I mean, in the reticle.

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04 05 57 02  LMP   Alright, let me - let me do my rain dance with the DSKY here.
04 05 57 08  CDR   Okay.
04 05 57 09  LMP   Got it on?
04 05 57 14  CDR   Now I need a VERB 76. I'm right on in pitch.
04 05 57 21  LMP   You want a VERB 76? Okay, you got it.
04 05 57 33  CDR   Hmm.
04 05 57 40  CDR   How are you doing - you going to be about ready to mark?
04 05 57 46  LMP   Yes.
04 05 57 55  LMP   Say, how about you remembering the number that I read to you; don't have to write it down. Roll right just a little.
04 05 58 08  CDR   Just about ready to mark.
04 05 58 10  LMP   Go ahead.
04 05 58 12  CDR   Oh, this cottonpicking - thought I was.
04 05 58 20  LMP   Give me a . . . check.
04 05 58 29  LMP   Ready?
04 05 58 31  CDR   Getting close.
04 05 58 33  LMP   Okay.
04 05 58 42  CDR   Ready?
04 05 58 43  LMP   Yes.
04 05 58 45  CDR   MARK it.
04 05 58 46  LMP   124 19, 124 19. Well, it should have been - 124 00.
04 05 59 05  CDR   Do another one?

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04 05 59 06  LMP   Yes.
04 05 59 12  CDR   Okay. I'm about ready.
04 05 59 21  LMP   Tell me when.
04 05 59 31  CDR   Ready -
04 05 59 33  CDR   MARK it.
04 05 59 34  LMP   Okay. 134 17; KEY RELEASE; PROCEED. ... it should have been - 124 01. One more. Getting closer.
04 06 00 18  LMP   Ready whenever you are.
04 06 00 29  CDR   Stand by. How's our roll?
04 06 00 36  LMP   Okay.
04 06 00 43  CDR   MARK it.
04 06 00 44  LMP   ... - 13; KEY RELEASE; PROCEED. 4 13 - ... it should have been - closer yet.
04 06 01 00  CDR   Okay, Mike, we passed the star check. Foxtrot.
04 06 01 04  CMP   Very good. ... 
04 06 01 16  CDR   Very good. Okay? ... 
04 06 01 29  LMP   Alright, let's go to - pitch to 180, 285, and zero.
04 06 01 47  CDR   Okay. We'll ... 
04 06 02 11  CDR   Cottonpicker just won't stay - try it!
04 06 02 16  LMP   Well, wait until we lose that descent stage, man.
04 06 02 19  CDR   We'd better take - a - piece of tape; hold that down.
04 06 02 25  LMP   How about if you get the bottom in the - get the bottom underneath this cover? That help?

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04 06 02 34  CDR   Well, it - it's still not; I've had it in there real good couple of times.
04 06 02 42  LMP   Your - hoses were tearing hell out of my board.
04 06 02 47  CDR   Sorry.
04 06 02 50  LMP   You got INVERTER 1 circuit breaker in, right?
04 06 02 53  CDR   Checked in.
Okay, I'm going to check INVERTER 1. INVERTER 2 is good; and INVERTER 1 is good, and we're on INVERTER.

Okay, get your AELD circuit breaker in and ABORT STAGE circuit breaker in.

AELD is in; ABORT STAGE is in.

Cycle the CWEA? No, we must have lost one.

Cycle the CWEA? No, we must have lost one.

Yes. That cottonpicker may be trouble.

Well, we'll have to tell them about that. I don't know when it - when it went out, because we didn't get any light that I saw, did you?

I think it's just a switch. I . . . if it doesn't trigger a light -

Something - -

Oh, we're in PULSE, and we're not commanding any firing - -

I don't know; that could have come under DOI, but I doubt it.

I just think that's one of those sticky flags. . . . got a good engine.

Alright, let's see.

Alright, let's see.

Alright, TTCA - -

THROTTLE on MINIMUM.

- - ENABLE - ENABLE - THROTTLE in MINIMUM. Okay, in 35 minutes, we'll get the BAT feeds ON and - -

That's the wrong time, right?

No, no, no.

...? PD?

It's - oh - about - probably maybe a second, right here, . . . 32. Okay?

Yes, it's about a second off.

If it's fast, I'll stop it; if it isn't, why, forget it.

You want this one over there?

I need this out. Burn in 46 minutes.
04 06 05 57 LMP You want this one?
04 06 06 00 CDR Yes. I don't - think - it'll be helpful, but I'll stick it here and pull it out if I need it.
04 06 06 20 LMP Let's see; we haven't got P20 going yet, have we?
04 06 06 23 CDR No.
04 06 06 24 LMP Let's do that. Let's get the RENDEZVOUS RADAR circuit breaker in.

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04 06 06 27 CDR Okay.
04 06 06 34 LMP IN. Might look at the DPS.
04 06 06 51 CDR What do you hear?
04 06 07 00 LMP . . . glycol pumps.
04 06 07 03 CDR Alright.
04 06 07 10 CDR Look at that. Oh, that must have been - . . .
04 06 07 20 LMP Okay, ascent - tank pressure - temperature's up, changed to - I don't know.
04 06 07 28 CDR DPS's good -
04 06 07 30 LMP Look at all that RCS we got.
04 06 07 35 CDR That's more than we've ever had in the simulator, isn't it?
04 06 07 38 LMP Yes.
04 06 07 51 CDR Got your camera rigged?
04 06 07 54 LMP The other circuit breaker? Camera's all set to go. I hope the others just don't fall out. Got them both in?
04 06 08 01 CDR Yes.
04 06 08 17 LMP Well, let's hope he's in mode 2.
04 06 08 33 LMP Okay, I'm going to get the ASCENT BATS, ON. BATTERY 5, ON; looks good. BATTERY 6, ON; that's good.
04 06 09 08 CDR Yes, we've lost it.
04 06 09 14 LMP Well, did it go to mode 2? That's where I want it to go.
04 06 09 22 CDR No - I can't tell.
04 06 09 26 LMP Yes, it's going to mode 2. Hasn't it?

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04 06 09 33 CDR Yes.
04 06 09 34 LMP Yes. There we are. Beautiful.
04 06 09 38 CDR Go to AUTO TRACK?
04 06 09 39  LMP  No, not yet - wait until the light goes out. Did that thing want to - Hey, I didn't know that could do that. You don't hear that, huh? (Laughter)
04 06 10 01  LMP  Hear that, too, huh?
04 06 10 06  CDR  Sounds like wind whipping around the trees.
04 06 10 16  LMP  Okay, AUTO TRACK.
04 06 10 32  LMP  Okay, we ready to go to P63?
04 06 10 36  CDR  Yes.
04 06 11 07  LMP  Okay, get a - get a - Need to compare a TIG time. 09:50. That's right.
04 06 11 25  CDR  See that Big Dipper there?
04 06 11 27  LMP  That's a big out of plane, but I don't know which way it is.
04 06 11 33  CDR  I believe minus - but they were expecting it.
04 06 11 36  LMP  Okay, four -
04 06 11 38  CDR  That's within 7 . . . seconds. Okay?
04 06 11 53  LMP  Okay. These should not be in AUTO, right?
04 06 11 57  CDR  Yes. Remember that one.
04 06 12 13  LMP  180, 287, 0. Here goes.
04 06 12 46  CMP  Give me - -
04 06 12 47  CDR  You'll get them before we will.
04 06 12 50  CMP  Ready to give them a status report? DOI?

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04 06 12 54  LMP  Well, I hope it's on the right page.
04 06 13 24  LMP  Okay, I'm going to get DESCENT QUANTITY, ON, . . . ON.
04 06 14 19  CDR  Okay, you want to give it - Okay, we've lost it. In AUTO now.
04 06 14 42  LMP  . . . RANGE RATE.
04 06 14 59  CDR  How about that?
04 06 30 47  CDR  VERB 77 and a VERB 62.
04 06 31 04  LMP  Okay, sequence camera coming on.
04 06 31 22  CDR  Should be a little . . .
04 06 31 43  LMP  Roger. I think I've got you on high gain now.
04 06 31 47  CDR  Okay. Hear anything about that?
04 06 32 02  CDR  Say again the angles, though.
04 06 32 04  LMP  I'll set them in to use them before we yaw around.
04 06 32 15  LMP  Copy.
04 06 32 19  CDR  Okay. What else is left to do here?
04 06 32 22  LMP  ENGINE ARM, DESCENT. 40 seconds.
04 06 32 30  CDR  Is your camera running?
04 06 32 31  LMP  Camera's running.
04 06 32 42  LMP  Okay, . . .
04 06 32 46  CDR  Okay, the OVERRIDE at 5 seconds.
04 06 32 54  CDR  DESCENT, ARMED.
04 06 32 58  LMP  ALTITUDE lights, ON? . . . proceed?
04 06 33 02  CDR  Proceed. 1, 0 -

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04 06 33 07  CDR  IGNITION. 10 percent.
04 06 33 14  LMP  Just about on time.
04 06 33 18  CDR  You got the OVERRIDEs ON?
04 06 33 21  LMP  OVERRIDE is ON. 24. FLASH. THROTTLE, up.
04 06 33 34  CDR  Good. Okay.
04 06 33 32  LMP  PGNS holding.
04 06 33 59  LMP  Okay, we're reading your relay to us, Mike? I'll leave it in SLEW. Relay it to us. See if they got me now; I got good signal strength on SLEW.
04 06 34 21  LMP  Okay, rate of descent looks good.
04 06 34 27  LMP  Roger. Copy.
04 06 34 44  LMP  Copy.
04 06 34 49  CDR  Okay. Coming up on 2 minutes; going good. AGS's good?
04 06 34 57  LMP  AGS and PGNS agree very closely.
04 06 34 59  CDR  RCS is good; no flag. DPS pressure is good. 1 minute.
04 06 35 11  LMP  30 feet per second. Light's on. Altitude's a little high.
04 06 35 21  CDR  Okay, we want a 10. Let's get - You want to get rid of this radar?
04 06 35 30  LMP  Yes.
04 06 35 31  CDR  To SLEW?
04 06 35 32  LMP  SLEW.
04 06 35 43  LMP  Houston, I'm getting a little fluctuation in the - AC voltage now. Just the meter, maybe, huh?
Okay, we went by the 3-minute point early. A little off.

Rate of descent looks real good. Altitude - right about on.

Our position checks downrange show us to be a little off. AGS - AGS is showing about 2-feet-per-second greater rate of descent.

MARK.

Show us to be about - Stand by. Maybe have to stop that.

Altitude rate looks right down the groove.

Roger. About 2 seconds off - rolling over.

Okay, now watch that signal strength because -

Yes, I think it's going to drop.

Boy, I tell you, this is much harder to do than it was -

Keep it going.

Houston, before we leave you, the ED BATS are GO at 4 minutes.

Roger.

How you look over there? Okay?

Okay. You got good lockon.

We got a lockon?

Yes. Altitude light's out.

Okay.

DELTA-H is minus 2900. We got the earth right out our front window.

Sure enough.

Houston, you're looking at our DELTA-H. Program alarm.

1202, 1202.

What is it?

That's in core . . .

Give us a reading on the 1202 program alarm.


Same alarm and it appears to come up when we have a 16 68 up.

Were we - were - was it coming down?

Yes, it's coming down beautifully.
04 06 39 26  CDR    Roger; it looks good now.
04 06 39 32  LMP    THROTTLE, DOWN.
04 06 39 33  CDR    THROTTLE, DOWN, on time.
04 06 39 35  LMP    You can feel it in here when the throttle's down; better than the simulator.
04 06 39 46  LMP    AGS and PGNS look real close.
04 06 39 48  CDR    Okay. No flags. RCS is GO; DPS is GO; pressure is - okay.
04 06 40 11  LMP    Okay, I'm still on SLEW, so we may tend to lose as we gradually pitch over; let me try AUTO again now, and see what happens. Okay, looks like it's holding.
04 06 40 25  CDR    Okay. 07:30 coming up. Should be . . .
04 06 40 36  LMP    . . .
04 06 40 45  CDR    And I have the window. I have that - view - out the window - Going to . . .

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04 06 40 56  CDR    Coming up on 8 minutes.
04 06 41 00  LMP    Could you give us an estimated switchover time, please, Houston?
04 06 41 08  LMP    Okay, 7000, . . . Looks good.
04 06 41 16  LMP    Roger.
04 06 41 33  LMP    P64.
04 06 41 40  CDR    . . . over. Okay. 5000, 100 feet per second is good, and I'm going to check my attitude control.
04 06 42 01  CDR    Attitude control is good - manual attitude control is good. Okay, 3070.
04 06 42 15  LMP    Roger; understand. Go for landing, 3000 feet. Program alarm - 1201.
04 06 42 22  CDR    1201. Okay. 2050.
04 06 42 29  LMP    2000 feet; 2000 feet.
04 06 42 30  CDR    Give me an LPD.
04 06 42 32  LMP    Into the AGS, 47 degrees.
04 06 42 33  CDR    Give me an LPD.
04 06 42 35  LMP    47 degrees.
04 06 42 37  CDR    47.
04 06 42 38  CDR    That's not a bad-looking area. Okay.
04 06 42 51  CDR    1030 is good.
04 06 42 55  CDR    What's LPD?
04 06 42 58  LMP    35 degrees, 35 degrees; 750, . . . coming down to 23.
04 06 43 05  CDR  Okay.

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04 06 43 06  LMP  700, 21 down, 33 degrees.
04 06 43 08  CDR  Pretty rocky area.
04 06 43 10  LMP  600 feet, down to 19; 540 feet, down to 30, down to 15.
04 06 43 24  CDR  Okay.
04 06 43 25  LMP  Okay, 400 feet, down to 9, 58 forward.
04 06 43 29  CDR  . . .
04 06 43 31  LMP  350 feet, down at 4 - 330 - 6-1/2 down. We're pegged on . . . velocity.
04 06 43 44  LMP  300 feet down, 3-1/2, 47 forward. Coming up - 1 a minute, 1-1/2 down. Moving out.
04 06 43 55  LMP  270.
04 06 43 57  CDR  Okay, how's the fuel?
04 06 43 59  LMP  Wait just a minute.
04 06 44 00  CDR  Okay, Ed, this looks like a good area here.
04 06 44 03  LMP  I got the shadow out there. 250, down at 2-1/2, 19 forward.
04 06 44 11  LMP  Altitude velocity light, 3-1/2 down, 220 feet; 13 forward, 11 forward, coming down nicely. 200 feet - -
04 06 44 23  CDR  . . . - -
04 06 44 25  LMP  5-1/2 down, 5-1/2 down.
04 06 44 27  CDR  I got to get . . .
04 06 44 30  LMP  160 feet, 6-1/2 down - 5-1/2 down, 9 forward. Still looks good. 120 feet.
04 06 44 43  LMP  100 feet, 3-1/2 down, 9 forward. 5 percent - . . .
04 06 44 50  CDR  Okay.

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04 06 44 53  LMP  Okay, 75 feet. And it's looking good; down a half. 6 forward; light's on. 6 - 60 feet down, 2-1/2, 2 forward, 2 forward.
04 06 45 13  LMP  Looks good. 40 feet down, 2-1/2. Picking up some dust. 30 feet, 2-1/2 down - straight down; 4 forward, 4 forward, drifting to the right a little.
04 06 45 26  LMP  20 feet, down a half; drifting forward just a little bit. Good. Okay.
04 06 45 41  CDR  SHUTDOWN.
04 06 45 42  LMP  Okay. ENGINE STOP; ACA out of DETENT.
04 06 45 43  CDR  Out of DETENT.
AUTO MODE CONTROL, both AUTO; DESCENT ENGINE COMMAND OVERRIDE, OFF; ENGINE ARM, OFF; 413 is in.

ENGINE ARM is OFF.

Houston - Tranquility Base here. THE EAGLE HAS LANDED.

Thank you.

Okay. Let's go on. Okay, we're going to be busy for a minute.

Alright, MASTER ARM, ON. Take care of the descent vent.

MASTER ARM coming OFF.

I'll get the pressure vent.

Okay.

Very smooth touchdown.

I didn't hear that vent going - -

... oxidizer.

... vent.

Houston, how do you reed Columbia on the high gain?

Okay, Houston. On DESCENT 1, the fuel and oxidizer are reading 10 psi; on DESCENT 2, fuel is reading 10 psi; oxidizer, 11 psi.

Okay, going back to OFF.

... is OPEN. Yes, ...

Alright, we need the -

Houston, Tranquility Base is ready to go through the powerdown and terminate the simulated countdown.

Hope he is, too.

OPEN.

Okay, the operations HEATER circuit breaker is OPEN.

Roger. It's in progress. Anytime, take your helmet off.

Roger. Couldn't have had better treatment from all of you back there.

Houston, Columbia. Copy NOUN 49?

Roger.

Yes, stand by 1, Charlie, for the next ...

Well, the area looks smooth, but I was unable to see them. I just picked out a distinguishable crater nearby and marked on it.

It looks like a nice area, though.
Houston, Columbia. I say again: I did not see them. AUTO optics pointed at a
spot very close to the coordinates which you gave me, so I picked
out a tiny crater in that area and marked on it, so that I'll be able to have
repeatable data, but I was still unable to see them.

Houston, Columbia. I'm coming up on my time for the first pass when I may be
able to see the LM. Do you have any topographical cue that might help me out
here on - AUTO optics is tracking between two craters. One of them, as the LM
sees it, would be long at 11 o'clock; the other would be short and behind him at 5
o'clock. They're great big old craters - depressions.

Roger, Houston. Columbia . . . up. I kept my eyes glued to the sextant that
time, hoping I'd get a flash of reflected light off the LM, but I wasn't able to see
any of my scan areas that you suggested.

It's going past now, Bruce, but I scanned that area that you are talking about very
closely, and no, I did not see them.

Go ahead.

Stand by 1.

Houston, Columbia. Over.

Houston, Columbia. Over.

Houston, Columbia. Over.

Okay.

Houston, Columbia on the high gain.

Read you loud and clear, Bruce. What's new?

Ready to copy.

Columbia.

Houston, Columbia on the high gain. Over.

I'm reading you loud and clear. How's it going?

Columbia. Roger.

Negative that.

Houston, Columbia on . . . How do you read?

Roger; Columbia OMNI Charlie. How do you read?

Hallelujah.

Roger, understand. You want a option 1 - P52, option 1?

P52.

Roger, Houston. Columbia's reading you.
04 16 15 20 CMP Roger. Stand by.

04 16 15 46 CMP Ready to copy.

04 16 17 37 CMP Houston, Columbia.

04 16 18 07 CMP Negative, Bruce. Just give me your latitude - longitude over 2, altitude, and the grid squares. Never mind the other; you're broken up.

04 16 18 28 CMP Well, that is, if you have the new information; otherwise, I'll just use the old numbers.

04 16 18 37 CMP Okay.

04 16 22 17 CMP Houston, Columbia. You got the new coordinates?

04 16 22 31 CMP Roger. Have you got the new coordinates for me?

04 16 23 13 CMP Roger. Thank you.

04 16 23 43 CMP Okay.

04 16 23 56 CMP Okay. I read back plus 00692, plus 11713, and minus 00144. And you have a grid square for me?

04 16 24 36 CMP Kilo 0.9 and 6.3. Thank you. One of these grid squares is about as much as you can scan on a single pass.

04 16 25 38 CMP Roger.

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04 16 25 51 CMP Okay.

04 16 33 57 CMP Houston, Columbia . . .

04 16 34 10 CMP Roger. I can't see them.

04 16 34 21 CMP Roger. . . .

04 16 34 43 CMP Roger. I need a very precise position because I can only do a decent job of scanning maybe one of those grid squares at a time. The area that we've been sweeping covers 10's and 20's and 30's of them.

04 16 35 10 CMP Roger. How's the fuel coming?

04 16 35 29 CMP Roger. Well, I'll continue this maneuver then to roll 82, pitch 218, yaw zero, if that's okay with you, and do a P52 in that attitude. And that'll be a . . .
05 03 08 00  CDR  Thank you kindly, Jim.
05 03 08 06  CDR  Glad to have all you big roomful of people looking over our shoulder.
05 03 55 17  CMP  Houston, Columbia on OMNI D, Delta. Over.
05 03 55 33  CMP  Go ahead.
05 04 16 24  LMP  BAT 2 and 4 coming OFF.
05 04 16 29  CDR  Okay, OFF.
05 04 16 43  LMP  DEAD FACE, barber pole. Okay, on 11, DESCENT ECA and DESCENT ECA CONTROL circuit breakers, OPEN. Just the descent.
05 04 16 54  CDR  DESCENT ECA and DESCENT ECA CONTROL, OPEN.
05 04 16 58  LMP  Right. Okay, let's ... and check the APS card.
05 04 17 03  CDR  Okay.
05 04 17 04  LMP  STABILIZATION CONTROL circuit breakers, all CLOSED.
05 04 17 08  CDR  All except APS - no, ... .
05 04 17 15  LMP  RATE SCALE, 25.
05 04 17 17  CDR  25.
05 04 17 18  LMP  ATT/TRANSLATION, 4 JETS.
05 04 17 19  CDR  4 JETS.
05 04 17 21  LMP  BALANCE COUPLE, ON, ... .
05 04 17 22  CDR  BALANCE COUPLE, ON.
05 04 17 23  LMP  TTCA, JETS.
05 04 17 24  CDR  Check.
05 04 17 32  LMP  DEADBAND, MINIMUM.

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05 04 17 33  CDR  MIN.
05 04 17 34  LMP  ATT CONTROL, MODE CONTROL.
05 04 17 37  CDR  Okay.
05 04 17 38  LMP  MODE CONTROL, AUTO.
05 04 17 41  CDR  Both AUTO, AUTO.
05 04 17 47  LMP  Okay, I'm standing by for 2 minutes to - for the guidance steering in the AGS.
05 04 18 03  CDR  ... ON, right?
05 04 18 04  LMP  Right.
05 04 18 27  CDR  Roger.
05 04 19 24  LMP  Got 26.9 . . .
05 04 20 03  LMP  Roger. Guidance steering in the AGS.
05 04 20 56  LMP  Okay, MASTER ARM, ON?
05 04 20 59  CDR  MASTER ARM is ON.
05 04 21 14  CDR  At 5 seconds, I'm going to get ABORT STAGE and ENGINE ARM. When I get it, proceed.
05 04 21 18  LMP  Right.
05 04 21 20  CDR  . . .
05 04 21 26  LMP  . . .?
05 04 21 27  CDR  Yes.
05 04 21 28  LMP  Okay.
05 04 21 31  CDR  DSKY blanks.
05 04 21 42  LMP  Got that ascent card?
05 04 21 44  CDR  This one? Place to put it?
05 04 21 50  LMP  Yes. 9, 8, 7, 6, 5 - ABORT STAGE; ENGINE ARM, ASCENT - Proceed.
05 04 22 01  CDR  We're off; look at that stuff go all over the place.
05 04 22 05  LMP  Look at that shadow. Beautiful 26 - 36 feet per second up - -
05 04 22 10  CDR  The Eagle is - -
05 04 22 11  LMP  - - Be advised of the pitchover - -
05 04 22 12  CDR  - - pitching over. BALANCE COUPLE, OFF.
05 04 22 16  LMP  BALANCE COUPLE, OFF. Very quiet ride. There's that . . . sticking out now.
05 04 22 25  CDR  . . . See if you can see the - Cat's Paw.
05 04 22 35  CDR  It's all the way out in front of us in that -
05 04 22 46  LMP  Roger. Can't see it.
05 04 22 52  CDR  Do you see the Cat's Paw?
05 04 22 53  LMP  No.
05 04 23 03  LMP  This might be it.
05 04 23 08  CDR  Roger. Yes, I think it is.
05 04 23 18  LMP  It's a very quiet ride, just a little bit of slow wallowing back and forth - not very much thruster activity.
05 04 23 35  LMP  700, 150 up, beautiful. 9000. PGNS and AGS agree within a foot per second.
Pressures are good.

2 minutes the time; 170 is beautiful, 14,000.

Within a foot per second again, AGS to PGNS.

S-band looks like it's holding good - 1500, 182.

Roger.

Right on H-dot. Coming up here - -

Looks like the velocity is sort of - -

- - this is H-DOT MAX now.

- - ... right here. Okay.

Going right down - going right down U.S. 1.

T minus 4 minutes - ... a little fast - we got altitude rate - -

Now we got - got Sabine off to our right, now.

Coming up on Schmidt here pretty soon, huh?

02:40 to go.

Everything's fine.

Okay, there's Ritter out there. See him, there it is, right there - and there's Schmidt. Man, that's impressive looking, isn't it?

I can't see it. Oh, yes, now I can just get a glimpse.

5 minutes, 33 - G&N, 54 -

Looking good here. It's a spectacular ride.

... off to the right.

6 minutes.

Looks like ... off a little here.

Roger. Good agreement in DELTA-V to go in both AGS and PGNS.

... three ...

Alright, 800 to go.
05 04 29 00  LMP  350 to go. Stand by on the ENGINE ARM.
05 04 29 11  CDR  Okay, I'm getting ready for ARM, OFF.
05 04 29 13  LMP  Ready?
05 04 29 14  CDR  ARM, OFF.
05 04 29 15  LMP  OFF. 50 -
05 04 29 16  CDR/LMP  SHUTDOWN.
05 04 29 21  LMP  We got 5337.3 and 32.8 feet per second, 60 666.
05 04 29 33  CDR  . . . up?
05 04 29 34  LMP  And we got - we got our residuals.
05 04 29 39  CDR  Okay - take those out, right?
05 04 29 43  LMP  Yes, take -
05 04 29 51  CDR  . . .
05 04 30 12  LMP  We're working on it.
05 04 30 39  CDR  I can't check that - residual.
05 04 30 42  LMP  That's good.
05 04 30 52  LMP  Okay, that sounds a little - little on the high side.
05 04 30 57  CDR  Okay.
05 04 30 58  LMP  Okay, Houston, we show 47.3 by 9.5.
05 04 31 12  LMP  The AGS has 9.5 - 46.6.

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05 04 31 25  CDR  Okay.
05 04 31 33  CDR  . . .
05 04 31 51  LMP  Roger.
05 04 32 16  LMP  You want to try . . .?
05 04 32 20  CDR  Yes.
05 04 32 23  LMP  Circuit breakers in - or do you want to go to align?
05 04 32 28  CDR  Maybe we'd better get an alignment - . . .
05 04 32 31  LMP  Okay. . .
05 04 32 40  CDR  Yes.
05 04 32 52  CDR  Roger, Houston. The Eagle is back in orbit, having left Tranquility Base and leaving behind a replica from our Apollo 11 patch and the olive branch.
05 04 33 24  CDR  We had a lot of help down there.
05 04 33 27  LMP  We're going to have to have our rendezvous radar circuit breakers in anyway to get onto your link.
05 04 33 30  CDR  Yes.
05 04 33 45  LMP  Okay.
05 04 34 05  CDR  Okay.
05 04 34 09  LMP  INVERTER 2, INVERTER 1, circuit breaker open?
05 04 34 11  CDR  I got INVERTER 1.
05 04 34 28  LMP  Close the AOT LAMP circuit breaker -
05 04 34 44  CDR  Going to TRACK here.
05 04 34 50  LMP  Yes.
05 04 34 52  CDR  That right?

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05 04 34 53  LMP  Right.
05 04 35 19  CDR  You know, I didn't see a lot of dust in the cockpit, did you?
05 04 35 22  LMP  No, there was a fair amount. What did you get, 283?
05 04 35 31  CDR  Yes.
05 05 06 58  LMP  . . .
05 05 07 08  CDR  Okay.
05 05 07 39  CDR  No. We'll wait until CDH.
05 05 08 17  CDR  Okay, thank you.
05 05 08 37  CDR  Okay.
05 05 09 31  CDR  No, I didn't; go ahead, Mike.
05 05 09 39  CDR  I think we are now, finally, and I think I have you in sight.
05 05 09 57  CDR  We have 51 5.
05 05 10 19  CDR  Well, the ground's got 51 5, and we got 51 5. Yes. First time we've ever agreed on anything.
05 05 10 41  LMP  Want these . . . first?
05 05 10 43  CDR  Not yet.
05 05 10 45  LMP  I don't know why.
05 05 11 17  LMP  I had to turn my S-band off so I could hear him - my S-band switch on the audio panel. Woo-woo!
05 05 11 31  CDR  Yes, that works good.
05 05 11 51  LMP  Not at this point, no.
05 05 12 42  CDR  Okay.
05 05 13 11  LMP  . . . Hey, Mike, how do you read me?

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05 05 13 24  LMP  Okay, let's go to B DATA on your command.
05 05 13 59  CMP  Eagle, Columbia.
05 05 14 06  LMP  Loud and clear.
05 05 14 10  LMP  Affirmative; we're at the burn attitude, too.
05 05 15 10  CMP  Eagle, Columbia. When you get a chance, could you give me the - the CSI P76 pad and your NOUN 84 and your NOUN 33?
05 05 15 21  LMP  Yes, we'll do that in a minute.
05 05 15 25  CMP  Alright.
05 05 15 21  LMP  Okay, Mike, you want the burn time and the NOUN 81; is that right?
05 05 15 50  LMP  Okay, the burn time is 125:19:34.7, and the burn is 51.5, zero, and zero.
05 05 16 16  CMP  Okay, I understand. Plus 51.5, zeros, and zeros, and you're using 125:19:34.70. Thank you kindly.
05 05 18 45  CMP  I'm in maneuver attitude, all set to burn if necessary. I've got about 45 minutes to TIG - 45 seconds to TIG.
05 05 18 51  LMP  Okay.
05 05 19 46  LMP  We're burning, Mike.
05 05 21 36  LMP  Burn complete, Mike.
05 05 21 39  CMP  Good show.
05 05 22 59  LMP  Okay, Mike, our CDH time is 126:17:45.58. Over.
05 05 23 12  CMP  Roger; copy. CDH, 126:17:45.58.
05 05 23 21  LMP  Affirmative.
05 05 28 33  CMP  Eagle, Columbia. I have you in an orbit 49.5 by 46.1.
05 05 28 43  LMP  Okay, thank you.

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05 05 29 09  CMP  Eagle, Columbia. I'd like to go back to VHF RANGING configuration, please, on your mark.
05 05 29 15  LMP  Roger. On my mark -
05 05 29 17  LMP  MARK, VHF RANGING.
05 05 30 37  LMP  . . .
05 05 30 40  CDR  Well, which way did I go?
05 05 30 42  LMP  ... out of plane.
05 05 30 45  CDR  What?
05 05 30 46  LMP  Did you hear that?
05 05 30 57  LMP  Why you don't hear these 3 - 3500-pound rocket engines when you're sitting on them, I'll never know.
05 05 31 03  CDR  Yes.
05 05 31 08  LMP  ... structure somehow.
05 05 31 31  LMP  3.5, Neil.
05 05 32 44  LMP  Woo-woos is on VHF B -
05 05 32 48  CDR  ... B?
05 05 32 50  LMP  Not on A.
05 05 32 58  CDR  (Laughter) That's your story, huh?
05 05 33 25  CDR  That's rugged country.
05 05 34 15  LMP  Yes, that perigee we're on ... 
05 05 34 20  CDR  ... alright, isn't it?
05 05 34 31  LMP  I got 4 feet forward and I got back 7 ... 
05 05 34 38  CDR  Boy, this water separator sure isn't working worth a durn. Maybe we ought to try the other one - ... water. Oh boy, this thing is just really spitting it.

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05 05 34 53  LMP  I sure do; it's been on - yes, we do - it's been on all the time.
05 05 35 06  CDR  We should see the tracking light now - That's it - Doesn't look ... but it's not - turned off.
05 05 35 16  LMP  Okay, let's try and get a Y-dot, or an R-dot, at 30 seconds.
05 05 35 21  CDR  It'll be the first time we've ever done it.
05 05 35 30  LMP  No, let me get COMM.
05 05 35 48  LMP  We're really going to be crying.
05 05 35 50  CDR  [Simulated crying]
05 05 35 54  CDR  My - top thruster over here has got a lot of brown holes in it - in the exit nozzle.
05 05 36 05  CDR  See it?
05 05 36 06  LMP  Yes.
05 05 36 13  LMP  You know, these thrusters aren't used much over here. Well, maybe ... or something.
05 05 36 31  CDR  See it?
05 05 36 34  LMP  No.
05 05 36 46  LMP  When we get the sun behind us, we might be able to.
05 05 37 04  LMP  Hey, I got to recycle. Then after . . .
05 05 37 28  LMP  It's all over me.
05 05 37 38  LMP  Coming out of that vent back of my neck, isn't it? That where it's coming out?
05 05 38 44  LMP  Give us the CSI state vector - navigation difference - no updating CSI . . .
05 05 39 02  LMP  Through AGS.
05 05 39 21  LMP  . . .

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05 05 39 45  LMP  Thinking about it.
05 05 39 51  CDR  You going to come up with a solution for us?
05 05 40 33  CDR  Range rate?
05 05 40 35  LMP  Range rate.
05 05 40 45  LMP  A lot of trouble having our . . . up.
05 05 41 08  LMP  Range/range rate is . . .
05 05 41 23  LMP  Yaw, damn it!
05 05 42 24  CMP  . . .
05 05 42 28  CMP  . . . is up.
05 05 42 30  LMP  125:47:45.58.
05 05 42 42  CMP  . . .
05 05 43 17  LMP  . . . feet per second.
05 05 43 19  CDR  Both tanks were pressurized, weren't they?
05 05 43 21  LMP  Yes.
05 05 43 22  CDR  Sure shook them up. I remember that Gene said theirs didn't drop a bit - remember that - when they pressurized? Don't think theirs dropped at all.
05 05 44 37  LMP  Okay.
05 05 44 43  CDR  We're getting minus 2.9.
05 05 44 48  LMP  Going AGS all the way, huh?
05 05 44 50  CDR  Yes, forget it.
05 05 44 54  LMP  Get more tracking if we forget.
05 05 45 01  CDR  No, we'll just - we'll just wait until CDH.
05 05 46 19  CDR  You got a lot of film left in there?
About half.
You could run it some here. Oh, you just - you want to leave some for docking, huh?
... Got that cockpit all cleaned up so that we got places for all our trash, Mike?
... \ldots
Yes, we got them all over us - look like chimney sweeps.
You bet you. Nice to get home.
... \ldots up tracking -
Got that?
What do you need?
That right-angle bracket, the right-angle bracket, need that -
It's not over here. Well, that's a good day not to throw in some failures. See if we can run the nominal one time.
CO2.
I don't think so, Mike, we got to - ...\ldots
... want to go to that - ...\ldots
Stand by for ...\ldots
Right, that's what we've got.
...\ldots
Coming up on 1 minute to TIG. Neil, how's it looking?
Pretty good.
That last out of plane was in the AGS, not the radar.
Alright.
...\ldots
Okay.
Ready to burn?
Okay.
We're burning.
Okay, that's it.
Burn complete?
05 07 04 35  CDR  Burn's complete. Did you read? Burn's complete.
05 07 04 40  CMP  Thank you.
05 07 04 43  CC    Eagle, Houston. Aft 0MNI, LOW BIT RATE, and we'll see you at 127 plus 51.
05 07 05 07  LMP  Okay, . . . . . . 5, huh?
05 07 06 10  CDR  Well - say when . . . Oh, wait a minute.
05 07 06 50  LMP  Chart at 26/7 forward for -
05 07 06 55  CDR  Pretty reasonable.
05 07 06 59  LMP  AGS had these residuals after its completion after the burn.
05 07 07 39  CDR  I can't see you, Michael.
05 07 07 44  CMP  . . . moving in at . . .
05 07 07 50  CDR  Okay. I got good radar; I just can't see you.
05 07 08 03  CMP  . . .
05 07 08 49  LMP  Do you think that pressure dropped?
05 07 08 51  CDR  Yes.

05 07 08 54  LMP  It doesn't show up in the . . . books. I don't see any reason why we don't take them all back. All that we've got - -
05 07 09 00  CDR  All got data.
05 07 09 02  LMP  We all got something . . .
05 07 10 20  LMP  Okay, you try getting it - . . .?
05 07 10 25  CDR  No, I haven't been; do you want me to?
05 07 10 27  LMP  No, I got to keep the chart.
05 07 10 58  CDR  . . . can take this update for them.
05 07 12 00  LMP  On the track about, huh?
05 07 12 21  LMP  Boy, my shoulders sure hurt.
05 07 12 23  CDR  Mine are, too.
05 07 12 26  LMP  Last night I couldn't get this far from the . . .
05 07 12 30  CDR  I was the same way.
05 07 13 00  LMP  Use all the green tape, did you?
05 07 14 31  CDR  I got it in sight now, Mike.
05 07 14 34  CMP  . . .
05 07 15 33  LMP  . . .
05 07 15 39  CDR  Okay.
05 07 16 08  SC  (Yawn)
05 07 16 12  CMP  ... 
05 07 16 18  LMP  Yes, so do we.
05 07 16 19  CDR  A hundred and what?
05 07 16 33  CMP  ... 
05 07 16 37  LMP  Okay, NOUN 81, minus 0, plus 0.4, plus 0.9.
05 07 16 49  CMP  And now, plus 0.4, plus 0.9. ... 
05 07 16 58  LMP  And 15 minutes after TPI, I've got -- 
05 07 17 03  CMP  ... 
05 07 17 35  CDR  M-1.
05 07 17 36  LMP  ... 
05 07 17 53  LMP  ... your burn's a little late.
05 07 18 04  CDR  ... be burning - ... 
05 07 18 12  LMP  Okay, ... the ... on? There it is. 
05 07 18 28  LMP  Neil, I guarantee you that the burn is precise, okay? 
05 07 18 31  CDR  ... 
05 07 18 33  LMP  Good. 
05 07 18 39  CMP  ... good burn ... 
05 07 18 43  CDR  No, it's not going to be late. Maybe 5 seconds. 
05 07 19 17  CDR  Burn complete. 
05 07 19 19  CMP  Thank you. 
05 07 20 13  CDR  Well, it's all over but the docking. 
05 07 20 26  CDR  Check the start out there. 
05 07 20 32  LMP  Okay. 
05 07 20 41  CDR  ... 
05 07 20 51  LMP  You still got him? 
05 07 20 55  CDR  Yes. I probably won't when the sun gets in my telescope. 
05 07 21 06  LMP  ... ... hold the ... 
05 07 21 11  CMP  Now I can't see -- 
05 07 21 13  CDR  The what?
05 07 21 14  LMP  Won't hold the .
05 07 21 19  CMP  . . . going right down the . . . and it sure has been nice.
05 07 21 23  CDR  Okay. I just got sight of you in the sunlight here.
05 07 21 27  CMP  Okay.
05 07 21 29  LMP  Oh, I've got him.
05 07 21 43  LMP  . . .
05 07 21 51  CDR  I've got him now, too.
05 07 22 00  LMP  Sure enough.
05 07 22 11  CMP  Well, I see you don't have any landing gear.
05 07 22 15  CDR  That's good.
05 07 22 19  CMP  . . .
05 07 22 27  CDR  You're not confused on which end to dock with, are you?
05 07 22 34  CMP  . . .
05 07 22 58  CDR  Okay, Mike, if there's some data bags around there - I may have one or two in my temporary stowage - why, we may want them in addition to the other regular bags, so we can put some of this data back in it.
05 07 23 13  CMP  In the data bags?
05 07 23 16  CDR  Yes, there are a couple of different LM bags that I left in there.
05 07 23 21  CMP  Okay, well, why don't we . . . back over there and . . .?
05 07 23 26  CDR  Right.
05 07 23 39  CMP  . . . bring the bag . . .
05 07 23 45  CDR  Could be.

05 07 23 47  CMP  Alright.
05 07 24 13  CMP  Okay, . . . have a plastic one and a . . .
05 07 24 23  CMP  Bring the . . . back.
05 07 24 40  CDR  I think we'll make it (laughter).
05 07 24 44  LMP  Don't tell that to poor . . ., though (laughter).
05 07 24 47  CMP  . . .
05 07 24 56  CDR  We'll see you at . . .
05 07 25 02  CDR  Okay.
05 07 25 31  CDR  One of those two bright spots is bound to be Mike.
05 07 25 36 LMP How about picking the closest one?
05 07 25 44 CDR Good idea.
05 07 26 17 LMP ... this light?
05 07 26 21 CDR Is that alright?
05 07 26 37 CDR Okay, at 49,000 feet, we're supposed to be 65 feet per second - our little old chart says. And our LOS rate's supposed to be about 0.1; it's about point - -
05 07 26 51 CMP ...
05 07 26 55 LMP Okay.
05 07 27 08 CMP ...
05 07 27 16 CDR Right - that's ... 
05 07 27 26 LMP 12 on here, right?
05 07 27 29 CDR Not exactly.
05 07 27 30 LMP Not exactly?
05 07 27 32 CDR You're a little less. You’re 10 seconds less in ... About that ... 

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05 07 28 23 CDR Look's like you're making a high ... on us, Michael.
05 07 28 27 CMP Yes, ... 
05 07 29 26 CMP ... let me move in just a ... 
05 07 29 31 CDR No, we aren't that - confident.
05 07 30 08 CDR ...?
05 07 30 12 LMP We've got about 54.
05 07 30 47 CDR You got ... to ...?
05 07 30 49 LMP Huh?
05 07 30 50 CDR The ...?
05 07 30 51 LMP Yes. ... 
05 07 31 05 CDR Let’s try this midcourse out.
05 07 31 08 LMP Right. Okay, it’s ... 
05 07 31 37 LMP ... 
05 07 31 40 CDR Is that right, I hope?
05 07 31 42 LMP Yes.
05 07 31 59 CDR It should be 70.
05 07 32 25 LMP Okay, I can see the shape of your vehicle now, Mike.
05 07 32 42  CDR  Oh, yes - got your high gain in sight; your tracking light - whole vehicle shows. I 
see that you're pointed at me. Now, you're turning a little bit - great.

05 07 33 39  CMP  . . .

05 07 33 49  CMP  Are you burning yet?

05 07 33 50  CDR  We're burning.

05 07 33 51  CMP  . . .

05 07 34 15  LMP  Good enough.

05 07 34 21  CDR  Seems like when you get down to around 110, you just keep chasing him. You put 
it in - stick it in one axis, and it goes through - out of another, especially when . . . stays about the same.

05 07 34 30  LMP  If it's . . ., it's definite.

05 07 34 43  LMP  Okay, now, let's see; we want to change the DAP - that what we want to do?

05 07 34 48  CDR  Yes.

05 07 34 49  CMP  I need a P76 now, Buzz.

05 07 35 05  LMP  Okay, you got the time for the burn; NOUN 81 was plus 0.1, plus 1.2, plus 0.5.

05 07 35 23  LMP  . . . plus . . .

05 07 35 38  CDR  Okay. . . . 45 -

05 07 36 14  CDR  8.2 miles, 40 feet per second.

05 07 36 26  LMP  You can have your place now.

05 07 36 49  CMP  . . .

05 07 36 52  CDR  Okay.

05 07 37 01  LMP  Can you see our tracking light, now?

05 07 37 04  CMP  . . . but you're in between my sextant and my COAS.

05 07 38 33  LMP  Where'd you put the . . .?

05 07 38 35  CDR  My what?

05 07 38 36  LMP  Your . . . for . . .

05 07 38 39  CDR  It's in the bottom over . . .

05 07 39 30  CMP  . . . pick me up . . .

05 07 39 33  CDR  I got you.

05 07 39 34  CMP  Okay. Don't . . . other spacecraft.
05 07 39 40 LMP No, I'm not going to lose you, brother.
05 07 39 49 CMP What have you got for ...? ... I have 6.8 and 9 miles, ... out. Oh, that checks.
05 07 40 06 CDR Got ... up? I thought I made it pretty clear.
05 07 40 20 LMP Not as sporty a ... as we thought, huh?
05 07 40 25 CDR That wasn't - bad at all; the alignment was - pretty dicey.
05 07 40 31 LMP Yes, sir.
05 07 40 34 CDR That was just luck (laughter).
05 07 40 39 LMP I hope you ... .
05 07 40 49 LMP I'll be glad to get to the ... .
05 07 40 52 CDR Yes, but I hate to ...; will you get ...?
05 07 40 57 LMP Okay.
05 07 41 02 CDR Oh, it'll come off, I guess - -
05 07 41 07 LMP These screws here - -
05 07 41 08 CDR Alright, there's a couple of bolts - -
05 07 41 10 LMP - - these screws here might do it.
05 07 41 13 CDR - - there's a couple of bolts down there that have come loose - if I remember. ... I'll get them.
05 07 41 21 CMP I'm slowly closing at 32 feet per second and a mile and a half.
05 07 41 25 CDR Okay, I've got a mile and a half and 32-1/2.
05 07 41 28 CMP ... .
05 07 41 40 LMP Take ... .
05 07 41 43 CDR Yes, I guess it'll take us another - 6 minutes or something like that.

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05 07 41 47 LMP Yes.
05 07 41 48 CMP ... we got 15 ... .
05 07 41 57 CMP ... .
05 07 42 01 CDR Okay.
05 07 42 23 LMP That's going to hit the braking gate right on the schedule.
05 07 42 30 CDR Yes.
05 07 43 02 CDR Okay, let's put P47 in.
05 07 43 22 CDR I don't know why I lost my - I'm at - oh, did you - you lost your transponder, Mike - I think.
05 07 43 33 CMP . . . pitch up a bit.
05 07 43 36 CDR I wish you would.
05 07 43 43 CMP I have 0.7 mile and I got you at 31 feet per second, . . . look good.
05 07 43 50 LMP Okay, . . .
05 07 43 53 CMP . . .?
05 07 43 57 LMP Okay, we're getting it.
05 07 43 59 CMP . . . -
05 07 44 12 CMP Are you . . . forward now?
05 07 44 15 LMP Yes - yes, we're in good shape, Mike; we're braking.
05 07 44 17 CMP Okay.
05 07 44 52 CMP . . .
05 07 44 53 CDR Flying all over us.
05 07 46 13 CDR Okay, we're about 11 feet a second coming in at you
05 07 46 17 CMP . . .

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05 07 46 43 CMP That's good. What . . . are you in?
05 07 47 05 LMP Hope we're not going to get a pitch straight down.
05 07 47 16 CDR We've got a - pitchdown and then a yaw to do - . . .
05 07 47 55 CMP . . .
05 07 47 59 CDR Looks good.
05 07 49 06 CMP I'm sure you're going to get . . ., I'll tell you that.
05 07 49 11 CDR It flies good, though.
05 07 49 16 CMP . . .?
05 07 49 50 CDR Okay, now, if I pitch over, I'm going to be looking right into the sun.
05 07 50 00 CMP . . .
05 07 50 09 LMP Hope you know how to roll.
05 07 50 11 CMP Yes, I do. I . . .
05 07 50 23 LMP You want to end up with that window - opposite his right window so you don't want to roll right. Right?
05 07 50 32 CDR Yes.
05 07 50 34 LMP The only trouble is, it's towards - towards 90, isn't it?
05 07 50 56 LMP You could - you -
05 07 50 58  CDR  If I roll 120 - it'll roll left
05 07 51 06  LMP  90, huh? ... 60?
05 07 51 21  CDR  Well, why don't I start to roll - -
05 07 51 24  LMP  Yes, I think if you roll up 60 -

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05 07 51 29  CDR  I'll be looking into his left window when I pitch up.
05 07 51 32  LMP  I don't think so. If you did it right now you'd - -
05 07 51 36  CMP  ... I got the earth coming up already; it's fantastic!
05 07 51 40  CDR  Okay, you got me.
05 07 52 00  CC  Eagle and Columbia, Houston. Standing by.
05 07 52 05  CDR  Roger; we're stationkeeping.
05 07 52 08  CC  Roger.
05 07 52 24  LMP  Pitch up ... pass right up just a little, you got a better view - bottom side - ... - move back.
05 07 52 45  CMP  ... - that's right.
05 07 53 08  CDR  Okay. I'm getting about into the right attitude, I think. ... 
05 07 53 18  LMP  Yes.
05 07 53 21  CDR  That roll's pretty far; I don't know just how much - so that's - Oh, it's going to go BLOCK!
05 07 53 28  LMP  That's it - going to AGS?
05 07 53 32  CDR  Yes, ... ATT DEADBAND.
05 07 54 11  CDR  Okay, Mike, I'll get - try to get in position here, and then you got it.
05 07 54 18  CMP  Okay.
05 07 54 37  CDR  How does the roll attitude look?
05 07 54 41  CMP  ... 
05 07 54 47  CDR  Let's see how the DSKY thinks it looks.
05 07 54 52  CMP  Have you stopped rolling yet?

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05 07 54 54  CDR  I'll stop. Matter of fact, I can stop right here, if you like that.
05 07 54 59  CMP  Need a little bit more. That's the way; keep it going. Need a little more ... That's the way; keep going - go a little bit more - go ahead - go ahead - okay, stop. Okay, I got it now.
05 07 55 27  LMP  You got the ... in ...?
05 07 55 36  CDR    Yes. Right there. Okay, ... 1 -
05 07 55 55  LMP    Well, we might need to at least have a platform ... 
05 07 56 01  CDR    Yes.
05 07 56 27  CMP    Okay, now, Neil, when you feel us contact, you're going to turn ... seconds, is that right?
05 07 56 33  LMP    That's right.
05 07 56 34  CMP    Okay, Buzz.
05 07 57 12  LMP    We got a platform to make.
05 07 57 13  CDR    Okay.
05 07 57 32  CDR    I'm not going to do a thing, Mike; I'm just letting her hold in ATTITUDE HOLD.
05 07 57 38  CMP    Okay.
05 07 57 55  CDR    I think we ought to be at 4 JETS for this, ... AGS.
05 07 58 04  LMP    HOLD.
05 07 58 13  CDR    ... 
05 07 58 42  CDR    He's about 15 feet out now.
05 07 58 45  LMP    Okay, I'd better try out the radar.
05 07 58 52  CDR    Don't you want to beef up that radar?
05 07 58 59  LMP    Yes.

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05 07 59 00  CDR    Good.
05 07 59 06  CDR    Ready to pull the circuit breakers?
05 07 59 08  LMP    Okay. You ready?
05 07 59 10  CDR    Yes.
05 07 59 12  LMP    They're pulled.
05 07 59 14  CDR    He's 10 feet. About 5 feet, I guess.
05 07 59 23  CDR    Looks good, Mike.
05 07 59 35  LMP    Okay, they're pulled.
05 07 59 39  CDR    Pull it out.
05 07 59 40  LMP    Okay. Circuit breakers - -
05 09 04 08  LMP    Now, here are a couple of bags - and I think it's self-explanatory what goes in them.
05 09 04 14  CDR    Yes.
05 09 04 18  LMP    ... water.
05 09 04 41 LMP Now, where are those things?
05 09 04 44 CDR They're at the over . . .
05 09 04 55 LMP Maybe I could slide out of here . . .
05 09 05 20 LMP Hey, Michael, you all tied up there?
05 09 05 25 CMP . . .
05 09 05 27 LMP Get ready for those million-dollar boxes. Got a lot of weight; now, watch it.
05 09 05 52 CMP You intend to keep . . .?
05 09 05 57 CDR Yes.
05 09 06 14 LMP That's all your input, are you sure?
05 09 06 17 CMP Yes.

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05 09 06 18 LMP Okay.
05 09 06 32 LMP Use what?
05 09 06 34 CDR Use lithium hydroxide.
05 09 07 06 CDR That thing still doesn't fit. No, they didn't fix it.
05 09 07 10 LMP Huh?
05 09 07 11 CDR They didn't fix it. I had thought somebody had mentioned it, at least.
05 09 07 19 LMP . . .
05 09 07 20 CDR What?
05 09 07 21 LMP . . .
05 09 07 24 CDR Get some tape.
05 09 07 26 LMP Yes.
05 09 07 29 CDR Still got some here?
05 09 07 30 LMP Yes.
05 09 07 31 CMP . . .
05 09 07 35 CDR Okay.
05 09 08 54 CDR Do you want to vacuum off any of those - those . . . spills or anything?
05 09 09 07 LMP Well, that's . . .
05 09 09 22 CDR Oh, the tape, I guess.
05 09 09 25 LMP Want tape?
05 09 09 26 CDR Yes, please.
05 09 09 27 LMP Here you are.
APOLLO 11 - Onboard Voice Transcription

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05 09 10 35  LMP  About how many pictures did you take with the closeup camera?

05 09 10 39  CDR  I don't know; 30 maybe, 40?
05 09 11 05  LMP  I hope I took the thing apart correctly.
05 09 11 07  CDR  Push the cutter bar down first?
05 09 11 08  LMP  Yes.
05 09 11 07  CDR  It's all right, then.
05 09 11 29  CDR  How are you doing?
05 09 11 32  CMP  Can't hear you.
05 09 11 33  CDR  (Laughter) Well, that stuff can't tell; think of Bobby...
05 09 11 42  LMP  Say, you did get a couple of hard ones in there, didn't you?
05 09 11 46  CDR  Yes.
05 09 12 15  LMP  I guess we leave this here or do you want to take it up?
05 09 12 19  CDR  I'd leave that here.
05 09 12 22  LMP  That might be a little hard to explain.
05 09 12 24  CDR  Yes.
05 09 12 42  CMP  Hey, Neil?
05 09 12 43  CDR  Yes?
05 09 12 44  CMP  . . .
05 09 12 53  CDR  Okay.
05 09 12 54  CMP  . . . get rid of this . . .
05 09 12 58  CDR  Okay. If you want to have a look at what the moon looks like, you can open that up and look. Don't open the bag, though.

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05 09 13 29  CDR  You'd never have guessed, huh? (Laughter)
05 09 14 00  CDR  What did you do with that checklist?
05 09 14 03  LMP  It's back yonder.
05 09 14 05  CDR  What?
05 09 14 07  LMP  It's behind the hatch.
05 09 14 17  CMP  What was that bag . . .?
05 09 14 20  CDR  Contingency sample.
05 09 14 23 CMP Rock?
05 09 14 25 CDR Yes, there's some rocks in it, too. You can feel them, but you can't see them; they're covered with that - graphite.
05 09 14 39 CMP . . . compared to -
05 09 14 45 CDR Looks like powdered graphite to me.
05 09 14 46 LMP Say, you got a screwdriver, Mike?
05 09 14 48 CMP Yes.
05 09 14 50 LMP Yes?
05 09 14 51 CMP Yes, I guess I have; just a second.
05 09 14 53 CDR You know, that - that one's just a bunch of trash that we want to take back - LM parts, odds and ends, and it won't stay closed by itself; we'll have to figure something out for it.

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05 09 17 05 LMP Okay. It looks to me like - what we're going to do is vacuum you out and get you out of here. I'll - throw the switches down there.
05 09 17 16 CDR How about the data bag?
05 09 17 18 LMP No, I need this bag.
05 09 17 20 CDR Well, I've got one here. I'll go try to get some more - when I go over. Okay?
05 09 17 26 LMP Okay. Give me the vacuum tube.
05 09 17 38 CDR Let me get my back to you first.
05 09 19 02 LMP Need a PPK.
05 09 19 05 CDR Huh? I guess they're in here. PPK's?
05 09 19 20 LMP I guess they're over here.
05 09 19 51 CDR . . ., you know? (Laughter)
05 09 19 54 LMP Get your circuit breakers pushed, AUDIO control circuit breakers?
05 09 20 06 CMP . . .
05 09 21 13 CMP How are you doing?
05 09 21 16 LMP It's filthy.
05 09 21 18 CMP Does all this stuff come in here?
05 09 22 09  CDR    Well, I guess that ought to do it.
05 09 22 20  LMP    Okay.
05 09 26 13  CDR    . . .
05 09 26 14  LMP    Yes.
05 09 26 15  CDR    . . .
05 09 26 17  LMP    Just a minute.
05 09 26 36  LMP    Say, I need some of those data books.

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05 09 27 59  LMP    Where did you put the book? Where did you put the first one? In here? Okay.
05 09 28 28  CDR    . . .
05 09 28 33  LMP    No, we can leave those two here. No, I don't want either of those two. No, I think the others might be -
05 09 28 55  CDR    . . . we leave these bags here.
05 09 28 59  LMP    Okay.
05 09 29 18  LMP    Hey, have you been over it, Mike?
05 09 29 21  CMP    . . . really . . .
05 09 29 31  LMP    How about calling them and asking them for - if those angles are still good? Right at lock-lock with them?
05 09 29 43  CMP    . . . last time . . .
05 09 29 47  LMP    Oh, okay. I'm sorry.
05 11 00 26  CC    . . .
05 11 00 34  LMP    It's not, but I'll get it off.
05 11 00 36  CDR    Okay.
05 11 00 41  CC    Roger. We were seeing - believe it or not, we were seeing some funnies on the Eagle's rendezvous radar - -
05 11 00 48  LMP    What do you do with it?
05 11 00 49  CC    - - and that was the only theory that we had - it looked like it was a good one.
05 11 00 52  LMP    Hey - what do you do with it?
05 11 00 54  CMP    Just turn it down to off.
05 11 00 56  LMP    This goes off - -
05 11 00 57  CMP    No, no, no, no, that's not the one - it's this switch right next to that IMU - -

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05 11 01 00  LMP    Oh.
05 11 01 01 CMP - - Buzz. Okay, that one, just turn it to - turn it to position 1 - extreme left; that one. There you go. Thank you.

05 11 01 18 LMP I thought you were going to be doing VHF RANGING on the darn thing because we had it set up for - VHF . . .

05 11 01 24 CMP I don't know where . . . other than that.

05 11 01 31 LMP That was to - -

05 11 01 35 CMP You ought to check the flight plan, it doesn't mention the (laughter) probe or the drogue. It says I remove my hatch, and then I notify you that you're clear to open your hatch.

05 11 01 49 CMP Huh?

05 11 01 58 LMP Oh, no.

05 11 01 59 CMP So, that's just the contingency.

05 11 02 04 LMP No, negative.

05 11 02 06 CMP That's the contingency.

05 11 02 08 LMP We move the drogue there. . . .

05 11 02 11 CMP We've got to reach down and grab that extension handle and all that good stuff.

05 11 02 26 LMP That was alright, we understand.

05 11 02 47 CDR Yes.

05 11 03 09 CMP Damn! My ears hurt from wearing this thing.

05 11 03 15 LMP How are the earpieces - inside . . .

05 11 03 22 CMP . . .

05 11 03 24 LMP . . .

05 11 03 26 CMP Yes, I hate those damn . . .

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05 11 03 28 LMP Yes, they're not - . . .

05 11 03 32 CDR Yes. I believe - Did you hear any noise during - you didn't hear any noise during descent, did you? . . .

05 11 03 38 CMP . . .

05 11 03 39 CDR How about during lift-off?

05 11 03 41 CMP . . .

05 11 03 46 CMP How was lift-off? How did lift-off feel?

05 11 03 48 LMP Well, there was a little - little blast - then we started moving; then we could see all those - -

05 11 03 56 CMP . . . were you very stable; I mean, you just sort of floated up or was there a bunch of rattling around?
The floor came up to meet you. I think it multiplied g by ... it was about at lift-off - maybe - half a g or two-thirds of a g.

Well, you know, - well, just looking at that one sample, it was - I'm surprised you didn't have a lot more dust. Now you saw dust during descent, I think, around 40 feet, something like that, 30 feet maybe.

Yes it was - -

But it's pattern is such that it sprays out horizontally, and it doesn't really come up and engulf you, huh?

All the stuff looks like very light tan and gray, you know, that's - that's the color of it. When you get right up there to it, when you see it, why that isn't the color at all.

Dark - battleship gray, isn't it?

Maybe not - I don't know - -

Well, what kind of - -

- - what stuck to the spacecraft, I think you can see afterwards - -

What do you think it is from the - geology standpoint, is it basalt dust?

Well, do the rocks - do the rocks all look the same? They're different - good, great; I'm glad to hear it.

There's really a tremendous -

Little sparkly stuff; quite a bit of it all over.

I'll be damned; I'm glad - I'm glad it wasn't just - -

Yes, is that right?

Luckily, you were able to get a little bit of everything. I mean, were the rocks - I mean, how did you - did you go around and - just pick up rocks, put them in - in - -

We were kind of rushed, if that's what you mean.

Yes.

Great, great. Yes, it's - beautiful. Man, that's beautiful. It doesn't make a dip whether ... and all that, I mean you know, they mapped the area and all that - -

Eventually, it does - -

Huh?

Well, eventually, it does - it shows the ... - you can see those - ...
That's great; fantastic! That'll keep those geologists jumping for years.

Yes, you got to keep. . . No, that's right, you got a 6-foot pole, you just stick
. . .

Sort of like wet sand - -

- - about that far.

Is that right? I don't know. I'm inclined to. . .

. . . Is this yours?

You yawed right 13 degrees? What's nominal?

Yaw left 13 degrees.

Ah so, ah so.

I guess the main thing on this stowage is to make sure it's reasonable for the g's
we'll get during TEI and sometime on the way home we can get everything all
squared away for. . .

No, I'm in no rush. Go ahead - go ahead and get everything all packed away; I
hate to have - a couple of suits out. If you want to air it for a while, go ahead and
get the hose to it, and - I'm in no rush. I'll take this thing off after you guys are
done there.

. . .

Yes. Is that right?

You finally got it level, huh? What was that thing that you said it was supposed to
be concave but it was convex?

Yes, yes.

. . . looking down there. . . sure looked like it was convex. . . Neil
walked back a little later and it was right smack in the middle. . .

But there's all different kinds of rocks, huh, or at least several different kinds?
Well, how. . .

. . .

Well, did - when you look - when you're walking around or just looking out the
window of the LM, did it appear very homogeneous? Everything sort of the same
color and all, or did it look. . .?

. . .

It's that dark battleship gray like?

When you looked down sun, it's very tan, very tan.
When you looked down sun, it looks almost white, just a reflection from the sun.

Well, ... as it goes out ... while on earth it gets ... in the atmosphere ...

Yes.

... that might be indicative of why ... ...

Yes.

Neil, when you get a hand, would you push that little goddam valve down to DUMP? Never mind, never mind.

... be sure and get the right one ... -

It's the lower valve on the lower panel - lower left; that guy right there. Yes, that guy right there; put him down to DUMP. Dump's easy; fine; set the clock.

Here's one.

... for the hoses? Well, check the ends of the hoses.

Well, why don't you leave the vacuum cleaner; I think you just got ... now the other one -

No, this one's got ...

Okay. Now the one I got is for my hose over here which doesn't have -

How big are the rocks that you just scurried around and picked up with the tongs? Good gravy! Beautiful! Just crack those guys open and get a - you know, virgin interior of them in a vacuum, and they'll have a ball. ...

Hey, the Velcro - the Velcro around them sort of ...

Huh?

I said, this is my field geology ...

Right.

... We could move - we could move that bag - it's no big thing, we can move the bag. Don't worry about it; we're going to leave it this way for TEI, right? Might as well.

Good day, I don't know. It's - I tell you, it's not a bad way to live, with that couch in there - I sort of - oh, yes, I agree; we can put two up and one down - ...

Yes, we could put the couch up now if you want to do that.
Yes. Maybe it - maybe it would make more sense to put the couch up now. Why don't you let me wrestle with the couch before we do anything more to this damn poor L-shaped bag?

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Alright. And we're - we're LOS here for a while anyway, 131 -

Here's about where we are, . . . Yes, this is the handiest little thing you've ever seen. . . . goes right in the helmet side, won't come out, and you can grab hold of anything you want, and there it is, it won't . . .

(Laughter) . . .

(Laughter) . . .

. . . all this little stuff . . .

. . . is this optional - sort of - . . .? Huh?

No, optional . . .

No, no, this is - used for the intervalometer?

. . .

. . . might have some layers on the wall of that crater. It just occurred to me that - that's got to be the result of . . . of some sort . . .

. . . is looking good.

Think so.

A little more.

You got to do what, Neil?

I don't think it's harder to . . . than it is - at orbital speeds. . . . There just isn't any way really of . . . altitude - or the size of this thing.

We're in INERTIAL, aren't we?

No, you want to go to INERTIAL?

I wonder if Neil has made any preparations?

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What's your altitude?

. . .

I guess we could put - . . . to . . .

Hey, Neil, I think this - this does have something . . .

Alright.

. . . Now it's on the other side. No, down, down . . .
What did you have on . . .?
No, that side. Yes, it was down to 3. He called 30 seconds at one time.
Yes, . . .
Yes, he called 60 seconds; then I heard him call 30 seconds.
Yes.
. . . I got it, thank you.
Well, it's held under that forward-velocity unit.
How's that?
With the . . ., I don't see how you can -
Leaving on your . . . in here?
I think - you had that same pair on all the time.
Is that the . . . - sitting there?
Yes, here it is.
Let me put it down here. Bring it on down. Over here. Put them all in one place.
You ready for your underwear? Mike - you ready for your underwear? You ready for your underwear?
Just a minute; yes.
. . . - put our - LCG.
Yes.
Somehow we'll figure a way to . . .
2 feet per second.
You didn't maintain that 3-1/2 feet per second down there.
(Laughing)
Well, I hope - I hope they have the data that shows just what we did have at contact when they can get photographs . . . all the film we got.
Yes.
Well, I really couldn't put the . . . no place, not that I'm sure of it, but my light came on, why, . . . hit.
Yes, that's sure - the way that thing was working - the way that thing was working and stayed locked on all the way down - Gees, it was a beautiful thing.
You mean you didn't . . .?
Getting all the damn alarms.
Boy, I thought for a while there that some of those might get a little . . . - . . .
I'd reset the program alarm in time for a . . . out of there.

Will that one do? . . .

Are you staying in this inertial attitude? Let's just leave it in REACQ then; it works just like a charm.

Yes, that's right.

How about that?

Beautiful.

405 and 404 - What's the matter with it? (Laughter)

403 I think we . . .

. . . alignment, oops, I got 404 again.

How about that, wise asses! Huh?

You had a - you had to work through, didn't you?

. . . O2 fuel cell's . . .

This is not dumping.

I figured that.

Did you try the other line?

Well - no, I haven't tried a whole number of alternatives. In fact, number 1 is not dumping. My guess would be that it's something to do with this connection in the UCD or something like that. When you try to dump your . . . regular urine bag, . . . It's so goddam smelly, I hate to grab it and dick around with it, but I guess I got to.

Not entirely. I think I'd rather stick around . . .

. . .

How long does it take to warm up this thing? 3 hours?

. . .

What state vector is in the LM slot? The LM?

. . . minus a few feet per second. . . .

Well, we got something in the LM slot . . .

Well, that's just an old vectors, because I never did VERB 66, I don't think, after . . .

We got 22 feet per second. Almost have to be LM - previous to the SEP burn.

Well, when it gets to be light, we got to . . .
Well, we probably ought to - . . . TPI.

Yes, the maneuver . . . right amount of . . .

. . . give me a waste bag. . . .

Yes, just . . . a lot . . . there.

It was back here.

Yes.

Who took the roll of tape?

Isn't it in its place? Closet?

No, no, it's not in there. It doesn't have that closet anymore. The last I saw it, it was up on the MDC. I gave it - I handed it to one of you guys to -

Yes, I stuck it someplace.

Let's invent a new home for it because that old home is full of that smelly old urine bag.

The floodlight isn't - hasn't even made the bottom of the package warm yet, fellows.

Well, when it goes up there, we'll have to put it up here.

I got the tape - right underneath your couch. Okay?

Alright.

Okay, we need a new home for the tape. Anybody got any good suggestions?

Okay?

Alright.

We believed you, though.

(Yawn)

. . .

Go ahead.

I think we had a . . .

Not a burn . . .

Oh, God, why . . . (laughter) . . .

. . . but right now, I am for a nice beer.

. . ., some water here. Mike, do you remember trying to get water into a grapefruit-pineapple drink?

No, don't do it.

Yes.
Don't do it.

Couldn't get it in, huh?

No.

..., Buzz?

... some of that.

There's a piece of that great bread that has mold all over it.

You got the flight plan?

...

...

Probably are. I purged them this morning when I woke up, Buzz. Probably did the hydrogen as well.

47, 32, 47?

That was quite a wild gyration for docking.

It was.

Son-of-a-bitching - -

You did a pretty good ... 

If I'd known how it was going to develop, I wouldn't have gone as far with the bottle as I did. I was in the habit of it, you know, as soon as contact is made, I look at it. It looks okay, I fire the bottle right away.

...

No, I would.

...

No, no.

...

... No sooner than I fired that goddamned bottle, than wow; and away we went.

...

No - they're way down so, I don't know - just ... 

Then, when I fired the bottle, and then, just about all that came ... since the thing started, I went back to CMC, AUTO, ... bothering me. And just about that time all those ... , my God, those flashes ... I thought they were ... I thought we were ...

... I mean later on ... all those ...

Look at this.
05 13 37 08  CDR   Yes.
05 13 37 09  LMP   Figured nobody could see where we were . . . .
05 13 38 08  CMP   Hey, did we decide the . . . back?

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05 13 38 38  CMP   No, the data should go to the log . . . The only good thing there you can say about it is . . .
05 13 38 55  LMP   . . . you guys. . . . love them . . .
05 13 39 51  CMP   All that probe and drogue and claptrap works; all that EVA transfer, you can forget about that and all those crazy procedures for taking that probe apart.
05 13 40 12  LMP   At least, we can forget them until the debriefing.
05 13 40 14  CMP   Yes (laughter).
05 13 40 55  LMP   . . .
05 13 41 23  CMP   This thing . . . make a great . . .
05 13 42 04  CDR   Picked up the CSM problem.
05 13 42 38  CMP   I've never thought about it.
05 13 42 50  CDR   . . .?
05 13 42 51  CMP   No.
05 13 42 54  LMP   All at once.
05 13 43 19  CDR   None of them.
05 13 44 31  CDR   Yes.
05 13 44 44  CDR   . . . long time.
05 13 44 51  CMP   It's . . .?
05 13 45 34  CDR   You got something . . .?
05 13 45 38  CMP   Yes. Yes, sir. Purring across the deep. Okay. Look at that.
05 14 57 22  CDR   Yes. We can get VERB 64 before we come over the hill and see what looks good.
05 14 57 28  LMP   Okay. LOS.
05 14 57 30  CDR   Okay. I'm ready to proceed now.

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05 14 57 34  LMP   Do it.
05 14 57 37  CDR   Here we go.
05 14 57 42  CMP   Say, you guys, . . . anything you want to do?
05 14 57 56  CDR   I got to make a star check, yet.
05 14 58 07 LMP You're not going to fool around with that camera anymore, are you?
05 14 58 09 CDR No.
05 14 58 11 CMP I'll take care of it for you.
05 14 58 13 CDR Post - we might - after post - after PDI if you can put it somewhere where you can get at it. Going away from the moon. I just didn't want it in my way - -
05 14 58 25 CMP Get all - -
05 14 58 26 CDR Well, yes, pull it - pull it out of the way.
05 14 58 27 LMP Neil, the handle -
05 14 58 29 CDR I have it right here. That durn near has a roll in it - it -
05 14 58 38 CMP I'll bet you . . . likes this.
05 14 58 42 CDR No. I don't care about any - Well, if it's annoying - let me - I can get it if it is. . . . star check . . . I don't care about . . .
05 15 00 00 LMP What's that pad say about horizon on the 100-degree - -
05 15 00 05 CMP 2 minutes prior, 100-degree line,
05 15 00 18 CDR You got double lines?
05 15 00 19 CMP Yes, I got double line on the 30, so I can use that as a head position . . . look down between them.
05 15 00 25 CDR They're not - they're not parallel? Can you see in the one-eye position?

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05 15 00 30 CMP What I'm saying is, on the 30 degree, I have both panes of glass - -
05 15 00 34 LMP Yes.
05 15 00 36 CMP - - and if you line those up then, then is your eye in the right position for all the others?
05 15 00 39 LMP Yes.
05 15 00 40 CMP Okay.
05 15 00 41 CDR What's the shaft and trunnion number?
05 15 00 45 CMP 1511.
05 15 00 47 CDR What? 1511?
05 15 00 52 CMP 151 - -
05 15 00 54 CDR 1511.
05 15 00 55 CMP We're a long way from being there, Neil; we're rolling over at a very slow rate.
05 15 00 58 CDR Okay.
05 15 01 00 CMP You want an extra . . . - we got a lot of gas - -
05 15 01 01 CDR No, no, no.
05 15 01 02 CMP  Be happy to zip on around.
05 15 02 16 CMP  This thing is taking forever to get around here; we've got 20 minutes to TIG. I think I'll speed it up a bit, if you don't mind.
05 15 02 24 CDR  Hey, you got - 1, 0.1, point 1 you mean?
05 15 02 29 CMP  Yes.
05 15 02 44 CMP  You know, if you hit this hand controller like you do in the simulator, MINIMUM IMPULSE, just bang it, it'll bang over and bang back, and it'll fire two opposing pulses, and you get nothing. You know that?

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05 15 02 53 CDR  (Laughter) Yes.
05 15 05 18 CMP  Oh, shit. . . . yaw out 14 degrees. Why in the hell didn't I do that? Read that number wrong.
05 15 05 29 CDR  Yes, it should have been 1.4 degrees yaw.
05 15 05 37 LMP  That "1" gets moved over so far.
05 15 05 40 CMP  Yes, the goddam "1" in this computer, you know - trunnion angle, it's there; DELTA-V, it's there; angles, it's there. It's probably over here for something although I can't think for what, but there, there, there, and there, of course - there is four places.
05 15 05 55 LMP  Okay, we're there, Neil; by the time you can get down there and get your eyeball out the window - -
05 15 05 59 CDR  Hey, what did you do with those numbers again?
05 15 06 01 CMP  Oh, we'll crank them in the computer.
05 15 06 03 CDR  Oh, I got them.
05 15 06 08 CMP  Questioning the accuracy of the computer?
05 15 06 14 CDR  . . .
05 15 06 23 CMP  Okay, you satisfied with that?
05 15 06 24 LMP  ENTER.
05 15 06 27 CMP  Give me the numbers.
05 15 06 29 CDR  1519, CMC OPTICS ZERO, OFF, VERB 41, NOUN 91.
05 15 06 37 CMP  You mean after I went to all this work of cranking those numbers in you're going to drive back to zero?
05 15 06 43 LMP  We got PROGRAM ALARM and an OPERATOR ERROR.
05 15 06 46 MS  (Laughter)
05 15 06 47 CMP  Christ. Give me the numbers, 1519 and what?

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05 15 06 54 LMP  It won't pass with that number.
05 15 06 58 CDR 1511 - 357.
05 15 07 01 CMP 357, okay.
05 15 07 15 CMP 357 and 1511. There's supposed to be a star there.
05 15 07 26 CDR That's right, if you put them in - in the right order. That 151.1 is shaft.
05 15 07 36 CMP Yes. I got a star in the - in the sextant.
05 15 07 38 CDR Good, it passes. Let's press on.
05 15 07 41 CMP I'm not sure it's Gienah.
05 15 07 43 CDR Good. There'll be no way of telling - You got 16 minutes until TIG. Did it pass?
05 15 07 51 CMP OPTICS ZERO - -
05 15 07 52 CDR OPTICS ZERO and MANUAL. The mode is manual already, isn't it? Okay?
05 15 07 59 LMP Alright. VERB 37, ENTER; 40, ENTER. Okay.
05 15 08 08 CDR Okay, BMAG MODE, three, to RATE 2.
05 15 08 13 CMP BMAG MODE, three, to RATE 2.
05 15 08 15 CDR SPACECRAFT CONTROL, CMC, AUTO.
05 15 08 19 CMP CMC, AUTO.
05 15 08 23 CDR Proceed.
05 15 08 25 CMP I'll proceed with this . . .
05 15 08 27 LMP Huh? . . . Don't you like this one? Alright.
05 15 08 33 CMP Let's not proceed.
05 15 08 35 LMP Alright. Stand by. Align spacecraft in roll. Already there.
05 15 08 41 CDR GDC align.

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05 15 08 44 CMP Okay, that's a good one. One - standby 1, and I'll get that.
05 15 09 33 CMP Okay. GDC aligned.
05 15 09 39 LMP Circuit breakers: STABILIZATION CONTROL, panel 8, CLOSED.
05 15 09 41 CDR STABILIZATION CONTROL circuit breakers are CLOSED.
05 15 09 52 LMP Okay. SPS circuit breakers - eight of them, CLOSED. Twelve of them closed.
05 15 09 57 CDR SPS, 12 of them closed - 2, 4, 6, 8, 10, 12, CLOSED. Okay?
05 15 10 15 CMP . . .
05 15 10 20 CDR Say again.
05 15 10 22 CMP I lost my clip.
05 15 10 24 LMP ATT DEADBAND, MINIMUM.
05 15 10 26  CMP  ATT DEADBAND, MINIMUM.
05 15 10 27  LMP  RATE, LOW.
05 15 10 28  CMP  RATE, LOW.
05 15 10 29  LMP  LIMIT CYCLE, ON.
05 15 10 30  CMP  Okay.
05 15 10 32  LMP  MAN ATT, three - RATE COMMAND.
05 15 10 34  CMP  MANUAL ATTITUDE, three, to RATE COMMAND. They are.
05 15 10 41  LMP  BMAG MO - BMAG MODE, three, to RATE 2.
05 15 10 46  CMP  BMAG MODE, three, to RATE 2.
05 15 10 51  LMP  ROTATIONAL CONTROL POWER, DIRECT, two of them, OFF.
05 15 10 53  CMP  Okay; OFF, OFF.

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05 15 10 55  LMP  SCS TVC, two, to RATE COMMAND.
05 15 10 59  CMP  RATE COMMAND, RATE COMMAND.
05 15 11 02  LMP  TVC GIMBAL DRIVE, PITCH and YAW, to AUTO.
05 15 11 05  CMP  AUTO, AUTO.
05 15 11 09  LMP  What's the time?
05 15 11 11  CMP  We have 12 minutes to go.
05 15 11 54  CMP  Got the HELIUM VALVES, AUTO and barber pole?
05 15 11 58  LMP  I'll get those.
05 15 12 00  CMP  Okay. I was just wondering if they were on - not questioning your checklist, just out of curiosity.
05 15 12 29  LMP  You going to pitch up after the burn?
05 15 12 33  CMP  Sounds like a good idea; let's look at the moon after the burn. That'll give us high gain, right?
05 15 12 41  LMP  Check.
05 15 12 52  CDR  Okay, 10 minutes until TIG.
05 15 12 55  CMP  Alright.
05 15 13 10  CDR  It's hot in here, isn't it?
05 15 13 17  LMP  . . . boiling any water.
05 15 13 21  CDR  You do it all?
05 15 13 22  LMP  No. It's not too hot, it's 65.
Those temperatures are deceptive. I don't know where they measure it, but the cold point is -

**Ok, 10 degrees - 2 minutes.**

2 minutes; that's more like it, there.

... this COAS as far as steering and everything goes, it's hopeless.

There's only one really bad mistake you can make there.

**Shades of Gemini.**

It is most important that we be going forward (laughter).

Shades of Gemini retrofire, are you sure we're - (laughter) - No, let's see - the motors point this way and the gases escape that way, therefore imparting a thrust that-a-way.

Yes, horizon looks good.

Okay, we got 8-1/2 to TIG.

Somewhere along the line, I think I'll trim this maneuver just for the hell of it. Would this be a good time to do it, Buzz, at 8 minutes prior? You don't care when I do it, do you?

No, it probably would be after we - when the gimbals are out.

Oh, yes, alright. Okay.

Beautiful looking horizon, it's hard to describe.

We can see it if we look through that thing you have.

Where's . . .?

Here or here? God, it has an eerie look to it. It's not a horizon, it's just a band.

You won't be able to see it, Neil, . . .

Which way? This way. Plus X . . .

It was really eerie when it first came - -

You got to look through the part of the window that isn't -
05 15 16 20  CDR  Yes. And the way the terminator is, you don't see the whole moon at all, you just see a - -

05 15 16 24  CMP  I know, I was looking at it upside down for a while.

05 15 16 27  CDR  Yes, and then that scares you, because that says you're going retrograde, right? Well, let's see, if it's upside down, you're going backwards.

05 15 16 33  LMP  Yes.

05 15 16 40  CDR  Okay, it looks good, I'll tell you.

05 15 16 44  CMP  Alright, we're coming up on bus tie time; we've got a little over 6:50 until TIG.

05 15 17 05  CDR  Ready for the bus ties.

05 15 17 07  CMP  Yes, sir. Whenever you are; it's about 6 minutes.

05 15 17 10  CDR  . . . ON, verified.

05 15 17 15  CMP  Okay.

05 15 17 16  CDR  . . . , ON. . . and a half.

05 15 17 22  CMP  Alright.

05 15 17 26  CDR  Okay. TVC SERVO POWER 1 to AC1.

05 15 17 30  CMP  1 to AC1.

05 15 17 32  CDR  2 to AC2.

05 15 17 33  CMP  2 to AC2.

05 15 17 34  CDR  TRANSLATIONAL CONTROL POWER, ON.

05 15 17 36  CMP  ON.

05 15 17 38  CDR  ROTATION CONTROL POWER, NORMAL, number 2, AC.

05 15 17 41  CMP  AC.

05 15 17 44  CDR  Arm ROTATION CONTROLLER, number 2.

05 15 17 46  CMP  ARMED. So far, so good.

05 15 17 59  CDR  Okay. When do you want the gimbal motors on?

05 15 18 01  CMP  Oh, at about 5-1/2 minutes.

05 15 18 04  CDR  Okay, that's right now.

05 15 18 05  CMP  Right now?

05 15 18 06  CDR  Yes.

05 15 18 07  CMP  Okay.

05 15 18 08  CDR  Here comes PITCH 1, ready?

05 15 18 09  CMP  No.
05 15 18 10  CDR  Wait a minute. Okay. Go.
05 15 18 11  CMP  PITCH 1.
05 15 18 12  CDR  PITCH 1 -
05 15 18 13  CDR  MARK it.
05 15 18 15  CMP  Got it.
05 15 18 16  CDR  YAW 1 -
05 15 18 17  CDR  MARK it.
05 15 18 18  CMP  Got it.
05 15 18 19  CDR  Okay. TRANSLATION CONTROLLER, clockwise.
05 15 18 22  CMP  Clockwise.

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05 15 18 24  CDR  Verify no MTVC.
05 15 18 28  CMP  Verified.
05 15 18 32  CDR  GIMBAL MOTORS, PITCH 2, YAW 2, OFF.
05 15 18 34  CMP  PITCH 2 -
05 15 18 35  CDR  MARK it.
05 15 18 36  CMP  Got it.
05 15 18 37  CDR  YAW 2 -
05 15 18 38  CDR  MARK it.
05 15 18 39  CMP  Got it.
05 15 18 40  CDR  Okay. Set GPI trim.
05 15 18 43  LMP  Alright, where are they on this pad? Let's see, that's plus - -
05 15 18 46  CDR  Minus - on pitch, minus 0.6.
05 15 18 50  LMP  Okay, minus 0.6. Very good.
05 15 18 52  CDR  Plus 66.
05 15 18 55  LMP  And plus 6 - -
05 15 18 56  CMP  0.6.
05 15 18 57  LMP  Okay, Neil, those look good to you? They look good to me.
05 15 19 00  LMP/CDR  . . .  0.6 - 0.6 - 0.6  . . .
05 15 19 02  CDR  Okay. GPI set. Verify MTVC.
05 15 19 09  CMP  Okay. MTVC verified; I'm on trim now.
05 15 19 18  CDR  Proceed to trim.
Does it look to you like the ... the right way?
Yes.

Alright. ... we're coming up on ... out to your right.
Okay.
Okay, verify MTVC.
Verified.
TRANSLATION CONTROLLER, NEUTRAL.
NEUTRAL.
GPI return to zero, zero.
It does.
ROT CONTROL POWER, NORMAL, number 2, to AC/DC.
AC/DC.
SPACERCAFT CONTROL, CMC.
CMC.
Trim.
We did.
Okay. BMAG MODE, three, to ATT 1/RATE 2.
ATT 1/RATE 2.
ENTER.
ENTER.
Verify CMC.
CMC verified; AUTO verified.
Proceed.
Okay, for the GIMBAL DRIVE. Up, down, zero. Up, down, zero. Okay, standing by for P-AX, OFF; and the Y-AX, OFF.
MARK it.
Good trim.
ROTATIONAL CONTROL POWER, DIRECT, two, MAIN A/Main B.
MAIN A/Main B.
SPS HELIUM VALVES, two of them, verified AUTO; LIMIT CYCLE, OFF.
05 15 20 34  CMP  Okay, LIMIT CYCLE's OFF.
05 15 20 36  LMP  FDAI SCALE, 50/15.
05 15 20 38  CMP  50/15.
05 15 20 42  LMP  Okay, wait for 2 minutes for DELTA-V THRUST A.
05 15 20 46  CDR  2 minutes to get our horizon check at 10 degrees.
05 15 20 48  LMP  Yes, and - sneaking up on there, looks pretty darn good. Looks like we're darn near right.
05 15 21 10  CDR  Just about midnight in Houston town.
05 15 21 15  CMP  Yes.
05 15 21 16  LMP  Okay, coming up on 2 minutes, and this damn horizon check is going to be, would you believe, perfect?
05 15 21 23  CDR  I hope so.
05 15 21 24  LMP  Fantastic. First time we ever got a perfect horizon check. Spent too many hours in the simulator looking for an unreal horizon. Alright, horizon check passes.
05 15 21 37  CMP  Beautiful.
05 15 21 41  CDR  - - DELTA-V - -
05 15 21 42  LMP  TRANSLATION CONTROLLER, ARMED.
05 15 21 43  CDR  - - okay, DELTA-V THRUST A, NORMAL; stand by for a malfunction - it's not there. Very good.
05 15 21 49  CMP  Probably get the sun in your window on that burn.
05 15 21 51  CDR  Yes, I believe it.
05 15 21 52  CMP  The sun - -
05 15 21 53  LMP  ROTATIONAL HAND CONTROLLER, number 2, ARMED.
05 15 21 58  CMP  ROTATIONAL HAND CONTROLLER, number 2, is ARMED.
05 15 22 01  CDR  Alright.
05 15 22 04  CMP  Ullage is going to be 16 seconds at 2 JETS.
05 15 22 07  LMP  TAPE RECORDER is going to COMMAND RESET on the HIGH BIT RATE.
05 15 22 25  CMP  Got to go from STANDBY to NORMAL.
05 15 22 28  LMP  I'll do that in 35 seconds.
05 15 22 29  CDR  Ullage is 16 seconds, 2 JETS.
05 15 22 30  CMP  16 seconds, 2 JETS, confirmed.
05 15 22 40  CMP  Coming up on 1 minute -
05 15 22 42  CMP  MARK it.
05 15 23 03  CMP  Okay, stand by for 35 seconds.
05 15 23 07  CMP  MARK it -
05 15 23 08  CMP  DSKY blanks; EMS is in NORMAL.
05 15 23 13  LMP  Check.
05 15 23 17  CMP  Coming up on 15 seconds.
05 15 23 18  CDR  Okay, I'll get the 99.

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05 15 23 23  CMP  Okay. Stand by - -
05 15 23 24  CDR  ... valve?
05 15 23 25  CMP  - - stand by for ullage. Ullage.
05 15 23 28  LMP  Got the ullage.
05 15 23 42  MS  ... 5, 4, 3, 2 -
05 15 23 44  CMP  Burn! A good one. Nice - -
05 15 23 45  LMP  I got two balls - -
05 15 23 46  CMP  - - okay, here comes the other two - -
05 15 23 47  LMP  - - barber pole, gray, the other two are on good.
05 15 23 51  CMP  Man, that feels like g, doesn't it?
05 15 23 56  LMP  I caught up - I caught up for a short while, but ... 
05 15 24 03  CMP  ... pressures are good. Busy in steering, but it's holding right in there.
05 15 24 13  LMP  How is it, Mike?
05 15 24 19  CMP  It's really busy in roll, but it's holding in its deadband. Looks like it's holding instead of plus or minus 5, more like plus or minus 8 - It's possible that we have a roll-thruster problem, but if we have, it's taking it out. No point in worrying about it. Okay, coming up on 1 minute -
05 15 24 44  CMP  MARK it -
05 15 24 45  CMP  1 minute. Chamber pressure's holding right on 100.
05 15 24 46  LMP  ... time looks good.
05 15 24 48  CMP  Gimbals look good; total attitude looks good. Rates are damped out - a little bit. Still a little busy, light ... 
05 15 25 01  CDR  ... still ahead.
05 15 25 08 CDR  Should I be going . . .?
05 15 25 11 CMP  Follow the needle; follow the needle . . . Take it off. Okay. Looking good.
05 15 25 21 LMP  This was . . . - -
05 15 25 22 MS  . . .
05 15 25 24 CMP  How's that nitrogen pressure? Okay?
05 15 25 25 CDR  Yes.
05 15 25 26 CMP  Good.
05 15 25 36 CDR  . . . pressures are GO.
05 15 25 42 CMP  2 minutes -
05 15 25 43 CMP  MARK it -
05 15 25 45 CMP  Hits the end of that roll deadband, it really comes crisply back.
05 15 25 55 CMP  Okay; chamber pressure's falling off a little bit; now it's going back up; chamber pressure's oscillating just a tad.
05 15 26 04 CDR  10 seconds left, . . . - -
05 15 26 05 CMP  We don't care about the chamber pressure, . . . watch yourself for - brace yourself - Standing by for ENGINE, OFF.
05 15 26 11 CDR  It should be shutdown now.
05 15 26 15 CMP  Okay?
05 15 26 16 CDR  SHUTDOWN. 4 -
05 15 26 18 LMP  . . . going to gray and barber pole.
05 15 26 21 CMP  Okay?
05 15 26 22 LMP  Okay.
05 15 26 23 CMP  Let's look at what we got. DELTA-V TRRUST A and B are OFF - -

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05 15 26 26 LMP  A and B are OFF.
05 15 26 27 CMP  - - SPS valves, CLOSED?
05 15 26 29 LMP  Okay.
05 15 26 30 CMP  Stand by for the GIMBAL MOTORS.
05 15 26 31 LMP  Okay.
05 15 26 32 LMP  PITCH 1, OFF -
05 15 26 34 LMP  YAW 1, OFF.
05 15 26 38 CMP  Got it.
05 15 26 39  LMP  PITCH 2, OFF.
05 15 26 41  CMP  Got it.
05 15 26 42  LMP  YAW 2, OFF.
05 15 26 44  CMP  Got it. TVC SERVO POWER 1 and 2 are OFF?
05 15 26 47  LMP  OFF, OFF.
05 15 26 50  CMP  MAIN BUS TIE's coming ON - okay.
05 15 26 55  LMP  Proceed.
05 15 26 59  CMP  Beautiful.
05 15 27 02  CDR  X and - 0.2.
05 15 27 06  CMP  X and Z, 0.2 -
05 15 27 07  CDR  X and Z, good.
05 15 27 08  CMP  F. Okay, and Z is down. Okay, then - you want to record those - five balls - -
05 15 27 23  LMP  Let me record them - -
05 15 27 24  CMP  - - five balls, plus 0.0, and I call it 0.8, it was hanging on 0.7 for a while, and it was 
zeroed and down. I'd give them - it was 0.1 down - plus 0.1. Now it's on zero, shit.  
Can't read those residuals; they dance all over the place.

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05 15 27 40  CDR  Okay, the residuals were 0.1, 3.9, and point - -
05 15 27 46  LMP  Beautiful burn; SPS, I love you; you are a Jewel! Whoosh!
05 15 27 53  CDR  Alright - EMS FUNCTION, OFF.
05 15 27 54  CMP  EMS FUNCTION - -
05 15 27 55  CDR  EMS MODE to STANDBY.
05 15 27 57  CMP  STANDBY.
05 15 27 58  CDR  BMAG MODE, three, to RATE 2. DEADBAND, MAX - -
05 15 28 01  CMP  Three to RATE 2; DEADBAND, MAX - -
05 15 28 02  LMP  . . . OFF, . . . OFF - -
05 15 28 03  CDR  Got the burn time to be about 02:30. You in BIT RATE LOW?
05 15 28 08  LMP  02:30 or 02:31 - -
05 15 28 15  CMP  Okay. Let's go. ROTATIONAL CONTROL POWER, DIRECT, two of them, 
OFF?
05 15 28 23  LMP  OFF, OFF. Good show.
05 15 28 31  CMP  We want to pitch over, I guess. Don't know if it matters much which way.
05 15 28 40  CDR  Oh, probably -up will be the best - -
05 15 28 44  LMP  Pitch up.
05 15 28 46  CDR  - - to keep the moon in sight.
05 15 28 49  CMP  Alright, is that ROTATIONAL CONTROL POWER, DIRECT, two of them, OFF?
05 15 28 52  CDR  Yes, I do.
05 15 28 53  CMP  Circuit breakers - SPS PITCH 1, PITCH 2, YAW 1, YAW 2, OPEN?
05 15 28 56  CDR  They're open.

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05 15 28 58  CMP  Proceed.
05 15 29 00  CDR  I think you did that already.
05 15 29 04  CMP  Hey, Neil, you want to proceed on these?
05 15 29 05  CDR  Yes.
05 15 29 06  CMP  Okay, where do we go, P00? To get the HIGH GAIN?
05 15 29 11  CDR  We want - Yes, P00's good - and we want a VERB 48.
05 15 29 16  LMP  Yes. Get in P00 and do a VERB 83.
05 15 29 18  CMP  I'm going to go to SCS and pitch up in the meantime.
05 15 29 25  LMP  Find out where that - other state vector is.
05 15 29 33  CDR  Okay, we're in P00, now who wants what, VERB 48?
05 15 29 35  LMP  No - yes. VERB - oh, okay.
05 15 29 38  CDR  Ah - -
05 15 29 40  LMP  I don't know . . . -
05 15 29 41  CDR  Well, it says change spacecraft weight.
05 15 29 44  CMP  DAP update. Yes - -
05 15 29 45  CDR  You've got your - -
05 15 29 46  CMP  - - 10101 does change - it has been changed. Okay, we've done that.
05 15 29 52  CDR  . . .
05 15 29 53  CMP  . . . service module RCS - -
05 15 29 55  LMP  I've done that. Done that.
05 15 29 56  CMP  Oh. Okay - -
05 15 29 57  CDR  VERB 83.
05 15 29 58  CMP  - - RCS monitors checked - (Laughter) Okay, here comes Buzz's baby - VERB 83 - de-dum-de-dum-de-dum. Operator error (laughter).
05 15 30 08  LMP  ... you don't know how to do it.
05 15 30 09  CMP  (Laughter)
05 15 30 13  LMP  Look at that, would you? Look at that.
05 15 30 14  CMP  Isn't that beautiful?
05 15 30 15  CDR  Pretty good.
05 15 30 16  CMP  A thing of beauty is a joy forever.
05 15 30 22  LMP  Alright, now call the VERB 89 in and see which way that - -
05 15 30 25  CMP  Oh, come on, you're not serious.
05 15 30 45  LMP  ... know to find out which way the ... is -
05 15 30 50  CMP  Okay.
05 15 30 50  LMP  - - you were wrong. ...
05 15 31 07  CMP  Okay, we got to visually acquire moon, take pictures, and then you got a P52 to do.
05 15 31 15  CDR  ... some unknown reason - -
05 15 31 17  LMP  We haven't got any damned program ready to call up. ... It's the only way you can do it. Supposed to do a VERB 66 and then put numbers ... apogee ... and then look at altitude and altitude rate - -
05 15 31 34  CDR  What are you doing, Mike? What you taking pictures of -
05 15 31 40  CMP  Oh, I don't know. Wasting film, I guess.
05 15 31 43  CDR  You can take some pretty good pictures out of the hatch, here.

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05 15 31 46  CMP  You're right. This crapping thing - - - set on f:4 or 5.6; that's probably about right.
05 15 31 57  LMP  Here's a ring that came from somewhere; I wonder where (singing).
05 15 32 04  CDR  You want to take pictures over here? Go ahead, why don't you just set up that - -
05 15 32 07  CMP  I'll check window 3.
05 15 32 10  CDR  - - set up that tape and let it do its thing; it's still got a long way to go for ...  
05 15 32 15  LMP  Alright, now, do we want black and white, color, 250, or 80? I've got all options over here.
05 15 32 19  CDR  Oh, we'll probably want - How many cameras you got?
05 15 32 21  LMP  Let me have a camera. How many cameras?
05 15 32 23  CMP  Well, only one camera, but I've got ... lenses.
05 15 32 28 LMP  You're a poor . . .
05 15 32 29 CDR  Well, let's take some color, and -
05 15 32 38 CMP  Want the 80, right? On this one?
05 15 32 46 LMP  Yes, I think you want to get - -
05 15 32 49 CMP  Let me know when I'm in a - in a good attitude to stop this pitch. How about right now?
05 15 32 54 CDR  Stop. What are you doing?
05 15 32 56 CMP  I'm rolling.
05 15 32 58 LMP  What for? What do you want to roll for?
05 15 33 02 CMP  I was off in roll; I'm taking it back to where I should have been. This is a pretty good attitude right here, looks to me -
05 15 33 14 LMP  Alright, I've seen enough of VERB 83, Mike - -
05 15 33 16 CMP  Here you go.
05 15 33 20 LMP  - - unless you want to call a VERB 89.
05 15 33 24 CMP  Not me; I'd rather take pictures.
05 15 33 32 CDR  What time is AOS?
05 15 33 35 LMP  Haven't the foggiest.
05 15 33 36 CMP  It's 135:34.
05 15 33 40 CDR  That's right now.
05 15 33 42 LMP  Give me a VERB 51.
05 15 33 55 CDR  Anybody got any choice greetings they want to make to Houston?
05 15 33 58 CMP  No, I - the best burn I've ever seen in my life, I'll tell you. I guess you guys have seen two good ones today.
05 15 34 09 LMP  Oh, a couple.
05 15 34 11 CMP  Yes, more than two. AOS.
05 15 34 34 LMP  Yes, we sure as hell have.
05 15 34 38 CDR  Get the burn status.
05 15 34 41 LMP  Hey, I hope somebody's getting the picture of the earth coming up.
05 15 34 44 CMP  . . . Not quite pitched far enough. Well, maybe I can get it out - -
05 15 34 53 CDR  I can get around to here.
05 15 34 54 CMP  - - your window:
05 15 34 57 CDR  Upside down; turn the camera upside down; then it'll look right.

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