CAPCOM Hello America, Houston. Standing by.
CAPCOM America, Houston. Standing by.
CAPCOM America, America, Houston. Standing by.
AMERICA Hey, Houston, America. Man, you wouldn't believe it. I finally got my suit on.
CAPCOM Nothing to make you feel good like a new suit of clothes.
AMERICA Okay, let me give you some P52 stuff here.
CAPCOM Okay, shoot.
AMERICA I had to arc all over the sky before I could find some stars. Okay, let's see, here's star 14 and 25. Star angle difference was .01 NOUN 93 plus .065 minus .076 minus .102 and I torqued at 108:20:00.
CAPCOM Okay, copy.
CAPCOM America, are you pretty well caught up with time right now or can you give me some indication where you are?
AMERICA I'm checking it off here. Right now I'm at 108:10. I haven't changed the canister yet. Let me check and see if I can have time to do that or not. Okay, AM-VOX. Can you hear me now?
CAPCOM Sure, loud and clear.
AMERICA Okay, I've removed the umbilicals - the CSM LM umbilicals. Guess I need to install the probe and the drogue. I'll get those things done right now.
CAPCOM All right. I'll make a note of the canister and remind you of it later.
AMERICA Yeah, Okay.
CAPCOM Hey, America. Can you confirm that you've got a pair of sissors on board with you?
AMERICA (laughter) Yeah, I made him keep one.
CAPCOM Okay, that's good thinking.
AMERICA They couldn't ever find the other set, either.
CAPCOM Okay, get hungry without those.
AMERICA (laughter) It sure does. (laughter).
CAPCOM We could hear your probe and drogue banging around there. It sounds like the kitchen is what reminded us of it.
AMERICA Oh, Okay.
AMERICA Okay, let's check out the VHF now. Okay, I'm simplex off and VHF right. We're B. Okay. Antenna right. Punch B. Okay, Jack, I don't read you, yet.

APOLLO 17 MISSION COMMENTARY 12/11/72 08:38 CST 108:44 GET CM1/2

AMERICA Okay, I'm sitting on simplex Bravo.
AMERICA I don't read you yet.
CHALLENGER I don't read you at all. Do you read me?
AMERICA Okay, I don't read you at all, Jack.
AMERICA Okay, I'm down to simlex Bravo.
AMERICA Yeah, go ahead.
CHALLENGER I'm talking on B now. How do you read?
AMERICA I don't read you at all either, Jack.
CHALLENGER No, I don't read you.
CHALLENGER Okay, I've got everything on in my AUTO panel. Let me try the other one for backup. Yep, I'm on left. I'm on what? Let me go to backup.
AMERICA You did all right here, yet.
CHALLENGER Stand by. Stay where you are.
AMERICA Okay.
CHALLENGER Hey, I finally got you.
AMERICA Okay. You were kind of clipping there for a little bit. I got the last part of your transmission.
AMERICA Okay, I heard it - I just missed - I just missed it. It was just warming up but I got you loud and clear.

END OF TAPE

AMERICA Hey, I finally got you. Okay, you were kind of clipping there, I got the last part of your transmission.
AMERICA Okay, I heard the - he was just - I missed the gist - it was just warming up, but I got the loud and clear.
AMERICA Okay, I read you loud and clear, that's VHF B.
AMERICA Yeah, I didn't hear you at all that time. Yeah, you're still clipping. All I got was now.
AMERICA Okay, how do you read now, I got that.
AMERICA (laughter) then I missed that part of it.
AMERICA Okay, loud and clear, Gene.
AMERICA No, you're still clipping Jack, can you move your mikes a little bit closer or something.
AMERICA No, I didn't read you at all that time.
AMERICA Loud and clear.
AMERICA No, you're going to have to yell or something, I still - you're still clipping yourself out Jack.
AMERICA No, I didn't read you that time. Okay.
AMERICA Okay, switching to Alpha.
AMERICA Bravo is OFF, simplex Alpha is ON.
AMERICA Don't read you.
AMERICA Don't read you.
AMERICA Okay, I don't read you guys at all, except through the tunnel.
AMERICA Okay, got you loud and clear that time. And Gene, can you verify the capture latches are all engaged?
AMERICA I didn't read you at all, Jack. Didn't read you.
AMERICA Okay, I got you that time, and check the capture latches.
AMERICA Okay.
AMERICA Yeah, I'm up in the tunnel, but go ahead.
AMERICA Okay, I read you, go ahead.
AMERICA (laughter)
AMERICA Okay, I'm getting the probe umbilicals installed now.
AMERICA Okay, Gene can you look at the capture latches? I've got it preloaded here now.
AMERICA Okay, preload the (garble), it's preloaded.
AMERICA Okay.
AMERICA What do you mean, probe locked?
AMERICA Yeah, it was locked. Oh the drogue, yeah yeah it's locked in there.
AMERICA Okay I can do that now, put the tunnel in, the hatch in a little bit later. Min deadband ATT hold, okay, I got that right now. Wait a minute, I don't have SCS, let me give you SCS.
AMERICA Okay, Gene, you've got min deadband ATT hold now.
AMERICA Okay, there we go, plus 356 -

END OF TAPE

AMERICA Okay, Gene, you've got min deadband ATT hold.
AMERICA Okay, there we go, a plus 356.95 plus 106.34 and a plus 001.49. Right.
CAPCOM America, Houston.
AMERICA Houston, America. Go ahead.
CAPCOM In order to get a better drift check, they'd like to tweak up the attitudes before they do that coarse align. So how about doing a VERB 49 and tweak back to the original undocking attitude.
AMERICA Okay, that's the what, 0 105 and 0?
AMERICA Okay, stand by, Gene, we'll get back here.
AMERICA Okay.
AMERICA Okay, Houston, America, it's 0 105 and 0, correct?
CAPCOM Yes, sir.
AMERICA That's interesting, I don't know how it got off attitude.
CAPCOM I was going to ask you the same thing. You might have knocked a stick or something while there was some slamming around down there. Could you -
AMERICA Maybe I hit the stick or something here.
CAPCOM Yeah.
AMERICA Okay, Gene, we're at min deadband ATT. Hold 0 105 and 0.
AMERICA Okay, VERB 6 NOUN 20: 000.32 104.40 359.55. Okay?
AMERICA Okay, Houston, I forgot to release the docking latches. Okay. I forgot to release docking latches 1 and 7.
CAPCOM Okay.
AMERICA And if I just put the - no, I'll do that.
AMERICA I was going to say you could read the probe temp if I put the circuit breakers in.
AMERICA Okay, there's number 1 (garble). Two releases and it's free. Seven. One release, two releases and it's free.
AMERICA Okay, docking probe circuit breakers, two of them are going close. Main A, Main B. Probe Extend/ Release. Retract, aha, two barberpoles. Okay, the docking probe circuit breakers are going open. Okay, extend/releases, and they went grey, of course, when they went open. Okay, extend releases to off. Verify probe extend latch engage indicators not visible. Well, I'll go back, it wasn't a while ago, but I'll go look again. The extend with the circuit breakers in. Ah, mighty fine, and it's still back inside there. Extend latches still engaged.

AMERICA Okay, stand by, go ahead.
AMERICA Okay, 000.44 104.63 359.69.
CAPCOM America, Houston, in order to get on and stay on timeline I'll remind you about the Lithium after PDI and we can let that one go. And if you'd like to let the camera business slide until after your sut check and we can get those things, I'll come back and remind you of those too.
AMERICA Okay, I've got the cameras all set. I got them out, anyhow. I don't have the right values on the lenses yet, but you know how the cameras are out when they're loaded.
CAPCOM Okay.
AMERICA I've got mag Oboe Oboe on the Hasselblad.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/11/72 10:08 CST 109:15 GET CM-4/1

CAPCOM America, Houston, in order to get on and stay on the timeline, I'll remind you about Lithium cannister after PDI, we can let that one go, and if you'd like to let the camera business slide until after your suit check, we'll get those things, I'll come back and remind you of those too.

AMERICA Okay, I've got the cameras all set, I got them out anyhow, I don't have the - the right values on the lenses yet, but anyhow the cameras are out and they're loaded.

CAPCOM Okay.

AMERICA I got mag 00 on the Hasselblad.

AMERICA Okay, Houston, why don't I go ahead and get the PGA bear out of the way, and then we can get some of the data, or would you rather get the data first?

CAPCOM Oh, it's your choice, why don't we go anead and get the PGA and I'll just sit on these PAD's and could you tell me if you ever got around to playing with the squelch on the VHF?

AMERICA Man, I did and let's see we're at squelch A now. Either I got it all the way down to 1 or I still don't hear them.

CAPCOM Okay. You did get a satisfactory check on your side didn't you?

AMERICA Oh yeah.

CAPCOM Okay.

AMERICA I got a satisfactory - every once in a while I can hear them now, they're cutting in and out somewhere, I don't know where.

CAPCOM All righty.

AMERICA Okay, squelch A is set at about 4.

CAPCOM And America, we'll give you a state vector if you give us ACCEPT.

AMERICA Okay, you have it.

CAPCOM Roger.

AMERICA Houston, America how much time to AOS yet, er - ah, LOS?

CAPCOM Oh about 29 minutes.

AMERICA Oh okay. Got enough time for the PGA bear again I guess.

CAPCOM And it's your computer anytime you want to get those Ron.

AMERICA Okay.

AMERICA Ah ha, I got the old helmet and gloves on.

END OF TAPE

AMERICA Okay, how much time to AOS yet - or LOS?
CAPCOM Oh, about 29 minutes.
AMERICA Oh, okay. Got a little time for the PGA (garble) I guess.
CAPCOM And it's your computer any time you want to get to it, Ron.
AMERICA Okay.
AMERICA Ahah, I got the old helmet and gloves on.
AMERICA More cables all over the place here than I know what to do with.
CAPCOM That place looks like a pig pen, you've run the same course every one else has I guess.
AMERICA (laughter) I've got cables and hoses - Son of a buck, I hit the stick again, now I've got to unlock it. Okay, you want me to move her back to attitude, Chief? We're off of attitude just a little bit. I'm in deadband, but I maneuvered out of the attitude, you want to go back to regular attitude?
AMERICA Okay, Houston. Return is closed, heat flow valve - the other two are closed, mine is open and I've got the interconnect in between the other ones.
CAPCOM Copy that.
AMERICA How's the old fluid pressure? That looks like it's pretty good. Okay, the 02 flow is lower limit. Okay let's go to PRESS. There we go. It's going up to PRESS. And it feels like it's going up. And terminal direct on (garble) to help it up. 02 flow high. Okay, wait a minute, Jack. I'll just go to receive on the VHF. I'll just go to receive on the VHF, Jack.
AMERICA Okay, let's see - there's a delta p of about 6-1/2 (garble) 60 second return here. Okay, that's out and back in. Okay, now we'll squirt a little more 02 fluid. Woo wee, there we go. (garble) God, Oh man, 02 is off, it's coming down. Gee, I made 4.5 in my suit, is that right?
CAPCOM Looks like about 4 on our meter, Ron.
AMERICA Well, I'll be darned, well, the suit gauge it reads 4.5. Want that closed in here. Let's say about maybe nine or something like that. Lot closer to 4. I can't tell for sure what it feels like. Anyhow, the 02 flow is down. It's not leaking very much. I'm reading about .3 or something like that.
CAPCOM Okay, we're showing 4.2 to 4.3 on our pressure spread and your cabin and suit pressure gauges probably show something similar. And we show that the flow rate is down.
AMERICA That's not to bad - that's pretty close to -
CAPCOM Yeah. And a - (garble)
CAPCOM And 02 flow is staying pretty good.
AMERICA Let's go to depress on this thing, huh?
CAPCOM Sounds good.
AMERICA Okay, so it looks like it's stable there isn't it?

CAPCOM Yes sir.
AMERICA Okay, let's go to depress. (garble) in my ears pretty good, you guys. Okay, I'm going to go to off. Save a little time here.
CAPCOM America, I don't know if I copied you correctly. You don't want to go to OFF on the suit test valve until the pressures are back down to normal - if that was what you asked.
AMERICA
CAPCOM Or are you already there?
AMERICA I changed my mind. Yes, my ears are popping to beat the band, and I changed my mind, I let it go down slowly.
CAPCOM Okay. Okay, and we've got about 20 minutes before LOS so just there's hurry on those pads, I've got them standing by when you're ready. And didn't know what you had in mind about working on these things. You might get started on the hatch integrity test if you get to that point, and I can give you the pads while you're waiting for it to bleed down or whatever turns out to be convenient.
AMERICA Okay, let's see, I guess it's just about time to - integrity check, okay.

END OF TAPE

AMERICA I'm trying to let it go down slowly.
CHALLENGER Okay.
CAPCOM Okay, and we've got about 20 minutes before LOS so while there's no hurry on those pads I've got them standing by when you're ready. And didn't know what you had in mind about working on these things - we might get - you might get started on the hatch integrity check if you get to that point and I can give you the pads while you're waiting for it to bleed down or whatever turns out to be convenient.
AMERICA Okay. Let's see, I guess it's about time to - to recyc - Okay.
CAPCOM Okay, and I guess the LM is going to be asking you for a NOUN 20 pretty quick here.
AMERICA Okay Challenger, America here. I'll go back to CMC.
AMERICA Stand by.
AMERICA Okay, go.
AMERICA Okay, 002.15 104.36 359.69.
AMERICA And Houston, do we want to release those docking latches before they do their hot fire? I don't think so, do we?
CAPCOM I'll check. Stand by.
AMERICA Yeah.
CAPCOM You're right Ron. We'll just hold up on that - releasing the latches until the hot fires are over so when you get your copying hand ready, we'll give you some pads. We'll clean that one up.
AMERICA Okay, let's see. 32 SCS integrity check (garble).
AMERICA Okay, Houston. Let's see - where are we going to start the pads.
CAPCOM Okay, and you might go to BLOCK on the computer, too.
AMERICA Okay.
CAPCOM Let's see, the first thing I'll give you is the SEP pad. And that's on page 113.
AMERICA Okay.
CAPCOM Okay. NOUN 33 is 11027 5500 roll is 0 105 pitch and yaw is 0.
AMERICA NOUN 33 11027 5500 and roll, pitch, and yaw are as detected 0 105 and 0. Right?
CAPCOM That's affirmed.
AMERICA Okay, got it.
CAPCOM Okay, the next thing I have for you is a p24 pad that goes on page 115.

AMERICA Okay, (garble) test valves are on OFF now. On page 115 - okay, got it.
CAPCOM Okay, it will be 17-1 110 58 13. P2 is 111 00 30 01 00 01 -
AMERICA Wait a minute. Wait a minute. Better hold it - hold it. Okay, wide deadband at hold thats - where am I? And America - Houston, America. I missed T21.
CAPCOM Okay, you ready to go back to it now?
AMERICA Okay, ready for T2.
CAPCOM All right sir - T2. 111 00 30 01 00 01 26, roll 015 297 000, north 02. Over.
AMERICA Okay, I'll read back what I have - 110 58 13 (garble) 2 TCA is 0100. T3 is 0126, roll 15, pitch 297 and 0, north 02. I presume 17 1.
CAPCOM Yes sir, and T2 time is 111 00 30.
AMERICA Okay, 111 00 30.
CAPCOM That's correct.
AMERICA Challenger says something every time you talked on that one.
AMERICA Hey Jack, could you go to RECEIVE ONLY on the VHF for a little bit?
AMERICA Okay.
AMERICA And Houston, America. You can go ahead on the next pad.
CAPCOM Okay, on page 113 I've got a DAP hold for you.
AMERICA Okay.
CAPCOM Okay, the weight 37 983 plus 040 plus 091.
AMERICA Okay, CSM weight is 37 983 vector plus 0.40 vector plus 091.
CAPCOM Okay, that correct and the last one comes up on page 121 and it's a LM P76.
AMERICA Ah ha½ Okay.
CAPCOM Okay, NOUN 33.
AMERICA Page 121, got it.
CAPCOM All right sir, 112 02 5192 minus -
AMERICA Wait, wait, hold it there. America for Challenger.
AMERICA I'll try you one free, Challenger.
AMERICA Challenger, America, you want for high power.
AMERICA Okay, going to FREE now.
AMERICA Houston, America. You can try that one again.

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CAPCOM All righty. NOUN 33, you're 112 02 5192 minus 00 075 and all zips for Y and Z.

AMERICA Okay, throw that NOUN 33 again.

AMERICA Houston, America. You were cut out on NOUN 33 again and I've got minus 00 07.5 and X and Y 00.

CAPCOM Okay, and the time 112025192.

END OF TAPE

AMERICA Okay, try NOUN 33 again.
AMERICA Houston, America. We are coming out on NOUN 33 again and I've got minus 0007.5 and actually 00. (garble)
CAPCOM Okay, and the time 112025192.
AMERICA Okay, NOUN 33 is 1120251. 1120251.92.
CAPCOM That's correct.
AMERICA Okay, Challenger, America. You're in, at 0. Hey, didn't get very far off that time, either. That's good. Okay?
AMERICA Okay, Challenger, America. Okay, I'm going to turn off B-3 and also my roll jets and then I'm going to undo the docking latches. Okay, verify transponder is off. Say again about umbilical. No, all I get is umbilical, I didn't get the question. Verify. I have those down here. And jet Bravo-3 is off.
CAPCOM Okay, Ron, we're about 5 minutes from LOS. And the only thing that you wouldn't be able to do, following right down your checklist is to get the VHF data on and check the tape recorder at LOS. The rest of that stuff, you can follow right on through, and we'll remind you of the lithium change after descent. So it looks like we're caught up again.
CAPCOM Okay, and America, Houston. You have a GO for undocking from here.
AMERICA Roger. GO for undocking. Okay, number 1 is disconnected. And Houston, can you watch my O2 flow, as I disconnect these things?
CAPCOM Yes sir.
AMERICA Okay. Two cocks on number 2 and that's out of the way. Number 1 J-hook is out of the way. One minute. Okay, that's three of them on number 3 and it's out of the way. Number 4 was already cocked and it's out of the way. Okay, number 5, 1, 2, and it's fully released and the hook is off of the docking rig. Okay, number 6 is 1, 2, and it's fully released and the hook is off of the docking rig. Okay, 7 is released and the hook is off of the docking rig. O2 flow still okay.
CAPCOM Yes sir. Looking good.
AMERICA Okay, here's number 8. This is 1, 2, and she's fully released and the hook is off the docking rig. Okay, here's number 9, 1, 2, and she's fully released , the hook clears the docking ring. Okay, number 10 is 1, 2, fully released and the hook clears the docking ring. Okay, handle is free JS clears the ring. Only got one more to go. There's first latch, two latches felt like it came over and hook stays clear, handle is free. Well, there you go. They're all off. Hey, Challenger, America. You're hanging on those three little bitty things. Okay, I put the old hatch in.

APOLLO 17 MISSION COMMENTARY 12/11/72 GET 109:43 CST 10:38 CM7/2

CAPCOM Okay, Ron. We're within a minute of LOS. Your O2 flow still looks good. And the rest of the stuff that can get on the VHF is going to be just fine. You're right on schedule now.

AMERICA Okay, I'll get that VHF stuff and then put the hatch in. Okay and receive only the B data. Hey, Challenger, America. I'm going to receive only B data. Hey, Challenger, America.

END OF TAPE

AMERICA Okay, Challenger, America.
CAPCOM America, Houston, standing by.
AMERICA Okay, Houston. This is America. We're floating free out here. The Challenger looks real pretty. Residuals on P-41 were plus 1.9 minus .2 and 0. Undock and SEP was on time.
CAPCOM Sounds good.
CAPCOM America, Houston. When you have an opportunity, how about cycling the high-gain to wide and then back to REACQ.
AMERICA Okay, can do.
CAPCOM Okay, Thank you sir.
CAPCOM Okay, America. How about going back to NARROW on the antenna. And could you verify what you loaded on Noun 34, they went by so fast on the down link we didn't get a chance to look at it.
AMERICA Okay, let me call it again here. There you got it?
CAPCOM Okay, that looks good.
AMERICA Does that look okay?
CAPCOM Yes sir, it sure does.
AMERICA Okay, no update then, huh?
CAPCOM That's correct.
AMERICA Okay.

END OF TAPE

CAPCOM America, can you verify that you gave us now on the high gain.
AMERICA Houston, America. Say again.
CAPCOM Can you verify that you gave us narrow on the high gain antenna, please?
AMERICA Ah, negative. (garbled) I'll give you narrow now.
CAPCOM Okay, I asked for wide a while back and guess we missed the call there.
CAPCOM You got your eyeball in that telescope.
AMERICA About this -
AMERICA Houston, America. At 50 percent of mag Charlie Charlie I changed mags there for the landmark tracking. And let's see frame 110, I think, or 112. Let me look on that one.
AMERICA That was frame 103 mag. Shish and refer to French. (laughter) Okay, there. Go ahead, John. How are you guys doing?
AMERICA Looks like it's pretty low down there.
AMERICA Ahhha. I bet.
AMERICA (Whistling)
AMERICA Hey, Challenger, America.
CAPCOM Okay, America, you're coming up on 3 seconds to T-1.
AMERICA Okay, 3 seconds to T-1. Thank you.
AMERICA Okay, Challenger, America, good luck on your PDI burn now. I'm going to track your landmark for you.
CAPCOM A will do.

END OF TAPE

AMERICA Okay, Challenger, America. Good luck on your PDI burn now. I'm going to strike your landmark for you.

CHALLENGER Okay, babe, have a good time.

AMERICA Will do.

CHALLENGER Don't forget. No DES.

AMERICA Yes. I got it too.

CHALLENGER Hey, Gordo, we got the landing site. We're coming ...

AMERICA That slide really shows up beautiful.

CAPCOM Okay, coming up on 30 seconds to T2, inspect the auto pitch rate and remember the good old Sun's going to be staring at you when you come around.

AMERICA Beautiful results. There's the Sun and the sextant. Boy, those guys are going to have fun down there.

AMERICA Hey, Houston, I got so excited there, I forgot to turn the camera on.

CAPCOM Oh, that's fair. You got any comments to make on any of those marks. They were collecting the marks in real time. Do you have any that they ought to pay particular attention to?

AMERICA Well, let me think for a minute. They were all within the crater itself. None of them were outside of the crater. Let's see, the last ones, I took, I started taking marks beyond what the real time was, just because you can still see it, so I wouldn't put too much faith in those, in about the last four.

CAPCOM Okay. Sounds good.

AMERICA Challenger, America. You want to try VHF ranging and rendezvous radar compare?

AMERICA Okay. Transponder coming on shortly. Okay transponder is on now.

END OF TAPE

CAPCOM America it sounds like Challenger is still working on their readbacks if you want to go ahead and get your 52 out of the way while your waiting for the range check that might save a little time.

AMERICA Okay, I think their about ready to do it now. Challenger America you about ready for a UHF ranging?

AMERICA Okay, here goes reset now. Ah, it works .50 miles. Okay .50 or .49 miles.

AMERICA Okay, I'm going to turn the ranging off then, the comm's a little better that way.

AMERICA Okay, Houston you copying the 93's.

CAPCOM Yes sir, torque any time.

AMERICA Okay, we'll torque at 451345.

CAPCOM Okay.

CAPCOM And America Houston has some vectors to send if you give us accept, and we're standing by with a pad.

AMERICA Okay Houston America ready to copy pad sir, and you have accept.

CAPCOM Okay, first one will be the circ pad on the same page.

AMERICA Okay, press on.

CAPCOM FPS G&N 37983 plus 040 plus 091 111 57 28 09 plus 00705. Delta VY is all zips. Delta VZ minus 00005 000092 358 00697 plus 00545 00705 004 00599. The stars are Sirius and Rigel 133 200 030. The ullage is four zips for 12 seconds. Comment on your PC - if you happen to notice the chamber pressure it will probably be running 90 to 95 and we're predicting that it'll show you about 6 psi less than what the actual chamber pressure is.

AMERICA Ah, that's good to know on that chamber pressure. What your saying is that even during the LOI burn the velocity gain or what have you was for a chamber probably up around a little better than a 100.

CAPCOM Yes sir. We've got a couple - -

END OF TAPE

AMERICA Okay, that's good to know on that chamber pressure. What you're saying is that even during the LOI burn the velocity gain and what have you was for a chamber pressure probably up around a little better than a hundred, huh?

CAPCOM Yes sir. We've got a couple of transducer problems - we'll talk about them sometime when we're aboard.

AMERICA Okay. For the P30 circ pad, NOUN 37, I mean NOUN 47. It's 37983 plus 040 plus 091111 5 72809. 981 plus 0070.5 zero on the Y and a minus .5 on the Z. Okay, roll zero, pitch 092, yaw 358. NOUN 44's 69.7 and a plus 54.5. That'll to be totalled 70.5. Burn time 004 Delta BC 59.9. Sirius and Rigel 133200030. That'll be 4 jett 4 second ullage.

CAPCOM Okay, that's a good readback. I have your RP3 tracking pad.

AMERICA Okay, ready to copy.

CAPCOM Okay, RP3, 1121701, 215123312419 north 04.

AMERICA Okay, copy that. While I think about it on the landmark tracking there on the low altitude mark, the computer was pointing me - I wish I - I have to get a map to look at the name of it, but I consider Sherlock and then the one to the south of that and another one to the south of that. There were three in a row, and it was pointed to the one just south of Sherlock, one about the same size as 17-1.

CAPCOM Okay, read back on RP3.

AMERICA T11121701, T2 215123312419. The north 04 miles.

CAPCOM Okay, that's good, and I have the other pads if you're ready to copy them or if you want to press on, then we'll come back and pick them up later. Your choice.

AMERICA Why don't I get started to the VERB 49 attitude and then I'll get the rest of the pads, okay?

CAPCOM Alright, sir, I think that sounds like a good plan. Say, when we're through with our uplink, you can go to block when you want to.

AMERICA (garble) Okay, I got you loud and clear, too.

CHALLENGER Okay, proceed.

AMERICA Okay, Challenger and Houston, Im maneuvering to circ burn attitude.

CHALLENGER Okay, sure will.

AMERICA Ah, hah, great.

CHALLENGER And, Houston and America, while we're maneuvering, I'll go to receive on the VHF. They can send those pads up.

CAPCOM Okay, here they come.

CHALLENGER Echo 1130200 -

AMERICA Wait a minute, hold it, hold it, hold it. You tell those guys to go to receive only. Hey, Challenger, America. Okay, Jack, could you go to receive only on your VHF? I got all these pads to pick up now. I'll call you when I'm all through. Okay, Houston, America, let's try it again on get our pad E.

CAPCOM Alright. Pad Echo 11302, all zeros, Fox Trot plus 01034 plus all zips minus 00500. Golf 113570000. Hotel 115364500. India 112495235. Juliet 115364500. Kilo 117354500. Lima 113142491. Mike 119343000. November 114571909. Over.

AMERICA Echo 11302, all zips. Plus 0103.4 all zips minus 0050.0. Golf 11357 all zips. 115364500. 112495235. 115364500. Kilo 117354500. Lima 113142491. 114343000. November 114571909. Over.

CAPCOM Okay, let's go over Mike again. That's 119343000. The rest are correct.

AMERICA Okay, on Mike 119343000.

CAPCOM Okay, got them all.

AMERICA Amazing.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/15/72 CST 12:22 GET 111:29 CM13/1

AMERICA Okay, Challenger, America. I'm through with all the pads now.
AMERICA Hey, Challenger, America. Are you still with me?
AMERICA Okay, I got something like yep,
AMERICA Okay, I just wanted to make sure of voice check. We still have VHF Comm.
AMERICA Okay, loud and clear OMNI, Jack.
AMERICA Challenger, America. I read you loud and clear. How me?
CAPCOM Okay, America, we show you inside of 20 minutes and you have a GO for certain.
AMERICA Ah, Houston, America. Roger, we'll do our best.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/11/72 12:32 CST 111:38 GET CM14/1

AMERICA And, we don't have any section star check this time. And we're in P-40, got a 58 10 align the old GDC.
AMERICA Okay, GDC is aligned.
AMERICA (garble) Stop control and SPS breakers are CLOSED. Attitudes are rate command. (garbled) ycles OFF, dead band min., rate to low, servo powers in rate command. Okay, Delta VC G's in CSM, give 'em a drive, PITCH and YAW in AUTO. Standby for the bus ties.
CAPCOM Say, you're looking good.
AMERICA Okay.
CAPCOM Okay, America. About a minute to LOS. All systems look good. We'll see you on the other side with a good CIRC.
AMERICA Okay, mighty fine.

END OF TAPE

CAPCOM America, Houston standing by.
AMERICA Hey, Houston. This is America. Good burn.
CAPCOM Okay. Glad to hear it.
AMERICA And, give you some dope here. Okay, it was on time; burn time, near as I could tell, was 4 seconds. VGX was 69er.9er. Okay, the trim angles were 357 89er and 4 degrees of yaw. Okay, at the place in the burn there of the NOUN 85. The NOUN 85's were plus 1.70 and minus 0.6. They were trimmed out to 00 and a plus .1. Delta VC was minus 10.0, and I didn't look at that until 112 plus 00. Oxidizer was 30.3, fuel was 31.1 and unbalances minus 200. Over.
CAPCOM Okay, that sounds good.
AMERICA And, P76 was good on the LM, too.
CAPCOM Okay, sir, I've got your (garble).
AMERICA And LC3 -- Okay, I'd better take it first.
CAPCOM Okay. I'll give you a 17-1 112 50 52 55 42 57 22 58 10 north 02.
AMERICA (Laughter) Okay, Ken, Jack keeps talking every time you do, so maybe you can keep one ear on them or something. I've got T 1 and 112 50 52, and I think G2 was 5542, and that's all I got.
CAPCOM Okay, America, ready to try again on the P 24 pad?
AMERICA Okay, let's try it now.
CAPCOM Okay. 17-1, 112 50 52 55 42 57 22 58 10 north 02.
AMERICA Okay, copied that time. 112 50 52 55 42 57 22 and 58 10 north 02 miles.
CAPCOM Okay, that's correct, and you were starting to say something about your RPE target?
AMERICA Yeah, RP 3 is just about the limit of high sun angle that she could take to track that thing. I could track to TCA and then, from TCA all across, you could hardly even tell there was a crater there at all. It's just completely washed out.
CAPCOM Okay. I'll keep that in mind when we look at it.
AMERICA But, I think we got some good marks on it anyhow, though.
CAPCOM Real fine.
AMERICA Also, Houston, I lost the landmark at 2401 instead of 2419er.
CAPCOM Okay.
CAPCOM Okay, America, we have taken one last look around your bird, and it's looking good, so at least your half is GO for PDI.

AMERICA Okay, mighty fine. And, I think that taper brush was up around 95. I really couldn't swear to it, so you might take a look at the readout and the playback.

CAPCOM Okay. He got a mighty fast scan pattern to see all that.

AMERICA That's what I say, I can really cut the (garble).

END OF TAPE

CAPCOM And America Houston we haven't watched you load P24 yet.

AMERICA That's a good point. I'll go ahead and get it.

CAPCOM Coming up on P1.

AMERICA Okay, Ken, thank you.

END OF TAPE

CAPCOM 5 seconds to P2.
AMERICA Hey, Challenger, this is America. Heard you all the way don. That's great. Beautiful.

END OF TAPE.

CAPCOM And, America, we have a stay for T 1.
AMERICA Roger, understand, stay for T 1. Good.
CAPCOM And, America, I have a pan camera photo pad whenever you're ready for it. It is on page 129. America, this is Houston, the LM has a stay for T 2.
AMERICA Okay, great, stay for T 2. Beautiful. Does it look like they hit the right spot?
CAPCOM Okay, and I - yeah, they must be right in there, and I got your pan camera photo pad whenever you're ready for it on 129. That's page 129, excuse me.
AMERICA Okay, just a second.

END OF TAPE

AMERICA Hey, okay. Great stay for T2, beautiful.
CAPCOM Okay, Ron.
AMERICA Did I hit the right spot?
CAPCOM Yeah, they must be right in there. Now I've got your pan camera photo pad whenever you're ready for it on 129. That's page 129, excuse me.
AMERICA Okay, just a second. - Okay, ready to copy.
CAPCOM Okay, T-start 114 03 11. T-stop 114 33 18.
AMERICA Okay, T-start 114 03 11. T-stop 114 33 18.
CAPCOM Okay, that's correct.
CAPCOM And, America, we're ready for high gain auto.
AMERICA Okay, do you have it?
AMERICA Yeah, it's a good thing that it's in the sextant because you can't see it in the telescope, 'cause the Earth is in the field of view.
CAPCOM Are you able to get something in the sextant or would you like for us to look first in the new stars and attitudes?
AMERICA No, you can see then in the sextant real well, Ken. You just can't see them in the telescope.
CAPCOM Okay. That's a mighty pretty thing to look at in the telescope, though, isn't it?
AMERICA Yeah, it sure is.
AMERICA You know, I noticed there is even a lot of difference in the Earth shine and in the double umbra. You get into Earth shine on that thing and it's hard to see the stars, even if you don't have the Earth in there.
CAPCOM Yeah, that makes a surprising difference.
AMERICA Double - on the back side of the moon. Yeah, the double umbra on the back side of the moon is even better in the simulator.
AMERICA Okay, if those look good to you I'll torque at 20.
CAPCOM Okay, that looks good.

END OF TAPE

SC Okay Houston, America, I think I'll go ahead and use shaft 0012 and 57 point 470.
CAPCOM Okay, we copied that.
SC That's for the cal.
CAPCOM All righty. I think (garble) a little better than the similator on that, doesn't it.
SC Yeah, sure does, it's out standing as a matter of fact. You can even see the star out here.
CAPCOM Yeah, it's a rather wondrous thing. When you get around to it, I've got a hydrogen tank 1 call . I'd like to have you turn that off.
SC Okay, let me get started here in the B20 attitude first.
CAPCOM Sure thing.
SC Okay, go on the HT tank.
CAPCOM Okay, that's hydrogen tank number 1 should be turned off.
SC Okay, H2 fans number 1 - off.
CAPCOM Okay, and I missed seeing you set the VERB 44, did you get that one in.
SC Yeah, I did it while I was doing the B52 for (garble). I'll do it again.
CAPCOM Okay, it's off. It looks good. Ron.
SC Okay. And rendezvous transponder is off.
CAPCOM Okay, thank you.
SC Okay, pan camera power is coming off.
CAPCOM All right.
SC And the VHF is off to receive only -
CAPCOM Okay, and also waiting here with baited breath.
SC He's ready to go to work, isn't he.
CAPCOM Yeah, he's chomping at the bit.
SC Okay, we're in deploy retract, circuit breakers in, smack powers on and those circuit breakers are in. So what do you want to square away. Okay, data system is going on.
CAPCOM Okay.
SC IR is going on. UV is going on. It has opened a few covers. A mapping camera laser altimeter, the barber pole, then a gray, IR, barber pole, and a gray, UV cover, the barber pole, then a gray. And we'll try timing the old mapping camera, see how she does this time.
CAPCOM Okay.
SC Oh, watch it. Okay, 3 2 1, mark it.
CAPCOM (garble) my clock, Ron.
SC Okay.

END OF TAPE

AMERICA Well, we'll try timing the ole mapping camera and see how she does this time.
CAPCOM Okay.
AMERICA Watch it. Okay, 321 mark it.
CAPCOM Got my clock running, Ron.
AMERICA Okay.
AMERICA Still barber pole.
CAPCOM Yeah, we're commenting on the same thing. We don't have any data yet, but we're wondering.
AMERICA Hey, it went gray. Mark it.
CAPCOM Okay, thank you.
AMERICA It was about 3 minutes and 20 seconds, wasn't it?
CAPCOM Yeah, 3 21. - Okay, Ron, and - before we got started this morning we skipped looking in the canister change and that was back at 108 hours and 10 minutes on page 3-109, so, at your convenience you might want to catch up on that one.
AMERICA Okay, do you have it handy there? What it is? Which one?
CAPCOM Yeah, just a second. I'll read it to you.
AMERICA Can you just tell me?
CAPCOM Okay, we wanted to take 11 into A and stow number 9, which you're going to take out, into A9.
AMERICA Into A9. Okay, then it must be where 11 is, then.
CAPCOM 11 should be in - yeah, okay. It ought to be in A9 now, hopefully.
AMERICA Yeah, A9.
AMERICA Okay, the ole lithium hydroxide canister's changed.
CAPCOM Okay, thank you.
AMERICA And - Ken, could you give me a hack on Houston time there? Or Greenwich Mean Time or something so I can set my watch.
CAPCOM Okay, I'll give you a Houston time. It's 14 35 21 2 3 4 5.

END OF TAPE

AMERICA And, Ken, could you give me a hack on Houston time, there - Greenwich mean time, or something, so I can set my watch.

CAPCOM Okay, I'll give you Houston time. It's 14:35:21, 2, 3, 4, 5.

AMERICA Okay, mighty fine, thank you.

CAPCOM Okay, America, we're about 3 minutes from LOS. All systems look good and P&C's noticed that you've got the optics not in zero. Next time you're down that way, I think it would make everybody feel better if you put it there. It's not something you've got to do right away.

AMERICA Okay, will do. Good way to keep me honest.

CAPCOM Yeah, I'll vote for that.

END OF TAPE

CAPCOM America, Houston.
AMERICA (garbled)
CAPCOM America, Houston.
AMERICA 318 (garbled) - there it goes. - Just about to make it. Map camera is standby.
CAPCOM America, Houston. We're reading you (garbled)
AMERICA Okay, I just about have you, Houston, not quite.
AMERICA (garbled) Okay, Houston. This is America. Looks like the - you - for good now.
CAPCOM Roger, Ron, you're looking great. We need word on the Spacecraft condition. We've got a couple of rockets out at White Sands ready to launch for a UV calibration and we need the "go" from you on that.
AMERICA (laughter) Great up here. They're not going to try to hit me, are they?
CAPCOM No, babe. We wouldn't do that. We need a couple of calibration rockets on airplanes -
AMERICA (laughter) Okay. That sounds great. Tape motion has stopped, by the way. And I'm ready to charge Battery B.
CAPCOM Roger, that's a go on that.
AMERICA (garbled) Okay, the battery compartment pressure went up to .8 after 3 or 4 days here.
CAPCOM Roger, Ron. We copy that.
AMERICA Let's see about Buss A and B - I think those are open. - Yep, they're open. Okay, bat relay bus, bat B is open. Okay, and on the battery charger - that charged up into Bravo. Both are about 30.
CAPCOM Ron, we're ready for pan camera power off.
AMERICA Okay, pan camera power is off and - let's see, is it time for (garble)
CAPCOM You've got about 3 minutes on that one.
AMERICA Okay. You know all I did was eat for 3 days and now I can't get a chance to eat.
CAPCOM Roger, are you getting hungry?
AMERICA Well, I've had 2 gingerbread bars and a brownie so far.
CAPCOM We've got to keep you busy.
AMERICA (laughter) Okay, that's good.
CAPCOM I understand they left you some (garbled) eat, huh?
AMERICA Yeah, fortunately. I've still got them. I've even got them tied down this time.
CAPCOM Rog.

END OF TAPE

SC Did Charles ever figure out where they are? Are they pretty close to the center of the ellipse?

CAPCOM They look like they're a couple hundred meters short, Ron. No problem. They landed in a smooth area and that's what counted.

SC Oh, that's great.

SC Okay, lunar sounder operate is in stand by. The recorder is going ON. Radar is going ON. Recorder is going OFF. OFF the CTR, and up the heaters. And the mode's going to VHF.

CAPCOM Good go, Ron, I've got that pan camera photo pegged anytime you want it.

SC Okay, let's see. 116 30. Okay, ready to copy.

CAPCOM Okay, Ron, T start time, 116 31 10. T stop time, 116 59 46.

SC Okay, START 116 31 10; T STOP 116 59 46.

CAPCOM (Garbled) Ron. Ron, we'd like the high gain to AUTO.

SC High gain to AUTO. And Houston, America here. I'm ready to do the lunar sounder extend test here for a while if you want. Whenever you're ready.

CAPCOM Roger, stand by, Ron. Okay, America. We're ready for the HF antenna extend test and just for your information, White Sands got one of their rockets off. The other one was a No/Go.

SC Oh, okay. Good. Okay. HF antenna 1. Barber Pole 1 thousand 1, 1 thousand 2. It's OFF. Gray. Okay, number 1, retract Barber Pole. Barber Pole, still Barber Pole. Very interesting. Would you believe number 1's stuck out there?

CAPCOM Rog, Ron, we're seeing strong stall current right now. Ron, we'd like to go OFF on HF antenna 1. And stand by on number 2.

SC Okay, it's OFF and of course, I'm going to try again.

CAPCOM Roger.

SC Stand by for number 2.

CAPCOM Stand by on that Ron, don't do number 2 yet.

SC Okay. I won't do it yet.

END OF TAPE

CAPCOM America, Houston, we'd like to try antenna 1 again and we'd like for you to go to extend for barber pole plus 3 seconds then off then retract.

SC Okay, we'll try that. It's up - number 1, extend one thousand one, one thousand two, one thousand three, it's off. And of course I've got barber pole as it was going up. Okay, do you want to try to retract again.

CAPCOM That's affirmative.

SC Okay, Check number 1 to retract, now, barber pole.

CAPCOM Ron, we'd like you to turn it off now.

SC Okay, it's off and talkback's gray.

CAPCOM Ron, Houston here, on that one we followed your retract current in for 7 seconds and then it went into stall so apparently it's retracting normally up to a point and then goes into stall. We'd like you to press on and to extend on HF antenna 2 and we're going to press on here, probably thinking like maybe we wont be able to get the antennas in.

SC Okay.

CAPCOM And on antenna 2 it records with the flight plan barber pole plus 2 seconds.

SC Okay, we'll go barber pole plus 2. Okay, number 2, extend barber pole one thousand one, one thousand two, OFF. Okay, number 2 go into retract, now, barber pole, one thousand one, one thousand two - gray - okay, it went gray. And back OFF.

CAPCOM Rog, we copy that. Okay, Ron, you're at GO for the extending and, just a remind on the flight line there's a recorder on prior to the extend there.

SC Oh, okay, it's good. Okay, recorder is going ON and we'll extend number 1. Let me get my clock going here. Okay, 3, 2, 1, mark it.

CAPCOM (garble) are looking good, the extension is looking normal so far. And the aero B rocket has some problem -

SC Okay.

CAPCOM (garble) has to look at the sun.

SC Uh oh.

CAPCOM And then they're going to try and launch a couple more the day after tomorrow.

SC Very good. Hey, I think I can see a light spot down there on the landing site where they might have blown off some of that halo stuff.

CAPCOM Roger. Interesting -

SC It's between Sherlock and Camelot - Hey, it's gray now, on the number 1 extend.

CAPCOM Roger, we got it and we got - we copy. It's all the way out down here. You can go to OFF on that one.

SC Okay. Number 2 is going to - it's OFF and number 2 is going to extend.

CAPCOM Okay, Ron, the currents look normal on number 2 while it extends.

SC Okay. Hey, I can see number 2.

CAPCOM Roger, that's a good show. It's still moving, Ron.

SC All the way out there. It is? My windows all fogged up and can't see a thing.

CAPCOM Roger. Okay, Ron, we show it's all the way out, you can go ahead and turn it off.

SC Okay, we'll turn it off.

END OF TAPE

AMERICA Houston, America.
CAPCOM Roger, Ron.
AMERICA I didn't have my map there but I was looking at the landing site and as close as I can remember it they ought to be somewhere around about TN 83.3 on the 200 meter scale. The TL 25-8.
CAPCOM Okay, Ron. We're coming up on some flight plan operations on the mapping camera next you might want to check.
AMERICA Thank you. - Okay, - it's always dark down there. Mapping camera is off - okay, mapping camera to standby. Leader on the meter - off. Image motion off barber pole. Okay, mapping camera to off.
AMERICA Okay - let's see - pan camera - self test, Off and after sunset - Okay - off - IR is off - Data system is off - MC power - we've got to get that off. MC power is off. Okay, it looks like 12 - it'll look better to operate.
CAPCOM America, while we're waiting for this lunar sounder operate for a few minutes could you - could you say again those coordinates you gave us. I dug out the map TL 25-8 and I got the 83.3 but what was the azimuth coordinates on that, Ron?
AMERICA It was Dog November. Maybe just a little bit to the right of Dog November.
CAPCOM Okay, Dog -

END OF TAPE

AMERICA It was Dog November. Maybe just a little bit to the right of Dog November.
CAPCOM Okay, Dog November, Thank you. And you think that's where they are, huh?
AMERICA Yeah.
CAPCOM Okay.
AMERICA Well, there's a real white spot down there, you know, and I didn't have my - I only got a short - I only got a look at the thing - for about 30 seconds - before I had to do something else, but I'm just remem - recalling in my mind where the - the white spot is with respect to those - there's Camelot and then Sherlock and then from Camelot and Sherlock there are two other craters and they were just a little bit closer to Camelot. But between those two other craters there.
CAPCOM Good show. Roger.
AMERICA There is a white spot - yeah, there is a white spot on the - like it might have been dust blowing or something, you know.
CAPCOM Rog, that may be the rocket exhaust it might be just a little bit off from that light spot.
AMERICA Yeah.
CAPCOM Okay, Ron, we're ready for lunar sounder operate - 2 operates, and if you'll give me a mark, I'll time it out for you.
AMERICA Okay. Standby 3, 2, 1, mark it. Barber pole gray. Okay, she's standby. Mode is gone to HF, a select L&D Bravo. Two bay dual high gain, manual on Y, and 12 and 211. Okay, minus 12 and 211. High gain antenna power is off. Bit rate is low. Okay, ready for the HF part of it?
CAPCOM Stand by, Ron.
AMERICA Okay, standing by.
CAPCOM Okay, Ron, you can go lunar sounder operate to "operate."
AMERICA Okay, operate at 15, barber pole in the gray. See - battery to standby, 17.
CAPCOM Roger.
AMERICA Okay, bit rate to "high."
CAPCOM Stand by, Ron.
AMERICA May as well pull some film. Okay, we'll stand by.
CAPCOM Okay, Ron, lunar sounder operate to "operate." We're all set.
AMERICA Okay, we'll make it at 1740.
CAPCOM Roger.
AMERICA 1740, 1, 2, operate.

END OF TAPE

SC 1840 lunar sounder, stand by.
CAPCOM Roger, Ron. Just for your information whatever we could read down here was looking great.
SC Hey great.
CAPCOM Both HF and VHF was good and we saw no visible interference on the CSM telemetry.
SC Hey, outstanding. That's great. Now if the old antenna would come back in, we'd be in good shape, huh?
CAPCOM Yes sir.
SC Okay, we're maneuvering to the HF test attitude.
SC Okay, Houston, I'm about ready to press ahead if you all are.
CAPCOM Stand by on that, Ron. Okay, Ron we're all ready to press on.
SC Okay. High gain antenna power's ON, we got Manual wide, minus about 12 and yaw about 21 or something, 211. and manual high gain, auto, looks like it worked pretty good. Okay, mode to VHF, find it - there it is - mode to VHF;
CAPCOM Okay, Ron, we're ready for the lunar sounder operate to operate.
SC Okay, operate at 28. Operate. Boy, you talk about night flying, this is the kind of night flying you want to do by the full Earth.
CAPCOM Is that right?
SC Beautiful out there.

END OF TAPE

AMERICA Okay, went to standby at 3 0.
CAPCOM Roger.
AMERICA Mode has gone to HF. Recorder is Off. It's a little calm here, huh? Maybe. Okay, there's Bravo. But on the - high gain - minus manual - white - minus 10 - and - 25 gray west - .
CAPCOM Okay, Ron, we're still riding you - reading you oud - -
AMERICA Okay, good, and again, antenna power's going Off.
CAPCOM Roger.
CAPCOM Just want to give you some fair warning, Ron, when you come around AOS next time at 116:30 it's a flight plan update - we've got quite a lengthy update on the flight plan - all orbital picture work - that's quite lengthy.
AMERICA Okay. Are you trying to pull that antenna back in first before we completely change the flight plan.
CAPCOM Ron, we're going to take a good hard look at that and see if we can generate up either a test on that or what - that's kind of in limbo right now, Ron.
AMERICA Okay.
CAPCOM These flight plan changes I've got for you coming up later will be all some items Bruck has on camera pictures on the - that Bob didn't - Jack thought he saw the white spot and a few other changes.
AMERICA Oh, okay.
CAPCOM And, Ron, just for your information, regardless of what we do on that antenna, we won't have any flight plan changes until after 144 hours due to that antenna.
AMERICA Oh, Okay.
CAPCOM Ron, we would like H2 tank 2 fans to On.
AMERICA H2 tank 2 fans are On. Now.
CAPCOM Okay, Ron. You're lucky you're up there tonight, Ron. We're having really ratty weather down here. Low clouds and rain and drizzle and cold.
AMERICA Oh, really?
CAPCOM Yeah, you walk outside and you just about can't see the top of Building 2.
AMERICA Gee whiz. Guess I picked a good time to be gone.
CAPCOM That's for sure.
AMERICA Hey, you know, you'll never believe this but I'm over the edge of Aureataw and I just looked down and saw light flashing myself.
CAPCOM Roger.
AMERICA Right at the end of the rille but on the east of Aureataw.
CAPCOM Roger.
AMERICA You know, you don't suppose that could be Bustard - Well, I'll be darned, I've got to mark that spot on the map.
CAPCOM Ron, just before you leave you'll be glad to hear you're looking good as you go around the horn and we'll pick you up at 116 30. Voices will be pretty marginal the rest of the way out.

END OF TAPE

SC Just about to loose you.

END OF TAPE

SC Okay, Houston, this is America. Looks like you're with me now.

CAPCOM That's affirmative, America. We read you loud and clear.

SC Okay.

CAPCOM Did you get the pan camera start time there, Ron?

SC Yeah, that's affirm, but I got a 3111 instead of 31 10.

CAPCOM Oh, Rog. No problem.

SC Okay. (Laughter). I'll try and do better next time.

CAPCOM America, is the bird in good shape?

SC So far as I know.

CAPCOM Okay, great. Any time you want to start taking the up - flight plan update just let me know.

SC Okay. Give me a little bit of time to lead into the landing site there, and we can go ahead and do it now.

CAPCOM Okay. The first thing is 119 00, 119 00. Add the following words, Ron. Configure camera in parenthesis Earthshine photos, CM 5 - command module 5 - window, the latch November kilo Nikon; flash 55. Flash VH BW, that's Victor Hotel Bravo Whiskey.

SC Okay.

CAPCOM Parenthesis F 1.2, 1, infinity, end of parenthesis. 18 frames FR, 18FR. Magazine -

SC Check zulu, zulu. Okay, go.

CAPCOM Okay, go down to 119 24 and add the following. Let me just read it to you quickly here so you can put in the words you want to. The words are point at target mark by LMP, use same technique as for Copernicus central peak.

END OF TAPE

CAPCOM MS 4 Copernicus central peak.
AMERICA Okay, we'll point it at the target by the LMP and use the same technique which is starting out at 1 second - was it 30 seconds?
CAPCOM Roger, let me read it to you. That's 1 second 2 frames, 1/2 second 2 frames, 1/4 seconds 2 frames, 1/8th second 2 frames, 1/16th second 2 frames. On Copernicus we're using a 32nd interval - it's not according to intervals - it's mainly just a stop setting on that. You're going to use a total of ten frames.
AMERICA Okay.
CAPCOM Okay, then add the following after that: After completion of above, switch to window CM 3 for 8 frames of end of target Poppa 17 Delta at 30 second intervals. Record frame number.
AMERICA Okay, I got switch to window 3 for end of target - say that again, the target number.
CAPCOM P as in Poppa 17 Delta, D as in Delta, 17 Delta.
AMERICA Okay. Poppa 17 Delta.
CAPCOM At 30 second intervals. Okay, there's a caution note on this. It's a note concerning the frame usage.
AMERICA Seems to me like Zebra zero only has 18 frames, doesn't it?
CAPCOM That's affirmed. Do not exceed one eight frames. The balance of mag Zebra zero was used for preflight calibration. Do not exceed 18 frames. Put that down any way you want it.
AMERICA Okay.
CAPCOM Okay. Under rev 17 I've got a note - a similar note for rev 17.
AMERICA Okay.
CAPCOM The note is do not exceed four zero frames on Earthtime mag Wicki Wicki. Balance of magazine was used for preflight cal. I say again, do not exceed 40 frames on Earthtime mag Wicki Wicki.
AMERICA Okay, on mag Wicki Wicki, don't exceed 40 frames. The balance is already on calibration.
CAPCOM That's affirmative and I've got three notes then, Ron, just general notes. You can make them up in the crew film area. Mag Poppa Poppa for crew option. Just use mag Poppa Poppa for crew option. Do not use Kilo Kilo for crew option. Do not use Kilo Kilo for crew option.
AMERICA Okay.
CAPCOM The last one is save all the remaining VHBW on Quebec Quebec and Romeo Romeo for scheduled photos. We have a very small margin on each. (garble)

AMERICA Okay, 3 more remaining on Quebec Quebec and what was the oth, Jack?
CAPCOM Romeo, Romeo.
AMERICA Okay, no extras on those two with the VHBW, huh?
CAPCOM Yeah, we've got a very small margin on those now. And you're about 10 minutes prior to landing site, over. Why don't you go over and start studying that, if you want.
AMERICA Okay.

END OF TAPE

SC You know you look at the next two of them Macrobius A there's a kind of a dark halo type crater there, very small one, and it doesn't have the appearance of a hummocky crater rim to it at all and it looks like the material just kind of spreads out all over the area but it doesn't have a hummocky appearance to it. I'll take a look at that again when I come back - on back around on the other side. There's a small mound down in the bottom of the crater also that's a domical shape structure in the bottom of that small crater. It's right next to J 3, it's north of J 3.

CAPCOM Roger, Ron.

SC Coming in I can see the landing site now, quite well. The appearance of the slide area definitely shows up. The South Massif seems to have a sudden shining right on the walls. I'm looking for any type of layering or any thing like that and can't see anything that - would show that up. The big difference between the Massif stuctures and the Sculptured Hills is that the Massifs look like they're are a steeper slope and they don't seem to have a type of covering over them like the Sculptured Hills do. I'm right over, now, the Scarp definitely cuts up through the North Massif - I can't see continuation on into the South Massif at all, but you can definitely see a vertical exaggeration as it cuts on around up over the North Massif and it's almost - I'd have to take another look at it for sure, but it almost looks like a flow coming from Family or in the vicinity in the direction of Family - not Family Mountain, but from the direction of Family Mountain - lapping up on the side of the North Massif is the way that it looks as you go on by it. I couldn't see anything that would lead you to believe that the slide area, so to speak, would come on across anything that would be the source of that slide area. I still think I can see the, one spot that has a lighter albedo than the surrounding area there in the Pentagon complex and it's pretty close to the - let me get my chart out here and take a look at it again. No it still looks like that area that is blown away there is Dog November, between Dog November and Dog Pappa and about 83 point 4 or something like that.

CAPCOM Copy.

SC Yeah, just like the map shows in all the pictures, you've got a definite demarcation in the annulus around Serenitatis there as you look by the Sulpicius Gallus area. As you look at it, I'm going to have to take another check on it, but the dark annulus looks to me like it's raised above the mare proper itself. I'll check that a little more as we come on across.

END OF TAPE

AMERICA You know all those rilles to the north - I mean to the west of Sulpicius Gallus, there's a bunch of criss-crossing them - right on the edge of Serenitatis basin I don't remember the name of that crater - I'm going to look it up later but they've got slightly raised rims around the rilles. You can see some layering down inside the rille itself in the east-west and the one that runs in the east-west direction.

CAPCOM Roger, you're talking about near Manilius?

AMERICA Well, I'll have to look on the map and see for sure what the crater is but there's an impact crater right on the edge of Serenitatis basin right on the terminator right now.

CAPCOM Roger.

AMERICA And then those rilles are just on the north of that crater.

CAPCOM Roger. It's probably Menelaus, Menelaus.

AMERICA I think it is.

CAPCOM Okay, Ron, is the pan camera off at the T stop time? Pan camera to stand by T stop time.

AMERICA Okay, is it now?

CAPCOM Roger, just a little bit past it.

AMERICA Oh, okay. Thank you. Okay, pan camera, stand by. Thank you. That's the first chance I've had to look at the Moon, you know?

CAPCOM Roger.

AMERICA Those guys wouldn't let me look at the windows.

CAPCOM Roger, that's all right. We don't mind calling you if you don't mind getting the call.

AMERICA No, not in the least.

CAPCOM Ron, I'll give you a cue here shortly for pan camera off. I just want you to know we will not be retracting the mapping camera, therefore, we will not be be closing the mapping camera lens altimeter cover. But we will be dumping normally. Over.

AMERICA Okay, we're going to dump with our mapper open is what you're saying, huh?

CAPCOM That's affirmative.

AMERICA Okay. It kind of looks to me like it all disappears anyhow - just kind of leavse the spacecraft. I don't think anything comes around or even sticks around.

CAPCOM Roger. At your convenience, high gain to auto.

AMERICA You have high gain to auto.

CAPCOM Thank you, sir.

AMERICA Okay, this orbital science photo is coming up here. Do I use magazine KK still, or shall we finish up Oscar Oscar?

CAPCOM Stand by, Ron. I'm checking with Tommy on that one. Ron, they'd like you to use mag KK on that.

AMERICA Okay.

CAPCOM As long as you're looking at the flight plan there at 117:20 where that mapping camera stuff just delete mapping camera retract and mapping camera lens altimeter cover closed at 117:25.

AMERICA Okay, delete mapping camera retract and mapping camera measure altimeter to close.

CAPCOM Roger.

AMERICA Okay. Magazine KK is starting with 21 pictures.

CAPCOM Roger, we copy.

AMERICA Okay, Bob, if you would give me a call when you get ready for that mapping camera stuff. Those guys shoved off this morning and I've got to sample there busses.

CAPCOM Yeah, Rog Ron, we'll give you a call - first there will probably be a pan camera call here shortly and then I'll call you when it's time for those H2 purge line heaters and things like that.

AMERICA Okay.

END OF TAPE

CAPCOM Okay, Ron, pan camera power OFF.
SC Okay. pan camera power - let's see - pan camera power is OFF.
CAPCOM Thank you sir.
SC Good. Yeah, this is not so bad if you think of iced tea I guess.
CAPCOM Roger. For your information, Ron, Gene's out on the surface right now.
SC Oh yeah, hey great. Did they confirm my position yet?
CAPCOM I don't - let me check here, I don't think we have it down exactly - you're pretty dern close to it, and that's for sure.
SC You know, it's funny it wasn't as bright, that pass over - this last pass as it was the time before.

END OF TAPE

CAPCOM Hope you haven't - hope you haven't spilled any, and by the way, LMP is on surface circuits now, too. America, Houston, you can go with the H 2 purge line heaters now. America, Houston.

AMERICA Houston, America, go ahead.

CAPCOM Rog, you can go with the H 2 purge line heaters for the rest of the flight plan.

AMERICA Okay. Well, what do you know. Looks like the heaters have been on.

CAPCOM Roger, we kind of suspected that.

AMERICA Okay. Okay, let's see. Mapping camera can come off. 30 seconds. Okay, mapping camera's going on standby. Pitch motion is off. Altimeter, laser altimeter is off. UV is off. IR is off. Okay. UV cover box. UV covers closed. Barber pole gray. IR covers closed. Barber pole gray. Okay. Laser camera altimeter - leave that one open.

CAPCOM Good show, Ron.

AMERICA Okay, and then it's my understanding you don't want to do any dumping until I go on the backside of the Moon, is that correct?

CAPCOM That's affirm, Ron.

AMERICA Okay.

CAPCOM According to the flight plan you'll do it at 117:50 right about that time.

AMERICA Okay, will do.

END OF TAPE

SC Bob, one little note of surprise I had this morning, wanted to make a note so I wouldn't forget about it, was when you go to Tunnel Vent, it takes a heck of a long time to vent that tunnel. In a simulator down there you go to tunnel vent and pssst, you know, and it flips right down and vents. I was beginning to wonder if it was leaking or something.

CAPCOM Roger.

SC As it turned out, it worked all right, but I bet it took a good 10 minutes to get up to 3 point 5 before I could turn the jets back on, you know.

CAPCOM Roger.

SC Oh, that's right, you know.

CAPCOM Ron, just one reminder as you go around the horn here. The waste water, the way - the position it's in - it will probably take between 10 and 12 minutes to dump it completely, or dump it to your 10 per cent number.

SC Oh, okay, that's good. I'll - besides, I don't have anybody to watch it for me this time.

CAPCOM Yeah, that's right, we wont be able to call you on that from 8 per cent.

SC (laughter) Okay, I'll put my old timer on.

CAPCOM Hey, Ron, 1 other reminder, we noticed in the flight plan that you may get real busy just prior to that orbital planned photo and ECOM would like to make sure the H2 purge line heaters off as scheduled at 118:02.

SC Uh, Okay, Be sure if it's in there, yeah, okay, it's in the flight plan. Okay.

CAPCOM Rog, it's in the flight plan but it's just before you're going to get busy on that orbital planned photo, you might of - you might go to the window early or something like that.

SC Oh, okay. That's a good point.

CAPCOM And your friends out on the surface have got the Rover out now and starting to load it up and getting ready to check it out.

SC Hey, great.

CAPCOM Surface work is going really good. They're just a little bit behind time line from their suiting up exercise but it doesn't make a whole lot of difference.

SC Uh hu, uh hu. 250 lives on that thing.

END OF TAPE

CAPCOM Ron, you're 5 minutes to LOS here and you're looking real good all around the room. No problems on any systems that we can see. We'll see you at 118:29 and we'll be with you for another 5 minutes.

AMERICA 118:29, okay, okay. I think I'll have a little grape drink.

CAPCOM Just remember what Jan says, don't spill it on your flight suit.

AMERICA Heh, heh, heh, right. Did I miss lunch or was I supposed to get any lunch today?

CAPCOM I don't - That wasn't on my shift but if you're hungry, why don't you eat something?

AMERICA (Laughter) That's what I'm doing.

CAPCOM It's been a long time since lunch.

AMERICA I've been nibbling.

AMERICA Yeah. Long time since breakfast, I think, wasn't it?

CAPCOM I think it was and you've got about 4 more hours until scheduled eat time so you've got some lunar sounder work there at about 119 or so, so you might as well consider eating a lot.

AMERICA Yeah, I could eat dinner. I'm kind of nibbling a little bit.

CAPCOM Just want to make sure you don't lose your scissors too.

AMERICA Yeah, this time I got them snapped to the hand controller and stuck in the little thing around it. I don't know how I lost those things.

CAPCOM Roger.

AMERICA I didn't like that big string on there all the time. I didn't like that big string always getting all over the place so I rolled the string up on the snap and stuck the scissors in that little bungee that's on the hand controller.

AMERICA I woke up the next morning and they were gone. I still think it's behind the optics.

CAPCOM Just don't go look at them. Okay. We'll find them pre to postflight, okay?

AMERICA Okay.

CAPCOM Hey, Ron, I don't know what Tommy's got against you but they just never scheduled an eat period in here. We checked this out so thoroughly, we forgot to check it and see if there was an eat period in there.

AMERICA Heh, heh, well, we probably weren't hungry when we checked it out.

CAPCOM Rog. You've got a lunar sounder HF pass at 19 - starting at 119 for flight - actually for two - no - one hour, you could probably grab some feed - food in that time.

AMERICA Okay.

END OF TAPE

CAPCOM America, Houston.
SC Houston, America. Go ahead.
CAPCOM Okay, just wanted to make sure you're there. Your friends are out on the surface and we've got live TV picture coming from the Moon.
SC Hey, great.
CAPCOM And Bob just passed word that they've dropped the scissors up there, but they found them under the dirt awhile. They almost lost a pair too.
SC (Laughter) Oh, come on now. They've only got one pair too, I think. Unless both of them ended up over there.
CAPCOM You getting some good pictures (garbled) Ron?
SC Yeah, I sure did.
CAPCOM Out of curiosity -
SC Almost missed it.
CAPCOM Right. When you came by Arabia did you see the subdued rings of Arabia?
SC No, I haven't had a real chance to look at those yet.
CAPCOM Roger.
SC Okay, magazine SS is full.
CAPCOM Roger copy. Ron, anytime you're ready I've got TEI 26 pad and an Earth shine photo pad.
SC Let me see - do do do do -
CAPCOM Ron, if you've got the 1/2 scale on high gain, will you go to REACQ and NARROW?
SC Okay. Good idea. REACQ and NARROW.
CAPCOM Good show, Ron.
SC Ta ta ta - Okay, let's see, I guess I ought to do a TEI - what did you say it was? 26?
CAPCOM That's affirm, Ron. TEI 26.
SC Okay, ready to copy.
CAPCOM TEI 26, FDS G&N 376 30 plus 05 3 plus 09 7 139 41 14 32 NOUN 81 plus 245 07 minus 209 78 minus 080 71 roll is 187 pitch 104 yaw 323 rest of the pad is not applicable. Good old (garbled) 133 200 030 OH 4 jets 12 seconds. VOX to the Moon at TIG will be minus 160 39. Over.

END OF TAPE

SC Okay, say again the longitude -
CAPCOM Roger, Ron, it's minus, minus 160 deimal 39.
CAPCOM Okay, read back, TEI 26 that's PS G&N 37630 plus 053 plus 097 139 41 14 32 and 81 plus 24507 minus 20978 minus 08 071 roll 187 104 323. 3.5 in rotational 133 200 030, 4 jet 12 seconds, lunar longitude at tick is minus 160 point 39.
CAPCOM Good read back, Ron, and the air sign photo pad is at 121 05 in the flight plan.
SC Okay, stand by, just a second. 121 05, huh?
CAPCOM That's affirmative.
SC Okay, have it.
CAPCOM Roger. T-start 1 2 1 03 59.
SC Okay, T-start 1 2 1 03 59.
CAPCOM And, Ron, we'd like the recorder ON on the lunar counter.
SC Okay, recorder ON.
SC La do da.
CAPCOM Just talked to the home front, Ron, and I guess some of you guys will do any thing to get out from - get away from putting up outdoor Christmas decorations. All the neighbors are outside putting up your Christmas decorations tonight. Pretty bad when you have to travel 250,000 thousand miles -
SC Well, I'll be darn, that's uh - uh, (laughter) yeah, that's pretty darn nice of the neighbors, though, I think.
CAPCOM And the Putnam cat is home so you've got the whole neighorhood back now.
SC Is there any rest?

END OF TAPE

AMERICA Okay, finally got mag ZZ in the old Nikon.
CAPCOM Roger Looking at the flight plan, Ron, you're coming up on selecting on the Bravo and setting up the high gain, hard powering it off and getting ready for the lunar sounder receive only inspection here.
AMERICA OKAY. Okay, 49 OMNI Bravo (garble). High gain (garble) 54 -
CAPCOM And roger, friends down there said that they could see you on the VHF loud and clear.
AMERICA I was just curious, I don't hear them. I thought maybe I could hear them. Yeah, I'm having a ball down here, guys.
CAPCOM Hey, Ron, we look like we're about 30 seconds in front of update. Right there, on update.
AMERICA Okay.
CAPCOM And we're not going to have to number any calls here for a good 40 minutes so this would be a good time to catch up on your meal that you missed there this morning, Ron.
AMERICA (laughter) Okay.

END OF TAPE

CAPCOM Ron, when you get a chance we'd like H2 tank 3 fans to off.

AMERICA Okay, H2 tank 3 fans are off.

CAPCOM Roger.

AMERICA Hey, Bob, did Jack call down where that flash is - where he saw that light flashing?

CAPCOM Roger.

AMERICA Let's see, I've got a mark next to Riciolli G Is that correct?

CAPCOM That's affirmative. We circled it at Grimaldi B and just a little bit to the east and north of the Grimaldi B right in that area.

AMERICA Okay, we put it just - just a little x = oh about the diameter of Riccioli G - west of Riciolli G.

CAPCOM Okay, that's probably - he didn't ever call the - I'll ask FAO here - but I don't think he ever called the actual coordinates on it. I'll ask FAO. That's probably close enough - It's probably (garbled) with it.

AMERICA Oh yeah, (garbled) - You'll never believe it but I saw a light just flashing down there too. (garbled) Did you hear that?

CAPCOM Rog. I heard that Ron. The thought that occured to us - could you be seeing the - those cosmic ray flashes just while you're looking at the lunar surface and get that effect?

AMERICA Well, that's just what I was wondering myself.

CAPCOM As (garbled) says, he thinks that he has seen something similar to that and possibly thought it was that and we were thinking maybe it was fooling Jack, but it won't hurt to take a picture of the area anyway.

AMERICA Oh yeah, I will try taking a picture of it but I think I - agree that's probably what it was.

CAPCOM Well, we're just guessing just like everybody else but now we're just kicking that around.

AMERICA (chuckle) Okay. Nothing showing up on the seismometer anyhow so it's pretty silent.

CAPCOM Well, you have to remember on that seismometer, on at least the one for Jack's call, the S-IVB had just clobbered the seismometer and that there was some small impact that if it was getting in the mud we wouldn't have seen it.

AMERICA Oh, okay. Sure.

END OF TAPE

CAPCOM Ron, I know you're wondering - all the data so far on the lunar sounder has come out real good and the HF pass is looking real good.

AMERICA Oh, that's dandy, hey that's great. Let's hope something is going on the film.

CAPCOM Thats - roger on that. We sure hope so.

AMERICA (laughter) Oh, I'm sure it is.

CAPCOM Let's take another look at Copernicus as you ease into AOS.

AMERICA Just stuck my head out the window, I got to find it. There it is right here. (garble). I'm not sure you can really tell Tycho through there or not.

CAPCOM Roger, I understand.

AMERICA You know, light and dark albedos show up real well. You can see some indication of terrain, that is hilliness or ferrels or gabbros or rilles, plus the fresh craters show up a lot whiter with respect to the surrounding territory than I think they do in the bright side, you know - with the Sun shining on them.

CAPCOM Roger. Gene became the first auto mechanic on the Moon because one of the rear fenders fell off the Rover right after they deployed it and he had to tape it on with tape.

AMERICA (laughter) Oh, he did? Well, they were pretty much sure those things would fall off, anyhow.

CAPCOM Yeah, they were willing to bet on it.

AMERICA (garble)

END OF TAPE

SC And I can see Riner gamma real well out window 3.
CAPCOM Roger.
SC I should be able to get that the next rev, I guess.
CAPCOM Roger. Looks like a gamma up there, is that why they call it a gamma?
SC Yeah, it sure does. You know, it almost looks like an elongated crater in this light.
CAPCOM Roger.
SC You know, with the gamma part of it in the in the crater rim.
CAPCOM Right.
SC And I'm sure it isn't that way.
CAPCOM We can get both of those - we got 2 - or a number of pictures to be taken in your next rev, but we got that sequence on Copernicus plus on Riner gamma there.
SC Ah ha. Okay. Well, now I'll see if I can find Riccioli. I should be able to see Grimaldi I think.
CAPCOM Getting pretty easy to locate yourself as you go on your track?
SC Yeah, it's starting to get that way. But it's not as good as I want it yet. Every once in a while I can look out the window and you don't have the slightest idea where you are.
CAPCOM Right.
SC Yeah, I can see Grimaldi and Riccioli coming up now. Just passing over the edge of the Mare (garbled)
CAPCOM Roger. How did you say the Grimaldi Mare there?
SC Yeah, I can see it coming up.
CAPCOM Okay.
SC It'a a pretty stark difference between the Mare and the - you might as well call them an island, That's what they look like. East of Protagorus. I can see where you get through to Grimaldi.
SC Okay, I'm going to switch to window 3. Little better to try and get some pictures.
CAPCOM Roger.
SC Too much glare on the window.
SC Okay, Bob, that is correct now you want to continue on across here the 15th huh?
CAPCOM Roger.

END OF TAPE

CAPCOM Okay, Ron, don't want to interrupt your picture taking, but we need to check out the (garble) when you get a chance.
SC Okay. There you go.
CAPCOM Good show.
SC Say, I can only take 18 pictures on that, I think, can't I.
CAPCOM Say again, Ron.
SC They'll only take 18 pictures, I think.
CAPCOM Roger.
SC Oops (laughter). Going around in here by yourself you get to be a square.
SC Well, I didn't see any flashes down there that time.
CAPCOM Roger.
CAPCOM Hey, you're looking good, Ron, you're right on the flight plan we haven't missed a thing yet today, I don't think, and in really good shape.
SC Well, okay, good. I'll tell you, a little more hustling up here than I thought there would be, though.
CAPCOM Keeping you busy, huh.
SC (laughter) yeah, a little bit. That's all right, it's fun.
CAPCOM Just don't want you to get lonely up there.
SC (laughter) Sure won't. Okay, that was Mag Zebra Zebra, I guess. Turns out just like we had it planned. Took two each at one second and a half, then a fourth, then an eighth. And took that on this camera at a 50 instead of 60.
CAPCOM That's good. and 150.
AMERICA Then the rest of them.
CAPCOM Yeah.
AMERICA The rest of them are one sixth - 150 throughout except the last two. They're put at the half.
CAPCOM Okay.
CAPCOM I'll get a confirmation on (garble) but I think when we get on to (garble) camera on that pass we'll probably switch to Delta. We're not going to have enough film left to run out over Riccioli and that area, which you've already taken. That's why we didn't take these now. Because when we come up there to this next pass you won't have enough film.
AMERICA Oh, I see. Okay.

END OF TAPE

AMERICA Let's see while I got the camera out. I'll have to look again, to see what - what the mag to put in there. WW, I guess, huh?

CAPCOM Yes, that's affirmed. WW on the (garble).

AMERICA Okay (garble).

CAPCOM (garble) comm get's pretty bad down here with us. We're going lose you in about 4 minutes, maybe 5 later. We might be able to pick you back up 120:28 thereabouts, 120:28.

AMERICA 120:28, okay, I'll see you then.

CAPCOM Ton you're about to go over the hills. You're looking really good.

AMERICA Okay, Robert, thank you much. See you in about 45 minutes then, I guess.

CAPCOM That's affirmative.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 21:20CST 120:26GET CM47/1

AMERICA GARBLE.
CAPCOM Oh, Ron how's it going up there?
AMERICA Hey, pretty good, Robert.
AMERICA Hey frontal flow pass was a good one. And just about at half an Earth now.
CAPCOM Roger.
AMERICA Houston, America. The mag Lima Lima is on frame number 54 now.
CAPCOM Okay, Ron, we copy, Lima Lima on 54.
AMERICA And mag - and mag Quebec Quebec is starting on frame 53.
CAPCOM Roger, we copy.

END OF TAPE

AMERICA Uh, Houston, America. I'm going to unplug you for a little bit, I'm so tangled up in the hoses here I could strangle to death.

CAPCOM Okay, no problem, Ron. Just give us a call when you're back on the air. Okay?

END OF TAPE

AMERICA Houston, you need OMNI BRAVO yet? Will you give me a call when you want it.
CAPCOM Roger, Ron. We'll give you a call.
CAPCOM You can go OMNI BRAVO now, Ron.
AMERICA Okay. You have it.
CAPCOM Okey doke.
CAPCOM Ron, if you're right there, we'd like you to take the H2 tank 2 fans to OFF, please.
AMERICA Okay, H2 tank 2 fans to OFF.
AMERICA You know, from the pictures of Maraldi Gamma, it looked to me like it might have been some sort of - maybe even a volcanic dome or some kind. Would you look at it up here now, and compare it with the rest of the surrounding material, it looks just like any of the other sculptured hills. They have small domical structures on it and the same type of material that carries on through south of Maraldi. And it looks like maybe some kind of a mare fill has come in and filled up Maraldi itself, you can see flow lines - it looks like - going down into Maraldi from Tranquillitatis. Now the impact or the craters that are inside Maraldi - they're smaller type craters - and they have a definite bluish tinge to the halo that comes out as opposed to the bright - most of the bright craters or white type thing - and those are more of a darkish bluish tinge to them.
CAPCOM Roger, Ron.
AMERICA And oddly enough, that's the same type of bluish tinge that you see right in the landing site right now. And the pentagon complex MOCR shows up that same type of a bluish tinge to it.
CAPCOM Roger, did you have any luck locating the LM area in the (garble)
AMERICA I didn't even see that bright spot there, anymore. I know where to look for it and I don't even see it.
CAPCOM Roger, understand.
AMERICA The South Massif just went into a hole too, so -
CAPCOM Roger, our best estimate of their location down here, Ron is 83 - delta mike 83 - delta mike 83.
AMERICA Delta mike 83, huh.
CAPCOM Yes, and that's seen on the southeast C - the FEC with the landing site and the first EVA on it. The one - the 25000 grid map on the - one of those you had put in at the last minute there.
AMERICA Okay.
CAPCOM And I assume you're set up for the pictures coming up at 121 right?

AMERICA Yes, it's funny, I can see Bessel, but I be durned if I can see a vertigan ray going across it - I mean a tyco ray - vertigan ray I guess.

CAPCOM I think you were right the first time, weren't you?

AMERICA Yes, it's a tyco ray.

CAPCOM Ron, I'm sorry, I missed this last time, would you give me a hack when you start on the earthshine photos on P17 - The Copernicus one. I'll time your 30 seconds for you down here - save you a look at the clock, and -

AMERICA Oh, okay, hey, that's a good idea.

CAPCOM I guess - even though it's the third time we've passed it at the time the group wanted to remind you that when you pass Eratosthenes - is a good time to be looking into the heart of Copernicus there. Remember from the map there.

AMERICA Okay, that's a good idea, thank you.

END OF TAPE

CAPCOM Were you able to see the scow Galois ridge there, Ron?

AMERICA Yeah, man oh man, that thing really sticks up there. I'm trying to estimate the height of it with respect to one of those craters down there. I still can't get over the difference in color in the annulus around Serenitatis. Yeah, that thing is really apparent.

CAPCOM Roger.

AMERICA And it looks like the color - the color distinction stops right at this ridge here just as we're going into the sunset right now.

CAPCOM Roger.

AMERICA I'm trying to determine the flow with respect to those ridges, if there is such a thing. Let's look at it again when we come around the next time. Okay, QQ has got 69 frames.

CAPCOM Roger.

CAPCOM Okay, Ron, you're about 2 minutes from T-start time. But again 5 to T-start time with respect to the crater, Aristoteles.

AMERICA Okay, why don't you just kind of give me a foot gouge when I should be at Aristoteles. (laughter).

CAPCOM Okay, I'll give a call and of course, your first frame is -

AMERICA I'll take it off.

CAPCOM First frame is F1.2 for one second you'll take 2 frames.

AMERICA Okay.

CAPCOM Okay, Ron, you're about 30 seconds from T start time.

AMERICA Okay, I think we got her.

CAPCOM Okay, just give me a call when you start. You're about 10 seconds on though.

AMERICA Okay. Stand by. 3 2 1 mark it. Okay, switch to half.

CAPCOM Okay, come up on 30 seconds. Mark it.

AMERICA Okay, good. To a fourth.

CAPCOM Okay, coming up on another 30 seconds here. Mark it.

AMERICA Okay. Okay, I'm down to a fifteenth. I'm just not fast enough, Bob, so here's a 1 on a fifteenth.

CAPCOM Okay, you're one ahead on the frame. You should be a 1/8 right now.

AMERICA Start my times from there.

AMERICA Yeah, I've already passed it so I had to count quick.

CAPCOM Okay, here you are, 1/8 here.

AMERICA Okay, tell me when to do it.

AMERICA	Okay? Rest of them 1/8?
CAPCOM	No, one sixteenth - one fifteenth.
AMERICA	Okay. give me a hack every 30 seconds.
CAPCOM	Okay.
CAPCOM	Well, Okay.
AMERICA	Or whatever tell us which windows.
CAPCOM	Hack it.

END OF TAPE

AMERICA (garble) which windows.
CAPCOM Hack it.
CAPCOM Coming up to 30 seconds. MARK it.
CAPCOM Coming up on another mark, Ron. Hack it.
AMERICA Okay.
CAPCOM Just a reminder. The end of this line goes up to empty and (garble) you probably reviewed that.
AMERICA Okay.
CAPCOM Coming up another mark. Hack
CAPCOM Coming up another mark. MARK it.
CAPCOM Okay, Ron. MARK it.
AMERICA Okay.
CAPCOM Okay, Ron. You'll be coming up on another mark here. MARK it.
AMERICA Good.
CAPCOM Okay, according to my calculations, you get 2 more sets of 2 frames each to take. You've taken 20 and you've got 4 more to go, I believe.
AMERICA Okay, I want to get some for Reiner Gamma right.
CAPCOM Roger. As soon as you do that, you just switch windows to the onside and Reiner Gamma - you've got 2 more to go here. Here we go. Coming up on another 30 seconds.
AMERICA All right.
CAPCOM MARK it.
CAPCOM You probably should be able to see Encke out there now. That's your last target picture.
AMERICA Okay. Switch over to window 3, then.
CAPCOM Okay, you take that last one on Encke or have you got 2 more to go on Encke there.
AMERICA I've only got 19 frames left, so -
CAPCOM Okay. That's the last MARK there.
AMERICA Same thing on the Eratosthenes. Okay.
CAPCOM Okay, Ron. On these Reiner Gamma pictures you don't have to wait 30 seconds. You just shoot the frames as soon as you get a good view there. Shoot 2 frames at 1 second, 2 at 1/2, 2 at 1/4 and 2 at 1/8.
AMERICA Okay. Would you believe that's what I did on Eratosthenes? And also on Copernicus.
CAPCOM Rog. That's what you were suppose to do on the Copernicus. So, you remembered better than me on that one. It wasn't 30 seconds 'till start 'till after Copernicus.
AMERICA (Laughter). Yeah. Well, I made a mistake too, I thought Eratosthenes was Copernicus. Well, we've got a series on Eratosthenes and also a series on Copernicus. So, we're in good shape.

CAPCOM Okay. You should be seeing gamma about now shouldn't you.
AMERICA Yeah but. I don't see it yet.
CAPCOM Okay.
CAPCOM Ron, You can just run this mag all the way to out to Frame 40 after you finish on gamma and you can just finish on out that line, up towards Riccioli and then run off to Frame 40 and stow it.
AMERICA Okay, will do.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/11/72 22:10 CST 121:16 GET CM-52

(All dead air)

END OF TAPE

CAPCOM Okay, Ron, did you get that mag finished up?
AMERICA Okay, all but one picture. And I was going to try to take one of Orientale. That's going to be one there just right on the edge.
CAPCOM Okay.
AMERICA So I'm just kind of looking out the window now. Why do you have some flight plan stuff?
CAPCOM I've only got one minor flight plan and that's all so anytime you're ready you don't - you know don't tear yourself away from the window as long as you can see anything here.
AMERICA Okay.
CAPCOM We would like you to select on the alpha.
AMERICA On the alpha.
CAPCOM And if you're looking at it and see anything interesting we wouldn't mind hearing about it.
AMERICA Okay. Well, the big difference, right in here, of course, is the - is the ejecta - the radial furrows and ridges and what have you from Orientale. There doesn't seem to be that type of a pattern at all on the backside.
CAPCOM Roger.
CAPCOM Can you still see things on Earthside or is it getting pretty black down there?
AMERICA Actually, you can still see it. That's why it kind of amazes me. It's almost like - you know sunrise and sunset.
CAPCOM Roger.
AMERICA Pretty soon the shadows get longer and longer.
CAPCOM I'll tell you we've got the television screen here -
AMERICA Okay that's my last picture on it.
CAPCOM Roger. You're going to have a couple of dirty companions when they come back up - I'll tell you.
AMERICA (laughter) What are they doing - getting all dirty?
CAPCOM Well I think they did fall down a couple of times and they're black all over.
AMERICA Yeah, it looked like a dark area down there.
CAPCOM Yeah, they sure are dirty. Okay, Ron, I - in the flight plan at 133:12 way on ahead you just might mark this down somewhere - it's a real simple mapping camera laser altimeter cover open and mapping camera extend, you'll just delete those since they are already there.
AMERICA Okay, let's see - where was that now about 131?
CAPCOM 133:12 it's in the other volume - the next volume of the flight plan.
AMERICA No. I'll just write it down. I don't have that volume out.
CAPCOM Yeah, just mapping is delete - delete the mapping camera laser altimeter open and mapping camera extend - just delete those two functions.

CAPCOM You remember, it's all ready out and the cover is staying open because it's out.
AMERICA Oh, okay, and that's about 131, huh?
CAPCOM 133:12 - 133:12.
AMERICA Okay. 133 plus 12.
CAPCOM And Ron, we made a trip around the room here and see if pan systems are all go - all look good and the lunar sounder looks good also.
AMERICA Okay, real fine. I guess I'll grab a bite to eat down here pretty quick.
CAPCOM Yeah, do that will you. Sorry you missed that other one.
AMERICA (Laughing) Oh, I filled in every once in a while so that's not too bad.
CAPCOM Good enough. And just a reminder, which is in the flight plan - the DSE voice recorders on the backside will not be dumped.
AMERICA Oh, okay.
CAPCOM And Ron the reason why we've got all the H2 fans off now is we're trying to get the pressures to drop some and we'll come up with a sleep configuration this next half.
AMERICA Oh, okay.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/11/72 22:30 CST 121:36 GET CM-54/1

(All dead air)

END OF TAPE

AMERICA Houston, America. Has there been call ups?
CAPCOM Guide on.
AMERICA Okay, I had my headset off here and I wasn't paying much attention when AOS came.
CAPCOM Oh, I wasn't even talking - listening for you, I was talking to your wife.
AMERICA Oh, okay.
CAPCOM You get a decent meal?
AMERICA Well, it wasn't too bad.
CAPCOM Jan says -
AMERICA Turkey and gravy.
CAPCOM Jan says she's - you're the last person she'd ever think would miss a meal up there.
AMERICA (Laughter) That's probably true, really.

END OF TAPE

AMERICA (garble)
CAPCOM Ron, are you up glued to a window or are you just eating now?
AMERICA Well, I'm really just eating.
CAPCOM Roger, I thought I'd update here before you get into your presleep checklist and have to get - I have a little bit of news from the day, but today's gone -
AMERICA Okay.
CAPCOM Sure not much news today. It's a good thing you guys made a landing today because there wouldn't be any news in the paper tomorrow if it wouldn't be for you all.
AMERICA (Laughter)
CAPCOM Let's see, Japanese Prime Minister Tanaka's civil democrats lost 26 seats, but he still has a firm hold on the diet and Tanaka still has a firm majority. And Henry Kissinger and Le Duc Tho's secret Paris peace talks have bogged down some more and they think they're under - bogged down under some academic situations. And the news out of Kansas City isn't too good. President Truman is - still has some irregular heartbeats and has reduced the optimism for his recovery.
AMERICA Not too good.
CAPCOM And this last one has got to be the height of trivia. I'm just going to read it to you exactly the way it is. It's from Saigon. Question: What does an airforce enlisted man do when he meets a naked general? He salutes. An order issued by Major Paul M. Bossman at Tan Son Nhut Air Base makes the requirement clearer. Salute when you recognize an officer even though you both are nude. An Airforce spokesman said he didn't know under what circumstances the officer and enlisted personnel might encounter - encounter each other in the nude. End of news for tonight.
AMERICA (Laughter) New's little trivia, isn't it?
CAPCOM Yeah, indeed. Everybody's from the home front sending their love. They had a little trouble hacking out the COMM since we're all on the squawk box together, so they're going to try and get it set up so just the CSM loop will go into your house tomorrow night. Tonight we had all of it and it was kind of a jumble for them.
AMERICA (Laughter) I imagine so, wouldn't it. They can't turn one down and - or something, huh?
CAPCOM That's right. Well, they're going - they're going to try to work on it for tomorrow so that only the CSM loop will go in there. They just had to finally give up on it

CAPCOM and go watch the - the surface work on television, 'cause over the loop it was just too much.

AMERICA Yeah, I'll bet.

CAPCOM When you get into the presleep checklist, you can delete the stir cryo's which is in the checklist. We won't stir the cryo's and then as you get further downstream closer to LOS here, the sleep period, we'll have you turn the H2 tank 2 fan to the ON position. I'll give you a reminder on that.

AMERICA Okay.

END OF TAPE

CAPCOM I'll give you a reminder on that.
AMERICA Okay.
AMERICA Okay, Houston, America. Bat C is about oh, 36.8 or 9 something like that.
CAPCOM Say again -
AMERICA Pyro A is 37.
CAPCOM Okay.
AMERICA Pyro - okay, Pyro A is 37 , Pyro B is 37, bat C is oh 36.9. I think you want the quads, now, right?
CAPCOM Roger.
AMERICA Okay, ALPHA is 82, BRAVO a 78, CHARLIE is 80, DELTA is about 83.
CAPCOM Roger, we got those and that matches pretty close what we've got right in front of us on those quads. You can go ahead and take the H2 tank 2 fans to ON, at this time.
AMERICA Okay.
AMERICA Okay, tank 2 fans are ON, H2, that is.
CAPCOM Roger.
CAPCOM And Ron, we'd like OMNI BRAVO.
AMERICA Okay, you have OMNI BRAVO.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12-11-72 23:47CST 122:54GET CM58/1

(All dead air)

CAPCOM Say again, it's the one in the sleep checklist. You'll get to it at - you'll get to it down here at about 23-10.
AMERICA Oh, okay.
CAPCOM Sounds like some good music in the background there.
AMERICA Yes, not too bad, really. (garble)
CAPCOM Ron, if you're finished there, we'd like the - ACCEPT - we've got the (garble) on monitor load and we've got a state vector for you tonight..
AMERICA Okay, you have ACCEPT.
CAPCOM Roger.
CAPCOM FIDO showed me where they're plotting on doppler with those markdowns they're doing to you, they really have effect.
AMERICA Oh, they are huh?
CAPCOM Yes, you can really see when you're going right over Imbrium and Serenitatis.
AMERICA (laughter)
CAPCOM And just prior to getting into rest sleep, we can take battery B off the charge and terminate the charge.
AMERICA Okay.
AMERICA Okay, I checked out the tone booster and it's hooked up.
CAPCOM Good show.
AMERICA I guess I'd better clorinate the old water.

END OF TAPE

CAPCOM Okay Ron you can go to block and the computer is yours.
AMERICA Okay, will do shortly.
CAPCOM Okay, you want me to remind you again while you're - after you coordinate here.
AMERICA No - I'll get it out.
CAPCOM Okay. Okay. The surface boys are on the way back to the LM. They have completed their EVA and they're getting - they're driving back to the LM right now.
AMERICA Hey, good. They got out and did a little riding around on the Rover, too, huh?
CAPCOM That's right. They -
AMERICA And the ALSEP is all deployed?
CAPCOM ALSEP is deployed. They had to cut their time at Station 1 a little bit. They've got to curtail the EVA slightly short of 7 hours due to - high oxygen usage during the - deploying the ALSEP. It's only 15 minutes early so it's no big deal.
AMERICA Oh, I see. That's not bad.
CAPCOM No, Geno's working pretty hard putting that drill in the ground and there is some pretty difficult work and they each fell a couple of times so they were really pretty busy.
AMERICA (Laughter).
AMERICA Are we going to leave tank 3 - I mean tank 2 H2 fan on all the time.
CAPCOM Rog. H2 tank 2 fan ON for all night.
AMERICA Okay.
CAPCOM The only thing we've got Ron, is it looks like you've got to get the batt B off the charge and then configure the comm when you're all ready to bed down.
AMERICA Okay.
AMERICA Okay battery B relays breakers in, chargers OFF. Hey, I've got to clean the old GARBLE screen yet. Plus X forward here so - plus 25 and 195 - no, wait a minute minus 10 and plus 25.
CAPCOM That's affirmative. minus 10 plus 25 and as tight as you can get it to those numbers Ron.
AMERICA Well, I'll tell you what I believe the dial's more than I believe the set knobs so - was that the AOS there no, not quite.
CAPCOM Ron, we've just been debating here - you need to be sure and do the knobs at the minus 10 and plus 25.
AMERICA Okay, I'll put the knobs there.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/12/72 00:16 CST 123:24GET CSM61/1

CAPCOM Ron, everything is looking great down here. It was a really great day, really busy. We're sorry about that eat period. And it's been real - lot of things have happened.

AMERICA Yeah, it was a good day. No, don't worry about that eating. No problem there.

CAPCOM And the bird looks great and we'll see you when we wake you up. You can sign off any time.

AMERICA Okay.

CAPCOM One point, Ron. They would like to have the DSKY cleared.

AMERICA I'm going to put the shade up.

CAPCOM Yeah, beautiful.

CAPCOM Ron, just a reminder on the upband on the wake call when you're ready to sack out.

AMERICA Okay, let me blow a little buffer solution out of the water here. About 10 minutes I think.

CAPCOM Rog.

AMERICA Takes a little longer to do all this stuff by yourself. (laughter).

CAPCOM It sure does.

CAPCOM Okay, Ron, we're going to drop the uplink here in one minute. So, see you tomorrow.

AMERICA Okay, thank you all, we'll see you in the morning.

CAPCOM Okay, you can call us.

AMERICA (garble) - voice going off.

AMERICA You can call me, but I can't call you. (laughter)

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/12/72 13:47CST 136:54GET CM62/1

CAPCOM Ron, Houston here, we're coming up on some PDI 38 pad and some flight and a solar corona pad and flight plan updating - are you ready?

AMERICA Okay, let's see - I think I've got the -

AMERICA Okay, let's see I'11 get my PDI book here. ALSEPS are TDI 38.

CAPCOM Okay, Ron. PDI 38, FPS G&N. 375 80 plus 055 plus 097 163 21 54 04. NOUN 81's are plus 266 80 minus 123 80 minus 04 141, roll 181, pitch 114, yaw 338. The rest of the pad is not applicable. Good old Sirius and Rigel for our set stars 133 200 030, ullage four jett, 12 seconds - that's 12 seconds. Tan the launch to the Moon at the TIG time is minus 153.71. Over.

AMERICA Okay, PDI 38, FPS G&N. 375 80 plus 055 plus 097. TDig is 163 21 54 04. NOUN 81's plus 26 68.0 minus 1238.0 minus 0414.1, roll 181, pitch 114, 338. Sirius and Rigel 133 200 030, four jett 12 seconds. Longititude at TIG is minus 153.71.

CAPCOM Good read back, Ron. Okay, all the rest of our readup here is in the flight plan.

AMERICA Okay, just a second. Okay, go.

CAPCOM Okay, at 137 33 the solar corona photo pad is T start 137 33 48. Over.

AMERICA Okay solar corona pad 13 33, 48.

CAPCOM Roger. Next one's over at 139 20.

AMERICA Okay, go.

CAPCOM Okay the old one - delete mapping camera laser altimeter cover OPEN, and at 139 21 delete mapping camera extend. They're already there.

AMERICA Okay, got them.

CAPCOM Okay, Ron at 139 21 where it says UV cover OPEN, move that down to 139 23. Make the following note. Delay opening 2 minutes to check operating current with cover closed. We'll be checking that and giving you a cue on that.

AMERICA Oh, okay.

CAPCOM And there's nothing - there's no problems expected there Ron, we've just getting some extra data that OSO wants.

AMERICA Okay, good deal.

CAPCOM Okay, the next one is at 141 50.

AMERICA 141.

CAPCOM 141 50.

AMERICA 150, okay.

CAPCOM Okay, we got a little - seeing some funnies on the V over H override so after pan camera stand by stereo and power we want to add the following V over H override high altitude - high alt.

AMERICA Okay V over H override to high altitude.

CAPCOM Okay, thank you.

AMERICA Rog, Houston. Better give a power ON.

CAPCOM Pardon me, Ron, I missed that.

AMERICA That's right, after you get to pan camera power ON, V over H to high altitude.

CAMCOM Right.

END OF TAPE

CAPCOM over H override, high altitude - high alt.
AMERICA Okay, V over H override to high altitude.
CAPCOM Okay -
AMERICA America, Houston. After I get my power on.
CAPCOM Pardon me, Ron, I missed that.
AMERICA That's right - after you get the pan camera power on - V over H to high altitude.
CAPCOM Right. Okay, Ron, the next 2 are just a couple of info notes for you. I don't know where you want to write this one, but FAO would like to remind you that you don't have any margin on MAG Lima Lima anymore. You used up all your margin on that mag. Everything else is needed for planned operating.
AMERICA Ahah, okay.
CAPCOM And the last one -
AMERICA No spares on Lima Lima.
CAPCOM Roger. Just use Lima Lima as scheduled, but don't use any spare shots on it. The last one is just a sum up here, Ron.
AMERICA Okay.
CAPCOM You obviously are aware of it but you have not missed any mapping camera or pan camera or lunar sounder operations to date and we're all on schedule and right on the flight plan - outstanding flight plan.
AMERICA You bet it's an outstanding flight plan, that's great.
CAPCOM Yes, Ron. I think you really have an outstanding flight plan to be flying at this time of the year because the weather in Houston is so miserable, you can't believe it.
AMERICA (laughter) Oh boy, that's what everybody keeps saying.
CAPCOM Roger, I just drove in and it's kind of a sleety rain, and it feels like it might snow at any moment, although, it's not really that cold, the ceiling is probably down to 6 or 700 feet. It is really rotten out there.
AMERICA (laughter) Yes, we did pick a good time to make the flight then.
CAPCOM That's affirmative. It's been this way since you left.
AMERICA (laughter)
CAPCOM You guys - you realize, of course, you're going to get blamed for that -
AMERICA (garble)
CAPCOM When we shoot people to the Moon that's what happens.

AMERICA (laughter) Yeah, right.
CAPCOM Okay, you can get back to work then, if you want.
AMERICA Okay, I'll get my solar - solar corna squared away here.
CAPCOM Okay.
AMERICA Okay, solar corona is mag qq and we're on frame 69.
CAPCOM Okay, mag qq 69.
AMERICA And Houston, America. Let's see - you really sent me over the hill on high bit rate this time for sure - as usual.
CAPCOM Stand by on that, Ron. Let me take a go on that.
AMERICA Looks like it.
CAPCOM That's affirmative, Ron. You'll be going over the hill in high bit rate.

END OF TAPE

AMERICA And, Houston, America just so you don't get confused there - I put two protect frames on the start of this.
CAPCOM Roger, that's affirm. We've got that.
AMERICA Yeah, I just wanted to try out that control cable with the PCM stuff, you know.
CAPCOM Roger, understand.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/12/72 14:16 CST 137:23 GET CM-65/1

CAPCOM Ron, we're coming up on 5 minutes to LOS, and we just want to update you. We went around the room and the spacecraft is looking great. We just have one reminder and that's at the end of solar corona period, please use only one protect frame, one protect frame per the flight plan, or per the checklist. And the other thing is, the lunar sounder little check you did at the beginning of this pass is - the recorder is pulling film as normal, the glitch we saw was a telemetry glitch, and the lunar sounder is looking great.

AMERICA Great - outstanding. That's good to hear. Sounds like we're getting kind of low on VHBW film though is what you're saying, huh?

CAPCOM On that particular magazine, yes, Ron. That's the problem, I think - we don't think it's the total thing as more as which magazine's is got what on it.

AMERICA Oh, okay.

CAPCOM And we'll see you at 138:15 when you'll be just about eating, so give us a call if you want anything. We'll be listening.

AMERICA Okay, I'll be on theloop. All right - hey, one thing, could you check on mag - what I have on the Nikon now, XX I guess. Seems to me like we just need that for another - zodiacal light thing.

CAPCOM Okay, we've got FAO working on that.

AMERICA (garble) In other words, are there 2 or 3 frames available? Do we have 2 or 3 frames available on that one?

CAPCOM Okay, let me check on that Ron.

AMERICA Okay.

AMERICA I want to take a red and a blue picture of the landing site sometime.

CAPCOM It's going to take a little bit of chasing on that, Ron. We may not have the word before you go LOS, but we'll have it definitely when you come up AOS.

AMERICA Oh, okay. Yeah, Don't - no, no problem. I won't use it until I get to the landing site anyhow.

CAPCOM Okay, Ron, there are 18 spares on X-ray X-ray that you can use.

AMERICA Oh, okay. Good.

END OF TAPE

AMERICA Houston, America.
CAPCOM Hello, America, how you doing?
AMERICA Well, I think I got it back under control again.
CAPCOM What happened? Any problems?
AMERICA Uh, let's see. Let me go back through my -- well, almost got into gimbal lock. (Laughter).
CAPCOM Okay, you almost got into gimbal lock, go ahead.
AMERICA Last step of the -- last step of the solar corona thing, which says go back to CMT AUTO, which wouldn't have been too bad, except as soon as you get a waste water dump it really torques it around, I guess. And, somewhere, I don't know, you have to check it back on the tape, about 137:50 -- between 50 and probably -- well, between 55 and 58, somewhere in there, I got the gimbal lock light and all those good-deal things. And, got it under control, took it back, and we got back to SIM bay attitude at 137:59:20. In the meantime, while I was doing all that, looks like my waste water dropped down kind of low, too. How much you reading down there?
CAPCOM Okay, stand by on that, Ron.
CAPCOM They're reading .16 percent and .9 pounds, 1.6 percent and .9 pounds, Ron.
AMERICA I didn't quite make it to zero, did I?
CAPCOM Rog, that's affirmative.
AMERICA Okay, caught that in time, anyhow.
CAPCOM Hey, Ron, just a question here -- pick up where you were reading up there. Did you go to CMC AUTO after the solar corona, or did you get the gimbal lock light prior to going to AUTO?
AMERICA I got it prior to going to AUTO. I forgot to go to AUTO after the solar corona thing.
CAPCOM Okay, we got you.
AMERICA I had to purge the fuel cell first and waste water dump. Yeah.
AMERICA No, I saw it before it tumbled the platform though.
CAPCOM Roger, we got you, and the platform was good enough, too.
AMERICA Oh, yeah, the platform was okay.
AMERICA And, if INCO's timing the bit rate portions there, high bit rate was - I mean, going to low bit rate was about 13742 was pretty -
CAPCOM Okay, we copy that.
AMERICA Okay, and then going to high bit rate, I got the high bit at 1375030, and I hit low bit rate again at 13808. Went to high bit rate of 13814.
CAPCOM Roger, Ron, we copy those times.

END OF TAPE

CAPCOM Roger, Ron we copy those times.
CAPCOM Sounds like you might have got your heart beat going good for your eat period. Is that right Ron?
SC (Laughter) yes, I might have. I'm going to have some peanut butter now if you guys don't care.
CAPCOM Roger, it's your eat period.
SC (Laughter) okay.
CAPCOM At least you didn't forget this one.
CAPCOM Ron, we've got some data here for you -
SC That's right by gosh. We've even got one scheduled. Go ahead.
CAPCOM We've got some data here for you for - if your planning on taking those red and blue filter exposures across the landing site if you want this information.
SC Ah yes. Okay go ahead.
CAPCOM Okay Ron here it is. It's a Nikon NK, November Kilo 55, 1 frame each filter. F11, 1/250ths, 1 frame each filter. With no filter exposed at F11, one one thousandth, and if you want to use the polarizing filter expose at F11, one five hundredths of a second.
SC Okay, looks like we'll bracket it there, F11, one twenty fifth, one frame on each filter and F-11 at a 250th, 1 frame on each filter, and then without a filter 1 F11 at a thousandth, and polarizing F11 at a five hundredth.
CAPCOM Okay, here's a note that I'm not sure I understand totally, but let me read it to you. Observe target through view finder and shoot as desired with polarizing filter in different positions. Mark exposure time with polarizing filter as data analysis requires the incidence angle.
SC Okay, so it needs a GET time when it takes a picture.
CAPCOM That's affirm, that's with the polarizing.
SC In other words - yeah. Yeah, with the polarizer, right.
CAPCOM And there's another note here. Do not exceed 18 frames total for the above pictures. 18 frames total.
SC Okay.
CAPCOM And your TCA, TCA is, for the landing site, is 138 39 11.
SC Okay, TCA is 138 39 11.
CAPCOM And, Ron, if you'll just give us a mark when you make the shot that'll be close enough and we'll mark the time here on those polarizing ones so we'll get the angle that way.

SC Oh, Okay.
SC I lost my fucking camera.
CAPCOM Ron, we'd like ACCEPT from the computer, we have a new state vector for you, your down track there got to be in excess of thirty thousand feet and this has nothing to do with your back side water dump just now, it just accumulates in a various path.
SC Oh, Okay. You have ACCEPT.

END OF TAPE

CAPCOM Ron, it's your computer.
AMERICA Okay, going to vox.
CAPCOM Okay, Ron, any time you want to reach up and go auto on the high gain you're (garbled).
AMERICA Okay, standby (garbled) - standby - mark it - polarizer all the way to the left - standby - mark it - polarizer all the way counter clockwise.
CAPCOM Gotcha.
AMERICA Okay, standby - okay, - wait a minute - lost my landing site - standby - Okay, standby mark it, that's all the way counter-clockwise. Standby - mark it - and that's all the way clockwise.
CAPCOM Roger, we got it.
AMERICA Frame 23 and 24 - I mean - yeah, 23 and 24 - we're looking north along the ridges there. The other two polarizes - the two before that were looking at the landing site. And I add 3 (garbled) red ones and a 500th of 250th and a 25th - and - a - the rest 16 and the blue ones at the same thing. - And we're setting on frame number 25 on the mag XX.
CAPCOM Roger, Ron.

END OF TAPE

CAPCOM Ron, you should not see a tape motion light at LOS here, because - flag because we've got the dump done and rewound ahead of time. They're rewinding it right now.

AMERICA Oh, okay. Do you want me to configure the DSE though at 39:32, right?

CAPCOM That's affirmative.

AMERICA Okay.

AMERICA How's the crew of Challenger? Are they getting about ready to go out again?

CAPCOM They're a little bit delayed, Ron, but there's no problem. They just slept a little longer - and - yeah, they're in their prep - pre-EVA prep.

AMERICA Yeah.

CAPCOM And everything's going good.

AMERICA I'll bet they're going to find that Scarp is a pretty good hill.

CAPCOM Roger, we understand.

CAPCOM America, Houston. At your convenience, Ron, no hurry on this, we'd like you to service your ZPM sensors on each side there - we're getting some bad data on that now.

AMERICA They're itchy. (laughter)

CAPCOM Roger.

AMERICA Yeah, it's pretty dry.

CAPCOM Roger. Dr. Z reccommends you might find a new location for them. Just move them around a little bit. And, put some cream on the other one.

AMERICA Okay.

CAPCOM There's no hurry on that, Ron. I wouldn't interrupt what you're doing now to - for that. It's not critical.

AMERICA Okay, I understand, Bob. I'll do it when I get a chance to. Okay.

CAPCOM Rog, you sound like a tourist up there.

AMERICA (laughter) That's right.

CAPCOM You're going to need a Kodak store here shortly, I'm afraid.

AMERICA (laughter)

END OF TAPE

CAPCOM Okay, Ron, you might want to look at your flight plan when you get a chance. We're coming up on a SIM-bay reconfiguration here shortly.

AMERICA Ah, okay. 56, 57, 58, 59, mark it. It's off.

CAPCOM Roger, we got it.

AMERICA (laughter) Whatever that is. Okay, recorder is going off. Not the heaters. Radar is off. Data system is on. Oh, oh. Shouldn't have put that smack power switch up there on the 230 as much as we use it.

CAPCOM Roger, I concur with that one. I thought it would only be an assimulation that you see on that one.

AMERICA (laughter) Okay, smack power's on. The old mapper is going to standby. IR's going on. Self test is gone to heaters. UV is going on. Now, we're going to open the IR and wait on the UV.

CAPCOM We concur with that, Ron.

AMERICA Okay.

CAPCOM We'll give you a cue on that UV cover open, here.

AMERICA Okay. There's the IR. Barber pole - gray.

AMERICA Houston, America.

CAPCOM Go ahead, Ron.

AMERICA Okay, are you going to try to shift the backside DSE? Back in there for this next pass, for the verbal science visuals and stuff?

CAPCOM Ron, we're calling for the DSE operation exactly as it is in the flight plan. Is that - do you concur with that?

AMERICA Oh, yeah, I concur, but I mean - sure, that's no problem but I mean in getting them back to Houston before the end of the flight, you know?

CAPCOM Negative. It was not in the plans unless you want us to, Ron. We don't have any provisions to record it and send it back here until it comes back (garble) form.

AMERICA Okay, okay. No problem, I'll - gotta paraphrase what I say and when I get into AOF over there.

CAPCOM Okay, no sweat, and if you have something you really want us to listen to, we can bring up the loop to get it but it takes a little effort, Ron, that's all.

AMERICA Okay. Let's don't do it, yet.

CAPCOM Ron, just a word. The voice quality has been real good. We've listened to it several different times and it's been real good and we can bring it in without too much problem. Probably wouldn't be ready for the next rev but we can get it in there without too much strain if you want it brought in.

AMERICA Okay, I think it might be worth while especially on this particular one where I'll be essentially talking all the way across on this one.

CAPCOM Okay, we'll just plan on it, Ron.

AMERICA If it's not too much of a problem, yeah.

CAPCOM Okay, Ron, you can UV cover open any time.

AMERICA Off, open, barber pole and it's gray.

CAPCOM Ron, we need to precondition our H2 tanks again. We'd like H2 tank 2 fan 2 off, please.

AMERICA Alright, H2 tank 2 fans are off.

CAPCOM Roger. And Ron, just a reminder. We will bring in that voice from that rev 27 backside pass.

AMERICA Oh, okay, good, thank you.

END OF TAPE

AMERICA I had trouble with the lunar sounder, guys, I'm sorry, if I pointed your antenna in the wrong direction there for a short period of time.

CAPCOM No problem. Just one question, Ron. That is the Hasselblad we're hearing every once in awhile, isn't it?

AMERICA Is that what?

CAPCOM Is that the camera running? Every once in awhile?

AMERICA Hasselblad?

CAPCOM Yeah.

AMERICA No, not now.

CAPCOM How about during the eat period on this pass? Were you running the camera quite a bit?

AMERICA No, the only thing was the Nikon.

CAPCOM Okay, understand. We keep hearing something sure sounds like the camera trigger.

AMERICA Might have been the tape - might have been the tape recorder. Might have been me trying to clear my ears, you know.

CAPCOM No, I don't think so.

CAPCOM Ron, we're 2 minutes from LOS and you're looking real good.

AMERICA Okay, Robert, thank you much. See you on the other side.

CAPCOM Okeydoke, and I'll try to get through to the home front maybe for this next pass, and you're going to be pretty busy. They're going to give you a little update, maybe.

AMERICA Okay.

END OF TAPE

AMERICA As well as the - some of these more eratosthenean craters around (garbled). Looks to me like you could still have a little bit of a hint at least of a layering or a broken up different colored material at the top of all of these craters. - 10 - suppose to stop rewinding the DSE - forgot to do that.

CAPCOM Roger, Ron. We'll take care of the DSE.

AMERICA Okay. - Okay, I'll let you do it.

CAPCOM Roger, Ron.

AMERICA Okay. -

AMERICA Okay, - I took 3 - or - 4 pictures on mag 0 0 - up to frame 104, kinda looking north across Sheita.

CAPCOM Roger, Ron. We copy.

CAPCOM Ron, just some words for you - we -

AMERICA Okay, and kind of a - Okay, go ahead.

CAPCOM Go ahead - go ahead with yours, we don't want to interrupt.

AMERICA Oh, I was just going to say that on the crater Aiken, on the other side, it's probably - there are no - rays - visible rays that I could see at the low sun angle, anyhow coming across there. There is definitely a mare floor in there - dark albedo type - flat floor - there are swirls in it - no definite expression of swirls - . One thing is quite apparent, you have a flow scarp in the northeast quarter of it coming out of - oh a little clover-leaf type of an area there. A - I'm going to have to look the next pass over to see if a kind of a south donnacle structure that's in there is breeched. I can't tell if the flow of material is flowing to the east out of the donnacle structure or if the flow is flowing into the donnacle structure. I want to take a better look at that the next time around.

CAPCOM Roger, we gotcha. Did you see any lava marks on the crater rims there?

AMERICA Well, that's the - the lava mark is what I call - it's almost a lava scarp - up in the northeast corner. There are some lava marks along the central peak - they aren't nearly as apparent though as that one up in the northeast corner. The northeast corner is definitely a flow front - a lava flow front and it's flowing up the - well the old interior wall of the crater.

CAPCOM Roger, Ron. What's the color of the dome in Aiken?

AMERICA Well, the color of the dome in Aiken is - is - colors are hard to visualize - the color of the dome is essentially the same as pretty much the surrounding material around there - maybe a little bit lighter - a little bit lighter than the surrounding material. Of course it's definitely lighter than the - the floor. The floor itself, to me, has a tan - hint of tan to it.

CAPCOM Okay, Ron, let's break away here a second. Pan camera moved to standby.
AMERICA Okay.
CAPCOM If you haven't got your flight plan it's pan camera mode to standby and then power on.
AMERICA Okay, power's on.
CAPCOM Okay, Ron. And it's time to charge battery A and we'll cue you on the pan camera power off. Okay, that should have been deleted - we've already charged battery A.
AMERICA Yeah, yeah, it's already charged.
CAPCOM Sorry about that, Ron.
AMERICA Okay, no problem.
CAPCOM How about the freshness of the wall and ejecta materials and the brightness of the rim deposits on Aiken while - while er have a minute here.
AMERICA Okay, - the brightness of the rim deposits are a little bit brighter than the surrounding area on the thing - the way that you put it - probably your early eratosthenean - it's definitely not copernican because I can't see - well at least in that low sun I can't see any rays - around it. But, probably late eratosthenean - somewhere in that area because the - you have the slumping - well, it's not subdued at all. The walls itself of the crater are not subdued - they're fairly fresh - not as fresh as copernican - and - I just can't remember whether we had - seemed to me like it was brighter -

END OF TAPE

SC Can't remember. Rather we had - seems to me like it was brighter at the higher sun angles around there, which indicate that there would still be some remnants of a bright ring around it.

CAPCOM Okay, Ron, and whenever you're ready pan camera power to OFF.

SC Pan camera's power's going OFF.

CAPCOM And we're with all eyes here waiting for Crisium-Serenitatis visuals.

SC Okay.

CAPCOM Anything at all, Ron, while we've got an open area - anything you want to say, we're following you on the map. Just sing out.

SC Okay.

CAPCOM Ron, while you're thinking here a second, do you have any views on the possible origin of the domes in Aitken?

SC Well, I'm pretty sure they've got to be volcanic in origin. It's what it looks like to me anyhow. Expecially if I can determine that the material on the northeast corner of Aitken has flown out of that domical little structure in there.

CAPCOM Roger, understand.

SC You know something - the observation I - I think it's a pretty significant - is the fact that most of the 30 kilometer craters on the back side of the Moon, seem to be fairly fresh and any of them that are fresh - by fresh I mean that - you don't have any real definite ring pattern to them, but you got a real smooth - not smooth but streaked straight slope 45 degree angle going down into the crater - in the crater wall. And then you get down to the bottom of the crater you got a flat floor down there or sometimes it's domical type of a floor. And the domical material down there doesn't resemble anything like the stuff that's slung down the side.

CAPCOM Okay, we copy. Ron, if you're handy, you might do air reset there on DSKY - it looks like you might have hit a mark button or something.

SC Yeah, I might have hit the mark button.

CAPCOM That fixed it.

SC Okay. I just got used to the other attitude and now I'm in a different attitude. Ha Ha. This ought to be a good observation attitude though.

CAPCOM Yeah, we understand. Roger. Are you able to pick up anything on Crisium yet?

SC No, just now I'm coming up on Crisium. I just now see it out of window 5. Just off the southern edge. Let me try window 3, it might be better.

CAPCOM Okay, you might remember we're looking for the color tones or shades between units up on Crisium. And we're

CAPCOM looking for the location of color boundaries over to the Mare ridge system.

SC Okay, I'm looking at the eastern edge of the Crisium now. As you come across there it looks like it looks like there might be a little bit darker - you know I keep seeing browns all the time up here, instead of grays - gray tones, maybe that's just a the way I interpret it. They are - to me they're kind of a brownish tint to them, and it's a darker brown than the stuff to - the south of the ridge system there.

CAPCOM Roger, Ron, our data would show that CM 5 might be a better window.

SC Take a look at that one. Yeah, it's a little better. Looking straight down. I'm just now passing that crater I took a picture of on the last time of the pass on there, and instead of having a round bottom - it's got a diamond shaped fill in the bottom, and the diamond itself is about oh, a half of the crater in diameter, and this is on the south rim of Crisium.

CAPCOM Okay, we copy. Does the ridge system cross the color boundry Ron, in Crisium?

SC Yeah, this ridge system is running east and west down here. The color boundry isn't nearly as apparent in Crisium as it is in Serenitatis, except that right under me right now, there's kind of a subdued crater type thing and with a southern part of a ridge. The ridge runs east-west, and it looks like we've got a flow coming out of it. Let me see if I can get a quick picture of that. Yeah, I lost my camera. Here it is. Yeah, it's too late, it's gone now. You know something (garbled) got a zero phase - a zero phase point that's following me right along out here in Crisium, so I get a different color straight out from the window than I do out from the edge of it. So I think that's going to influence my thinking.

CAPCOM Rog, Ron. How does the color of Picard the rim of deposits on Picard compare to the surrounding mare material there?

SC Okay. The color on Picard is definitely darker. It's got a darker rim - darker material that goes out to - oh, about a half a crater, and at some points extending out to the crater diameter. And then from the south, arching around to the west, to the northwest corner, you got some light color material on top of that.

CAPCOM Is any of that tan or brown?

SC It's kind of a - the darker material I'd call tannish gray. More gray than tan. In other words the whole mare itself I consider kind of a light tan, and then the type of material that the dark material that's flowing out, is thrown out is kind of tannish gray.

CAPCOM Okay, in the inner characters of Picard,

CAPCOM for color variations, can you determine different units, based on color and slope characteristics?

SC Yes, you can. In the area where you have the white thrown out, on top you essentially got a - as you go down the crater wall, you've got a white streak that goes all the way around it and then you've got a dark layer underneath that. And then a white layer on below that.

CAPCOM Roger, you're saying the color zones are concentric?

SC Yeah, the color zones are concentric going around.

CAPCOM Beautiful. How about the central peak material to that of the crater wall?

SC Yeah, the central peak material is - you know it's more smooth -

END OF TAPE

AMERICA You know, it's more smooth type stuff. The stuff in the crater walls is fine, straight sloping, except where it's sloped down, where it's sloped down it's just kind a piled up - a jumble-type stuff, you know.

CAPCOM Roger.

AMERICA Oh, and the crater appearance over there has the same color distinction it out for about a crater diameter, except it doesn't have any of the light material on it at all.

CAPCOM Okay, Ron, we might direct your attention to the dark halo craters in the western mare Crisium. Are they impact or volcanic in origin?

AMERICA You can see some of the radius from the crater Proclus have spread out all the way across here and they completely cover up the ridge system that goes around there so I can't see any cause for distinction on the eastern - or on the western edge of the Crisium.

CAPCOM Roger, we copy. How about those dark halo craters, are they volcanic in origin, you think?

AMERICA Okay some of the - You know, I was looking at those off the volcanic - or the dark rimmed craters - some of them might have a - what I call a - ejecta pattern around them, and the others just have kind of a raised rim with no apparent blocks. The one to the west, let's see - southwest, and that little V that sticks out there by Yerkes - that hill that sticks out there by Yerkes. Now that's the one that to me looks like it has an ejecta pattern around it with blocks. It's about a - oh, bout a 1000 meter crater.

CAPCOM Roger, got it. The crater that you mention with the flow pattern - will you be sure and make a mark of that on your map, please. We're really interested in that.

AMERICA Okay.

CAPCOM Should be coming up on Macrobius by now, aren't you?

AMERICA Yeah, you can just barely see Macrobius and a - it would be better out of window 3.

CAPCOM Okay, stand - we're standing by.

AMERICA I haven't looked for any dark halo craters - I haven't looked for any dark halo craters in this area that might be sticking through the Proculus rays. You know, you compare on either side of the proculus rays, though, and the same size crater, whether it's out in the Tranquillitatis or the mounties and stuff before you get to the Tranquillitatis, or rather it's underneath the Copern - the Proculus Ray. You get the same albedo of the ray material from the small craters in either case.

CAPCOM Roger, we understand.

AMERICA Well, here's Macrobius A and B. Of course, J-3 is up there. The two dark craters - well, the one just - north, I guess, of Microbus A, and also north of J-3 - now that's the one that has a dark mound around it and it's got a small dome down in the center. It doesn't have any ejecta pattern around it. You know, no rays, no nothing. To me, that looks like - it sure looks a cinder cone to me. You get that same type feeling. The dark halo that goes around it goes out for at least a crater and a half diameter. The raised dome down in the center of the crater is about a fourth of a crater diameter, and there are no rays, and it has a dark halo.

CAPCOM See any color tones on that a - that crater at all, Ron?

AMERICA Yeah, the color on that particular - the color of that is the same color as you see in Maraldi and you see in the landing site, and that is what I consider the dark tannish, tannish-gray type of material. And, again, the fresh craters there in Maraldi still look kinda bluish to me. Not as much as they did yesterday, but they still look kinda of a - have a bluish tint to them from the reflection of the sun. In other words, they are fresh craters and they're about the size - one of them is about the size of Moker and the other one is about the size of Sherlock or Camelot.

CAPCOM Okay, you're on Maraldi -

AMERICA (garble) Look just same way. Yeah, I'm still on Maraldi, yeah. I'm on Maraldi and think - (garble)

CAPCOM Okay, how about comparing the floor fill of Maraldi to the light plains in Maraldi east?

AMERICA Go ahead.

AMERICA The floor fill in Maraldi is definitely a darker color. The lighter plans in Maraldi E are the light tans material. And Maraldi - the floor of Maraldi looks just like the landing site.

CAPCOM How about the color, tone and texture of Maraldi Gamma?

AMERICA Okay, Maraldi Gamma looks like just the rest of all the surrounding hills around there. I think that's just the - some of the - what do you call it - the Sculptured Hills type of material that has been high and that has been inundated by mare flow at one time or another. It had - it - mare flows come up around it.

CAPCOM Okay, how about the Domical Hills inside of the Vitruvius A as compared to Aitken?

AMERICA Okay, I just missed that one. We'll have to get that one. We'll have to get that one on the way by.

CAPCOM Okay.

AMERICA Next time I'm - I guess. Right now I'm

looking at the ridge system around the annulus of Serenitatis and the dark material stops before you get up to - oh, what's the crater that sticks into the side of Serenitatis and sticks out? Beyond the eastern edge of Serenitatis. Anyhow, the dark material stops just before you get to there. The dark material only goes up to - oh, let's see. There's a definite rille, there's a wrinkleridge, and at the east of the wrinkleridge are two craters of about 20 kilometers in diameter and further east of that is the rille - a graben, looks like that goes on too, and that's about the extent of the dark area that's the same material as the landing site.

CAPCOM Roger, we copy.

CAPCOM Okay, Ron, that completes the visuals on this pass. If you want to look some more, we've got the time. We do have some flight pan camera pad and that, but no hurry on them. We do (garble).

AMERICA (garble) You want me to keep looking here until we pass? Do you need an attitude change now?

CAPCOM No, that's not until 4 or 6. We've got some time on that. It's a VERB change to NOUN 68.

AMERICA Okay, give me a clue about a minute ahead of that.

CAPCOM Yeah, I'll do that, Ron. Just keep talking.

AMERICA Okay, we're in the Tacquet area now and, in this case, the wrinkleridge system that's out in the middle does not make a change in the color boundary. The color boundary is completely out to the outer edge and is in the area of those - the rilles. There is kinda arcuate rilles. Straight rilles, and in the Tacquet -

END OF TAPE

AMERICA Tacquet yesterday, I - said this - Sulpicius Gallus, Tacquet area.

CAPCOM Roger, Ron. Could you give us a color difference between dark mantle and the mare at this sun angle?

AMERICA Yeah, the color difference - it can't be - I just now noticed when I get down to the sun angle - out in front of me I got one color and then I look straight down and I have a different color. But in this Tacquet area you've definitely got some cinder cone type - oh - what's this cinder cone - but anyhow, volcanic - and it almost looks like a breeched cinder cone right next to - I think it's - Melrose is the name of that - that crater - the big one - it's right on the edge of Serenitatis. I'll find it on the map and mark it for sure. But, just to the east of that it sure looks like a breech cinder cone in one of those rilles down there. And then that type of material is - kind of a dark tan - at this sun angle. And it's definitely darker than - than the Serenitatis basin material.

CAPCOM I think it's Tacquet, is the name of that crater, isn't it Ron?

AMERICA Tacquet is the little one and then there's a bigger one - right next to Tacquet.

CAPCOM Okay, Menelaus is just to the east of Tacquet there. - Hey, Ron, I blew that, Menelaus is west of Tacquet, there.

AMERICA Yeah, Menelaus that's the one.

CAPCOM Any textural difference between the dark mantle in the site and the Sulpicius Gallus formation, Ron?

AMERICA Yes, there is.

CAPCOM Would you attribute it to the actual ground or would you attribute it to possibly sun angle difference?

AMERICA I think I would attribute it really to the actual ground. - I guess what I'm going to have to do is really wait until the sun angle gets a little bit higher there in that Tacquet region to answer that for sure - but it seems to me like the - the material on the landing site area is more smooth or smoother than what's in the Tacquet region - the part in the Tacquet region seemed to me like it was a - just a rougher looking type of material. You know, not massive - Hey, there's the - (garble) - - what do you know?

CAPCOM Do you have any dark - any dark halo craters near Sulpicius Gallus?

AMERICA Yeah, - the - well, I'll be darned -

CAPCOM We're - we're - baited breath, waiting.

AMERICA Picture 28 of (garble) with with the Hasselblad - I mean with the Nikon. (laughter) And the sun angle must be about 1 or 2 degrees.

CAPCOM Roger, copy.

AMERICA Ah - you know, I really didn't concentrate too much on Sulpicius Gallus at that particular passing - I was concentrating on the Tacquet area and - in that case - all of the rilles and the - ridges, not the wrinkle ridges on the middle out in there, but the - the rilles and the area built up around the rilles and also associated maybe - oh - Yeah, I was going to say - 10 times the rille width is all one color.

CAPCOM Okay, Ron, we'd like high gain to auto and like to load your NOUN 78.

AMERICA Okay, - high gain to auto - well, let's see - 22 NOUN 78 enter, Okay - let's see plus 52.25 - plus 52.25 uplink verb 58 enter - PA D proceed to, till A gets out of the way. Okay, (garble) was taken on picture number 28 it was F8 at a 500th and then I took - 3 more before that - they were terminator photos looking north across Sulpicius Gallus and farther north and they were a 500th at F16 to start with and then F11.

CAPCOM Roger, Ron.

AMERICA That's probably about all I'm allowed. I think I took this XX film.

CAPCOM What was your last frame number on XX, Ron?

AMERICA Yeah, that was - I'm on number 29 now.

CAPCOM 29 Rog. You're on 29, right.

AMERICA Hey, on magazine Oscar Oscar - did we get enough of our required photos out of that or are the rest of those - opportunity or not?

CAPCOM We'll check on that with FAO, Ron. I do have one - flight plan update for you on the pan camera photo pad. It says you first ought to go to the image motion, increase barber pole plus 4 step to on and laser altimeter to on.

AMERICA Right now, you mean?

CAPCOM Yeah, this - it's time Ron. Time for that.

AMERICA Okay - image motion - that goes barber pole plus 3 before - there it is - 3, 4 - laser altimeter on.

CAPCOM Okay, Ron. That's pan camera -

AMERICA I hope I can pick up some answers to a some of those questions in a couple of more passes. Okay, that's alright, go ahead.

CAPCOM Okay. did it bother you any - me reading some of those questions to you - I know you hadn't had time to study them but I thought I'd jog your memory on them?

AMERICA Oh, no. Oh, that's good - I appreciate it.

CAPCOM Okay, I'll get a conference here with Farouk before we start the next pass on the next rev around - see if we improve it. Things worked perfect down here - we had the questions in front of me and Farouk flipped them into the screen and it really worked great. Okay, Ron -

AMERICA That's good, okay.

CAPCOM - at 141 50 I've got the pan camera photo pad.

AMERICA Okay, ready to copy.

CAPCOM Okay, T start time 141 -

END OF TAPE

AMERICA Okay, ready to copy?
CAPCOM Okay, T-start time. 1415401. T-stop time 1421824.
AMERICA Okay, T-start 1415401, T-stop 1421824.
CAPCOM Good show, Ron. It's your bird now, for awhile.
AMERICA Okay.
CAPCOM Ron, just for your information, we're playing back the voice playback from the last rev and that'll be recorded out and is readable and we can read it.
AMERICA Oh, okay, good. I purposely tried to keep one of the microphones right at my mouth on those things. I don't know if that helped or hindered it.
CAPCOM Roger, I -
AMERICA At least I can hear myself talk that way.
CAPCOM Roger, it worked and we can read it in - and somebody can listen to it here when we get a chance. How about on the backside of this next rev? It looks like you're pretty busy with pads and some photo work in there. Do you expect to be doing any recording much - recording then?
AMERICA No, probably not. I'll just try to make notes of it or something and then pass it on out when I come out the other side.
CAPCOM Good show, Ron, good show. And, your grounded friends down there are busy working around the LM right now and doing some loading the Rover and that getting ready for EVA-2. In other words, they're out on the surface and loading the Rover.
AMERICA Okay, good. I'm glad they (garble) I can make it up that hill or not - scarp - looks like they should be able to go right up that valley, the way they have it planned there.
CAPCOM Gene's got to take some time here in this EVA to make a fender. We're piecing together a couple of maps and trying to get a fender because they lost a piece of a fender last night.
AMERICA Oh, they did, huh?
CAPCOM We're going to give Gene his auto mechanic's license if this works.
AMERICA Yeah, right. (laughter) How's my zippin? All I did was move it, haven't put in a new sensor yet. Do I need to put on a new sensor?
CAPCOM Ron, the ZPN data isn't too good if the sensors' sponges need to be replaced, if you didn't already replace them.
AMERICA (Laughter) I thought I could get by without replacing them. I'll replace them pretty quick.
CAPCOM Hey, you know, your choice. We can stand the crew exercise period without replacing them, I'm sure.
AMERICA Okay. While I was eating my peanut butter awhile ago, I lost my lobster biscuit and my juice and I just now found it.

CAPCOM Okay, Ron, here's your word on some magazines here. X-ray X-ray has to be left for the zodiacal light. You should not take any more on X-ray X-ray until after zodiacal light. And Oscar Oscar and Poppa Poppa are yours to play with as long as you stay with the flight plan on the rest of the mags.

AMERICA Okay.

CAPCOM And those are your crew options for the rest of the mission, those two mags.

AMERICA Okay. In other words, we made it up on Oscar Oscar I guess on that one pass, huh? The rest of them are crew options.

CAPCOM Roger.

END OF TAPE

CAPCOM Hey, Ron, you've got 110 heart rate. What are you doing?
SC (Laughter) Shaking the couch.
CAPCOM (Laughter) Yeah, I thought we could hear that. That's pretty good.
SC - shake the couch. (Laughter)
CAPCOM Okay, keep it up there. You got 120 and Dr. Bert wants you to keep it there for a while.
SC (Laughter) Okay, thanks.
CAPCOM What's the whole idea of this thing, Ron? Okay, got you 130 that time.

END OF TAPE

CAPCOM Hate to say it because it's very dead serious work, but I'm kind of watching the lunar comedy as that the two lunar stalwards are trying to clamp a new fender on the vehicle down there.

SC I'll bet that's really no easy job, you know.

CAPCOM That's right. They got a couple of their clamps - what they did is they got - they took a couple of their clamps and they taped together in their cockpit a couple of their big lunar maps - big heavy maps and now they're clamping that map to the fender where the removable part is.

SC Yeah. Oh, I see. Must be pretty dusty down there or something.

CAPCOM Yeah. Well, they lost a fender and it was throwing dust up on Gene. It just ridiculous how much dust they got up - they just decided they had to go ahead and do something.

SC Yeah.

CAPCOM I would hate to be paying for that fender repair job by the minute.

SC (Laughter) Boy, that's for sure.

CAPCOM I was going to call them at 5.

SC Say again, Houston.

CAPCOM Oh, that was me. I went off on the wrong loop. loop there, Ron.

SC Oh, okay. Okay. On that Crisium-Serenitatis, number 4 or 5, that dark dome just of the northwest of J-3. The one I was talking about that has a typical cone type shaped with the dome down in the side of it.

CAPCOM Rog. We had - we kept a pointer at it the whole time. I knew just what you were talking about.

SC Yeah, okay. Okay.

CAPCOM We talked to the home front a little while ago and everybody's fine, Ron. And they were able to get the squalk boxes squared away so she should have been listening to you for the last couple of passes (garbled). The problem was we weren't able to shut off one loop or the other, so, today they've been able to get all the CSM loop in there during the AOS periods.

END OF TAPE

CAPCOM On your lunch period.
AMERICA Oh, I see. In other words, if they were both coming in.
CAPCOM Yeah, last night they were both coming in. Today, they got it squared away so you're just coming in and they'll be able to watch and listen to the other one on the TV calendar.
CAPCOM And they say they're looking forward to good weather tomorrow. We're supposed to finally get a break in this stuff tomorrow.
AMERICA Hey, good. They can say that's because the guys went to the Moon, see?
CAPCOM Roger, okay.
AMERICA We're getting a good break in the weather.
CAPCOM About 5 minutes - 4 and a half minutes to LOS now, Ron. We went around the room and all systems look good and you're just looking great.
AMERICA Okay, mighty fine, feeling pretty good.
CAPCOM That's great. We noticed your heart rate went up pretty well on the exercise, looks like you got some exercise here, and now we'll be seeing you at 142:12.
AMERICA 42:14, okay.
CAPCOM And we'll be all set up with our back room for those orb science visuals that are from Copernicus on down to Linergamma and you know it's (garble) that we'll be up for all - for everything in between, so standing by for your word.
AMERICA Okay.
CAPCOM And Stu's mentioned if you hadn't earlier, that you might try the binoculars when you look at Copernicus for that dike if you hadn't thought of it before.
AMERICA Yeah, I'm going to try that this time.
CAPCOM Okay, good show.

END OF TAPE

AMERICA There's the old Earth just about a half Earth now. Houston, America.

CAPCOM Go ahead, Ron.

AMERICA Okay, Robert. I guess the big thing I want to report from the backside on this one here is that I took another look at the clover leaf in Aitken and with the binox and that southern domical crater in the clover leaf has a breach on the east side of it. I can't tell - there's a flow - in other words, the domical structures themselves are part of a flow material that has partially filled up the breach. In other words, the breach has either flown into that little domical structure before the domes were built or else all of that stuff that's in the mare floor has flown out of that domical structure before the dome came in. In other words, the domical structures themselves are different time in relationship to the floor itself. They're younger than the floor itself.

CAPCOM Roger, Ron, we copy that. Ron, is there a difference in the color between the dome and the mare in Aitken there?

AMERICA Yes, there is. The dome type material is - well, colors again, are very hard. I'm just going to have to say that it's slightly darker than the mare floor, is the way it looks to me right at this point in time. Also, the texture is a coarser texture than the floor itself. In otherwords, the floor to me is kind of a standard mare flat floor type stuff and I have to compare the texture of the domical hills to - oh, what I would imagine - some of the bassite flows that I've seen out in California, you know? A heavy viscus type flows.

CAPCOM Roger, we copy that, Ron. That's good data there on Aitken, Ron. Those color differences anyhow. In many of these things, that color is one of the most important things you can give us. We'll be all ears for that.

AMERICA Okay, I'll try to do that. The trouble with colors I'm finding out is it's sheer function of the Sun angle as to what color it appears to your eye.

CAPCOM Roger, we can believe that. We just (garble).

AMERICA (garble) as we pass it, yeah. You know, you take a look at the central peak of Neper and, on the south and western edge of it, you get the vertical stripes in it are streaky as you get off the massif in the landing site area, and then you look at the area around the rim, around the rim of Knepper, and you get the corncob, I guess, or Sculptured Hills type of appearance.

CAPCOM Ron, time for pan camera T stop time.

AMERICA Okay, thank you. T 24 now. Okay, what's the standby at - whenver I said now?
CAPCOM Roger.
AMERICA Must have been about 30 something.
CAPCOM That's fine. No problem.

END OF TAPE

CAPCOM Ron, if you start your Picard orbital science photos on time, I'll be glad to call you the change to F 5.6 and the change to F 4 if you want.

SC Oh, okay.

CAPCOM Okay, Ron you can go pan camera OFF is the time.

SC Okay, pan camera power OFF.

SC That's Condorcet or Condorcet or whatever you want to call it, Condorcet Hotel is the one that's got that diamond shaped shelf down in the floor.

CAPCOM Roger, understand. Condorcet Hotel.

SC Condorcet Alfa has either got a landslide - I'll get a picture of that next time with the other frame but, it's either got a landslide on it or it's had a - and it doesn't look like a crater in the side of the wall in the northwest wall of the crater.

CAPCOM Okay, we copy that. Northwest wall of Condorcet A.

SC And it's a - the area is oval or elipsed shape. And of course the top of the elipse - toward the top of the crater and it looks like it's almost gets a flow out of the bottom of the elipse which is about a fourth of the way up from the bottom of the crater.

CAPCOM Roger. Give me a scale on the size of that slope compared to the rest of the crater.

SC The hole or the slope or the slide or whatever you want to call it, down through there may be 1/8 of the crater diameter. And the floor area is only just a real small portion of the 1/8 size.

CAPCOM Have you seen any lineaments in the area - any linaments in the area?

SC Yeah, there were some lineaments on the area - in the area - again they're vertical type lineaments or lineations kind of like the downslope operations of (garbled).

CAPCOM Roger, agree.

SC They're fresher ones. Okay, let's see. We're going to Picard then up to Guericke - where's Guericke - there's- Okay. See what we're aiming at here. Okay. It's about time, does it look like?

CAPCOM Rog. You can start at - your just about 30 seconds from starting on Picard and like you said on the map, you go up to Picard after you start Picard X there and you go on up through Picard and Guericke in that front there up at Guericke area. That's the - at Gericke right above there's where you change F11.

SC Okay. Here we go. Start it. Picard X. It works better if you take the slide out.

CAPCOM If you just give me kind of a call of what you're aiming at like at Picard X and Picard - I can give you a call on those F stops, Ron.

SC Okay. I just passed the Picard axis and then the one west of that. What was - it's the next - about half the size of Picard axis. Does this go right through Picard or south of it?

CAPCOM No, it goes right through dead center of Picard.

SC Okay. we'll get it. Sure hope that color difference shows up in - on Picard.

CAPCOM Roger. We hope so too.

SC The black material - you get on up here- the darker tannish gray material covers essentially from the east, all the way around to the south. And it goes outside the rim as well as inside the rim. It drapes over the rim. That can't be a shadow effect.

CAPCOM Have you taken Picard yet, Ron?

SC No, just now - just one more and I'll get rid of Picard. Change to what?

CAPCOM No, not yet. You don't change until you get on the other side of Guericke up there. Your pass goes directly between Guericke and -

SC Oh, okay. Let me go to F 11.

CAPCOM No, don't change to F11 until you are at Guericke.

SC Yeah. Okay. I'll get the other side of Guericke.

END OF TAPE

AMERICA Yeah, okay, so I'll get the other side of Yerkes. I can still see those dark halo craters down there. I'm going to have to look at them with the binox sometime.

CAPCOM Okay. With Yerkes there, you want to switch to F-11 just on the other side of Yerkes.

AMERICA (garble) Okay.

CAPCOM And looking west, you'll go right through Proclus.

AMERICA Okay, now what comes after Proclus?

CAPCOM Okay. Just keep on pressing on up through up in towards Maraldi. You go through Proclus, then Proclus D and at that point you'll change to F-5.6 and get into the Maraldi and across the mares there and Mare of Tranquillity.

AMERICA Oh, okay. It's sure easy to see why that ray excluded zone shows up on the pictures because to me it's a tan Sculptured Hill type material there in the ray excluded zone of Proclus.

CAPCOM Okay, Ron, this pass continues and you change to a 5.6 up there at Proclus D at the Mare highland contact at Proclus and from Proclus and Fron.

AMERICA Okay. It's about now. I'll change to 5 6, going out into the mare.

CAPCOM Okay. You go right across the mare to Maraldi M and Maraldi B, across to Vitruvius A, and Vitruvius.

AMERICA Ah, okay, a little closer in then.

CAPCOM And, after Vitruvius, again on that contact to mare to the highlands, is where you go to F-4.

AMERICA (garble) At, okay, Vitruvius? Yeah, okay. F-4.

CAPCOM You know, if you can look on your map, it looks like a subdued, would you believe, almost submerged crater between - I mean, just east of Vitrivius A, and that the domical mounds that are sticking up around there are the same type of structures as Maraldi Gamma, and that's what leads me to believe it's just some old jumbled up type stuff that was here before the mare.

CAPCOM Roger, we copy.

AMERICA That has a completely different texture to it than the domical structures of Aitken.

CAPCOM Okay, we got that. Okay, have you gotten up over vertical over Vitruvius? If you are, that's where you go to F-4.

AMERICA Not quite. I'm in the Vitruvius A right now. And I just took a peak at that with the binox and - 5, 6, yeah it was 250 - and that's a different type of material. It looks like it's a - it almost has to be a flub type of operation. Somehow it gets piled up down in

the middle. But they're a smoother more sub - type of a domical structures than the ones in Aitken. Okay, switching to F-4.

CAPCOM Roger. F-4, your track goes right across the mare, the mare there between Tranquillity and Serenity, right across Dawes and ends at just to the east and north of Plinius. That appears to be the boundary between Tranquillity and Serenity.

AMERICA Okay. Oh, when I take a look at it from this angle, I even get a difference - the ejecta from Plinius kinda covers up the rilles and the annulus around Serenitatis. And now we're getting into relatively low Sun and Serenitatis is a lot lighter color than the - it's a light tan to me - and then, in the low Sun you look at it - to Tranquillitatis across Plinius and that demarcation turns out to be the same, the same kind of gray tan, you know - it's a darker.

CAPCOM But there is a color difference between Serenity and Tranquillitatis there?

AMERICA Yeah, there's a definite color difference between - and it almost looks like if you could expand on color alone, the color from Tranquillitatis extends on over into - you know, it kinda drapes over the edge and covers up part of Serenity.

CAPCOM Okay, we got that. Well, that should be all your photos there for that pass, Ron.

AMERICA Okay.

CAPCOM And Ron, before we get into the visual here, we'd like high gain auto.

AMERICA Yeah, high gain on.

CAPCOM And if you can give me a magazine report on that - two pictures?

AMERICA (garble) away from the window.

END OF TAPE

CAPCOM And can you give me a magazine report on that position?
SC (garble) window. Okay. We're magazine Lima Lima and it's 129. Now we're at the extreme sun angle and there's no doubt it, from tack A on up to Mel something or other there's a group of small rilles in there and those rilles have got ejected material around and up and over the rilles, it's not impact type ejecta, it's got to be a volcanic ejecta of some kind, up around there. It's a dark brown, a darker brown than the tan of Serenitatis.
CAPCOM Roger, you're referring to the Manilius rilles there right to the west of Tackay, right.
SC That's to the west of Tackay, still looks like it's in the Serenitatis, but the Serenitatis basin - right on the edge of it.
CAPCOM Rog, we see them.
SC And then they kind of stop just even with Mel what ever it is, Manilius or something like that.
CAPCOM Not Manilius or Manilia, take your pick.
SC Yeah, okay.
CAPCOM Do you see a ray coming out of Menilius going through Bethel, is that one of Tycho's rays.
SC Uh, it disappeared, couldn't see that one.
CAPCOM Roger.
SC Take a look next time around.
CAPCOM That was my question, I was just curious.
SC Yeah. I know it shows it on the map, there, and I haven't really got a good clear picture of a ray, yet.
CAPCOM I'm going to be more interested to see -
SC Want to see it for sure next time.
CAPCOM I'm going to be more interested to see if you can see the alleged crator Arabia on this next pass.
SC (laughter) I've been looking for that ever pass. And there's a lot of depressions and ridges and hills around there. It's hard to - see, you don't really get a big picture view of it, you get a little piece of it at a time and I think in order to really convince yourself that you've got something there, you're going to have to get off away from it and uh -
CAPCOM Rog, understand.
SC (garble) I'm sure a depression. Like nothing I've ever see before.
CAPCOM Roger.

CAPCOM You got a good chance to get some pictures of that next rev.

SC Next rev, okay, they ought to be good ones 'cause the sun angle is going to be pretty good. But at this point you get a dark tan, kind of a mare type material, it's in a mare type material, and then it's a light gray down in the deep Caldera itself. Sure looks like a D all right, but it's a light gray down there and it's got bumps that stick up, and the bumps themselves are, I want to look at it again for sure, but I get the impression the bumps themselves are the light tan material.

CAPCOM Okay, understand, Ron, light tan.

SC Yeah, the bumps are light tan and then down between the bumps that are down in the caldera it looks like a rough, a real rough blocky gray material. Well, I hope you're keeping me honest on the flight plan, I've got my head out the window (laughter) I can't follow the flight plan.

CAPCOM It's affirmative, all you've got is in about 4 minutes or 3 minutes now you pick up orbital signs visual on Copernicus and we'll just stay with you on those ORBS signs visuals right through RINER GAMA and at 143:12 you've got a rather rapid time you might want to quite early. Get the LOI cannister changed and then you've got a P52, so your choice on that. I'll call you right at 143:12, if that's what you want.

SC Okay, give me a call right there, because I've got to get right into that stuff. I'll do the P52 first so you all can see it and then I can all ways change that cannister.

CAPCOM Yeah, okay, we'll confirm that, but just don't forget it.

SC Okay.

CAPCOM Ron, you're coming up on Copernicus, I might read you some of these questions. One of them was study the floor of Copernicus and compare it's material to that on the wall terraces. The other one is when viewed from the opposite direction is an extension of the structure in the middle central peak, I guess that we refer that with might be a dike in that middle central peak, and what is the nature of that structure.

SC Okay. I think those things are going to be kind of hard to see, but we'll try.

CAPCOM The back room would like for you to kind of concentrate on looking at that dike if it's at all possible, Ron, even if you have to use the binoculars.

SC Okay.

CAPCOM If you want to feel for some scale on that, just a reminder, the crater is about 3 killimeters deep and the central peak is 400 meters high around.

SC 400 meters, okay.

AMERICA Is this Eratosthenes I'm passing over now? I hope.

CAPCOM Yeah, you should be just about over Eratosthenes right now.

AMERICA I hope it's Eratosthenes because the old sun is shinging right in my rendezvous light out here.

CAPCOM Roger.

AMERICA You can't see anything out the window. - Ah, - there's Copernicus. - Well, I'll tell you what, I think we need more daylight.

CAPCOM Kind of tough, huh?

AMERICA Yeah, especially you - the binocs cut off - it must cut off too much light or something.

CAPCOM Okay, we understand that. You might just stick with the naked eye there and do the best you can, I guess.

AMERICA Well, I'm trying to - to recall what Jack said on it and what I see - I'm not sure, did he mention the dark part to the south, on the south part - side of Copernicus? In other words you can see albedos real well and there's a dark area that - extends maybe - oh a half a crater diameter - three-quarters of a crater diameter to the south and it kind of flows down in - I don't want to say flows - but at least it carries itself down - down the crater wall - down to the crater floor. And this is kind of in the south - maybe from six - a - let's see - from about 4:30 to 7:30, and then the rest of the crater all the rest of the way around it - you can see light albedo steppes all the way around the crater - it's the first step down and about a fourth of the way down in the crater wall.

CAPCOM I don't recall that but it sounds good, Ron.

AMERICA Okay. - Unfortunately this thing's moving - disappear fast.

CAPCOM Take a look at the peak and concentrate on that mountain in the center in the center of the peak, if you will, Ron.

AMERICA Okay, - it's already passed now, but I can recall as I was looking at it - the peaks - well, it seems to me like there's four and they have the same light albedo texture as the - not texture but the same light albedo - as that first - ring on the inner wall of the crater and then interspersed between those white peaks were a darker - you could just tell it's the darker albedo - and you couldn't tell for sure - it's not part of the crater floor - it's just a darker albedo - interspersed in there. And I spent - oh, half the time - trying to acquire the thing in the binocs - and it just cuts the - the binocs just cuts down the light too much.

CAPCOM Okay, we'll try maybe later on the binocs on Copernicus. I guess you're coming up in the Kepler area. Aren't you're coming up on Kepler B.

AMERICA Yeah, I think there should be a Kepler B right out there now.

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AMERICA Let's see - that's a (garbled) Oceanus Procellarum.
CAPCOM Isn't it. That's affirmative.
AMERICA Yeah, and then Aristarchus is coming up, I think, isn't it? No, that's Kepler.
CAPCOM I think Kepler's the real bright one with many bright rays from - coming out of it.
AMERICA Yeah, it's got a lot - it's got a lot of bright rays on it. Kepler B and there must be another one down there. They - the two small Keplers don't show any bright rays at all. They show - there are bright slopes on the inner walls - the rays of Kepler really show up quite markedly in the Earth shine. I'll bet they - I'll bet they show up probably better in Earth shine than they do otherwise, because I think Earth shine tends to bring out the albedo differences considerably.
CAPCOM Why don't you give me a hack when you're right over Kepler, Ron?
AMERICA Okay, will do. And then, what's directly south of Kepler. There's one about the same size of Kepler.
CAPCOM Encke is about the same size and directly south of Kepler.
AMERICA Yeah, that's it. Okay, Encke. Encke has departing from the west - no, I mean - departing on it's eastern side - it's either a - it's a light - well, I don't see how in the world it could only have one ray but that's the only one I can see. But there's a light streak - oh - about - an eighth of the diameter of Encke and it goes out to the east a little ways and then curves back - it goes out to the east - oh - about three quarters of a crater diameter and then essentially curves back to the northeast and continues on out for another crater diameter.
CAPCOM Roger. Good show.
AMERICA There might be - there might be in the margin of the highlands there, I'm sure.
CAPCOM Okay.
AMERICA Let's see - Reiner Gamma is going to be out of window three, won't it?
END OF TAPE

AMERICA Let's see, Reiner Gamma's going to be out of window 3, won't it?
CAPCOM That's affirmative, Ron. Window 3 for Reiner Gamma.
AMERICA Yeah. Okay, it's just north of - sure can't remember those names - Kiper -
CAPCOM North of Kepler there?
AMERICA Kepler, yeah. And I'm looking out of window 3 now and you can still see those rays. They must be coming from Kepler. They go on way on up north here toward - there's - the next one is -
CAPCOM Yes, do you see much going up toward Marius, there?
AMERICA (garble) Yeah, I can see Aristarchus - I think that must be Aristarchus way back over to the north.
CAPCOM Yeah, that's Aristarchus, that's affirmed.
AMERICA Yeah, yeah.
CAPCOM Can you see anything on that Marius rille up there? Or is that too far up?
AMERICA That's what I've been kinda looking for and I can just see some - about three or four light spots up in there. But that's a long ways away, you know? It's about half way to the horizon or the three light areas I see and you can see Reiner Gamma. I guess Reiner is the crater there by the end of the big crater just before you get to it.
CAPCOM That's affirmed.
AMERICA I think. And then, Reiner Gamma - hey, you know, from here it almost looks like it's the ejecta from a crater because - and then continuing from the bottom of the gamma is, again, a lighter albedo that comes down toward the crater Reiner about half way between the two of them and then it takes off and goes perpendicular to the line between Reiner and Reiner Gamma.
CAPCOM Roger, we copy that.
AMERICA And that's a lighter, a lighter albedo - that demarcation there.
CAPCOM Is there any topographical expression associated with brightness? The brightness of gamma?
AMERICA Well, that's what - it's very hard to pick up. Maybe that's what the - what I'm describing here is going perpendicular to the two of them. I've got to check and see if its, you know, a rise from a relatively flat area up to a kind of a hilly terrain.
CAPCOM Any dirt deposits associated with the gamma - Reiner Gamma?
AMERICA Yeah, the gamma itself is dark. Now, at zero phase, - hey, I think we're going to be lucky - the zero phase is going to go right through it. But, there are dark in other words, the gamma itself - is about the same size as the - the full extension is about the same size as the crater Reiner and then a half of a crater diameter on the

inside of that. Of course, in the gamma type shape is a dark type material - zero phase is going right through it right now. By gosh, it didn't blot out the dark at all and dark material -

CAPCOM Got any more thoughts about what it is? Do the light color markingsto the North look the same, Ron?

AMERICA You mean on toward the mare field area?

CAPCOM Yeah, that's right.

AMERICA The only light - yeah, the only light-colored stuff that you can see - I don't see anything off toward the mare field on the thing. You see it right around by the Reiner Gamma itself and then, intermixed within that is a dark annulus, except the annulus is on the inside of the white. And, it looks like - I don't know if your eyes deceive you in this darkness or not - but it sure looks like the light colored stuff is raised up with respect to the dark. In other words, the dark almost looks like the interior of a crater ramp - interior of a crater wall, you know?

CAPCOM Roger.

AMERICA With some white material around it. Now that's what it looks like in the darkness. And, then on the southwestern rim of it it almost looks like a - you've got a breach of the dark albedo stuff going out to the southeast corner of it in two spots. Okay, let me - the light stuff turns into - how do you put it - a darker swirly-looking type stuff as you continue on west of Reiner Gamma. It crosses a kind of a wrinkle ridge. I can see a wrinkle ridge down there now. It crosses the wrinkle ridge with no - with no apparent change in albedo, anyhow, as it crosses the ridge.

CAPCOM Roger, got you. I think I've got the ridge on my map. I think we've got it here.

AMERICA Okay.

CAPCOM You still think you might be away from from of those craters?

AMERICA That's the last of the - You know, it's kind of associated with it's own little thing. It doesn't look like it's a ray. It doesn't look like a ray. In other words, it doesn't thin out in different parts of it like a ray does.

CAPCOM Okay, you -

AMERICA It looks like it's a lot thicker than a ray. Yeah. Okay, this must be Riccioli, I guess, the big

crater, about now -

CAPCOM We're just coming up on Ricci - Grimaldi and you have to go to Hevelius first of all, then you get into Grimaldi and Riccioli.

AMERICA Okay, that's Hevelius - that's the one I'm approaching right now. Hevelius is showing up real clear. You can see the slumping of the crater walls coming down there. It's a fairly old type crater because you don't see any rays associated with it, although the slumping is not completely degraded. There's a flat floor with a central peak on it. The central peak has the same albedo as the lighter albedo - about the same albedo texture as the walls, as the west wall. We're passing over a - generally a hilly type terrain and then just before we get into Grimaldi area, it looks like we're out in the plains type material again, interspersed with a hummocky type - well, I guess that hummocky stuff is associated with Grimaldi.

CAPCOM Roger. We'll check. The view is passing a little bit west to Grimaldi, now -

END OF TAPE

CAPCOM We'll check the geostat and move it to the west of Grimaldi. Do you concur with that? About right over Riccioli.
SC Ah - this looks like Grimaldi, yeah, I guess it is though.
CAPCOM Okay, Ron. You probably ought to think about if it's getting kind of dark there for seeing anything, you might consider getting in the P 52 although you're a couple minutes - still a couple more minutes left on that. If you can see back at Encke and Reiner Gamma from this angle it'd be good, otherwise if it's our you ought to just consider the 52.
SC Okay. Ah, she's pointing in the wrong direction.
CAPCOM Okay. That was some good stuff, Ron. Just don't never fail to keep talking on that. We can sort it all out when we get down.
SC Okay. The bright - I'm looking out window 1 now, must be out to the north, I guess, and there's two very bright craters in there just crossing some rilles. They run north and south. There's a little bit of a mare material out in there. Wish I knew what the crater was. Well, I better get going on P 52, I guess.
SC (Singing). Boy, the old heater sure working me nutty. They're always nice and warm when you take them out.
CAPCOM Roger. Understand you're changing LOX. LOX engine OFF.
SC No, the optics.
CAPCOM Oh, okay, good.
SC Telescope when you - you take the telescope out - it's got a heater on it in there and it gets it nice and warm - nice Okay. CMC 3, Duke 2 option 3. Okay, then back to P 20. Okay this time we will not forget to go to AUTO. Okay, computer, find me a star. How about that. Menkar. Okay, take me to Menkar. Ah. Looks - Menkar. Okay,(Canopus - Canopus). Okay, take me to Canopus. Yeah, Canopus is bright as all get out.
CAPCOM Just like the simulator, huh?
SC Bright - brighter than any star we've ever had in the simulator. So bright he almost blanks out the crossair. That's better.
CAPCOM Yeah, I hope it's Saturn, huh?
SC (Laughter) Me too.
CAPCOM Well, we'll know in a minute when we look at your 905.
SC Ah, man, okay.
CAPCOM Nothing wrong with that one.
SC That's pretty good.
CAPCOM Yes, we'll buy that.
SC Think that's a good one.
CAPCOM Okay, why don't you go ahead, torque.

END OF TAPE

CAPCOM Okay, Ron, you can go ahead and torque.
AMERICA Okay, we'll torque at 19.
CAPCOM Okay, good show, Ron.
AMERICA Now, I do - that's just in there isn't it. Univectors of Saturn that ought to be in here somewhere?
CAPCOM Say again, Ron.
AMERICA The univectors of Saturn - aren't they in my - planet univectors, yeah. Mars - ah, here we go.
CAPCOM Hey, we just got a beautiful picture of the Earth from the Rover, just spectacular picture of the Earth.
AMERICA Right.
CAPCOM Yeah, just beautiful. Lowell Bindell's been hunting for it all night but he finally found it. It's just beautiful.
CAPCOM Ron, we're five minutes from LOS here. Everything's looking great(garble) check list on that TM - T-20 and CMP mode back to auto, and then just a reminder on the LOH canister. If you'll go back and pick that up we'd appreciate it.
AMERICA Okay, we'll get that one. I'll try and see if I can find Saturn there.
CAPCOM Okay.
CAPCOM This VOX mode is just great. We're sitting here following what you're doing, you don't even have to talk to us. It's really great.
AMERICA (Laughter) I think it's great too.
CAPCOM Your voice is so clear you sound like you're in the next room.
AMERICA Oh, really? You know that's funny because I really can't hear myself in the, you know, in the intercomm.
CAPCOM All right. You sound - you sound louder in my earphone than in the simulator there when you're down at the Cape or over here across the way. You're just loud and clear, even better than amen.
AMERICA (Laughter) That's good. Yeah, it's beyond the field of view. Maybe we ought to catch it another time.
CAPCOM Yeah, that's too bad.
CAPCOM We're going to pick you up at 144:10, be losing you in another minute or so and 144:10. Have a good backside.
AMERICA Okay.
CAPCOM And you might check your ZPN fittings when you are - sensors when you get a chance on the backside here. They're still not giving much good data.
AMERICA Okay, yeah, it looks like a lot of little time this time so I'll do it.

CAPCOM Rog. Don't let them tear you away from the window, though.
AMERICA (Laughter) Okay.
CAPCOM And we dumped the data from the last couple backsides revs and you sound real good, Ron.
AMERICA Okay, hey, real fine. You know, the guys on the lunar surface don't even have any ZPN, you know. They left it up here.
CAPCOM Rog.
AMERICA (Garble) I didn't know that until they left. Okay, the old LiOH canister - let's see, 13 in the A and 13 must be in A9 then. (Singing) Another old 13. Take 14 out so we put the other guy at the bottom.
CAPCOM Hey, Ron, we just had a discussion here and your point is well taken and why don't you just go ahead if you want to, take the ZPN signals, the yellow plugged ones off and take them off for the evening if you like.
AMERICA Hey, that sounds like an excellent idea. Thank you.
AMERICA Okay, for 11 - out. Make nice balls, I guess, none of them have been stuck so far.

END OF TAPE

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AMERICA Houston, Coming in. (garble). Dark striation. Vertical (garbled). Up and down the (garble) rim and it looks like there's a black - they all look green - you know, looks kind of a green gray in this type of light back on this side. The green gray material is down in the center of the Rooster Tail or floor of the Rooster Tail and the floor is about one fourth the diameter. Let's turn this thing off. Fierce EL 250. 8 second intervslometer and I lost it (garble) counting secondly yesterday. Stuff around here that disappears like nothing.

CAPCOM Ron, this is your friendly interval - intervalometer operator speaking. Can I help you?

AMERICA (laughter) Okay. Let's see we're about 150 - No, I'm going to take two more pictures on this frame and phase it up on Lima Lima, huh? Off to the north. Maybe it's got more than 160. I'll keep it.

AMERICA Okay, Lima Lima is on 161. I don't know how many is left. There's 160, on iy, still going. Mag Mike starting with number 1.

CAPCOM Mag Mike number 1 Roger.

CAPCOM Ron, just for your information, we're not going to give you a TEI 49 pad or a state vector at this pass. We're going to give it to you at the beginning of next pass. We want to refine our data a little bit.

AMERICA Oh, okay. Hey, I found the intervalometer (laughter). Stuck under the seat between the web and the metal part. 250 lens on this. Okay. Ta ta da da. (garble) let's see now. 8 - lifted - 88 frames. Takes lots of pictures. Okay, that's frame 160 on Lima Lima. Now, configure the camera. Okay, Pierce. Bet. And mag Que's (garble).

END OF TAPE

CAPCOM That photo shows going right across Arabia there, on this last - a little bit ago, Ron.

AMERICA Okay, yeah those were good. You can kind of see the topographic rise in the Sanger area, especially it's a little bit higher to the west of Sanger then to the east, but you can still see a general rise in that area.

CAPCOM Roger.

AMERICA Gives you kind of a hint of the second ring of Arabia.

CAPCOM Real good. Ron, we need to get battery A - terminate the charge on battery A.

AMERICA Okay, the charger OFF, Bat A looks about 37 Volts. Relay bus coming closed.

AMERICA Okay, on the pan camera photos, when you want to start looking at something, look for a small - okay, just to the east of Abul Wafa - there's a small crater about oh, he must be 2 to 400 meters in diameter and he's got a black stripe right on the western wall - going down the western wall of the crater. It doesn't look like the stripe extends beyond the rim at all - just down inside the crater wall. Also, next to - oh I forgot where I was.

CAPCOM What was the name of the crater with the black wall or where was it near again.

SC Well, it's right near Abul Wafa on the first ring of Arabia.

CAPCOM Okay.

SC And I think that oughta be up in the - should show up in the pan camera.

CAPCOM Okay, good, good show. You notice the swirls right near Abul Wafa.

SC Yes, I really saw them that time and where the swirls really show up are about a crater diameter from Pershaw - a crater diameter to the west. And I talked about it on the tape, but basically, they're kind of a concentric swirls in that area with light and dark, and the contrast between the light and dark is something tremendous. The dark is not a mare dark tan, but it comes real close to it.

CAPCOM Real good. Ron, you're coming up within a minute of this - or a couple minutes of this Orbital Science photo of Pierce starting at - in the Sea of Craters - Crisium and going through Pierce and that area.

AMERICA Okay, let's see. That would be out window 3. We're going to stay F8 all the way across on this one, huh?

CAPCOM No, it says F8 to start and then, according to the flight plan, you change to F 5.6 and you'll change that at about micro bus A and then you'll go to 1-125 right at the Littrow area.

AMERICA Okay, we don't want to jump to F11 going across those highlands, huh, on the western edge of Crisium.

CAPCOM No, see F8 - it shows F8 on the map all the way across Crisium starting at F8 and using F8 all the way across Crisium.

AMERICA Okay. Let's see, there's Picard X so we should start about right here somewhere.

CAPCOM Yeah, it's close to the rilles or whatever you call it - the rilles I guess - to the north of Picard X is where you start.

AMERICA Okay, shows come on, intervalometer, okay we started it just about tip time. Okay, there's absolutely no color variation on these flow fronts or scarps or - by golly flow fronts, looks to me like. Just looking north right from Picard X.

CAPCOM Roger. You'd call them flow fronts and -

AMERICA Flow front or a - you know it's hardly even - let's me see they're bright on the high side as you're looking north, you know, They're bright on the high side I would presume. They kind of run east and west.

CAPCOM Roger, according to the map they're just exactly west.

AMERICA Yeah.

CAPCOM Your photo path goes directly between Pierce and Pierce Bravo and leads up toward Pierce Charlie, just a little bit north of Pierce Charlie.

AMERICA Okay. Pierce Charlie has really got some black lines going down - vertical down them.

CAPCOM You talking about inside the crater - black vertical lines inside the crater.

AMERICA Yeah, inside the crater and also it looks like it carries on across. I'll have to get a little bit closer on 3 and see if it carries on across or not.

AMERICA Those can't be shadows. You can still see the darker annulus around Pierce. Pierce Bravo's also got a dark annulus around it. Pierce Bravo only goes out to about a half a crater diameter though.

CAPCOM Roger.

AMERICA You know Pierce Charlie looks like the insides of the South Massif, almost. You look down in that - in other words there's a kind of highly eroded elongate crater.

END OF TAPE

AMERICA peaks are all vertical. You know I don't have a - vertical is the only way I know how to describe them. They point toward - you know radially - they point radial, but they all point toward the middle of the crater.
CAPCOM Roger.
AMERICA Does that make sense.
CAPCOM (laughter) We'll try and fathom out - yes, it does make sense Ron.
AMERICA Okay. Pierce CHARLIE was right in the middle of a little framelet there.
AMERICA South of Macrobius, huh.
CAPCOM Yes. you're just a little bit south of Macrobius, there. Right on the edge of it actually on the southern edge of Macrobius.
AMERICA Okay.
CAPCOM As you get up ahead between - the contact line between the mare and the highlands - at Macrobius ALPHA is where you'll change to 5.6.
AMERICA Okay.
AMERICA Do we go north of Macrobius ALPHA?
CAPCOM Boy it looks like you just - yes, you're north of Macrobius ALPHA, that's affirm. You're even just a little north of Macrobius BRAVO.
AMERICA Yes, that's what I mean BRAVO Macrobius BRAVO. There's a beautiful - between Macrobius BRAVO and Macrobius there's a beautiful ray excluded - what do you call it - butterfly - a little butterfly - about a 1000 meter crater.
CAPCOM Roger.
AMERICA Got 'em. (Laughter)
CAPCOM Okay, you ought to be changing 5.6.
AMERICA Okay, let's see - that's 5. - ah. Now again is where sun angle may make a little bit of difference on the thing, but this kind of a hummocky close to Sculptured H.11 type of material that we're flying over between Proclus and Macrobius A and B. It doesn't look at all like the Sculptured Hills at the landing site area. In other words, all along the edge of Crisium or edge of Serenitatis you have the Sculptured Hills effect that has the vertical dark lineations in it? These vertical-radial or whatever you want to - lineations - striations I guess - dark striations - are not apparent on the western edge of Crisium at all. Where does this come out by - the landing site - north of the landing site?
CAPCOM You're quite a bit north of the landing site, you're over Littrow in fact you're north of Littrow.
AMERICA Over Littrow.
CAPCOM You're north of Littrow.
AMERICA Okay, we're trying to get the Littrow (garble)
CAPCOM Okay, when you cross into the mare on Serenity there after Littrow you want to change to 1/25.

AMERICA Okay, so that will be -
CAPCOM And Ron, this camera pass ends at Bessel A, Bessel ALPHA in the Sea of - in Serenity - Serenitatis.
AMERICA Okay, let's see that's beyond the rilles out there - let's see - that's quite - about the middle isn't it - way out there.
CAPCOM Yes, you cross those east-west running rilles there in Serenitatis and then get right up to Bessel.
AMERICA Okay.
AMERICA I don't think that scarp should be a flow front across there, but it sure does look like it. The thing that changes your mind about it being a flow front is that it goes up the North Massif. I couldn't see any real continuation - it looked like there were 2 possible continuations on the south side and the South Massif. I'll have to take another look at that the next time around.
CAPCOM Okay, high gain to AUTO when you get a chance there, Ron. And you've got to switch over for this terminator photo P29 CHARLIE on Sulpicius Gallus.
AMERICA Okay.
AMERICA Okay, Serenitatis from Sulpicius Gallus, huh?
CAPCOM Roger, you get -
AMERICA That'll be 2 to 500.
CAPCOM And then F11 on the mountains right behind or right to the west of Sulpicius Gallus, and that's using the 250 millimeter.
AMERICA Okay, these are 250 - F22, okay going back and starting at 79.

END OF TAPE

AMERICA K is vect Quebec Quebec starting at 79.
CAPCOM Got it. Starting at 79. Roger.
AMERICA I've got 6 in window. Yeah, which window, let's see, yeah.
CAPCOM I don't have my Sunday helper here, or I'd give it to you.
AMERICA (Laughter)
CAPCOM CM5 is what we think.
AMERICA I can see it out of window 3. Lets see, if -
CAPCOM Yeah, try CM 5, Ron.
AMERICA Yeah, this CM 5 is a good one. Okay, so that's 6 of them around Sulpicius Gallus there. There's 22 to 500th's.
CAPCOM Okay, and get those Halmus Mountains right next to the west of Sulpicius Gallus.
AMERICA Yep.
CAPCOM Then you get DeCaldera.
AMERICA Okay. Hope I can find it this time again. (Laughter) Wouldn't it be a hell of a note.
CAPCOM You better believe it.
AMERICA - take a picture of it but couldn't find it. (Laughter) Okay, let's see. One, two, three, four, five. Okay, next one is - hold on that.
CAPCOM Okay, on DeCaldera you want to go f/8 at 1/250th.
AMERICA Okay, let me get some of these mare - still got to get the Halmus Mountains there.
CAPCOM Okay, surely.
AMERICA And get some of the -
AMERICA Okay, DeCaldera - 250th, huh?
CAPCOM Yeah, 1/250th f/8. F/8 1/250th on DeCaldera.
AMERICA Okay. I found it.
AMERICA Okay, what's the next one?
CAPCOM Okay, I don't even know what the name of it is - it's just immediately up - it's that gill and rille there just immediately to the west of DeCaldera.
AMERICA Okay.
CAPCOM Looks like it'd be right at the terminator.
AMERICA a - 125th. Ah, yeah, it is as a matter of fact.
CAPCOM Ron, when - as soon as you're done with the photos, you might take the laser altimeter. We - it went belly up during this photo pass, just absolutely quit like you'd shut it off with your toe or something.
AMERICA Thank you. Okay. It is off, as a matter of fact. Should I turn it on now?
CAPCOM Why don't you turn it on so we'll get a check here, and then it'll be coming off in a second. Think you got it with a toe or something?
AMERICA Okay, it's on.

AMERICA I must have.
CAPCOM Okay, it's working good too.
AMERICA I wonder if I ever turned it on?
CAPCOM No, it - you was - it was on and running, Ron, and then all of a sudden about 5 minutes ago we got a - just a complete belly up. No power to it at all.
AMERICA Oh. Well, I tell you, I've worn the toes through my underwear here, so you just - you do a lot of rolling around. Let's see, let's recapitulate here. Mag Q Q - we're on frame 104. I'm not sure where it was when we started on that one.
CAPCOM I think you gave me a call at 79, didn't you?
AMERICA Ah, I didn't write it down. (Laughter)
CAPCOM That's all right. We've - you've - we've gotten all your calls. I think Tommy can figure that one up.
AMERICA Oh, okay.
CAPCOM Tommy's shaking his head, he's got it all squared away. So, if the bookkeeper's right, we're right.
AMERICA Oh, okay. (Laughter)
CAPCOM And you can go ahead and start dialing that line now, we've seen the laser altimeter enough I think.
AMERICA Okay. Mapping camera off. Yeah, dt's dark down there, I'm not getting any more pictures. Okay, mapping camera to Off at 8 30 seconds. Okay, we're rolling them up.
CAPCOM Okay, you've got mapping camera to standby and image (garble) up.
AMERICA Okay, mapping camera to standby. Off barber pole. Gray. Laser altimeter, off. Okay, we're already in GMC 3 and we're rolling left.
CAPCOM Rog, Ron. I think it'll just help me to remind you that those high gain angles that you see in this block here are strictly if we lose VOX here during the maneuver, that's the reacquire angle.
AMERICA Okay, that's after we get to apoges, okay.
CAPCOM I'm watching your buddies on the screen down here right now, and believe me they've got more black showing than they do white right now of those suits. They've really been down among 'em.
AMERICA They out to the scarp yet?

END OF TAPE

AMERICA They up to the start, yet?
CAPCOM Yeah, they're ah - let me ask Bob here -
AMERICA At the edge of the mountains - have they a -
CAPCOM It's going up and down the SCARP. We're -
AMERICA Okay. Maybe they've gone all the way pass station 2 and then they're going to Station 4.
CAPCOM Rog. See, they're at station 3 right now, as a matter of fact. That's where we saw them on TV. They've been up to Massif and up to station 2 and now they're back down to Station 3.
AMERICA Okay. Mike Mike is at 95, I don't know if I ever told you that or not.
AMERICA I think I always get more pictures than I'm suppose to.
CAPCOM We've decided, that what you're doing is, you're trying to use up all the crew option ones, before Jack gets up there.
AMERICA (Laughter) You guessed it.
AMERICA Hey, which reminds me. If you get to a point where you've got one of these MAGS that doesn't have enough for a complete set, you know, we could make those options on the end of a reel and use a Poppa Poppa there.
CAPCOM Rog. That's affirmative.
CAPCOM Hey, Ron, I've got to ask this. During the last eat period, did you leave the Hasselblad running without a bag in it, just to pull our chain?
AMERICA (laughter) No, that's a good one. I really didn't.
AMERICA Your's still clicking all the time, huh?
CAPCOM Rog. It was very periodic, just like it was on the intervalometer. It sounded just like the - just like the Hasselblad sounded this last time. Just exactly like it.
CAPCOM Probably it was just pulling its hair out over there.
AMERICA (Laughter) Did ah - Have I used up any more film on some of these, than I should have?
CAPCOM No, we haven't caught any anomalies in the film usage.
AMERICA (Humming) 18 32, Roll attitude.
AMERICA You know, I just noticed something that I didn't know before.
CAPCOM What's that.
AMERICA That is, that when you maneuver, you know on the simulator, it's just like the eye view ball, you know, it's nice and smooth transition, you know. You look at the GDC ball and it goes - kind of takes its jump in pitch and then a jump in Yaw, a jump in Pitch and the a jump in Yaw. If you put it on ball 2, then ball 1 usually does the same thing.

CAPCOM Roger.
AMERICA Yeah, it does the same thing, that's just the way the GDC operates, I guess.
AMERICA And, it's not the ball it's just the GDC.
CAPCOM That - GSE says that's nominal.
AMERICA I'm sure it is, but, you know, I just didn't give it any thought. Because, I hadn't noticed it before, I guess.

END OF TAPE

CAPCOM Ron, while you're sitting there watching this maneuver - To completion - I've got some readups from Orbital Science reports for the CMP if you'd like to hear it.

AMERICA Hey, I sure would - go ahead.

CAPCOM Okay, let's talk about the UV's. The far UV spectrometer data has been excellent throughout the mission. Indications are that the hydrogen atmosphere of the Moon is much less than expected. The Aero-B launch from White Sands on Monday failed to get solar UV calibration because an instrument viewing port failed to open. A second Aero-B flight is scheduled for tomorrow. The IR scanning radiometer is performing beautifully. Indications are that the sub-solar point surface temperatures are higher than earthbase observations predicted. Many thermal anomalies are being seen in the ocean coast alarm area west of Copernicus. A few unusual coldspots have also been detected, indicating areas of fine soil with few or no blocks. The Lunar Sounder data is excellent and the Specular Power Monitors signals correlate with surface features. HF data indicates that layers are being detected in the mare areas. Over.

AMERICA Hey, beautiful. Man, that sounds like all that stuff's working good. Outstanding. It's good to hear.

CAPCOM Roger, and don't worry about that short period of time there - your laser altimeter is off. It shouldn't effect anything.

AMERICA Okay.

CAPCOM And anytime you can reach over there, Ron, it's H2 tank 2 fans to ON for the night.

AMERICA Okay, tank 2 fans are going ON.

AMERICA It's rattling, we must be pretty close to attitude.

CAPCOM Roger, you've got a 50-18 on the DSKY.

AMERICA Okay. You know it doesn't shake, rattle and roll as much since we got rid of that tin can, but it still does - a little bit - you know there's a little more dynamic then I had thought it would be.

CAPCOM We'd like ACCEPT. We've got a jett on monitor load for you.

AMERICA Okay, you have ACCEPT.

CAPCOM You're trying to say - you're prejudiced - and you think you've got a better flying vehicle than somebody else?

AMERICA (laughter) I just say it doesn't shake, rattle and roll as much as it did when the other guys were on here.

END OF TAPE

CAPCOM Ron, we need REACQ and NARROW and the dials at 25 and 195 as is in the flight plan.
AMERICA Ah ha, okay. We got it.
CAPCOM Thank you, sir. We would have lost you here shortly in Auto.
AMERICA Oh, okay.
CAPCOM Okay, Ron, the EMP's running and you can go back to block.
AMERICA Okay.
AMERICA (Garble) Working.
CAPCOM Ron, Jamie wanted me to mention the fact that she got a couple of A's on some tests today, and she's real tickled and knew you'd be happy to hear that.
AMERICA Hey, you bet, by golly. That's great.
CAPCOM Ron, we're probably going to lose you a little early on this pass, and we may -

END OF TAPE

CAPCOM Ron, we're probably going to leave you a little early on this pass and we may pick you up a little late at the start of the next pass unless you were to try to acquire us manually or something like that. If you go via the flight plan, which is really what we want, you will be coming in a little bit later than shown. If you have to talk to us or anything like that, you can acquire manually and we'll be right there.

AMERICA Okay, I was just looking at the Earth out window 3 here. Boy, that's beautiful. (garbled) that pretty quick.

CAPCOM Rog.

AMERICA Got some pictures of it the other day.

CAPCOM Yeah, we were going to steal Jack's thunder and take a - take our own weather report when we had the TV looking at the Earth here a little bit ago.

AMERICA (laughter)

CAPCOM Jon told me to tell you to be sure - and - that he's so glad you're there because you worked so hard all these years to be there. He's really tickled. Jan said to send her love.

AMERICA Tell them I appreciate it very much.

CAPCOM They're listening and hanging on every word.

END OF TAPE

CAPCOM America, Houston.
AMERICA Okay, Houston, America. I'm with you now.
CAPCOM Roger, Ron, good show. We need the SEP so we can give you the state vector.
AMERICA Okay. Sorry, I had my helmet off.
CAPCOM No problem. Did you unplug your EKG blue leads?
AMERICA No, but I didn't have the power on, see. I didn't have the suit power on.
CAPCOM Okay, (garble) looks good right now. You're in good shape there.
AMERICA Yeah, okay.
CAPCOM Ron, we want to delete cryo stir tonight from the presleep checklist.
AMERICA Okay, it's deleted.
CAPCOM And I've got a TEI 49 pad any time you want it.
AMERICA Okay.
CAPCOM Okay. You ready to copy?
AMERICA Stand by. Okay, ready to copy.
CAPCOM Okay, Ron. TEI 49 SPS G&N 37568 plus 056 plus 096, 185124795. Now 81s plus 27815 minus 18315 minus 05323. Roll of 182, pitch 104, yaw 330. Rest of the pad not up, NA. Okay, the set starts are the same as always, Sirius and Rigel, 133200030, 4 jett 12 seconds. Okay, and let me see - two comments - launch to the Moon at TIG minus 17834 - that's minus 178.34, and second comment, assume no plane change one, no plane change burn. Over. And the computer's yours, Ron.
AMERICA Okay, (garble) TI 49 SPS G&N 37568 plus 056 plus 096 and take of 185:12:47.95. 81X plus 2781.5 minus, 1831.5 minus 0532.3, 80 104 330. Rigel 133200 jett 12 seconds. Lunar longitude at TIG is minus 178.34. Assume no play change.
CAPCOM Good readback, Ron, but I didn't catch your readback on the roll - 182 is the roll - 182. Did you read that?
AMERICA Roger, roll 182.
CAPCOM Okay, I just missed the readback on that one - good readback.
AMERICA Okay.
CAPCOM While you're doing your presleep checklist, you may be interested that at Shorty, the surface crew found some very, very orange soil - a great deal of it indicates strong oxidation and probably indicates water and/or volcanics in the area and they're really - Jack's kinda like a boy at Christmastime, I'll tell you, a little kid at Christmastime on that one.

AMERICA (laughter) I'll bet he would be. Yeah, that's a great find, by gosh.

CAPCOM Yeah, it's the first time we found - it's orange, boy, you can see it in the television. It's just bright orange soil, no question about it.

AMERICA I'll be darned.

CAPCOM And, as luck would have it, they found it all and got working and got - had to pull out of Shorty due to constraints - walkback constraints in the area - you know, consumables versus walkback.

AMERICA Yeah.

CAPCOM Okay, Ron, everything is - that's everything we've got from down here. Once you finish your pre-sleep checklist and you'll be cleared to turn the COMM off or turn the down voice to off, and have a good night's sleep.

AMERICA Okay.

CAPCOM And, if you've got anything in specific you want me to check into at the home front, I'll be glad to take it down and give them a call later or I can let you know tomorrow or even before you go to sleep if you want.

AMERICA Okay, appreciate it but I can't think of anything.

END OF TAPE

SC Okay, appreciate it, but can't think of anything right now. Just send my love.
CAPCOM Roger, they'll hear that.
SC (Laughter) Okay, travel nine is receive, and we're duplexed with (garble). Check my talk booster here.
CAPCOM Ron, that got garbled, say again, please.
SC Get it?
CAPCOM Okay, we got you, we got you. All right, it's working good.
SC (laughter) Okay. Well, I'm going to get down here and clean the old circuit return valve.
CAPCOM Hey, Ron, -
SC Yeah.
CAPCOM Did you have some noise in the cockpit just now.
SC Yeah, I'm down here in the - cleaning the circuit return valve. Can you hear that, I was banging the door.
CAPCOM Yeah, that's exactly it. We're getting a noise on the loop that sounds exactly like that Hasselblad. Just exactly like the Hasselblad and that's what we got all during that eat period, but, you know, it gives a click and then it sounds like it's transporting film and another click, just exactly like the Hasselblad.
SC Yeah (laughter). Yeah, but not from up here.

END OF TAPE

AMERICA (Laughter) Naw, that's not ah - not from up here. Least I don't hear anything like that.

CAPCOM Rog. Understand.

END OF TAPE

AMERICA You know, I'm looking - from this position back toward Le Monnier - Le Monnier - Le Monnier or whatever - Le Monnier and you can see - (garbled) - you can see the annulus around Serenitatis - the demarcation is about - oh the diameter of Le Monnier towards westward from there and the demarcation of the color - the color from this observation again is a light tan - darn, I forgot to get that colorwheel out - but it's a darker tan than the tan of Serenitatis.

CAPCOM Roger, Ron.

AMERICA The color boundary is not associated with any rille or anything that I can see. It doesn't look like there's any topographic expression to it.

CAPCOM You might be interested Ron, we just woke up the Challenger and they're all doing fine.

AMERICA Oh, hey, good - good.

AMERICA It sounds like Robert? Are you back on?

CAPCOM Yeah, they pressed me into service because they - we woke up the Challenger and they needed somebody on that one - so I'm over here. It's still cold and cloudy.

AMERICA Yeah. (laughter)

CAPCOM But - we've got one blessing - it's not rainy outside.

AMERICA Well, that's good, anyhow.

AMERICA Well, now even from here I can still see that annulus around that Le Monnier.

CAPCOM I'll buy that.

AMERICA Pronounce those things for me, you know. (laughter).

CAPCOM Are you saying that annulus is extended right into Serenitatis and you see some kind of like rings of Le Monnier out there in Seneritatis, like that?

AMERICA No, they aren't rings of it - just - a - it's a diameter - it just extends into Serenitatis about the diameter of Le Monnier.

CAPCOM Okay, we copy that.

AMERICA Even from this distance and I'm almost to the western edge of Crisium looking back across there. And - even from this distance you can still see the - the - color boundary between the two. And as far as - it goes up north by Posidonius and then it kind of blends in and it looks - as far as I can tell anyhow - going from Posidonius on around to the north side of Serenitatis - of course it's a long ways away and I really can't see it but I couldn't tell a definite demarcation - it just kind of blended in from the tan to the dark tan.

CAPCOM Roger.

AMERICA Yeah, Bessel is the one crater that really shows up out there - it's the biggest one in the in the mare Serenitatis and it's also the one that has an ejected pattern - a fresh ejected pattern around it - and that really shows up in the shallow sun as you're looking back toward the sun.

CAPCOM Copy, roger.

AMERICA And this is the first time now, looking back towards the sun, where I've been able to see that - ray from - That's suppose to be a Tycho ray, isn't it - going right across Bessel? In the north south direction.

AMERICA There's a 58 T - and let's see - what are we suppose to be doing here? Light coming in the window here - I can't see my DSKY. -

CAPCOM Ron, if you'll standby with us, we're going to have roll maneuver here real quick for you so you can get the mapping camera out of the sun.

AMERICA Oh, okay. Which way?

CAPCOM Roger, Ron. We want a 360 - we want 360 degree roll - 360 roll - 3 6 zero or zero zero zero, your choice.

AMERICA Okay, that's only 20 degrees.

CAPCOM Yeah, That's - I didn't mean a 360 roll - just roll to 360.

AMERICA Yeah, that's right. That's what I had too.

AMERICA (garbled) degrees to go. Will that hack it?

END OF TAPE

AMERICA How's that, gotten any clearer?
CAPCOM Hey, Ron, looks good. Soon as the sun goes down you can roll back to 341 as required.
AMERICA Okay. Okay, there's my NOUN 78s, 90 plus 90 minus 19 47 and 4, then it doesn't make any difference.
CAPCOM Rog, I'm looking at them right now.
AMERICA Hey, that's a minus 05 plus 50 okay.
CAPCOM Got it.
AMERICA D 41 22 plus 00 that looks good.
CAPCOM Yeah, right on the money. Hey, Ron, did you kill P20 when you brabbed the stick that time.
AMERICA Uh, I don't know, I don't think so. See what I'm going to do, just as the sun goes down, I'll roll back to all my air needles recall P20.
CAPCOM Ron, they're saying that when you roll back to 341 you'll have to restart P20.
AMERICA Yeah, that's - that's what I'll do.
CAPCOM Okay.
AMERICA Tut Tut Tutttttttt Tut (humming). Foot foot foot. Can you tell with the - the pitch rate changing.
CAPCOM Roger, Ron.
AMERICA Okay.
CAPCOM Must have felt good to be able to fly it by hand there for a while, huh.
AMERICA Covers are open. Yeah. Yeah, we're going down, okay, we gotta go down.
CAPCOM Ditto, Ron.
AMERICA Pretty close, but we made it.
CAPCOM Just of interest to you, Ron, we were really pleased with the way that our visual display and that worked out last night during the orbital science visual, proved that they will feed me the questions and I was able to get them to you. If you have any comments one way or another, if you don't want to do it on REV 40 you're not, but if no we plan right now on REV 40 for those orbital science visuals to do the same thing, going it's a visual through landing site down through D-Caldero and we're going to run the same operation because it went so smoothly down here, we hope it went that same way for you up there.
AMERICA It sure did, as a matter of fact, I like it very much. It kind of clues me on what to look for as you're going through 'cause you see so many things down there that you - that you kind of - In fact, if any, I have a tendency to forget what the main things I should try to look for is.

CAPCOM Well, good show. We're prepared to do it on this next REV and I guess you might say, even though it isn't that way in the flight plan, we'll probably just stand by right straight through on REV 40 where you pick up at the landing site and go right through D-Caldera we'll be just standing by for that whole REV, that REV, that whole piece about 12 minutes or so.

AMERICA Okay.

END OF TAPE

AMERICA Okay, looks like she worked. One at two-tenth's of a degree per second, now.
CAPCOM OMNI Charlie, Ron, we'd like OMNI Charlie.
AMERICA There it is.
CAPCOM Okay, and we hear the crackles.
AMERICA Yeah, it sure does. It even crackles up here but I guess it's a lot worse down there, isn't it?
CAPCOM Yeah, we can live with it.
AMERICA What time was that that you want to feed through to the LM? Prior to dock? I'm sitting on an OMNI waiting for a liftoff, I think.

END OF TAPE

CAPCOM Do what?
AMERICA Say again, Bob.
CAPCOM My fault. I just kicked the pedal down here, Ron.
AMERICA (Laughter).
CAPCOM Ron, just a little information for you. One of those little highlights of the day. When you come around AOS on this next pass, there'll be - White Sands will be standing by and the countdown on Aerobee rocket for UV calibration shots and if that one doesn't go they've got one for tomorrow same way.
AMERICA Very good. Yeah, I hope this one works.
CAPCOM Roger. We need the calibration data.
AMERICA Right.
AMERICA Is it starting to look pretty good on your high gain antenna scale down there? You switched to high gain yet?
CAPCOM That's your cue, Ron. What you think on the high gain meter will be your best bet.
AMERICA Oh, okay.
CAPCOM You're at that time in the flight plan where you should be able to get it and we should be able to get our PCM data. Sounds like you got it.
AMERICA Hey, it worked like a charm.
CAPCOM Rog. Boy, it sure does quiet down as soon as you get it in there.
AMERICA (Chuckle). It does, doesn't it.
CAPCOM I sure hope I'm as clear to you as you are to us. You sound like you're just in the next room. It's really great COMM.
AMERICA Yeah, you are, really. It's really great.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/13/72 GET 161:06 CST 1358 CM-103/1

CAPCOM Ron, we're about ready to lose you and at 161:30 you have a maneuver, we want to make sure that gets started on time because of Sun problems on the camera.

AMERICA At 161:30, okay?

CAPCOM It's just a matter of doing it on time or else you'll have Sun problems.

AMERICA Okay.

CAPCOM And it's because the camera's out of the -

AMERICA I'll tell you when I'll start that. Yeah, I'll start that as soon as I get the cover closed on T stop. That give us a minute or so there, too.

CAPCOM That'll be real fine, Ron. Okay, we've got the DSC running, Ron, as per the flight plan.

AMERICA Okay.

END OF TAPE

CAPCOM America, Houston. Don't want to interrupt your eat period, but just would like to have a word from you on how the SIM-bay configuration went. Did the UV cover come open? We're standing by on that Aerobee launch.

AMERICA Affirm UV cover's open. I think SIM-bay's all squared away.

CAPCOM Roger, thank you -

AMERICA Sunrise was 7 seconds, I think, after we closed both covers. Good timing.

CAPCOM Roger.

CAPCOM Okay, I'll keep you posted during your eat period of how the Aerobee is coming. It's due to launch at 162:10 and we need to get the 64 kilobit data here. As soon as we get that, we'll be giving it a GO for launch but we did want to get your word on the cover.

AMERICA Yeah, it's open. It's open and verified ON.

CAPCOM Roger, Ron. And they're in the count at White Sands.

AMERICA Okay.

AMERICA Okay, frame number 110 of mag Oscar Oscar was taken at window one off toward Lomonosov. You could really see the swirls in Marginis. They're - trying to compare them with the same type of swirls back there in Arabia.

CAPCOM Okay, we copy.

AMERICA Let me take the old binocs out and look at it. That's a long ways away.

CAPCOM Roger. What are you looking at again, Ron?

AMERICA These are the swirls that, looking off across Marginis (garble) toward Lomonosov and, let's see, what's that other sea? Big crater's just to the northwest of Neper.

CAPCOM Okay, let me look at it here.

AMERICA About the same size as Neper.

CAPCOM I got a poor map, Ron. All I show is next to Neper, you have the Border Sea which is northwest of Neper and called the Border Sea. I don't know if that's the proper term you wanted or not.

AMERICA Yeah, that's what I mean. I think that's Mare Marginis - it's a round one up there. I think that's what it is.

CAPCOM Yeah, I think so too. I've got to get hold of -

AMERICA And, in that case, my map doesn't go up that way, either, so - the one I have out.

CAPCOM Okay, stand by.

AMERICA I think Marginis is a circular basin.

CAPCOM Yeah, Marginis is the name, yeah.

AMERICA And just north of that is -

CAPCOM You've got a big one called Goddard.

AMERICA (garble) it's a - yeah, okay. But in the case of Marginis, there's a brand new crater just to the northeast corner of it - I mean northwest corner.

CAPCOM Okay, brand new crater in the -

AMERICA And all marked just like Neper. In the northwest corner of Marginis, it's about, yeah, let's see, I'm guessing - 100 kilometer size, probably.

CAPCOM Okay, we copy that (garble)

AMERICA (garble) 50 kilometer size.

CAPCOM Rog, you've never seen that before on any of the maps?

AMERICA You know it's - well, I've got to look on the map. I'm sure it's there because that's what causing all the swirls going across Marginis.

CAPCOM Okay, do you see a color texture difference? Between the swirls across Marginis there?

END OF TAPE

SC There's a brand new crater just to the northeast corner of it - I mean northwest corner.
CAPCOM Okay, brand new crater in the -
AMERICA In the northwest corner of Marginis, and it's about - let's see, I'm guessing - a hundred kilometers sized probably.
CAPCOM Okay, we copy that -
AMERICA No, 50 kilometers sized.
CAPCOM Rog. You've never seen that before in any of the maps?
AMERICA You know - well, no I got to look at the map. I'm sure it's there, because that's what's causing all the swirls going across Marginis.
CAPCOM Okay, do you see a color picture difference between the swirls across Marginis (garbled).
AMERICA Yeah, the color - the texture is hard - you just can't get any texture out of it. There's a dark - a dark gray and then the swirls seem to be around this dark gray - the dark gray areas. The swirls of course are light, light - light, light tan.
CAPCOM We'd like - Stu, and I'd like to know - do you think the swirls are ejecta from that new crater you're seeing?
AMERICA Well, yeah, the swirls in that one crater seem to be in Marginis, and I hope that's Marginis. I'm going to look in my map here in a minute and look for sure. But they seem to be eminating essentially radial from that bright crater. Going out across the mare.
CAPCOM Roger. Just a reminder, Ron. We don't want to tear you away from your window if you don't want to, but this is your eat period.
AMERICA No, that's right.
CAPCOM And we're T-minus 3 at White Sands and counting.
AMERICA (garbled). Hey, good.
CAPCOM Dynamics retro. Ron, if you're in the simulator right now, I'd have you adjust your mirror.
AMERICA (Laughter). Yeah, so you could tell where I'm looking, huh?
CAPCOM No sir. So you can look - you know what we used to adjust the mirrors for down at the simulator all time.
AMERICA (Laughter). Yeah, I know what you mean.
CAPCOM I guess what I'm saying, is I need a mirror down here on my console. It looks like a peanut gallery here.
AMERICA (Laughter). Okay, the crater I was talking about was Al-Biruni. Is the one that's got the swirls across coming from it. And then off from the northwest corner just outside the rim, that's a very bright crater. It shows up on that contingency chart. And that was Al-Biruni. Goddard's got a lot of swirls in it also. No, wait a minute. Goddard was the one I was talking about. Not Al-Biruni.
CAPCOM Okay, Goddard. Roger, I got you.

AMERICA Well, yeah. Goddard is the one I was talking about. Crater size is more relative on that one and there weren't any craters on the floor so that had to be Goddard.

CAPCOM Okay, we just had lift-off at White Sands.

AMERICA Hey, good. Just hope she keeps going.

AMERICA You know, I'm looking north of along Crisium. Okay, there's Picard- and ierce. And you get the same - same pattern that looks kind of like a swirl. Looks the same type of albedo as the swirl with light places and dark places, the only difference being that you can definately tell that these are ejecta from Proclus because the pattern is somewhat radial, you know, from Proclus itself. And then you've got the same thing as a crater up on the north - north rim.

CAPCOM Roger, we got you.

AMERICA Crisium just outside of it. It's about a 50 kilometer crater again. And it's a very bright one and there the rays cross the Proclus swirls or rays. Here you have to definitely call them - call them rays instead of swirls. Yet they look the same way. And the only distinction is, in Crisium they go essentially radial, they have a direction to them. Whereas the ones over there at Marginis and next to (garbled) or somewhere else in that part of the country or - don't have any particular direction to them.

END OF TAPE

CAPCOM Okay, Ron, White Sands just called us and they have a good data take on their preliminary of the good data on Aerobee.

AMERICA Ah, perfect.

AMERICA I'm looking out of window 2 now - and - you can definitely get 3 different colored textures on the thing. You've got the light tan of - Serenitatis and then you've got the - an annulus ring that - stops somewhere in about the middle of the two ridge systems that go around and then you come down south in the landing site area and the two dark things change - ah - I can't quite see it anymore - the landing site is a darker - more of a grey - goes on - goes on up to - there's a subdued crater - there's kind of a - the - the rilles go on up there and then there's a filled in crater just to the west of one that's about 20 kilometers in diameter. And that's about where the - the dark grey material ends - right on the edge of that crater and then - you run into the annulus that runs all the way around Crisium - I mean, not Crisium - around Serenitatis.

CAPCOM Good enough, Roger.

AMERICA On frame 110 and 111 we're taking - just now out of mag Oscar Oscar - one of the landing sites and one north of the landing site trying to get the color distinction between the three of them there.

CAPCOM Roger, we copy.

END OF TAPE

CAPCOM Ron, do you have your flight plan handy, I've got an update and thought by that. I don't want to interrupt your eating if you don't have it, we'll get it after the eat period.

AMERICA Okay, just a second here, I'll get it. Okay, 113, 114 and 115 were taken on the western edge of Serenitatis. Let me get unwound from the cord here a little bit and I'll - you know if we design another spacecraft we got to have something with a - do nothing but get tied up with this crazy cord.

CAPCOM Roger, copy that. Hey, look, there's no hurry on the flight plan, just keep doing what you want and I'll call you at about 162:40.

AMERICA Let's see, where are we now? I gotta (garble)

CAPCOM We're at 162:29.

AMERICA I'm not doing any thing. Okay, I'm ready, go ahead.

CAPCOM Okay, what we want to do is we have to take a look at the data longer so at 162:45 we want to put in Mapping Camera Retract at that point. Mapping Camera Retract.

AMERICA Okay.

CAPCOM And that will delete it over at 163:05, you'll just delete it from that point.

AMERICA Okay.

CAPCOM And there's a zodiacal light photo pad which is over there at 163:10 about, is 163:10:49, that's 163:10:49.

AMERICA Okay, there's a zodiacal light T-start 163:10:49.

CAPCOM Okay, the only reason I wanted to get that up to you is that mapping camera retract there at 45, we have to take a good long look at that data, you know, you know, the problem we're having with it.

AMERICA Oh yeah, uh hu. Okay.

CAPCOM Okay, Ron, if you're near there, high gain to AUTO

AMERICA High gain is AUTO.

END OF TAPE

AMERICA Houston, America.
CAPCOM Roger, go ahead, Ron.
AMERICA You want the laser altimeter on? While we try to retract that?
CAPCOM That's a negative, Ron. Just let it run.
AMERICA Okay, will do.
CAPCOM They're going to stay running until over at 163:35 or so is where they go off and we're just going to retract the camera.
AMERICA Okay. Why, isn't the laser altimeter still putting out good data? Far as we know, anyhow.
CAPCOM Yeah, the only problem we have is when your toe caught it that one time. It's been good all along.
AMERICA Okay.
CAPCOM Ron, we'd like H2 tank 1 fans on, please.
AMERICA Okay, H2 tank 1 are going on.

END OF TAPE

AMERICA Okay, H2 tank 1 are going off.
CAPCOM Roger.
AMERICA Okay, let's try to retract the old mapper, huh?
CAPCOM Roger. We're ready (garble)
AMERICA Okay, retract extend off. 5, 4, that wouldn't be - I started at 15, 4515. 13, 14 GO. Got a barber pole.
CAPCOM Okay, we see motion, Ron.
AMERICA Okay, good.
CAPCOM Ron, we've got one change of flight plan. Ron, we've got one change of flight plan and we should have gotten it to you sooner. At 163:40 we want to change that VERB 49 maneuver because we want the lunar sounder to look at the SEP at the landing site.
AMERICA 163:40. Okay, go.
CAPCOM Okay, let's change this to roll 115, pitch 297, yaw zero.
AMERICA Okay, roll 115, pitch 297, yaw zero.
CAPCOM Roger, Ron.
AMERICA Mark it, barber pole.
CAPCOM Mark it, roger.
AMERICA I don't mean barber pole. I mean gray. Well, whatever it was, it changed.
CAPCOM Yeah, it looks like that's all we had.
AMERICA Yeah. Say, I've been having a little trouble with that whenever I push the tracking stamp switch off on that one.
CAPCOM That's okay, Ron.
AMERICA Okay, if we can remember it's retracted. Houston, America.
CAPCOM Go ahead, Ron.
AMERICA Houston, America.
AMERICA Okay, it looks like we're running a bit beyond what it might take to do this here. Why don't you check with Bob Mercer and see if we could get by without using the - what do you call that frame that's the protect frame? Either that, or how real is the 40 expose usables exposures on the front of the film? How much protection - how much room is there to -

END OF TAPE

AMERICA How much protection did - How much room is there to (garbled) before he came to his calibration films?
CAPCOM We're checking on that, Ron.
AMERICA Okay.
AMERICA (garbled) may want to skip one of the 60 second exposures in there somewhere, you know.
CAPCOM Rog, Ron.
CAPCOM Ron, our film record down here indicates you've got 3 more frames on there than you need for zodiacal light. Do we have a bad number somewhere?
AMERICA Ah - you may have, - cause I'm ready to take - yeah, I've only got 11 more pictures on here. I'm setting on number 30 - ready to take picture number 30.
CAPCOM Okay, understand you're setting on 30 ready to take number 30 and you've got 11 pictures left.
AMERICA Yeah. - so that's - 30 - 11 pictures the way I count them. Unless there's some, you know, a little gravy between the 40 usable frames.
CAPCOM Okay, Ron, there are 44 usable frames on that mag so you can go from a 30 to 44 in getting data.
AMERICA Ah, - okay. That's good. We can get the whole works then.
CAPCOM Roger.
AMERICA Outstanding.
AMERICA Okay, Charley 3 and Bravo 3 are on. Alpha 3, Album 3 are off. Charlie 3 and Dog 3 are on.
CAPCOM Rog, we copy that Ron.
AMERICA Okay.

END OF TAPE

CAPCOM Roger, Ron, we're probably going to lose you early. You're looking good as you go around the Horn. We went around the room and everything's - all systems are GO. Just a reminder on this next backside, there's no recording so there'll be no DSE recording of voice on the backside.

AMERICA Oh, okay, thank you much.

END OF TAPE

CAPCOM America, Houston. America, Houston.
AMERICA Houston, America, here, sorry, but I didn't have my hat on.
CAPCOM Roger. Ron - no problem, we've got a flight plan update when ever you're ready.
AMERICA Let me get the camera squared away here first, okay.
CAPCOM Okay, just give me a call.
AMERICA I've been looking out the window and I took, I took the 4 before 120 on the horizon across Arabia with the 80 millimeter.
CAPCOM Roger.
AMERICA Mike mike. There it is. That was on mag Oscar, Oscar, by the way.
CAPCOM rog. Did you see Arabia?
AMERICA Yeah, it was a pretty good hit at it. It doesn't really - you've got to study it.
CAPCOM Okay, we don't want to talk you into something.
AMERICA (laughter) That's right. AGX 20 intervalometer F4 250th.

END OF TAPE

AMERICA Okay 19 frames. Okay, we're starting with 143 Mike Mike. Okay, all set for a flight plan update here.

CAPCOM Okay, Ron. It's a couple of short items. Let's see, first of all, that 16435, just anywhere in that area, we'd like you to service your biomed harnesses, if it's convenient. We're getting pretty ratty data on you now.

AMERICA I just put a new one on last night.

CAPCOM Okay, we think you need to service it with some jelly or something.

AMERICA (garble) I guess, huh? I guess they could dry out, okay?

CAPCOM Right. Okay, the next flight plan update is at 166:36.

AMERICA Okay, go.

CAPCOM Add a verbal 49 maneuver to lunar sounder HF target attitude at 166:40. The angles for the VERB 49 maneuver are as follows: 142 269 359.

AMERICA Okay, that's the - VERB 49, a 142 a 269 and 359. That's for the pass where it (garble) through there.

CAPCOM Right. 166:40 is the time of that maneuver and after - there's a note after that, resume nominal flight plan.

AMERICA Okay.

CAPCOM That's it. You got everything up to date. You are aware, I assume, that we have a total alternate flight plan laid out if we should have to jettison the high - the antenna.

AMERICA Yeah, you bet. I don't know what it is yet, but (laughter).

CAPCOM And Ron, FAO just a reminder on that maneuver I gave you to start it at 36 to be in attitude by 164:40. No, say again 166:40.

AMERICA Okay, 166, okay. Figured it was. Okay, do I stay in that attitude then? I guess that's what it is, isn't it? For the rest of the SEP?

CAPCOM Affirmative.

AMERICA Back to the receive only. Okay.

CAPCOM And, just for your information, your buddies on the surface are out walking around the Rover right now on television.

AMERICA Hey, good deal.

AMERICA Tacquet up to Bessel E and Tacquet to Bessel S. To run along the pass Valdez, change at cannon rilles. (garble) Terminated there.

END OF TAPE

SC Yes, he was trying to match my color wheel with Crisium and nothing match.

CAPCOM Roger. Seems that (garble) found that too.

SC (laughter)

CAPCOM Hey, Ron. You're already aware, I'm sure that with this different attitude you've got - your look angle on D-Caldera photos here is going to be pretty marginal and CM 5 - I guess is the still the best window but it's - I guess it's go ahead and get them, but it may be marginal.

SC Okay, I'll see - I was wondering about that really.

SC You know the crater, Dawes, has got - starting from the top going down the rim - there's a kind of light tan layer - it's a concentric layer that goes all the way around and then you come into a lighter - it's almost to the white that it looks like on the hills around the landing site, and this first layer goes down maybe - let's see if you look at the total distance in there - about a third of the distance and then the white layer - concentric layer that goes all the way around, and this isn't the western wall I'm looking at now. And it goes down to about a half of the distance - not quite half of the distance from the top of the rim down to the bottom. Then the lower portion of it, the lower half - a little better than a half, really, is kind of a tannish gray - it has a tannish gray albedo to it. It's all streaked. Of course the bottom of the layer, the bottom of the crater itself is filled with - well they're not the same color of material that's laying around the edges of the crater. It has some radial rings around it, which gives an indication of a subsidence of some kind - they're sliding down the hill. That's really the first crater where I've been able to see any sort of glaring in the walls. Now, the first layer, on the north side and also on the south side - in a dark brownish layer of the thing - you can see parts that are jugged - jagged and sticking out. In other words, there's a slight change in slope in it. It looks like it's a very steep slope, which would indicate that it's a fairly compacted type of material in the first layer. And then the slope changes in the white layer on down a little bit more. In the white layer it seems to sort of combine and maintain the same type of slope as the dark grayish tan layer at the bottom or from half way down to the bottom of the crater.

CAPCOM Thank you, Ron. Did you tie in some of that ejecta material to a layer at the very bottom of the crater - like an overturned slab or something.

SC Yeah, that's what it looks like.

CAPCOM Roger, got you.

SC The ejecta material is about the - same.
SC Okay, here we come on - well, it's an odd angle - I guess it'll work. Good, I want to get some of the 30 - let's see - first we're going to start a Tacquet - gonna whip her back and get one back the other way cause that's kind of a change in the color - the color of the area changes right at the Tacquet relative to the browns. This - I forgot my little gouge there - it goes north of -

END OF TAPE

AMERICA This - I've forgotten old gouge here. It goes north of Menelaus, doesn't it?
CAPCOM You come up Tacquet and then you go right near Bessel E - up in - and follow those ridges along into Bessel there - Bessel E, rather.
AMERICA Follow the rilles, Okay.
CAPCOM You're north of Melanius - Menelaus, I guess.
AMERICA Okay.
AMERICA Now, I see it.
CAPCOM Okay.
CAPCOM And you cross just a little bit south of Sulpicius Gallus. Say again, Ron.
AMERICA Okay, south - I was going to say that's definitely a volcanic field or a deposition. And it's - you have relief with it from Tacquet on up to - even Menelaus.
CAPCOM Roger.
AMERICA Bob, you say we crossed south of Sulpicius Gallus?
CAPCOM Yeah, just about - just a little south of Sulpicius Gallus and the Haemus Mountains. Cross the Haemus Mountains and then you're right over D-Caldera.
AMERICA Okay.
AMERICA I think I got D-Caldera awhile back with the 250 lens too.
CAPCOM Good show.
AMERICA Now these Haemus Mountains have the same color tones, and what have you, as the - that field from Tacquet to Menelaus.
CAPCOM When you're a little bit past D-Caldera you - on the - there's a line between the Sea of Vapors mare and the Apennine Mountains. That's where you change to F2.8.
AMERICA Okay. That's pretty good. We're going to hit D-Caldera anyhow. There's the Conon Rille. Yeah, there's a dark halo crater just to the west of D-Caldera. It's about twelve hundred meters or so in diameter, if my scale is right. It's about a fourth of - fourth of the size of D-Caldera.
CAPCOM Okay, Ron. I don't show that on my map.
AMERICA Okay, I think it might be on the picture, there. I'm not sure. I'll have to get a better look at it before -
CAPCOM Okay, and as you cross this mare that you - just to the west of D-Caldera you'll switch - as you get across and up into the Apennines you'll switch to F2.8.

AMERICA Okay.
AMERICA Oh, Conon Rille has sure got something sticking up on the west side of it there. We ought to take a look at that picture. Looks like a spire sticking up on the left side because it creates a tremendous shadow. And it's a perfectly round - suppose that could be a crater. (laughter).
CAPCOM Rog.
AMERICA Yeah, might be a crater.
AMERICA 2.8 at a 250th.
CAPCOM Ron, you want F2.8 and then up here we can get the Apennine Mountains - the line between the Apennine Mountains and the mare up there you want to go to 1/125.
AMERICA Okay, 125th. Okay.
CAPCOM Stay at 250 up until you get across the Apennines, Sir.
AMERICA Man, oh man, look. I think those are the Lyre flows or something out across there. They really stick up. You can sure see the flow fronts of the - you know - in the Imbrium you can see the flow fronts and the rilles a lot better than you could in Serenitatis. They must be bigger. 2.8 at 125th. Eratosthenes is just being picked up.
CAPCOM Right. Ron, the terminator is going to go right across on the next path - right across the eastern edge of Eratosthenes.
AMERICA Ah. Okay, that's all we're going to get.
CAPCOM Okay. Ron, due to the verti-sounder saturating from the SEP we would like to change attitude. And right now go to that VERB 49 maneuver attitude that we called up for 166:36. We'd like for you to go to that now. Over.
AMERICA (laughter) Okay. The old SEP is saturating. Let's see - what was the attitude?
CAPCOM Okay, I can read it to you. It's roll 142 269 359.
AMERICA Forty-two -

END OF TAPE

AMERICA 226:93:59. Okay, CMC in auto, go 50, 18 proceed. Hey this is interesting. MAG mike, mike, we're on 172.

CAPCOM Roger. We copy MAG mike, mike on 172.

AMERICA Just check that decal for the heck of it. Do I use the rest of them for targets of opportunity?

CAPCOM Stand by, I'll check with Chuck here.

CAPCOM Ron. We don't think mike, mike has got anything left on it. But if you - if it is you can use it for targets opportunity. But, it's not suppose to have.

AMERICA Well, it's pretty well got one or two of them left here, you know, and I'll just keep it handy. And take it until the thing turns read, you know.

CAPCOM Rog.

AMERICA The next one might be the last one. (Chuckle).

AMERICA (Whistling)

AMERICA Houston, America.

CAPCOM Go ahead, Ron.

AMERICA Is there any way the surgeon there could tell which, which two things are out of service or all three of them. (garble) You know, sponges come in packages of twos, not threes.

CAPCOM Okay, why don't you say it again Ron, I just punched up to surgeon here, why don't you say it again please.

AMERICA Okay. Is there any way the surgeon can tell which lead needs to be fixed or which two leads, because the sponges and all those things come in packages of twos, you know.

CAPCOM Hey, Ron. We just talked it over down here. The EKG is good and just forget the ZTN for another day. Just go EKG, and forget the ZTN.

CAPCOM That's complements of Dr. Z.

AMERICA Oh, hey, beautiful. No wonder what kind of writings, I don't even have ZTN on. (Chuckle)

AMERICA Say, last night I moved those, moved all three sensors on the EKG to different spots and I put some of that cream stuff on. And I think that helped.

CAPCOM Rog. You can tell, and he's noticed that and it's improved the signal on the EKG part.

AMERICA Oh, okay.

END OF TAPE

CAPCOM Ron, we're about ready to lose you in about 10 minutes. Everything's fine; we'll make one more final go around the room before you go out of sight. I'm watching your buddies down there. They're up against a rock which is about twice as tall as they are and they're trying - pounding away on the side of it. Doesn't look like they're having that much luck getting anything off of it, but they're beating on it.

AMERICA (Laughter) Tell those guys if they don't roll a rock down a crater, they're supposed to do that for me.

CAPCOM Rog. I think - I think Jack got the nickname "Twinkle Toes" last night. He was bouncing around very gracefully. Everytime he'd hit the rock he'd fall over down there.

AMERICA (Laughter) Ah, great.

END OF TAPE

CAPCOM Ron, everything looks good as we go here to LOS. No problems at all. You're buddies are down at Station 6 right now.

AMERICA Oh, okay. We thank you much.

CAPCOM Okay, see you around the other side. On the flight plan schedule, now.

AMERICA Okay -

AMERICA (Humming)

END OF TAPE

AMERICA Free off, I think.
CAPCOM America, Houston.
AMERICA Houston, America. Roger, loud and clear.
CAPCOM How you doing up there, Ron?
AMERICA Okay; real fine. I saw a - part of these rilles - type things and it's got a light brown, now a dark brown, it's almost a mare-type coloring heading in the southeast/northwest direction. And it's down from - yeah, there's Sanger. East of Sanger yet. Let me find it on my map.
CAPCOM Starting east at Sanger there, you get into the first ring of Arabia or the second Arabia there.
AMERICA Yeah. Hey, you know this is - let me get this picture. This is the first I've ever really been able to see that first ring of Arabia.
CAPCOM You think you saw it, huh?
AMERICA And it shows up as kind - yeah, it - no, I'll take two of them. First, if I'd better get the dark slide out. The way then Sun is shining on the darn thing. And it shows up as a bright - well, I'll be darned. That's amazing. Shows up as a bright ray just like we got it drawn on the map. You know, you get a brighter albedo all the way around to the top of the ring. That was frame 120 through - or 122 through 124 on mag Oscar, Oscar.
CAPCOM Okay, Ron, we've got a flight plan update and a lunar sounder PAD if you want to take it before we get into the visuals here.
AMERICA Okay, I better, I guess.
AMERICA Okay, frames - the last 3 frames before 128 were also looking east. Okay, we have an update, huh?
CAPCOM Lunar sounder PAD is at 166:40 in the flight plan. Let's go to that one first, okay?
AMERICA Okay.
CAPCOM Okay, T-start time: 166:42.12. T-stop time: 47.10.
AMERICA Okay, T-start at 166:42.12 and T-stop is 47.10.
CAPCOM Good copy. I've got a - the lunar sounding gazing attitude VERB 49 at 167:28.
AMERICA 167:28, okay.
CAPCOM We're tweaking up that attitude a little bit. It's 283, 063, and 328. Over.
AMERICA (Laughter) That's really tweaking it up. 283, 063, and 328.
CAPCOM Roger. And over there at 167:55 where the antenna retract sets.
AMERICA Ah, yeah, right.
CAPCOM Okay, it's pretty obvious we want to take HF antenna 2 retract and move it above HF antenna 1. We'll call for the retract, make sure we're ready and we'll also cue it on our cue, Ron. What we want to do is look at HF antenna 2 retract

CAPCOM all the way and get the times, etc., and then we'll go ahead and retract HF antenna 1.
AMERICA All right.
AMERICA Oh, okay. Sounds reasonable.
CAPCOM Okay, Ron, we're all just standing by. That takes care of the flight plan update, and we're just standing by for your visuals. The PAD should come out straight on the landing site and the D-Caldera, as you know.
AMERICA Okay.
CAPCOM Ron, we want to concentrate on the small scale features and your binoculars may be what you need. We want to look at the dark halo craters in the Site area and examination of D-Caldera with the binoc's.
AMERICA Okay, that sounds like -

END OF TAPE

AMERICA Okay, that sounds like a good idea, we'll see what I get there.
AMERICA (Laughter) Crazy. Going over Earth's attitude, every time I look out the window, I've got to look at a different direction.
CAPCOM Rog. We understand.
AMERICA (Laughter) it's funny.
CAPCOM Hey, Ron. When you come up on the landing site, we would like you to concentrate on Shorty Crater and F Crater and on the other dark halo craters ah - As you know, as I told you last night, Shorty ended up with some orange colored material that looks an awful lot like a fumarol or event anyway, fumarole, and it looks an awful lot -
AMERICA Fumarole.
CAPCOM Yeah. Okay. It looks an awful lot like it and what we're trying to do is see what you see from there and that may give us some correlation of some of these other ones.
AMERICA Okay. I'm going to take a look and see which one's Shorty.
CAPCOM Ron, it's the dark crater on the slide, the dark crater on the slide.
AMERICA Oh, Okay.
AMERICA I hope we got a pan camera picture of that what, the (garble) F or something like that, the one I described had a little bit of diamond down in it?
CAPCOM Roger.
AMERICA Because, what that little diamond turned out to be was a mine arch it's a dome of material in there and the reason it looks like a diamond is because you have slide material, or Talus type stuff that slumped down around it. And in that dome type material, there are three or four black spots in it. I called them black, they're really, I'd consider it a greenish ah - a greenish black, you know.
CAPCOM Roger.
AMERICA I sure hope we - if ah - why don't you check with Farouk and see if our pan camera coverage, covered that, that crater. I think it probably did. An interesting one to take a look at it in.
CAPCOM Ron, Farouk thinks it is on the pan.
AMERICA Very good.

END OF TAPE

AMERICA You know, in the eastern wall of Picard, and looking at it with the binoc's now, and you can definitely see the first part of it up there. It has a vertical escarpments - escarpments along the edge of it. And the vertical escarpments are kind of in irregular layers. Just kind of like you would suspect you - eroded out a bunch of lava layers. In other words, they're not continuous, but they're kind of intermingled along. And they go about, oh, a third of the way down from the top of the rim down to where the talus starts sliding on into - into the crater.

CAPCOM Good show. We'll tie that up with what you gave us last time on Picard.

AMERICA Okay.

AMERICA You know these dark halo craters in that one picture? By that little diamond we've got up by Yerkes, the one furtherest to the south looks like an impact type of crater. In other words, there's definite ejecta floping out around on those. The one that's - Hey, I'll have to look at it in the middle of my picture, but I think it's probably the second one down from the top. It has a rounded ridges, rounded rims, and coming up on the side here. I don't know if I'm going to be able to see it until I go by it. It has rounded - a rounded rim. The ejecta pattern, or the dark halo is about twice the size of the, or out to one crater diameter. And it doesn't - It's either a highly eroded impact-type crater or it's a - it's a volcanic-type structure. And to me it doesn't look like a highly eroded impact one. Again, that's a little one we could probably pick up a ground truth, so to speak of, the pan camera film.

CAPCOM Ron, are there any similarity between the highlands west of Crisium and those east of Serenitatis?

AMERICA You know, oddly enough that's just what I was looking at. And, the ones to the east - west of - wait - Yeah, east of Crisium and west of - no.

CAPCOM West of Crisium and east of -

AMERICA What I was looking at was the -

CAPCOM Serenitatis.

AMERICA Yeah, west of Crisium and east of Serenitatis. Those are a different - there seems to be a different type of highlands, and I want to - I want to check the other ones when I go by, but it looked like when I was coming up on - on those west of Crisium, they're more of a tan-type color, smaller undulations, smaller - you know, the corn cob effect, I guess, is what you'd call it. What I'd call it anyhow. Smaller - smallers ears of corn or smaller mounds closer together, as opposed to when you get

AMERICA over to the landing site. The ones on the landing site seem to be more raised I guess. In other words, you still have a group of a small mounds and what have you, but they're a little more massive. You get more of an appearance of a dark flow or a dark albedo between mounds and between the bumps.

CAPCOM That's a good show.

CAPCOM Are you getting the landing site in the view now?

AMERICA I got it in window 2. Okay, I've got Shorty in the picture. It looks like a sharper crater than any of them in the pentagon complex. The other thing that looks sharp just like that one is F crater.

AMERICA Supposed to inspect the other window.

AMERICA Did they find that orange stuff on the north side of it?

CAPCOM Let me check on that, Ron, I'll be back with you in a second. I don't think so, their stop at Station 4 -

AMERICA Okay.

CAPCOM Station 4 was on the south side of it.

CAPCOM Go ahead with what you see, we'll tell you that -

AMERICA Looks like they barely got into the stuff - but it looks like that kind of the north rim of it has more of a tint of different color to it. Oh, lost all my pictures.

CAPCOM Is the color differentiation concentric around the crater or is it just in edges and slotches?

AMERICA No, it's just in the - kind of the north side of it.

CAPCOM What would you say the color is there, is it one of the different tans?

AMERICA Yeah, the color - (Laughter) Yeah, it's kind of a different, would you believe kind of an orangish-tan through this - through these binoc's. I'd like to get another look at that when I go by the next time.

CAPCOM Rog, I believe ya.

END OF TAPE

CAPCOM Ron, when you get back, when you get done with this, we'd like you to sketch, when you get a chance, the color variations with the thoughts of where the splotches are, with respect to Shorty, in particular.

SC Okay, I'll do that when I finish up here.

CAPCOM Roger, if you get a chance look at F crater.

SC Yes, F crater is sharp just like Shorty. I hope I was getting F crater. F crater is about the same size as Shorty, isn't it? If not, I was getting one between Family Mountain and -

CAPCOM Just about the same size, Ron, maybe just a tad bigger.

SC Yeah.

CAPCOM Ron, is there a cone associated with that crater?

SC I didn't get a chance to look at it that much. I'll have to check it next time.

CAPCOM Okay.

CAPCOM Have any thoughts on how - what's its origin.

SC I'll have to look at F crater again on the next time I come over on the thing cause I spent most of the time looking at Shorty.

SC Okay.

CAPCOM You know, this formation again from Tacquet on down to Menelaus from Menelaus - just went over that again and I was looking at it with the binoculars. I saw one sharp crater in the area that had an ejecta almost the same color as the stuff around Shorty.

CAPCOM Roger, Ron. You might pinpoint that crater between Tacquet and Menelaus when you again get down here.

SC Okay. Boy, oh boy, (garble) there is gonna be - between all the windows.

CAPCOM Do you have any flow scarps in that unit - near that Menelaus crater?

SC No, I tell you what. There aren't any scarps there at all. That's another thing I was looking for. It's just a gradual degradation or gradual change in the color.

CAPCOM Do you have any topography changes with respect to that color?

SC Yes, no the topography plane change is just a gradual change. With - there's a mound. Here it is - I've got to switch all the windows.

CAPCOM Are you able to get up on the D-Caldera?

SC Yes, I got D-Caldera into my sights, now. The mound - little blotches in the center - are the same type of material as that surrounding the D-Caldera itself. Down in

SC the Caldera, the gray blocky type of stuff - you know what - I'd almost say that - you know how water drops kind of form on the surface as you - if you had a high spot, and something kind of flowed up to it - a high spot and water kind of flowed up to it, and it didn't quite stick to it - you know, stick to it - all in one spot -

CAPCOM Roger.

SC It would leave a depression due to surface tension as you come up there and then you have kind of little bubbles that float across there. That's what it looks like to me.

CAPCOM Roger, we copy that. Keep going, that sounds great.

CAPCOM How about the dark haloed crater west of the Caldera?

SC Uh, I'm finding out with the binoc's - your observation is cut to about half. And I'm going to have to get that the next time over.

CAPCOM Roger, do you think that the dark halo crater is any relation just to those mare like patches in the Caldera, itself?

SC No, I don't think so. Just because the color differences - or the color is completely different. So that's an open question on that one that I'll have to find out on the next time around.

CAPCOM Can you talk about the light colored annulus around D-Caldera?

SC No, I couldn't see a light colored annulus.

CAPCOM Okay. Hey, we need a recorder on here on the -

SC Oh, okay. Let's see - recorder is ON.

CAPCOM Okay, Ron. Let me read you some questions here real quick on D-Caldera. Determine the color differences between D-shaped expression and its surroundings. I think you pointed some of that out. Have you got any more comments on that?

SC Okay, there's nothing surrounding D-Caldera that looks anything like the silver-gray material that has depressed. It's definitely depressed with respect to the surrounding terrain. The little bumps that are in D-Caldera are the same color and the same smoothness - kind of smoothness, as the rest of the material, the mare material, surrounding the area.

CAPCOM Okay.

SC I could not detect the - an external annulus around the Caldera itself.

CAPCOM Okay, do you feel that any of the material on the Caldera is related to the material in its immediate vicinity?

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SC The smooth looking - let me get my picture here. The smooth looking bumps in there -

END OF TAPE

SC smooth looking bumps in there are difinitely - doesn't look to me like they're the same material as the stuff in the whole area.

CAPCOM Okay.

SC They're smooth, tanish. You know, if I look at that picutre - dark colored stuff looks to me like it's a depression, you know. And it's the other way around. The light - the light colored light albedo stuff in the picture is the part that's depressed and the darker portions that looks like the material surrounding the area, is the part that's raised up.

CAPCOM Roger. We copy that. (garble) D-Caldera, do you have any view of any more of the terrain below you, or are your windows pretty well messed up?

SC Nah, it just got dark.

CAPCOM Okay.

SC And I stopped talking just about the time we got to the terminator.

CAPCOM Okay, good show.

SC Let me - let me go back to a map and make sure I was talking about F crater.

CAPCOM Ron, I think you can put an order of priority on some activity here as far as the Geology goes. You might consider sketching out on Shorty with just a rough handle on where you though you saw some of the coloring differentiation up on the northern side of Shorty and also give some thought on F crater, if you will. I know you can't look at it because - If we can tie up the - what you see from orbit on Shorty to what we know we've got from the ground truth, we might really have something here as far as matching up on some of these other craters.

SC Ah ha. Hey, that's a good point.

SC Guess I can change the adapter and get that out of the way. Well, let's see - kind of fouled that one up. You really want 142 and narrow deadband, don't you. AT 142 269 and 0. And 359. Forgot we were already in that attitude.

CAPCOM And Ron, you might want to trim your attitude. That - you were not to go to that VERB 49. That was deleted at 130 - 166:36. That VERB 49 was deleted and your attitude is back to the 142 269 359. You might want to trim that up.

SC Okay, just did it. Thank you, Bob.

CAPCOM It would have done it by itself if I hadn't gone to CMC-FREE. But I forgot that we were already in that attitude.

CAPCOM Roger. No sweat here. You've got a minute or so before we're in the lunar sounder attitude. For the Marius Hills there.

SC Okay, 166:42.

CAPCOM And Ron, you may be interested that after we got the lunar sounder unsaturated there with the different attitude, we - we can detect the SEP in the lunar sounder data.

SC Oh - hey - good. Kind of proves it's working, anyhow.

CAPCOM Yeah, that's for sure. Everybody seems to be pretty tickled at what they're getting so far. Just hope the film comes out as well.

SC Oh, I'm sure it will. People at Goodyear out there at Litchfield Park do a good job.

END OF TAPE

CAPCOM Ron, we've got 30 seconds to T-start.
AMERICA Oh, thank you. Operate started at 42:12. Okay, recorder's on, radar's on, it'll work.
AMERICA MARK. 11, GO. Hey it worked out fine. Bet they hit it 3 seconds early.
CAPCOM Rog. They still haven't figured out how to time this thing, yet.
AMERICA (Laughter). That was good. I got the MARK at same time I did it.
CAPCOM Okay, you can relax, Ron, and I'll give you a call at 40 - about 30 seconds prior to 47:10, so you don't have to sit there and watch anything.
AMERICA Okay. I'll ah -
CAPCOM Gotta earn my pay down here somehow.
AMERICA (Laughter) Boy you all ready have, I'll tell you.
CAPCOM Okay, Ron. We're about 30 seconds from T-from Lunar sounder stand by time.
AMERICA Okay. 7, 10, operate to Standby.
CAPCOM About 5 seconds. MARK.
AMERICA Got it.
CAPCOM Okay, there's your 1 minute, Ron.
AMERICA Okay. Recorder is going OFF, not the heaters.
CAPCOM Roger. Good show Ron. B Farouk just came out and said a real good showing. He's really charged about what you saw there and real pleased with it.
AMERICA Okay. I think I said north and as I look at the map, the orange distribution goes generally about a crater diameter to the north, but it essentially starts - now if you cut a - about a 60 degree angle from (garble) 63, you've got a 60 degree angle there and that'd make that go around at about a crater diameter.
CAPCOM Okay, to the north at (garble) at 63.
AMERICA At (garble) at 63, that's on the 400-meter scale there.
CAPCOM Yeah, I've got it.
AMERICA On TL-50. And at the right hand side if you're looking at the thing from the bottom, the right hand side is 0, go up 60 degrees, you're 60 degrees up from the horizontal or 30 degrees down from the vertical. Be something about like that.
CAPCOM Okay.
AMERICA I had sort of a brownish orange tint to it.

END OF TAPE

CAPCOM Ron, I guess one of the things that at least goes through Stu's and my mind on that Shorty crater - I think you dispelled it when you say it goes off in like a 60 degree angular cone away from it, but the question we'd really like to be thinking about is that a concentric coloring around there like it might be just a layering from a flap over - you know a turned over flap or something like that or whether it just seems to be some sort of - I don't want to say flow, but something that would give it direction - the 160 degree direction like that.

SC Yes, I see what you're saying, and it almost looked to me like it was gradational as you went away from the crater. In other words more orangeish, more orangeish closer to the crater than as you got away from it.

CAPCOM Okay. We're ending up looking at future passes. Maybe not today, probably, but for the future and see if we can fit in one or two more observation periods here where we can set up the back room like we had it and all - if you'll go along with that - and if we can fit it in - we'd like you to do that.

SC Oh, sure. The crater that I described as looking comparable to Shorty, I don't think is the one on Family Mountain. I think it's the one on Bright Dot, about the same size dot as Shorty on the 17-1 lead-in for the - is that 17-1 for landmark tracking.

CAPCOM Okay.

SC I think Family Mountain is the bigger of the two mounds to the west of the landing site isn't it?

CAPCOM Stand by on that Ron, let me clarify that.

CAPCOM Roger, it's west of the landing site, and I believe it's the bigger of the two.

SC Yes, okay. The one that I said that looked like Shorty is kind of between the two mounds. That's the one I looked at.

CAPCOM You say it looked like Shorty or looked like the other one? F-crater or Shorty?

SC It looked like Shorty.

CAPCOM Okay, copy.

CAPCOM Ron, we'd like the H-2 tanks 2 and 3 fans to ON, please.

SC Okay, H2 tank 2 fan is ON, now - tank 3 fan is ON.

CAPCOM Roger, thank you.

CAPCOM Ron, I might just draw your attention to the flight plan at 167:20 - in that area where your Lunar Sounder finishes up. It says that there will be no SIM bay or PCM data recorded until 169:03 and then you have to configure the DSE there, just wanted to draw your attention to that.

SC Okay, it's a good point.
SC Hey, would you all do that 60 degree angle - were you making that 63 degrees up from - not 63 - 60 degrees from line 63?
CAPCOM Yes, I didn't know how to handle on 63, but I took a point at Dog Sierra in 63 and kind of created a 60 V cone away from the crater at that point.
SC Uh, no you want to create a semicircle of - at - the center of the cylinder, well - let's see - that's the flat half of the semicircle along a line that goes through Dog Sierra at 63 and Dog Whiskey 57.
CAPCOM Dog Whiskey 57, Roger.
SC Right.
CAPCOM Okay, I've connected a line -
SC Make a semi-circle to the right of that line.
CAPCOM Okay, to the right of that line or to the north side of that line?
SC Uh, actually it will be kind of to the north-east, but to the north side of it, yes.

END OF TAPE

CAPCOM Ron, we're going to loose you shortly. And all the systems look good over here and I've got a bet with E-COMM that you'll get everything in the flight plan. That you won't miss anything for me.

AMERICA (Laughter) Okay, we'll try that. Hey before I go, take a look at Crisium - Serenitatis 3 of 5 and the second one down from the top or second one from the north is the one I was looking at, as described as possibly subdued and a I mean a rounded type thing with kind of breaches into the side of the wall. What I consider breaches in the side of the wall.

CAPCOM Okay, we've got it Crisium - Serenitatis, second one from the north, huh.

AMERICA Yeah. And the other one not even circled. It's just north of the one in the bottom and that's the one that usually shows up on here. And the impact type because it's got ray - ray material as to fresh impact and bringing up bluish type of material.

CAPCOM Okay, good show; you're saying that the two of them are distinctly different from the one's youview - One's impact and one's possibly a volcanic -

SC Yeah. Right

CAPCOM Good show.

END OF TAPE

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SC Houston, America, it looks like we're with you again.
CAPCOM Roger, Ron.
CAPCOM Ron, we're at GO for retraction on HF antenna 2, HF antenna 2, you're GO for retraction.
AMERICA Okay, just a half a second here.
CAPCOM Hold on that, Ron, hold. We've lost data here a second, please hold.
AMERICA Okay, will do.
CAPCOM Ron, we verify you hadn't started to retract them yet.
AMERICA Yes, it's verified. I did not touch anything.
CAPCOM Okay, fine. We'll give you another call as soon as we get data here.
AMERICA Okay.
CAPCOM This is important, Ron, for us to get the currents on this one so we can compare it on the HF 1.
AMERICA On the other one, yeah. Okay.
CAPCOM Okay, Ron, let's try HF antenna 2 retract now, please.
AMERICA Okay. There we go. Let's see, you count down on it. Okay, five, four, three, two, one, mark it. Barber pole.
CAPCOM Okay, Ron, we're reading good data on that.

END OF TAPE

SC MARK it. Grey.
CAPCOM Mark it. Roger.
CAPCOM Stand by for HF 2. We're changing some data points in them.
SC Okay.
CAPCOM I'm sorry, HF 1.
SC (Laughter) Okay. No problem.
CAPCOM Here in the room when I make a comment like that, I get about 14 different people saying, 1 not 2.
SC (Laughter). Well, I knew what you were talking about.
CAPCOM Okay, Ron, if you'll give us a hack, we're - you're GO for HF antenna 1 recheck.
SC Okay. Just a second. (Laughter) You know that's funny. I can't remember which one I can see out my left window over there.
CAPCOM I believe the other night you called it antenna 2 - If it's still out there it better be 1.
SC That's what bothers me. That's what I'm saying, if it's still out there, it better be 1. Okay, I'll give you count down in just a minute. 5, 4, 3, 2, 1 MARK it. Barber pole.
CAPCOM We got part of an indication of motion, it's gone in, Rog.
CAPCOM That the one you can see?
SC Yeah. I can't any more, it's gone. I can only see about, I don't know, 6 or 8 maybe 8 feet of it sticking out there.
SC Started to move, and it's gone.
CAPCOM Ron, we can see stall current, now, can you give HF antenna 1 off.
SC Okay, it's off.
CAPCOM And you do not have a size, is that true.
SC (garble) as compared to the other one.
CAPCOM Say, again.
SC That's affirm, I did not.
CAPCOM I've got about 9 seconds from when they called stall current 9 seconds different from the other one.
SC Shoot, it ought to be pretty well in there hadn't it.
CAPCOM Yeah, it should be.
SC Ready for pan camera mode, to standby.
CAPCOM Stand by, let me ask, Oso. Stand by on that, Ron.
SC Wilco.
CAPCOM Ron, we're analyzing the data on the antenna, we're one second out of the tolerance that Stan had established for determining the (garble).
SC (Laughter)
CAPCOM Say, Ron. Pan camera to stand by.
SC Okay Pan Camera, by standby.

SC Power is coming on. Barberpole, grey.
CAPCOM Ron, you can turn HF antenna 2 recheck switch to the OFF position.
SC Okay, thank you, sir.
CAPCOM Ron. On X-ray X-ray (garble) -
SC I'll check it off. Yeah, go ahead.
CAPCOM If x-ray, x-ray is still in the night-conn you can shoot off one frame as a protect frame and then you can keep shooting on all the rest of them until it won't pull any more and you'll feel that of course. And those are your options.
SC Oh½
CAPCOM Don't get too happy it might just pull one frame and be done.

END OF TAPE

CAPCOM Don't get too happy. It might just pull one frame if it does.
AMERICA (Laughter) Yeah, probably.
CAPCOM Okay, Ron, pan camera power off.
AMERICA Pan camera power is off.
CAPCOM Okay, Ron, you got you setup mapping tools up there because we got a flight plan update for tomorrow - the trim burn or the bagle burn I guess.
AMERICA Okay. (Laughter) You know what I did on that camera, I forgot it. I wound it up in there. I haven't had a chance to take the film out yet, but I wound it back in the can. (Laughter).
CAPCOM Okay, Ron, sorry about that. Okay, let me tell you, Ron, we're - all the data analyzed says we got a good retract on HF antenna 1; we're going to fly a nominal flight plan the rest of tonight and then all this update I'm talking about is for tomorrow morning at 180:15.
AMERICA Ah ha, outstanding. I figured you should come to that real good conclusion.
CAPCOM Yeah, we think so too. Boy, you should have seen the flight plan changes you would have had.
AMERICA (Laughter) I can imagine them.
AMERICA Over there, okay.
CAPCOM Say again, Ron, I cut you out.
AMERICA Oh, I was just going to say that we're in volume 3 tomorrow morning.
CAPCOM That's right on -
AMERICA Okay.
CAPCOM Yeah, volume 3.
AMERICA Okay. Okay, I got volume 3 now.
CAPCOM Okay, and it's at 180:15. 180:15 is the first one.
AMERICA Okay.
CAPCOM Okay, I know I told you we wouldn't update the ones in the block, but the very first one is inside the block so - where it says LOPC target load, just cross out and make that trim target load.
AMERICA Oh, okay.
CAPCOM And below the update - next block, at part of that block add trim PAD. We'll be coming up you with trim PAD.
AMERICA Okay.
CAPCOM Okay, the first one is at 180:20. Add POO and below it add VERB 49 maneuver to P52/TRIM attitude.
AMERICA Okay.
CAPCOM And put a note: Maneuver will take 14 minutes.
AMERICA Okay.
CAPCOM Okay, we're going to give you the high gain angle numbers and the VERB 49 maneuver numbers tomorrow morning.

CAPCOM They'll probably change on the latest update, so we won't give anything for the - you can just put three blanks for the roll, pitch, and yaw there with that VERB 49 maneuver. Okay, as you go down the page -

AMERICA Okay.

CAPCOM As you go down the page to 180:27, delete, cross out CMC mode 3 POO CMC Mode Auto limit cycle on. Attitude deadband, min and rate low. And delete that note that starts, "Do not stop orb rate early, avoid gimbal lock problems" over there right next to that. Just delete all that.

AMERICA Okay, got it.

CAPCOM Okay. On the next column, 18040, delete the VERB 49 maneuver.

AMERICA Okay.

CAPCOM Okay, at 18044, add UV cover closed.

AMERICA V clover closed, 18044.

CAPCOM Roger, and at 18045, if you can fit it in between the 02 fuel cell purge in that, add the following: UV off, IR off, and enable all jets, enable all jets.

AMERICA Okay, after IR cover closed, we'll put turn the UV cover off, the IR off, and then enable all jets before the fuel cell purge, huh?

CAPCOM Well, you can fit it in there wherever it's convenient. Rog.

AMERICA Okay.

CAPCOM Okay, at 18058, where it says "configure DSC", change high-bit rate, cross it out, and make it low-bit rate.

AMERICA Okay, low-bit rate instead of high-bit rate.

CAPCOM Okay. Over on the next page, at 18115. Add the following:

AMERICA Okay.

CAPCOM Free SPS burn, burn SIM prep cue card. Let me read that again. Free SPS burn SIM prep cue card. Another statement: secure equipment for TRIM/LOPC.

AMERICA Okay, at 18115, we'll do the free SPS burn, SIM prep cue card, and secure equipment for TRIM/LOPC.

CAPCOM Roger, and right after that, put P-30. P three zero.

AMERICA Okay.

CAPCOM Okay, and you might as well scratch out those words where it says "Eat Period" on that line, and down at 18123, add P-41, P-41.

AMERICA Okay, P-41.

CAPCOM Okay, at 18133, add TRIM burn, TRIM burn.

AMERICA Okay, TRIM burn.

CAPCOM Okay, at 18135, add the following: VERB 49 maneuver to LOPC burn pad attitude.

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AMERICA Okay, VERB 49 to the LOPC burn pad attitude.
CAPCOM Roger. At 18143, add "Report burn status".
AMERICA Okay.
CAPCOM Okay, at 18215, at 18215, delete "Pre SPS burn SIM prep cue card, IR off, UV off, enable all jets, secure equipment for LOPC". Delete all those, because you've already done them.
AMERICA Okay.
CAPCOM Okay, at 18220, delete the note where it says "PCM data --

END OF TAPE

CAPCOM The note where it says, "PCM data will not be recorded during LOPC", delete that note.
SC Okay.
CAPCOM Okay, and, then the last one is just a general comment, Ron. As you can see, we're cutting into your eat period, and you're going to be awful busy, and your eat period is very short, so right at wakeup, while you're working, you might consider getting eat things ready to go up with -- ready to eat -- you know, as you're doing your post-sleep check and that, you might be getting some food out. You're going to be busier than the proverbial one-armed paper hanger there.
SC Okay. Probably a good idea. (Laughter)
CAPCOM And, we wanted that up to you so you might get a chance to look at it this evening, or the rest of this rev, and make some thoughts -- or pull your thoughts together on that burn in the morning, and see if we've covered all bets.
SC Okay. So far, it looks pretty good here. We'll have some different high-gain angles there at 181:00. You're going to give those up anyhow.
CAPCOM Okay, at 181:00 --
SC Going to send those up with the -- for the next AOS there.
CAPCOM Yeah, we see that. Okay, we'll have to be calling that up to you tomorrow, as you go around again.
SC No, it won't -- that'll be the same because the -- the LOPC burn attitude should be the same as nominal.
CAPCOM Uh, yeah, Roger.
SC Or about.
CAPCOM Yeah, you're right.
SC Okay, so that's all right. That's right.
CAPCOM Ron, just to make sure, you understood the reason why we have to do this TRIM burn, or ham burn, or whatever you're going to call it?
SC Yeah, as I understand it, the mascons didn't work the way we thought they would.
CAPCOM That's about the size of it.
SC They didn't get down into a circular orbit. Let's see, just glancing through here, looks to me like we're going to do the TRIM burn and the LOPC REFSMMAT, right?
CAPCOM That's affirmative, Ron.
SC Okay.
CAPCOM And, Ron, just, think you realize this, but all this has been checked up with CMS down at the Cape

already, and it's all been run, and there's no gimbal lock problems, as far as we know.

AMERICA Hey, outstanding, okay? Good.

AMERICA Yeah, those guys in the CMS down there do good work.

CAPCOM Roger.

AMERICA You know, that crater that's circled next to de Caldera has a lot of blocks -- blocks -- blocky materials laying around it. That -- little bit of a terrace that I can just barely see on the west side of the western rim, down inside the western rim.

CAPCOM Gotcha.

CAPCOM Didn't think you were going to be able to see anything with the attitude -- surprised you can see anything at all.

AMERICA Yeah, I was, too. I just happened to look out, and there it was.

CAPCOM Just talked to El Lago a few minutes ago, Ron, and all the neighbors are out -- are at your home by the squawk box listening, and Dan said to tell you that Jaime and John will be out here at -- with us tomorrow. We're gonna all -- they're going to watch the burn from here -- the LOPC and the TRIM burn.

AMERICA Oh, hey, good deal. Yeah, I got some real fine neighbors down there, I'll tell you that.

AMERICA You know, I look at that de Caldera from a distance, I can still see it in the binocs, and I keep trying to look for some hint of a topographic expression -- a topographic rise, surrounding the Caldera, and I can't see a hint of a shadow, a difference in the color, or anything. It's just flat out in the middle of a flat plain, and it's D-shaped depression -- it's sunk down. There's no rise around the rim or anything.

CAPCOM Roger, gotcha. Must be frustrating because it's supposed to have some topo --

END OF TAPE

CAPCOM Must be frustrating, because it's supposed to have topographical expression, huh?

AMERICA Yeah, right, you know. It's supposed to have something. But, it looks like it just fell right out of the flat plains huh. And, took part of the plain with it because there are these bubble-looking things down in the Caldera.

AMERICA How many frames of the next Nikon mag do I have to diddle with?

CAPCOM Okay, we're running that one through FAO here. Stand by on it, Ron --

AMERICA Okay.

AMERICA From the ejecta pattern of Aristoteles, you can just see it looking back into the sun now, and the terminator's right in the -- right in the middle of Aristoteles now, and you can sure see the classic impact ejecta pattern around it. It goes out for -- you know -- almost two crater diameters, as -- where you can see the topographic expression. You can see the scalloping, or scouring, as it's going back across there, due to the shadows that are created in the low sun angle.

CAPCOM Ron, at your convenience, we'd like H2 tanks 1, 2, and 3 fans off. H2 tanks 1, 2, and 3, fans off.

AMERICA Okay, we'll turn off all the H2 fans. There's 3, 2, and 1 are all off.

CAPCOM Good show.

AMERICA Well, I took a bath last night; think I'll try to shave tonight. Starting to itch underneath this helmet.

CAPCOM Roger.

CAPCOM You mean you're not going to come home with a beard, huh?

AMERICA Well, John wanted me to, but I can't seem to get past the itching stage.

CAPCOM Just be comfortable, just be comfortable, you got another week to go.

AMERICA (Laughter) I know it. I've already shaved once. When you -- when you start to shave, you can only -- you can only put that brushless shaving cream on, oh maybe a third of your face and start hacking out there because it dries out real quick. So, you put on a little bit, then scrape it off with a razor, then get some more on it, and then scrape it off.

CAPCOM Roger.

CAPCOM Okay, Ron. FAO's data says that on Magazine Yankee Yankee we have twenty unscheduled frames that you can use prior to the scheduled photography. After the scheduled photography, anything that's left will also be yours.

AMERICA Oh, okay. Yankee, Yankee must be the next one up, then I can change and put that in, huh?

CAPCOM That's affirm, Ron. You can go ahead and put it in and shoot twenty, and then you have to hold the rest for the scheduled photography.

AMERICA Okay, will do.

CAPCOM I can see your thoughts there, Ron. You're going to get those twenty shot up before Jack ever gets up there, huh?

AMERICA (Laughter) It is a good thought. No, it's just that every once in awhile at the terminators, you know, you have some real good shots, and we just can't schedule them one -- all the time, because sometimes you can't do it. But, if you just take just one or two shots of each terminator as it comes by, you get some real good pictures.

CAPCOM Roger, we understand.

END OF TAPE

AMERICA Okay, Magazine Yankee, Yankee is in the Nikon. Finally.

CAPCOM Roger.

AMERICA Think I mentioned the other night, didn't I? I was putting the magazine in there. You know, it's a real tight critical fit, and you got to push in there just right, and then at zero G's that thing bounces back out of the way, you know, before you can get the back on there.

CAPCOM Roger.

AMERICA (Garble)

CAPCOM You don't think the Nikon is designed for zero gravity, huh?

AMERICA (Laughter) We're (garble) Sure is something to be said about a removable magazine cassette, though.

CAPCOM Roger.

AMERICA But, then, again, you can focus the Nikon.

CAPCOM Roger.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/13/72 CST 21:43 GET 168:50 CM133/1

AMERICA Hey, Houston, America.
CAPCOM Okay, Ron, we're here.
AMERICA Okay, I was looking over this transfer list at about 184:00, and I don't remember Gene and Jack leaving their helmet storage bags back to me, so I think they must have them in the LM -- the Challenger.
CAPCOM Okay, we'll make a note of that and check it out tonight.
AMERICA Okay.
AMERICA Oh, let's see. Probably about time to B-20 here.
AMERICA Plus X forward SIM-bay attitude. Two enter, plus five enter, six, okay, proceed, now, it's eight. That's already (garble). 62.25 plus X is 180, okay? Except we're going to have them redo that. Two enter, 2 1/2 degree deadband plus 2.50. Means Number 50 is the Moon, and right now we'd like to orbit right around the Moon. 8, 2, 0 --

END OF TAPE

CAPCOM Hey, Ron, do you have your Volume 3 handy?
AMERICA Yes, as a matter of fact.
CAPCOM Where, your last call about the helmet stowage bags. Where about in Volume 3 are they?
AMERICA 184, about 19.
CAPCOM Okay, we got it.
AMERICA They got suited and took their helmets and gloves with them over in the LM. Took their helmets and gloves with them over in the LM. They said they were going to send them back, but I don't think they ever did. We all got busy, so they still got them over there somewhere.
CAPCOM Ron, we're going to lose you in about one minute, and you're looking good. No problems at all.
AMERICA Okay, we'll see you on the other side then, Bob. Thank you.
CAPCOM Rog. Ron. At 159:51 or there abouts, we'll see you.
AMERICA Okay.
CAPCOM And you'll be eating, so we won't call you, but we'll be standing by.
AMERICA Okay.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/13/72 22:42 CST 169:48 GET CM135/1

CAPCOM America, Houston.
CAPCOM America, Houston.
CAPCOM America, Houston.
CAPCOM America, Houston.
CAPCOM America, Houston.
AMERICA Okay, Houston. This is America. Wanted to get the antennas set right so it's easy to lock up.
CAPCOM Roger.
SC How would you like to have some P-52 stuff?
CAPCOM Standingby. All ears.
SC Okay. NOUN 71, excuse me, are 6 and 42. NOUN 05.01 N 93's plus 053 minus .011 minus .039 and I torqued at 169 21 00.
CAPCOM Roger. We copy, Ron.
CAPCOM And Ron, while you are there we'd like H2 tank 1 fans to ON.
SC Okay. Tank 1 H2 fans water on.
SC Got to much jug, it won't all fit in one jettison bag.
CAPCOM Ron, just to update you on several of the things that happened while you were on the back side of the just then. The service crew is at the LM and did there - they're in the closeout procedures there and they unveiled the plaque and read a message to the school children of the world and they received a telephone call from Dr. Fletcher who said he'd been in close contact with the White House and was following - the White House and was following - they were - the White House was following the journey very closely. And He expressed the good wises of all the people down here to all of you up there.
AMERICA Hey, that's mighty fine. By gosh.

END OF TAPE

CAPCOM Ron, sorry to interrupt your eating, but could you take the H2 tanks 2 and 3 fans to ON. We're trying to get the pressures up prior to sleep?

AMERICA Okay, 2 and 3 ON.

AMERICA Through these glasses Boti still looks like it's a light tannish orange and it's doesn't come all the way down to the center of the crater. It's kind of tangent to the north edge, tangent to the edge that's perpendicular to the scarp line itself as it goes down through there.

CAPCOM Roger. Copy.

AMERICA Man, it's hard to see that. Everytime I'd focus on that crater, I jiggle a little bit and I couldn't focus.

CAPCOM Roger. Sounds like you use binoculars at a football game, huh.

AMERICA You know you need the 10 power, but you sure need something to stabilize them.

CAPCOM Rog.

END OF TAPE

AMERICA You know I looked down here, oh boy, just between Tacquet and Menelaus and off to the west of Menelaus, there's a crater that's about oh 10 kilometers in diameter and just to right of it, out in the brown stuff there's a brand new, spanking fresh impact crater that has brown ejecta on it. And then some of the other craters, that crater happens to be right on the edge of the brownish type material, right over one of the rilles. I hope I can mark that on the picture or on the map and some of the other craters about that same size are out in the area, out in there, and they have a, the light colored ejecta, just like the normal small impact craters, recent impact craters out in the Mare Serenitatis itself.

CAPCOM Roger, Ron.

CAPCOM Ron, we'd like to get ready to start on some of these state vectors early. This state vector on the JET-ON monitor, so if you'd give us ACCEPT, we'd appreciate it.

AMERICA Okay, you can have it now. Is that, yes, let me see ... Clear the computer for you.

CAPCOM Ron, could, just for my information, (garble) pinpoint that big crater between Tacquet and Menelaus.

AMERICA Is it what.

CAPCOM Like half way between or is it on the checkline?

CAPCOM Or is it in the rilles, they're contact, say east, west of Tacquet, but in the rille area.

AMERICA It's, let me get my map.

CAPCOM Oh, that's allright, Ron, it's not that, it's not . (garble) that close. Don't want to interrupt your eating.

AMERICA That crater is closer to Menelaus. Menelaus whatever it is.

CAPCOM Okay.

AMERICA And it's almost directly east of Menelaus.

CAPCOM Rog. I'll put a mark here and mark it on my map, so you can look at it pre-flight, post-flight.

AMERICA Okay.

AMERICA You know, I look at Decaldara and you got low bate, a low bate flow front sticking down in the crazy thing. I'll be darn.

CAPCOM Must be amazing up there. The whole scene seems to change as that terminator is shifting each REV. Something is different in each area, because of that Sun angle, I'm sure, but boy sure is dif...

AMERICA Yes. You know it's almost like a, what I originally said. It maybe is a high spot or a dry spot and you try to wet it, you know?

CAPCOM Roger, understand exactly what you're talking about.

AMERICA And the flows come up to it. Yes. That's what it looks like. Just like that.

CAPCOM Kind of like a wax surface where you throw water on it and the surface tension gathers it together in various lumps and then the rest is clear.

AMERICA Yes. Yes that's it.

AMERICA And the part that, the wax surface, so to speak analogy there, is a light bluish gray.

AMERICA Picture number 1 on the Nikon was looking south along the terminator and the rilles e.., west of Eratosthenes.

END OF TAPE

AMERICA And the picture No. 2 is looking towards Timocharis.
CAPCOM Say again. Looking towards where?
AMERICA Timocharis.
CAPCOM Okay.
AMERICA Timocharis is right on the terminator now. The middle of it.
CAPCOM Got it.
SC And that crater that has the definite tan ejecta blanket, if you'll go - see - directly north - directly north of the center of the crater Auwers until you come out to about one of those rilles there in the Tackay area. That's about where it is.
CAPCOM Right, we got it.
AMERICA Well, I better get busy and start eating I guess.
CAPCOM Ron, you got to eat here and then - well don't get to busy, you're supposed to have been eating. I've got to read you up a TEI 55 pattern. You want to take that -
AMERICA No.
CAPCOM When you get through your PC checklist and we'll see -
AMERICA Okay.
AMERICA Doesn't seem like there's enough time to get everything done that you want to get done.
CAPCOM Right. Okay, the computer yours back to block.
AMERICA Okay. Going to block and see you got a TEI pad, huh?
CAPCOM Right. TEI 55.
AMERICA Okay.
CAPCOM Okay, SPS G&N.
AMERICA Copy.
CAPCOM 36076 plus 056 plus 080 196 58 4651 NOUN 81 plus 27857 minus 09571 minus 01746 roll of 179 pitch is 085 yaw 343 rest of the pad is not applicable. Sirius and Rigel are the set stars, but we have a little difference on the R line. Tonight's R line is 136 160 034 4 jets 12 seconds. I've got three comments. First comment,
AMERICA Okay, go.
CAPCOM Longitude is TIG minus 156.91 degrees. This pad is still the trim burn and LOPC-1 burn. And this status assumes a lift-off REFSMMAT. Over.
AMERICA Okay. The last note was assume lift-off REFSMMAT huh?
CAPCOM That's right.
AMERICA Okay. TEI 55 SPS G&N 36076 plus 056 plus 080 196 58 46 .51 plus 2785.7 minus 0957.1 minus 0174.6 roll 179 085 343. Sirius and Rigel 136 160 034 4 jets 12 seconds. Longitude is TIG equals minus 156.91 assumes a trim and LOPC burn and assumed lift-off REFSMMAT.

CAPCOM That's a good readback, Ron. Okay, it's all yous on the flight plan and -

CAPCOM Ron, we might point out that if you get going into the presleep checklist here and the VHF comm configuration, get that done, then there's a break of - you'll lose comm and you'll have a 15 - 20 minute break, you can jump into your eat and then go right to bed.

AMERICA Oh, okay.

CAPCOM Ron, my last call. I promise. Here's your H2 tank configuration. We want H2 tank 1 and 2 fans to OFF. H2 tank 3 fan to AUTO. And you can delete cryo stir from the presleep check list.

AMERICA Okay. I've got tank 1 and 2 fans OFF. And H2 fan No. 3 to AUTO.

CAPCOM And delete the stir from the check list.

AMERICA Okay, we'll just - we'll just leave the Stir.

CAPCOM Okay, and we'll be standing by to see your onboard readout in 10 minutes.

AMERICA (garbled) Oh, okay. Might just as well get those through - let's get to VHF -

CAPCOM Roger, we concur on that.

AMERICA Leave on panel 9. Okay, it's received and we're in Duplex Alpha and squelch B is whoooooo - about 5 and it cuts out the noise. I don't know if I'd ever hear them or not, but anyway it cuts out the noise. Okay, let's see - let's see. There's about 36.7. Pyro A barely below the line, but we'll say 37.0. And Pyro B is 37.0. And looks like that's in good shape.

AMERICA Okay, quantity and RCS Alpha about 79, BRAVO is 76.

END OF TAPE

AMERICA Bravo is 76 barely 78, delta V.
CAPCOM Okay, we've got them. I don't know what they advertised down here but on one of the big screens here for the sign script they've got three - four signs put up now that says the Marines look for a few good men. United States Air Force a challenge for the bold and fly navy and stay in school.
AMERICA (Laughter) put all the good things up.
CAPCOM Rog, well the first thing they up was the Marines are looking for a few good men and Deak gave me a dirty look here.
AMERICA (Laughter).
CAPCOM By the way the troops are getting into the LM right now.
AMERICA Okay, they're already to crawl back in, huh?
CAPCOM That's affirm. Ron that closes it all out and then you can just preceed through your presleep checklist and we'll stand by if you want any calls. We'll see you tomorrow and the doctor just wanted one question whether or not the cream had done any good on those spots where the ZPN was. Has it made it feel better?
AMERICA Yes, it did as a matter of fact and I forgot to look to see if it was still red, but - -
CAPCOM Okay, as long as it made it feel better.
AMERICA There's a little bitty spot that must have been the center of it that's only about an eighth of an inch in diameter that's still a little bit red. But, the rest of the redness is all gone and it doesn't itch any more.
CAPCOM Real good.
AMERICA I think i'm going to have to use a different mag than what's listed down there for the Hasselblad. I got November November and it's already got 160 frames on it.
CAPCOM Okay, let me look (garble) here he's suppose to give me word.
AMERICA Okay.
CAPCOM Ron, you should use kilo kilo in place of November November.
AMERICA Okay, it's sitting there with 65 frames on it.
AMERICA (Humming).
AMERICA Okay, Houston America.
CAPCOM Go ahead, Ron.
AMERICA Okay, the mike is cutting out on my light weight headset. But, the earphone works real good - works

AMERICA okay so I'm going to wear the earphone and the lightweight headset and I'll keep the other gentleman hooked up you know this call carrier hooked up on a different system. So, if I need to talk I can pull the comm carrier over. But, I'll be sleeping so I'll have to pull the comm carrier over to talk to you. But, I can hear you is what I'm saying.

CAPCOM No problem Ron you're not breaking up to us. You know better than we though so no sweat.

AMERICA Yes, no I thought the lightweight headset that that I'll be wearing tonight.

CAPCOM Rog.

AMERICA I'm wearing the comm carrier now. But, it itches if you leave it on all night.

AMERICA Okay, get the onboard readouts recycle the fans will save to the potable water. Mismanagement overboard drain. Okay, that's off, waste stowage vent valve closed, battery vent by the way is in vent. How about a battery readout? Seven alpha is 1. okay optics 0 (garble) optics is up, optics are stowed. Cabin pressure regs.

CAPCOM Okay, Ron we didn't copy your battery manifold or battery manifold read out.

AMERICA Battery manifold. It was 1.2 Bob and it was that last night too.

CAPCOM Okay. Thank you sir you just made EECOM very happy.

AMERICA Okay. I don't know when it went from .6 up there, but I looked at it last night and it was 1.2.

CAPCOM Roger.

AMERICA And repress valve - I haven't kicked them off. Like one of them was closed. Okay. Total vent valve didn't still be off. Okay, it's off.

END OF TAPE

CAPCOM Hey, Ron. We hear and intervalometer, going off every 20 seconds. It's timed out exactly, right. Do you have the intervalometer running on something.

AMERICA No, I can't figure out what that is.

CAPCOM We can't either, because we, we hear.

AMERICA Times it every 20 seconds, huh?

CAPCOM Rog. Tommy just timed it out. Every 20 seconds exactly.

AMERICA Back up folks the valometer, intervalometer stuck to the wall over here. They're not hooked to anything. Besides I don't hear that.

CAPCOM Besides and - Sure. Well, we're going, we're going to get a recording of it. I mean we, I'm going to look for the recording when I get a chance. I'll show it to you. Because it's been, the last two days, every 20 seconds as big as life.

AMERICA Okay.

AMERICA I'll be curious to what, see what that is. I don't even have this tape recorder going now.

CAPCOM Roger. And we went around the room, Ron. Everything's in great shape and you're GO for sleep or whatever you want to do. We won't call you.

AMERICA Okay. Thank you much. We'll, we'll see you all tomorrow, then.

CAPCOM Roger.

END OF TAPE

MADRID A bit downleg on this CSM America round.
CAPCOM Roger, Madrid. This is Houston ComTech. How do you copy?
MADRID Loud and clear, Houston comm.
CAPCOM Roger, read you the same. Stand by for a voice and keen check.
MADRID Roger.
CAPCOM This is Houston ComTech on CSM air-to-ground, testing 1, 2, 3, 4, 5, 4, 3, 2, 1, 1234554321, test out.
MADRID Roger, Houston. Madrid has 100 percent keen, modulation is GO, this is CSM air-to-ground.
CAPCOM Roger, Madrid.
AMERICA This will enable C1 and C2 for roll, off, pitch and yaw are off. And, Houston, ready for pan camera to stand by and stereo to pair hold, and all those good things, whenever you are.
CAPCOM Roger, America. We're standing by.
AMERICA Okay.
CAPCOM Okay, Ron, you can go to pan camera standby.
AMERICA Camera is -- hey, good morning, Robert, how's it going?
CAPCOM Real fine, real fine. Lousy weather, but we're all here.
AMERICA (Laughter) Okay. Let's see. Pan camera. That's verified standby. Okay, it's going up to stereo. Turn the old power switch on. (Garble) is still in high altitude.
CAPCOM You may be interested. We just woke up the Challenger, or maybe they woke us up, but I guess they gave the song here from there first, and they're all fine, and they're in the service checklist getting ready for ascent.
AMERICA Hey, great. Okay, I ought to get my prep for transfer ready here. You know, again last night and also this morning as I was flying across the backside of the Moon here, I was thinking a little bit, and I wonder, it seems like the -- the Aristotelean-age craters -- you know, the ones that are fairly -- fairly fresh -- they're not Copernican, and they don't have rays, and this type of thing, but they're fairly fresh in their slumping characteristics on the inside I think, but they all seem to have a Mare floor -- you know, a flat Mare floor, a volcanic type floor in the thing. And, I wonder if there's anybody that's kind of come up with the theory at all that maybe you had a liquid mantle during the Aristotelean era of the formation of the Moon. Well, and those craters at that point in time were penetrating that liquid mantle. (Garble)

CAPCOM Roger, Ron. That's a good thought.
CAPCOM Get kind of -- the feeling like you're seeing --

END OF TAPE

CAPCOM Thank you, Ron, that's a good thought.
CAPCOM Get kind of - the feeling like you're seeing like out at Hawaii where craters like stick up out of the ocean and you see the walls of the craters and the ocean up in amongst them. Is that the kind of feeling you get?
AMERICA Must not be because I don't know for sure what you mean.
CAPCOM Rog.
AMERICA I guess the feeling I was getting is that most of the Eratosthenean craters all have some sort of a mound admical structure down in the bottom of the crater. You know even the smaller ones. Some of the 30 and 50 kilometer class you know have a flat floor they look volcanic on the floot some of the bigger ones of course they're definitely volcanic lava flows on the floor of these big craters. The slumping of the walls is not as fresh as the copernakin aged crater, but you know it's not all beat up either. The walls - the crater walls had a slumping coming down through there and it's still fairly fresh in the slumping, but you don't have any rays showing up on the outside of the crater. So, their kind of airsonsentian age.
CAPCOM Roger, copy.
AMERICA And all of the craters that are that age have the mare still in them you know.
CAPCOM Roger.
AMERICA But, there must have been some volcanic activity during that period of time.
CAPCOM I guess my feelings were, Ron, that what I'm trying to say is -
AMERICA Go ahead.
CAPCOM If you had - if you'd had a liquid mantle in the crater sticking up through it you might have the mare not only on the floor of the crater, but the mare would be on the exterior walls of the crater you'd see a high water mark along the exterior wouldn't you.
AMERICA Oh, I see what you're saying yes. No you would have to have some sort of a solid crust and when the impact hit the solid crust and broke through the crust and got down into the liquid mantle.
CAPCOM Okay, now I've got you right.
AMERICA The kind of an operation I was thinking about.
CAPCOM Rog, I've got you.
AMERICA No, but it would have to be a relatively thin crust.
CAPCOM Rog, understand.

APOLLO 17 MISSION COMMENTARY 12/14/72 CST 12:37 GET 183:44 CM142/2

AMERICA Okay, I've got the temporary stowage bags all set and removed to OP from the dikon bags on A2 and one bag of ropes in there. Put those - could I put those, right hand yes, okay that's in the right hand temporary stowage bag.

CAPCOM Okay, Ron you're coming up on 1 minute to tank and T start. I'll call you at 30 seconds.

AMERICA Okay.

CAPCOM Okay, 30 seconds to T start time.

AMERICA Okay, let's see we start at - excuse me I got a piece of candy in my mouth - 841 camera will go to operate. 40 mark it 41.

CAPCOM Roger, got it.

AMERICA Bob, if you want to keep your eye on the clock for me I'll - -

CAPCOM Ron I'll cue you and just forget the pan camera and I'll cue you about a minute prior to pan camera stop.

AMERICA Okay. This jet bag is so full of junk I don't know if I can get through the tunnel.

AMERICA Okay stow the old rope in the right hand temporary right hand okay, that's mine, did that. Dikon bags straps to top of A2 and hang L3 okay, that's where it's been for a long time. We have two jet bags. Vacuum bag and the vacuum cable from A2 and the cable's already in the bag. Empty jet bag, the vacuum bag and the cable in the left hand temporary stowage from last night. Yes, that's in there. Okay, let's see Stow the empty jet bag - oh, I did that okay, replace remaining jet bag on A2 mode with following. Okay, A9 is empty so I got that fecal bags oh those are the empty ones. Oh, yes and we've got some extra ones on here. Heat flow experiment I did a good job and now I'm going down the tubes. Okay, it's in the bag. Okay, the helmet shield WG's. The next one okay that's all four of them. I've got to take that one off.

CAPCOM Okay, Ron when you can recup we'd like high gain auto.

AMERICA High gain to - where is it - auto.

END OF TAPE

AMERICA Oops, just about threw away my PRD. That would --
AMERICA You know, that's sure good tape that they put on those food bags. Lot better than that roll of tape that we have.
CAPCOM Roger.
AMERICA (Singing)
AMERICA Bent it over two small jet bags. Can't get anything else into them.
CAPCOM Roger.

END OF TAPE

AMERICA Okay, (garble) for WG's and interconnects A8, stow on right hand temporarily. Okay, we'll put a -- two WG's in each guy's temporary storage bag.
CAPCOM Okay, Ron. You're 1 minute from pan camera T-stop time.
AMERICA Okay?
CAPCOM I'll give you another cue in 30 seconds.
AMERICA Come up here and get that one then. Okay?
AMERICA Forgot to write down T-stop. What time is it?
CAPCOM It's 184:06:43. And you're -- you're about 30 seconds from T-stop time now.
AMERICA 0643. Okay? 06B will set it off. Go to standby.
CAPCOM Mark up T-stop?
AMERICA 2, mark it, it's off. Okay?
AMERICA Hey, while I think about it, I started the mapping camera and laser altimeter about 3 minutes early there -- on the backside.
CAPCOM Okay, we copy.
AMERICA The old vacuum "cleanuh".
AMERICA Presto.
AMERICA Right now, if I can find the cable. (Singing)
AMERICA Power cable in the back of the bag. Ah, there's old vacuum bag.
AMERICA Vacuum bag here. Which, from the sounds of things, those guys are pretty dirty down there. Probably need an extra bag.
CAPCOM Roger.
AMERICA (Singing) Got the pins on it. Gotta have holes in it for the cable. (Singing) (Whistling)
AMERICA Good little vacuum cleaner we got. Does that when it starts up. Let me try it again, okay? Watch the main Bus B.
CAPCOM Okay, we'll watch you set the --
AMERICA Let's see. It must be 3, 2, 1, on. Starting -- yeah, back up now. Just the starting torque on this crazy motor, I guess.
AMERICA Well, it works. Glad I tried that out. I'd hate to hear that thing while we're -- oh, I know what to expect now. And if this thing will fit down here between the F2 and an MDC. Supposed --
CAPCOM Ron, we're going to think about that awhile. You're starting current was a little higher than we expected on that. We're checking through the background.
AMERICA Okay. I wasn't quite expecting it either.
CAPCOM Gets the old heart rate going a little bit doesn't it?

AMERICA Yeah, makes it kinda go pitty pat.
AMERICA Okay, let's see now. Oh, that's Hadley Rille. Looked out the window. Okay, back to work here. Let's see, vacuum brush, did that, power cable, connect the cable, stow the vacuum between F2 and MBC, okay. Oh, the helmet storage bags. I put mine down there, but I don't have theirs. (garble) (Singing) Should be able to get to it right there, I guess.

END OF TAPE

AMERICA What's the time here? Let's see, 17. Just barely -- barely making headway here. Okay, I did that. Close out curtains. Stow in right hand temporary stowage bag. Okay. Good idea, then we can get in there and put those old rock boxes in those hole.

CAPCOM Hey, Ron, doyou have -- did you write down the time that you torqued to the current REFSMMAT at 183, right around there?

AMERICA Yeah, sure did. I meant to give you that. I'm sorry. Let me give it to you. Okay, I did the course line, and I torqued at 183:01:45.

CAPCOM Thank you, Ron, and while we --

AMERICA Course line torqueing errors were -- what?

CAPCOM Go ahead.

AMERICA Okay, course line torqueing errors are minus .439er minus 7 -- or .798, minus .092.

CAPCOM Okay.

AMERICA Prime difference is .01.

CAPCOM Got that while we've interrupted you, we've got two little things down here that we can remind you of. One of them is that the current we saw on the vacuum cleaner was just about nominal, and it tripped on the OMNI volt by just a tenth of a volt, so we -- its -- we wouldn't have expected the under volt, but the current -- starting torque current was just about nominal. And, the other thing is that we're still getting kind of bad data on EKG. If you have time, you might check your sensors. There's no hurry on either of those.

AMERICA Oh okay, say, do you have the zododic light photo pad yet?

CAPCOM Rog, I've got it right here, and I've got -- P-24 landmark tracking pads, too, if you want to wait until 30 or take them now, your choice.

AMERICA Uh, let me get this other stuff squared away first.

CAPCOM Right.

AMERICA Then I can get it. Got about two more things to do, it looks like, then I'll be all done. Good thing I did half of them last night.

AMERICA (Singing) Have a sugar cookie cube for a little energy. (Garble)

CAPCOM Okay, Ron, pan camera power off.

AMERICA Camera power -- off.

END OF TAPE

AMERICA Bottom of BJ bag insert the bottom flap in the top pocket. Got my suit in there -- come out. Get my suit out, I guess. Okay, I guess we're ready to take our mapping camera off, huh? Is that what you said? 1524. Yeah. Mapper's gone off.

AMERICA Okay, mapping camera's going to standby. Oop, barber pole. (garble) There's one off. Transponder going to heater. Okay, mapping camera laser altimeter cover. It's closed. Barber pole? Right. Okay, those are all three closed. And, check thru the isolation valve. Okay, go to POO and turn on the A-1 too. A-1 down, up, down. Okay, A-2. We gotta coupled attitude. Okay, Houston, America, ready to copy.

CAPCOM Okay, Ron. We're with the zodiacal light pad. Zodiacal light at 1 T-start time of 1845822.

AMERICA Okay, T-start 1845822.

CAPCOM Okay, and over at 18550, we've got the F-1 tracking pad and the 17-1 tracking pad, and I just might add that we will not give you the tenths of a second on the T-2 times, because these are high altitude.

AMERICA Oh, yeah, we don't need those. Okay?

CAPCOM Okay. F-1, 1, T-1 is 1853800. T-2 is 4250, TCA is 4430, T-3 4518; if north, 909er, north 09 nautical miles.

AMERICA Okay, F-1 1853800, 4250, 4430, 4518, north 9 miles. Got that, I guess.

CAPCOM Okay. 15-1, you ready?

AMERICA Yep.

CAPCOM Okay. 1855725, 1860215, 0355, 0443. It's south 03 nautical miles.

AMERICA Okay. 17-1 1855725, 1860215, 0355, 0443, south 3 miles.

CAPCOM Okay, Ron, that's the pads I've got in front of me right now. You're up to date.

AMERICA Okay, thank you.

AMERICA (Singing) How did that plane change on tracking work out on that plane change burn. That okay?

CAPCOM Right now, it's beautiful. Let me check with FIDO right now. It's very good. Let me -- let me get your parameter down.

AMERICA Okay.

CAPCOM They don't have a real smooth solution yet on that track, but it's real good, no problem at all.

AMERICA Good, okay. Old computer comes through again.

CAPCOM That's affirmative. Guess those residuals on the SPS burn were like zero, weren't they?

AMERICA Yeah, thats a -- that's a good --
AMERICA Is there a place in there where I hook up that TV camera? Maybe I'll do that now. Look like it. Okay, and I see a 30 something -- I'll get it out of I can find it. -- old jet bags in the way. Want that -- all over the place.

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/14/72 13:26 CST 184:33 GET CM147/1

AMERICA Okay, let's see. 30 some - can't get it out, but - Ah, little jet bag's in the way. Want some - floating all over the place.

AMERICA And, Bob, give me a clue when you get ready to do that VERB 49.

CAPCOM Yeah, you're right on time for the VERB 49, Ron. It's 37 in the flight plan and it's 37 right now.

AMERICA Okay, I'd better get busy on it then I guess.

AMERICA 024, I guess it is.

AMERICA 00. Okay, 2472 and 4 (garble) and AUTO.

AMERICA Okay, Nikkon 55 mm. to infinity. Yankee Yankee

END OF TAPE

APOLLO 17 MISSION COMMENTARY 12/14/72 13:36 CST 184:43 GET CM148/1

AMERICA Okay, Nikon 55, voltmeter 2 infinity. Yankee Yankee. Gives frames. (garbled) tape 2 flood lights. Okay.

CAPCOM Ron, we'd like to get the H2 tank 2 fan to OFF. Say again. H2 tank 1 fan to OFF.

AMERICA 1 fan is OFF. 1, 2, 3 are all OFF.

AMERICA Okay. Time to run the radar check. It's been in heater for a minute. Closed Okay. Heaters for 21 minutes. Power. Gage, transmitter A and she's reading 2.8. Okay. Times spot our test. Oh, okay. You read about 2.35. Okay. Ah, good operators (garble) 04. Right hand to C and it unlocks it rather than anything. Up to .8. Meets .3. Same thing as it did before. Looks like rendezvous radar. Transponder stuff does its works. Yeah. (garbled) Alpha's still 1.2. Turn to heater. Okay. Go.

AMERICA 2 90 and 0, okay. T-start is in there. And a plus 22. Okay, NOUN 78 is VERB 249 there it is. 05 plus half a degree dead band. I have up 18 2 and 4. Looks pretty good. Now let's see. We can go ahead.

AMERICA Ah.

CAPCOM Ron. We're a couple minutes from LOS here. You're looking good. We'd like to make sure you get the data system off and just a comment on the rendezvous transponder. We're going to leave it at here straight through until ascent because the - the LM got up late. They're not doing there P-22 today.

AMERICA Oh, okay, okay. Understand. Okay, the old data system is going OFF. Man, I got to configure the DSE and AOS looks like.

CAPCOM And we have configured the DSE is controlled at Ron. You can scratch that line of the flight plan.

AMERICA Okay.

CAPCOM And have a good zodiacal light.

AMERICA Put, put, push, pull, click, click. Round the corner 3 seconds, 1/2, 1/4, skip 1, skip 2, skip 5, that'd be fun.

END OF TAPE

AMERICA Can't sponge, but I guess it works. Okay, now, let's see, what to do next, find a new sponge or something.
AMERICA The hair's starting to grow out again.
AMERICA Better take the sticky stuff off before it sticks.
AMERICA (Singing) Taking a walk. Okay, where did that other little thing go? (Singing) Okay, 20. (Whistling)
CAPCOM Mark T-2 time.
AMERICA Oh, okay, coming up. 42 -- 4150, I hope. Cause I don't see it yet.
CAPCOM T-2's at 4250, PCA is at 4430.
AMERICA Oh, okay. On the old DAC here-- don't see it much. Maybe -- 7 degrees. Okay, she's coming down now with interest. Aha, I see it. And, it's pointing a long ways from it. It's five degrees up. Oh, not that much, 3 maybe.
CAPCOM Do you have the DAC on now, Ron?
AMERICA Yep, DAC's on. Gotta bring her down then. Okay, I guess the best thing to do is take the center of that thing -- right there. It was supposed to be 10 seconds apart.
AMERICA That one was a little bit off. Discount that one. Okay, beautiful. Right there, right (garble). Ah, hah, it's going through zero phase. Got it. Have to lose it. Last one, okay. Last one may not be that good. Just lost it. Okay, DAC is off. Okay. TCA P20, T zero, enter, nine time VERB 25, NOUN 89, enter. Plus 20160. Wish I had time to load the F crater and look at it through the Sextant. Might have time to do that. 201 where am I - 15405 plus 15.
CAPCOM Roger, Ron. We'd like to make sure you configure your VHF prior to this landmark 17-1 tracking.
AMERICA Okay. 5 plus 2016 2 plus 15405F60 okay, configure duplex Bravo, VHF comm, B is duplix, okay, load the VOX, I'm in. VHF AM and TR channel 9 instead of receive, okay? Antenna to the right. Just (garble) I can hear myself cutting in and out.
CAPCOM Okay, you sound good to us, just a reminder that, Ron, that the transponder does not go to power there, we just keep it in heaters.
AMERICA Okay, thank you.

END OF TAPE

AMERICA Antenna to the right, just squelched. I can hear myself cutting in and out.

CAPCOM Okay. You sound good to us. Just a reminder that rendezvous transponder does not go to power there, we just keep it in heaters.

AMERICA Okay, thank you. Okay, number 1 - make sure we pick them up, transmitter 9 - we're duplex. Okay, by the way, the old zodiacal light, went like a charm. Easy. Cut out enough of those things, you know, so that - reasonable to get them done.

CAPCOM Roger. Good show.

AMERICA And the sun came smacking through the window at 15 01 something like that.

CAPCOM Okay, Ron, you've got to load your NOUN 89 to me, I missed it, and we just want to remind you that we'd like CD rolls configured and we'll be using CD rolls for the rest of the mission.

AMERICA Oh, okay. We'll change the old (garlbed) did I miss that somewhere.

CAPCOM No sir, that's a call from us. And you can wait until 186 11 there's no hurry or anything like that. Just a reminder.

AMERICA Okay. let me wait till after this landmark tracking here. De de de de de...57 25 - Okay. If you'll give me a call shortly before T-1 and I can start my clock.

CAPCOM Roger, Ron.

AMERICA And in the meantime, I can put in another little old sponge. That'll keep the surgeons happy. Besides it feels better to change them anyhow. Different spot.

AMERICA Okay, you ought to be getting good data now.

CAPCOM I'll go over here and make the - Rog, he says we're getting good data now.

AMERICA Okay.

AMERICA I wanted to be all clean shaven and like to be nice and presentable for the guys and I didn't have time to shave yet.

CAPCOM Rog. Still itching?

AMERICA No, it's not too bad, really. Right now it's just kind of to a point right underneath the chin, you know, where your tong carrier ties on with that little pad down there.

CAPCOM Hey, Ron, if you let it grow a little bit you can join the back up crew.

AMERICA Hey, that's right too. There goes old Picard, right through the telescope. And at this kind of a sun angle it still has a dark halo. Looks like the dark halo is a little bit smaller - you can't notice the distinction quite as much. It only goes out to about to about a half a crater diameter. You can see a hint of something out to one crater diameter. You can still see the dark material - dark albedo type stuff on the eastern side of the crater. And the demarcation between the two of them. It just disappeared.

CAPCOM Okay, Ron, you're less than a minute till T-1. I'll give you a call in 30 seconds.
AMERICA Okay.
CAPCOM Okay, Ron, 30 seconds to T-1.
AMERICA Okay. Give me another call when you start.
CAPCOM And Ron, you might be getting - making a VHF check here, right while you're doing the landmark tracking.
AMERICA Okay.

END OF TAPE

CAPCOM And you might be making a VHF check here right while you're doing the LM R tracking.

AMERICA Okay.

CAPCOM I'll call you on that T-2 if you want and you can go ahead and call and make your voice check.

AMERICA Okay. Man, you can't find anything - anything with the sextant. Okay, let's see, T-1 was (garble) 25 - will be one minute.

CAPCOM Ron, will you give your LM guide as a call, please. They're calling.

AMERICA Oh, okay. Hey, Challenger, this is Sea Monster, how do you read? This is America, really (laughter). Hey, read you loud and clear. Okay, I'm just transmitting Duplex Bravo. Okay, I'm doing great now - standing by for you - do a little more tracking when I go over this time. Negative on the ranging. Hey, outstanding. I tell you, it's a beautiful bird. Okay, you're kinda fading out a little bit. Okay? Okay, we'll see you when - just prior to liftoff, then. Guess I can turn my VHF off if theirs is off.

CAPCOM Yeah, it shows going off at the end of landmark check.

AMERICA Okay. And there cames Maraldi.

CAPCOM Okay, you're coming in 1 minute to T-2 time.

AMERICA Okay. Medium okay. Channel's off VHC. Okay, we're passing over the Sculptured Hills and coming in to the landing site, now. I still say (garble). Beautiful. Boy, it's going to be bright.

CAPCOM Okay. Stand by for a mark on T-2. Mark T-2.

AMERICA Off, a long ways off. Let's point up to (garble) mountain. You know, through the telescope anyhow, the whole area down there is a lot lighter than it used to be and I'm sure is due to the increase of the Sun angle. However, the landing site itself and the whole valley extending on out to the Serenitatis annulus is still darker - darker than the surrounding territory but with the higher Sun now, it's a lighter tan than it used to be. Come on, catch up with us there. Okay, I got three good marks right there in a row there. That's because I missed the PCA - couldn't catch up with it. (garble) is gone. Okay, this Family mountain looks like it's black on the top - not black, but a real dark - dark gray on top of it.

CAPCOM High gain auto.

AMERICA High gain auto?

CAPCOM Please. We're in better shape, now.

AMERICA I can see the Earth.

CAPCOM Okay, stop running the tape, Ron.

AMERICA Okay, VERB 48 enter. VERB 24 enter. 1112 0111. That looks good. Proceed. Okay, we'll VERB 49 it.

CAPCOM Ron, you'll need to select your jett for BD roll.

AMERICA Thank you. Good point. I was doodling around looking through the telescope. Ran across the Seranitatis there.

END OF TAPE

CAPCOM Ron, you'll need to select your jets for BD roll.

AMERICA Oh, thank you. Good point. I was doodling around looking through the telescope going across Serenitatis here. (chuckle) Let's see, roll mode here, 180, 244 and 12. No, that's not the (garble).

CAPCOM Ron, here's some information for you while you're working here. The control status you're above the line on everything and in particular you might be concerned about SM RCS, you're 1 percent above flight plan plan at this time, even after that burn.

AMERICA Even after the burn still 1 percent, huh?

CAPCOM That's affirmative.

AMERICA That's good 'cause I had a little (garbled) command in there too. - Hey, I found my bright mound crater I wish I could just P24 I could just take a mark and then that would show where it was. I could - I can do that, can't I? Let's see - from (garbled) I ought to get a 409 or something - Oh, okay, I'll take a couple of marks on it. 2 - yeah, I was afraid of that. Disappearing now. Still has the brown - the tannish ejecta off of it and it hit over in the - in that volcanic rille area. I got some sequence camera pictures of it but I don't know how good that will be.

CAPCOM Ron, did you get your mark on the crater you want?

AMERICA Yeah, I think I got a - I got a 405 alarm and I don't think it will take a mark, - when you have that 405 alarm. But, anyhow, I took 2 marks on it.

CAPCOM Okay.

AMERICA It might be in the data, there, I don't know.

CAPCOM Ron, I've got that P27 update pad which is on page 3277 of the flight plan at about 186 hours. It's a long one, so any time you want to copy it.

AMERICA Okay, I guess I better - get going on that, let's see - let's - Okay. The magazine Bravo Bravo is down to, huh, 50 percent.

CAPCOM Roger.

AMERICA Lost my pad somewhere - pencil -

CAPCOM Hey, Ron, now that you're in P00 we'd like ACCEPT. We got a state vector.

AMERICA Okay. - And I'm ready to start copying.

CAPCOM Okay, it's a long one. The first one is a CSM state vector - 71, GET is 188 01 42, index is 21. The following line is all data - I'll break about every 5 if you want to stop me. Opposite 02 we go data as follows: 01501 00002 77563 77431 77517 45633 00013 11736 65021 43762 11131 31244 07624 10720 10043 17330. End of the CSM state vector, read back.

AMERICA Okay, verb 71 188 01 42 21 01501 00002 77563 77431 77517 45633 00013 11736 65021 43762 11131 31244 07624 10720 10043 17330.

CAPCOM Good show, Ron, and do you want to break here or do you want to take a LM state vector verb 71?

AMERICA Ah - if you're through with the computer I might start the maneuver to attitude, here.

CAPCOM Negative, we still need the computer, Ron.

AMERICA Okay, let's go on with the LM, then.

CAPCOM Okay, I'll give you the same thing just interrupt me if - about every 5. LM state vector verb 71 GET 188 19 00, index 21, data follows: 01501 77775 77472 77201 77741 70163 00121 16227 77273 41206 17767 36400 05052 15405 10051 32120. That's it, if you can read back the computer is yours.

AMERICA Okay, I'll go to block. Verb 71, 188 1900 21 01501 77775

END OF TAPE

AMERICA Okay, I'll go to block. VERB 7118819002101501 four 7s and a 5, 77472 77201 77741 70163 00121 16227 77273 41206 17767 36400 05052 15405 10051 32120. Over.

CAPCOM Roger, Ron, good readback. I've got a DAP weight for one man for the CSM, if you want to copy it somewhere? FAO would like to get the maneuver started. Ron, go ahead and I'll give you the -

AMERICA Okay. 80 244 and 341 proceed. 5018 CMC caged, proceed. Okay, CSM weight.

CAPCOM Okay, CSM DAP weight for one man - 36032. Note, too, engine trim good as is. And a note from FAO. If mag Bravo Bravo has 50 percent, no need to change. Good for docking with 50 percent. Readback.

AMERICA Okay, CSM weight is 36032 and that's for me, alone, I guess. Packed off and yacked off are good as is and there's 50 percent on mag Bravo Bravo, so we might as well use it, huh?

CAPCOM That's affirmed.

AMERICA Don't want to run out. Okay. Houston, America, did you all reset the surface flight?

CAPCOM That's affirmative. That's affirmative. We reset it.

AMERICA Okay.

CAPCOM The only thing we've got open right now, Ron, is the OU and ascent pad or pads.

AMERICA Okay. I - yeah, if you had them I could go ahead and copy them but - if you haven't, well that's alright.

CAPCOM Okay, Ron, I've got the direct ascent and the coelliptic rendezvous. Take times page 187. Yeah, that's on time 187.

AMERICA Okay. Just a second there, Bob. Okay, ready to copy the old direct ascent pads, I guess.

CAPCOM Okay, Ron, the direct ascent - GET liftoff 188013593, GET TTI 188555700 Over.

AMERICA Okay, liftoff 188013593, TPI 188555700.

CAPCOM Okay, Ron and the coelliptic rendezvous pad below that.- GET liftoff.

AMERICA Okay.

CAPCOM 188011400. Down 11 CSI time - 189015381.

END OF TAPE

CAPCOM 911 CSI time, 189 01 53 81 now 37 TPI time, 190 55 0000. Over.
SC Okay. Liftoff is 188 01 14 00, CSI 189 01 53 81 TPI 190 55 0000.
CAPCOM One thing's wrong in there, Ron, the GET time lift off is 188 04 and they call it the rendezvous pad, 188 04 14.
SC Yeah, does sound a little better.
CAPCOM Did you get that, Ron, 188 04 14 00.
SC Okay, for the coelliptic lift off is later than ascent so it is 188 04 14 00.
CAPCOM Roger, good readback and open up block if you didn't copy the CSM weight that I gave you before is 36 032.
SC Yeah, 36 032 that's where I put it. Okay, I guess you need a P52. Tattt Tattt (humming).
CAPCOM Give you an easy one didn't we.
SC Yeah. Yeah, but with the earth in the field of view you can tell you that there's a star there, but you can't recognize the pattern.
CAPCOM We'll know when we look at the sky a little different.
SC Ha ha. That's right. 24 is gaina, okay. Take me to gaina. After gaina, I hope. Oh, that's not so bad.
CAPCOM Yeah, we'll buy that.
SC Okay. Flux 102, flux 030 and a minus 08 at 186 how about 35, huh.
CAPCOM You can torque them.
SC Okay. I torque. Uh ha, testing for theory. Bill, the view is 1 point 8 degrees per section isn't it.
CAPCOM That's affirmative (garble)
SC Just move it inside of it so this is, indeed, 2 degrees in diameter.

END OF TAPE

AMERICA - doing here now - calibration. Okay? And that's a pretty good picture. That's within the deadband. Down is timing - That's it, right there.

CAPCOM Okay, I copy those numbers in your DSKY?

AMERICA Okay.

CAPCOM Ron, we're 12 minutes from LOS here and you're looking good. You want to be done in your PTA so that you're not on loop at LOS. We just - You're looking good and just be advised that we'll be - have the S-band relay from the LM to you will be active. When you come around, and there'll be a single CAPCOM loop set up for this next rev.

AMERICA Okay, I'll go to PTT then for that type of an operation.

CAPCOM Roger, real good. You will not be relaying to the LM. The LM will be relaying to you but it won't go the other way, Ron. Unless we need to set up -

AMERICA Oh, it won't? Oh, okay, I see.

CAPCOM And also, we do have the dual -

AMERICA Yeah, that's a good deal.

CAPCOM - list set up here at CAPCOM, so if at any time we want to break down any relay at all, and go back to split loop we can do it, no problem.

AMERICA Okay.

CAPCOM Ron, just a reminder, zero the optics when you can, please.

AMERICA Okay, thank you.

END OF TAPE