APOLLO 10 COMMENTARY, 5/18/69, CST: 10:22, T-126

This is Apollo Saturn Launch Control, KING one hour, 26 minutes and counting - we are proceeding with the Apollo 10 countdown at this time. The closeout crew at the 220 foot level have now essentially completed their work and they are about to secure the White Room, the arm that attaches to the spacecraft hatch itself. They begin to break up the White Room in preparations for the departure, and also preparations a little later for retracting the complete swing arm, swing arm number 9, to a standby position. We are a good bit ahead in the countdown as far as these preparations are concerned, probably in the area of some 20 minutes ago or so. We anticipate that the closeout crew will be ready to depart in about 10 minutes from this time. Spacecraft test conducter made another check with Houston Flight, just on a contingency basis, at this time in the countdown to check the flight since we are on the same launch time as planned - the flight azimuth of 72 degrees is already aboard the spacecraft computer and no changes are required. This is strictly for contingency purposes in case we - the window changed or we were launching a little later than the planned lift off time. All still going well at this time; 1 hour, 24 minutes, 42 seconds and counting. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, 10:32 am

PAO This is Apollo/Saturn Launch Control T-1 hours, 16 minutes and counting. We are GO on the countdown for the Apollo 10 Lunar Mission at this time. Astronaut Tom Stafford, the spacecraft commander, is in the spacecraft going through some checks with the spacecraft test conductor of the stabilization and control system of this spacecraft. at this time. All the propellants are aboard the 3 stage Saturn V launch vehicle, and all looks well at this time. We are GO at T-1 hour, 15 minutes, 30 seconds and counting. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1042a, T-106 3/1

This is Apollo/Saturn Launch Con-PAO trol at T - 1 hour 6 minutes and counting. Still aiming at our planned lift-off at 12:49 pm Eastern daylight time. All aspects of the countdown, both with the Saturn V launch vehicle, the Apollo spacecraft, and the lunar module. all are GO at this time. The close-out crew, which has been up to the 320-foot level at the end of the swing arms, swing arm number 9, working with the Apollo 10 crew in the spacecraft, now is departing the area. Once the crew has left, this will permit us to go into preparations to move the swing arm away from the spacecraft hatch. We move the swing arm 12 degrees from the hatch in a parked position, where it remains until the T - 5 minute mark in the count, when it comes all the way back to its full-back position of about 60 feet. The purpose of course, is in the event of an emergency, we could bring that swing arm on back in a hurry and the astronauts would egress. They have a high-speed elevator that's locked at the 320-foot level standing by, in case of such an emergency. This elevator is operated by Jack Lousma, the capsule communicator, the astronaut capsule communicator here in the firing room. We are still GO at 1 hour 4 minutes 42 seconds and counting. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, 10:48 am

PAO This is Apollo/Saturn Launch Control, we are coming up on 60 minutes and counting. Mark, T-60 minutes and counting, T-60 minutes, we are proceeding at this time. The 363 foot Apollo/Saturn V space vehicle is GO as are the tracking elements, weather, all conditions ready for a launch at 12:49 p.m. Eastern Daylight time. At this point in the countdown we are beginning some final telemetry checks and we are bringing up the various radio frequencies concerned with the launch vehicle. These include 2 key tracking beacons located in the instrument unit which give us back tracking information during the powered phase of flight. All still well with the Apollo 10 astronauts, Tom Stafford, John Young, and Gene Cernan aboard the spacecraft at the 320 foot level. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1052 AM, T-56 5/1

PAO This is Apollo/Saturn Launch Control at 56 minutes and counting. 56, and we're proceeding satisfactorily. Weather conditions still GO for a launch attempt at this time. All still well with the crew in the spacecraft. We're going through some telemetry checks with the launch vehicle. We've also taken a look at that RP 1 fuel in the first stage that's been in there for a little while. We've checked its status and the status is reported back as good. We're proceeding, 55 minutes 33 seconds and counting. We'll be prepared within a matter of minutes to bring the swing arm back from the spacecraft at the 320 foot level. This is the top swing arm, Apollo access arm, identified as swing arm number 9. It will be retracted initially to a parked position some 12 degrees from the spacecraft. This is about 5 feet. It will remain in that position until a 5 minute mark in the count when it will be brought to its complete fallback position some 60 feet from the spacecraft. Coming up on 55 minutes, this is Launch Control.

APOLLO 10 COMMENTARY, 4/18/69, CST: 10:57 T-50:52 6

KING This is Apollo Saturn Launch Control T-50 minutes, 52 seconds and counting. All still going well with the countdown at this time. Here in the firing room the launch team gearing up for two key tests at this time. One, a check of the range safety command destruct system aboard the Saturn V launch vehicle. The other, some attitude command checks to assure that the engines will swivel in response to commands from the guidance system during flight. The astronauts in the spacecraft still busy with some of their final preparations at this time, and all is proceeding satisfactorily. T minus 50 minutes, 18 seconds and counting; this is Launch Control.

END OF TAPE

6/1

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1102a, T-46 7/1

PAO This is Apollo/Saturn Launch Control at 46 minutes and counting; T-46 minutes and counting. All is still proceeding very satisfactorily for the countdown of the Saturn V Apollo space vehicle. The swing arm number 9 now has been retracted to the 12-degree position. This is a position some 5 feet away from the spacecraft. Once this was accomplished, we then proceeded to arm the pyrotechnics, the busses for the pyrotechnics aboard the spacecraft, particularly the launch escape tower. From here on down during the count, if an emergency was so critical that it would be necessary, the astronauts could activate that escape tower now that the swing arm has been moved away from it. The range safety command checks are still continuing at this time. All is going well. Still aiming for that planned lift-off time of 12:49 pm Eastern daylight time. This is Launch Control.

APOLLO 10 COMMENTARY, 5/18/69, CST: 11:07, T-41

This is Apollo Saturn Launch Control, KING T-41 minutes and counting. T-41; all going well. Little quieter from the spacecraft now; the astronauts are still busy but they are not sending back as many reports as they had up to about 10 minutes ago. The countdown still proceeding very satisfactorily at this time. Coming up in about 5 minutes will be a key test of the Launch vehicle Apollo transfer, where we will switch from external power to the flight batteries aboard the 3 stages; an instrument unit of the Saturn V to assure themselves that they will operate properly when called on during the flight. Over the final portion of the countdown, that swing arm number 9 will come back to its fully retracted position at 5 minutes in the count, will go on an automatic sequencer at 3 minutes and 6 seconds in the countdown; from that point on down, all activities during these final moments of the countdown will be automatic, run by the ground base master computer here in the control center. If anything does go wrong, the computer will automatically shut down and stop the count; would go into a HOLD in those conditions. Once the automatic sequence does occur, we will begin to pressurize the various tanks in the 3 stages of the Saturn V. We'll go to transfer to internal power with the launch vehicle at the 50 second mark, the 5 engines in the first stage will ignite at 8.9 seconds; we'll have all engines running at 2 seconds in the count and should get liftoff at zero. Still aiming towards a final liftoff - 12:59; correction, 12:49 PM, Eastern Daylight Time, this is Launch Control.

END OF TAPE

8/1

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1112 AM, T-36 9/1

PAO This is Apollo/Saturn Launch Control at T minus 36 minutes and counting. T minus 36. All still going well with the command module, service module, lunar module, for the flight as well as the three stages of the Saturn V launch vehicle. We are GO for the mission at this time. The following are some of the highlights that have occurred since last evening. We went into a built-in hold at 4 PM Eastern Daylight Time yesterday afternoon. Following the start of the built-in hold we did move the 9.8 million pound service structure from the pad. The service structure was moved to its fallback position which is some 17,000 feet away from pad B. Astronauts Donn Eisele and Joe Engle boarded the Apollo 10 spacecraft last evening to go through some switch list checks to assure that all would be ready for the countdown when it was picked up today. We picked up our countdown at T minus 9 hours and counting at 2:49 AM Eastern Daylight Time this morning. We were a little late starting our propellant loading because of some minor problems at the launch pad concerned with ground support equipment. However, we then did proceed into our propellant load and loaded a little more than three quarters of a million gallons of liquid oxygen and liquid hydrogen aboard the vehicle. We were then ready by the time we resumed our countdown at 3 hours and 30 minutes to have a full propellant supply aboard. The Apollo 10 astronauts Tom Stafford, John Young and Gene Cernan were awakened this morning with Stafford and Young being awakened at 7:34 AM. Their teammate Gene Cernan got up a little earlier. He was awakened at 6:50 AM. They had breakfast with some 10 of their colleagues, donned their suits, and then came to the pad. They were declared physically fit during their brief examination by Dr. John Teegen and Dr. Alan Harter before coming to the launch pad. The breakfast menu included the normal astronaut fare of steak and eggs, coffee, orange juice. The crew came aboard the spacecraft with the commander first at 10:06 AM. He was followed by the lunar module pilot, Gene Cernan, who sits in the right-hand seat, at 10:11 AM; and finally John Young, the man in the middle seat, the command module pilot, at 10:16. Since the crew has come aboard we've really been ahead in the countdown. Since that time all has gone well. We're proceeding at this time. We have just satisfactorily completed our power transfer with the launch vehicle. Tom Stafford aboard the spacecraft giving some readouts back to Test Conductor Skip Chauvin at this time. All aspects of the mission including weather GO as we approach the 33 minute mark in the count. Now 33 minutes, 10 seconds and counting, this is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, 11:17 am

PAO This is Apollo/Saturn Launch Control T-30 minutes 40 seconds and counting. We are proceeding at this time and aiming for a planned liftoff 49 minutes after the hour. Coming up shortly the Apollo 10 lunar module will go on internal power. This is on power of 2 batteries in the ascent stage and 4 batteries in the descent stage. Most of the preparation work in the lunar module had been taken care of before we got into the final count, but it will go internal shortly. For a status report on operations at the Mission Control Center we will now switch to Houston.

PAO This is Mission Control Houston, the prime team of flight controllers headed by Glenn Lunney is on station prepared to support this mission. The manned space flight network reports it is green, ready to support the mission. One minor problem with the telemetry computer at Carnarvon, but it will not hold the mission up, there is a backup computer there. Recovery forces report all on station. Among those in the viewing room here in the Control Center are Senator and Mrs. Barry Goldwater. We have 3 astronauts at the CAPCOM console, Charlie Duke, Bruce McCandless, and the backup spacecraft commander for Apollo 10 Gordon Cooper. Taped to the CAPCOM console are 2 dolls, one Charlie Brown, one Snoopy, replete with spacesuit. This is Mission Control Houston.

END OF TAPE

10/1

APOLLO 10 COMMENTARY, 5/18/69, CST: 11:22 A, T-26 11/1

KING This is Apollo Saturn Launch Control, T-26 minutes and counting; all aspects of the countdown for the Apollo 10 lunar mission are GO at this time. At this point in the count, the astronauts in the spacecraft have completed the pressurization of the reaction control system for the Service Module. These are those 4 thrusters, those 4 quad thrusters, around the service module, 100 pound thrust each, which they use for maneuvers once the astronauts have seperated from the launch vehicle and are on their way to the moon. In addition to this, Astronaut Tom Stafford is getting a new setting for his altimeter in the spacecraft; he uses this to change different abort modes during the powered phase of flight. The new settings given to him from Houston Flight by the Spacecraft Test Conducter here. Vice President Agnew has arrived at the control center; he has been here for some 25 minutes at this time, and he is viewing the operations from a room adjacent to firing room 3, from where the overall countdown is being handled. We are 24 minutes, 53 seconds and counting; this is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1127a, T-21 12/1

PAO This is Apollo/Saturn Launch Control at 21 minutes and counting. All still going well, aiming for our planned lift-off at 49 minutes past the hour. We are making some final checks of the second stage of the Saturn V launch vehicle, at this time starting a chill-down sequence in which we introduce cold helium into the engine chamber, the five engines in the second stage. To condition it for later, during the powered flight, when that extremely cold hydrogen and oxygen meet in the engine chamber. We condition them for these extremely low temperatures over the final portions of the countdown itself. As a matter of interest, the target of the Apollo astronauts, the moon, at launch time will be a distance of 218,528 miles, 218,528 nautical miles. We are coming up on T - 20 minutes and counting, all aspects of the mission GO. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, 11:32 am

PAO This is Apollo/Saturn Launch Control T-16 minutes and counting, T-16, we are proceeding satisfactorily. Astronaut Tom Stafford in the Apollo 10 spacecraft had completed some final checks of the spacecraft stabilization and control system. Coming up in the next minute will be a series of busy checks on the part of the astronauts aboard the spacecraft. They will update the spacecraft computer with some central timing feeds from Houston. The spacecraft will go on full internal power. Of course, the fuel cells for power for the spacecraft have been upped, but an external source has been sharing the load. This external source will be removed and will be on full fuel cell power at the 15 minute mark. The astronauts also will switch their emergency detection system equipment to the automatic mode for abort purposes during the flight. The rotational hand controllers both for Tom Stafford and John Young will be armed. 15 minutes and counting, this is Launch Control.

END OF TAPE

13/1

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1137a,T-11 14/1

PAO This is Apollo/Saturn Launch Control, T - 11 minutes and counting, T - 11. All aspects are still going well at this time. The astronauts aboard the spacecraft have completed some special communication checks on what we call the astro-comm circuit. It's a special circuit which has the Launch Operations Manager, the Spacecraft Test Conductor, and Astronaut Jack Lousma who has the call sign Stoney, the capsule communicator here in the firing room. This is special communications which can be used particularly for abort contingencies. These are the only people on the circuit and they have performed their final communications checks. In about 5 minutes, we will go on the circuit and keep it up at that time. Mission Control Center in Houston also coming in shortly with some communications checks. All aspects going well, we are proceeding, all aspects of the mission GO, coming up on the 10-minute mark in the count. This is Launch Control.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1142 AM, T-6:43 15/1

This is Apollo/Saturn Launch Control PAO at T minus 6 minutes, 43 seconds and counting. Spacecraft Test Conductor Skip Chauvin has just completed Apollo status check of all personnel involved in the spacecraft countdown. He received GOs from all participating. Three particularly strong ones from the three astronauts aboard the Apollo 10 spacecraft. The countdown still proceeding very satisfactorily at this time. We'll have final GO/NO-GO checks from Launch Director Houston Flight and Mission Director coming up in about a minute or so. The weather is GO and the complete Saturn V launch vehicle to include the spacecraft and lunar module appears to be ready for a launch 49 minutes after the hour for this the Apollo 10 lunar mission. We've now hit the 6 minute mark. All aspects of the mission GO. This is Launch Control.

APOLLO 10 COMMENTARY, 5/18/69, CST: 11:44A, T-04:30

KING This is Apollo Saturn Launch Control. T-4 minutes 30 seconds and counting. The Apollo access swing arm number 9 now fully retracted to its fall back position, some 60 feet away from the spacecraft. At liftoff we will still have some 5 swing arms still attached; they will move back automatically at first motion, some 3 quarters of an inch after the vehicle takes off. Astronaut Tom Stafford has completed his checks with the Spacecraft Conducter, the Mission Director George Hage and the Launch Director Rocco Petrone have given a GO for the flight as has the Range. We have now passed the 4 minute mark and proceeding satisfactorily; we are GO; this is Launch Control. We have just passed the 3 minute mark; we've had the firing command; that's the signal that the automatic sequence is now in, and the remainder of the count will be handled by the Master Computer here in the firing room as various events click off leading up to the ignition of the 5 engines in the first stage of the Saturn V at the with liftoff at the zero mark in the count. The actual ignition of those 5 engines will come at 8.9 seconds in the count. We'll have a report of all engines running at the 2 second mark, and at that time, and over the next few seconds, those engines will be specially checked to assure that we have proper Once that occurs we will get COMMIT, meaning that the thrust. hold down arms can release and we will get liftoff of the Saturn V launch vehicle atop 7 and a half million pounds of thrust. We are now coming up toward the 2 minute mark in the count; at this point the tanks in the vehicle pressurizing: 2 minutes and counting. Our status board indicates here in the control room that all aspects involved are ready. Tom Stafford has just reported back that they want to thank everybody for all the help. We are now at T-1 minute, 45 seconds and counting. We'll go on internal power with the launch vehicle at the 50 second mark - at 17 seconds in the count, the guidance system goes internal - this is guidance reference release. We already have the proper flight azimuth in, now 90 seconds and counting. Now 90 and counting. The astronauts have turned off their ground communication at this time however they are on VHF, and of course the S band circuits, as well as the special astronaut communication circuit. One minute, 12 seconds and counting. The vehicle tanks beginning to pressurize at this time; our status board indicates the first stage tanks are now pressurized. We're coming up on the 60 second mark; 60 seconds and counting; we are GO for a mission to the moon at this time -

END OF TAPE

16/1

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1147am T-1 17/1

PAO - the tanks are now pressurized. We are coming up on the 60-second mark. Sixty seconds and counting, we are GO for a mission to the moon at this time. The second stage now pressurizing and we are coming up on Apollo transfer. Fifty seconds and counting, we have now switched to internal power satisfactorily on the batteries of the first stage, all three stages of the Saturn V vehicle. Forty seconds and counting, Tom Stafford making a final check of his computer. The vehicle, all stages pressurized at this time. We are waiting for the swing arms to come back. One should be coming back at this time, the second one at 17 seconds. Tom Stafford reports they are GO. We are coming up on the 20-second mark. T - 20 seconds and counting, guidance internal. 15, 14, 13, 12, 11, 10, 9, we have ignition sequence start, engines ON, 5, 4, 3, 2, all engines running, launch commit, lift-off. We have lift-off 49 minutes past Stafford reports the clock has started. The tower the hour. is clear.

PAO Tom Stafford acknowledges the roll and pitch program to put Apollo 10 on the proper course. SC Okay, pitch is tracking, looking

good. CAPCOM Roger. SC Roll complete, ELS manual. CAPCOM Roger, roll. CAPCOM And Houston mark, one bravo. SC Roger, one bravo. PAO One bravo is a kind of abort mode dealing with altitude, function of altitude. SC I'm going to load low bit in here. CAPCOM Roger. PAO Plus 55 seconds. SC Cabin is relieving. CAPCOM Copy. PAO Cabin pressure is relieving. Downrange 1 mile, 3.3 nautical miles high. SC What a ride, what a ride. CAPCOM Rog. PAO That's Gene Cernan reporting, "what a ride." SC And roger, going to 3.2 CAPCOM Roger. You're through to max g, you're looking good. SC 3 and a quarter g's. She's looking beautiful. PAO One minute 44 seconds downrange, 7 uh, 12 miles high. SC Here's 4 and 1/2 g's. CAPCOM Roger, copy, Tom.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1147a, T-1 17/2

CAPCOM And mark for one Charlie. You are looking great. SC Roger, one Charlie and it feels great. CAPCOM You are GO for staging, 10. SC Roger, 10 is GO. SC Inboard check alignment. CAPCOM Roger. SC We are ... PAO Inboard engines are aft. SC . . . CAPCOM Roger, copy, Tom. EDS off, 10. PAO Charlie Duke asking the crew to turn off their emergency detection system. Second staging ... SC CAPCOM Roger. PAO Good ignition on the second stage. CAPCOM (Garble) on the S2. It's looking good. Confirm EDS off. SC EDS is off (garble). CAPCOM Rog. PAO Flight Dynamics reports trajectory GO at 3 minutes 9 seconds. Downrange 81 miles, 46 miles high. Second plane separation, that is the skirt around the engines on the second stage. And the launch escape tower has jettisoned. SC Man, that staging was quite a sequence. CAPCOM Rog, sounded like it. And we have guidance initiation. SC CAPCOM We confirm that, 10. SC Roger. CAPCOM Yes, 10 is looking beautiful. Everything is going steady. SC Roger. PAO That's Charlie Duke talking to Tom Stafford. CAPCOM - not bad. Just like old times. It's beautiful SC out there. You guys sound ecstatic. CAPCOM SC Man, this is the greatest, Charlie. SC Charlie, babe, it fantastic, babe, really. PAO That's Gene Cernan with fantastic. CAPCOM You are GO. Trajectory and guidance look good. SC Roger. We were right on the line on board.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1147a, T-1 17/3 171 miles downrange, 67 miles high, PAO at 4 minutes 15 seconds. Still GO. PAO Glynn Lunney taking a status check. Four minutes 50 seconds, 230 miles down-Evervone save GO. range, 67 miles high. CAPCOM 10. Houston. In 5 minutes you are All your systems are looking great. all GO. Roger, 5 minutes and 10 is GO. SC CAPCOM Roger, you are right on the track. SC Roger, Charlie. PAO We have an estimate of inboard engine cut-off on the second stage at 8 minutes 15 seconds, outboard engine cut-off, 9 minutes 11 seconds. Five minutes 30 seconds, 299 miles downrange, 83 miles high. All Controllers reporting GO. 350 miles downrange, 87 miles high now. SC ... elevators coming on. pitch 1. That's go. CAPCOM Yaw 1. SC CAPCOM That's go. SC Pitch 2. That's go. CAPCOM SC Yaw 2. You got them all. Tom. CAPCOM SC Looks good. PAO Guidance says it's looking real It's 6 minutes 23 seconds. good. - no, I think Snoopy is still there CAPCOM with you. You are looking good. We copy the gimbal motors on and your trim looks good. SC Sensors tracking them just beautiful. CAPCOM 10, Houston, mark. S-IVB to orbit capability. SC S-IVB to orbit capability. PAO Apollo 10 now has the capability to get into orbit on the S-IVB should the second stage malfunction. CAPCOM On 7 minutes, you are all GO. We have nominal level sense arm 8 + 15, SII cut-off 9 + 11. ... sense arm and 9 + 11 for SII. SC CAPCOM Rgoer. PAO Seven minutes 14 seconds. Downrange now 538 miles and 94-1/2 nautical miles high. Coming up on inboard engine cut-off. SC ... is good. CAPCOM Rog, looking good here. SC Inboards shut down. CAPCOM Roger on the inboards, Tom. We confirm it.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1147a, T-1 17/4 CAPCOM How's the ride? CAPCOM 10, Houston. Eight minutes. How's the ride? SC Rog, fantastic, Charlie, fantastic. CAPCOM Rog. CAPCOM (broken tape) enable sense arm. SC Enable sense arm. PAO We are right down the ground track at 8 minutes 30 seconds. 755 miles downrange, 98 miles high. Velocity is 21,499 feet per second. Flight Director is taking a status for staging now. - everything looks good. SC CAPCOM Roger, Apollo 10, you are GO for staging. Mark mode IV, Apollo 10, mode IV. CAPCOM SC Rog, mode IV. Staging. CAPCOM Rog. SC Separation. CAPCOM Roger. SC Appears we got good ignition. CAPCOM Roger. Thrust is good and guidance has PAO initiated on the S-IVB stage, the third stage. SC Charlie, lots of stuff out the win-We catching up and passing it now. dow in staging. CAPCOM Okay. SC Okay. Guidance looks right on the ..., Charlie. CAPCOM Rog, we confirm that. Looking great You are looking beautiful. here. SC Roger. PAO 1,037 miles downrange and 102 miles high and the velocity is 23,400 feet per second. SC - looks good. CAPCOM Fine. PAO Predicted cut-off for the Saturn S-IVB stage 11 minutes 47 seconds. CAPCOM S-IVB cut-off 11 + 47. SC 11 + 47. PAO Downrange 1,200 miles now at 10 minutes 44 seconds, 102-1/2 miles high, the velocity at 24,280 feet per second. SC - looks good. CAPCOM Roger, 10. CAPCOM 10, Houston, at 1110, you are looking good. SC Roger, Charlie, the guidance is beautiful. CAPCOM Rog.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1147a, T-1 17/5

PAO	Predicted cut-off now 11 minutes
45 seconds.	
SC	SECO.
CAPCOM	Roger, SECO.
SC	Six.
CAPCOM	Roger. Stand by, 10.
SC	Okay, Houston, we show a 102.6 by
101.1.	An and An
CAPCOM	Roger, we copy that.
SC	And our VI was 255565 - one-tenth
H dot, and 102.6.	
CAPCOM	Roger, we copy.
SC	Insertion.
SC	And Charlie, have them take a look
at our evaporator.	We are reading a high outlet temperature
and we off-scale low	on the steam pressure right now.
CAPCOM	Rog, we agree. Stand by.

APOLLO 10 COMMENTARY, 5/18/69, CST: 12:02P, 1400 GET 18/1

10, Houston. Your SIVB is straight; CC we'd like for you to - on your evaporator, we'd like for you to close the primary back pressure valve, and activate the secondary loop. Roger, understand. Close the primary SC back pressure valve and activate the secondary loop. Roger; just for a little while. CC We'll give you anumber. We'll have Vanguard LOS at 15:32, and a minute gap, and we'll see you over the Canaries at 16:29. Roger; and we have closed the isolation SC valve on CM RCS ring one two is still open. CC Roger. 10; Houston. Your Saturn is in great CC shape; you're configured for orbit; we are all GO. Roger; just looks beautiful. SC CC And 10, Houston. We confirm your orbit. The IU vector has you in a 103 by 100. SC Roger. 10; Houston. We want you to keep the SC primary back pressure valve closed for about 15 minutes. And then we'll deacti - stand by. SC Roger. 10; Houston. At GET of 30 we'd like SC you to put the primary back pressure valve back in AUTO and deactivate the secondary loop. Roger, understand. You want - at 30 -SC you want to deactivate the secondary loop and go back to AUTO on the primary boiler. CC Affirm Gene. PAO We've had LOS at the Vanguard - there will be about a minute gap between the Vanguard and the Cana; Showing a liftoff time of 12:49:00.70 Eastern Island station. Daylight Time. This is Apollo Control; we should be picking u Canaries anytime now; we'll continue to stand by. We do have AOS - acquisition of signal - at Canaries now. CC Apollo 10, Houston - standing by through the Canaries. SC Roger; 10 reads you loud and clear. We're just looking through the insertion check list. CC Roger, copy. And 10, Houston; would you like for me to review this ring 2 heater check? SC Why don't you do that; (garble) CC Okay, Tom, we'd like for you to - we have a 7 step procedure here and I'll read it up to you. On panel 8, CM heaters 2 main B closed, CM RCS logic ON, CM RCS heaters ON, we want you to heat ring 2 for 15 minutes. And you can select position C5 on the systems test and monitor the OX line 10.

SC

All sub first.

APOLLO 10 COMMENTARY, 5/18/69, CST: 1202p, 1400 GET

Correct - 10, your first step would CC be to close the RCS propellant isolation valve on ring 2. SC We'll be able to do that right now, Charlie. Okay, then you can - then we'd like CC for you to - if you are going to close the prop valve right now, we'd like for you to turn the heaters on too. Okay, turned the heaters on right now. SC CC Okay, affirm. And then after - uh, 10 Houston? SC All clear Charlie. We're going through the procedure; the heater is ON. CC Roger. Okay, and we'll turn them off after SC 15 minutes and you say we can monitor one on C5? You can monitor the oxidizer line temp CC on C5 - it'll probably be all scale high, but if you see any change, we would appreciate you telling us. Roger. Okay, we got that Charlie. SC> CC 10, after 15 minutes, we'd like for you to turn the heater off, RCS logic off, and open both heater circuit breakers. Roger; will do, Houston. SC SC Charlie, it's just fantastic to be back up here again'z Fantastic; really. CC Man, you (laughter) you guys really sound great up there. SC Yeah Charlie, after 3 years, it seems a long time, but here comes the Coast of Africa again and it looks beautiful. CC I'll bet. Wish we were there with you. SC (garble) That makes us all feel great. CC Roger; next time we are gonna put a cot onboard and one of us is going along. SC Roger. PAO That was Gene Cernan and Tom Stafford conversing with Charlie through - both very happy to be back in orbit. CC Apollo 10, Houston. The P52 is your option - it really looked great during the launch phase; we have an azimuth correction of minus .11. SC Roger. Minus .11, thank you. CC 10, Houston. If you've taken your helmets off, we'd remind you to open the suit circuit return valve. SC Roger; we're gonna do that now. CC Okay. Apollo 10, Houston; you've got about 1 minute to Canaries LOS; Tananarive at - correction - 37. SC Roger; Tananarive at 37; thank you.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 24:00, CST 12:12pm 19/1

This is Apollo Control at 24 minutes into PAO the mission. Canary Island has loss of signal. Tananarive will acqurie Apollo 10 at 37 minutes. Apollo 10 is in a good orbit. Controllers here in the Control Center report all systems functioning well. The procedure that you heard passed up to the crew over the Canaries was to release some oxidizer in system B of the command module RCS. During a test on the pad when the isolation valves were open it was discovered that a burst disc had opened also and had allowed some liquid hydrogen to flow into the lines. The valve was then closed, the crew is now going through a procedure in which they will open an engine valve and allow this liquid hydrogen to vent through the engine. This was the talkiest crew on liftoff in the memory of anyone here in the Control Center. We have a tape of that powered portion of flight and we will play that for you now.

REPEAT OF LIFTOFF SEQUENCE

PAO This is Apollo Control at 36 minutes just about within acquisition at Tananarive. We have a report now from the flight surgeon on the heart rates on the crew during launch. Tom Stafford, 123; Gene Cernan 120; John Young 125.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1226 PM, GET 3800 20/1

PAO Launch. Tom Stafford, 123: Gene Cernan, 120; John Young, 125. And the Guidance Officer has just reported that all of the guidance systems look very good on Apollo 10. Tananarive will be acquiring Apollo 10 any second now. We'll stand by for any conversation through that station. CAPCOM Apollo 10, this is Houston through Tananarive. How do you read? Over. That's Astronaut Bruce McCandless PAO putting in a call. CAPCOM Apollo 10, this is Houston through How do you read? Over. Tananarive. Tananarive, Houston COMTECH Net 1. COMTECH Houston COMTECH, Tananarive. TAN COMTECH Roger, can you confirm that CAPCOM is uplinking through your site? That's affirm. You are uplinking. TAN COMTECH Have you heard any downlink from the spacecraft? TAN Negative, no downlink. COMTECH Roger. Apollo 10, this is Houston through CAPCOM Tananarive. Radio check, over. CAPCOM Apollo 10, this is Houston transmit-Confirm simplex alpha, over. ting in the lbind PAO This is Apollo Control. We have experienced considerable voice communication difficulties at Tananarive in past missions, apparently we're having the same problem on this mission. We'll continue to stand by. CAPCOM Apollo 10, Apollo 10, this is Houston through Tananarive, over. SC Houston, Apollo 10 transferring into BRAVO. We're reading you loud and clear. CAPCOM Roger, 10. Now we're reading you loud and clear. Up. We're been reading you all the time SC BRAVO Houston. John and Gene have completed the P52 and the purging on the spaceship (garble) is minus 12 plus 34 and minus 76. Looks like the platform is real good. CAPCOM Roger, 10. We copy. Understand platform is good. SC We will turn the command module RCS B heater off at 32. That will give us 15 minutes on it. CAPCOM Roger, we confirm, we confirm that, and your (garble) valves off - RCS propellant valves off? That's affirmative, George. SC CAPCOM Okay.

SC Houston, Apollo 10. The (garble) on the first heater is off scale high which we expected ou the heaters and we're going to turn the heaters off at 43. Say again, Apollo 10. You're fading CAPCOM in and out. SC Roger, command module RCS heaters off at 43. CAPCOM Roger, we copy off at 43. CAPCOM 10, Houston. We expected that on the heaters. We'll have LOS here at Tananarive in 30 seconds. We'll see you over Carnarvon at 52. Roger, understand 52. Our radiators SC appear to be working all right, our glycol evap outlet temperature is down around 58. The steam temperature is off scale low, off scale low. CAPCOM Roger, steam pressure off scale low. That's affirm, and the evaporator SC outlet temperature is 58 degrees with the radiators apparently working. CAPCOM Roger, we copy, Gene. And Apollo 10, Houston. If you read, we'd like you to close the primary back pressure valve again, over. This is Apollo Control at 43 minutes. PAO Apollo 10 is out of range at Tananarive. The purge of that oxidizer line on the command module RCS system has been completed. This system is in good shape. Gene Cernan reported the radiators on the spacecraft are working well. Carnarvon will acquire Apollo 10 at 52 minutes. This is Mission Control

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20/2

END OF TAPE

Houston.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 5200, CST 1240 21/1 This is Apollo Control at 52 minutes PAO into the mission of Apollo 10. Carnarvon has acquired Apollo 10. We will stand by for transmission. Hello Apollo 10, Houston through Carnarvon CAPCOM standing by. Roger, Houston, this is Apollo 10. We SC are going through our BCS checklist and everything looks good. Roger, Tom, sounds real great. CAPCOM SC Thank you. We could read you all the way through Tananarive, Houston, but evidentally you couldn't read us at all with COMM until here at the last. We got the heater off exactly at 15 minutes, the propellant valve was shut, the logic was off and the breakers open. CAPCOM Roger, we copied, Tom. SC Houston, Apollo 10, did you get our torquing angles on the IMU realine? Roger, Tom, you were pretty weak. CAPCOM What I coped was minus 0.12 plus 0.34 and minus 0.76. SC Roger, and everything looks real good. CAPCOM Roger, can you give us the time that you torqued those? SC Stand by. It was 41 minutes even, Charlie, that's SC what I paid special attention to that. Roger, thank you very much , John, CAPCOM 41 minutes special attention. SC Hello Houston, this is 10. CAPCOM Go ahead. SC Okay, guess you got my word on the off scale load on the steam pressure on the primary loop. CAPCOM Roger, we've been discussing it, Gene, and stand by and we'll have some words for you. I just rechecked a secondary loop and it SC all looks good on it. Through all our monitor checks and redundant component checks looks like we've got a good Charlie Brown here. CAPCOM Roger. CAPCOM Apollo 10, Houston, with some words on the primary evap. SC Go ahead Charlie. CAPCOM Roger, we'd like you to put the back pressure valve back to AUTO - correction, MANUAL, and we wondered if you went to AUTO on the H2O valve during launch. That's affirm, I sure did. SC I went to AUTO on the steam pressure valve and the water valve. Okay, we want the steam pressure back CAPCOM to MANUAL and we're going to think about it a little bit more and we might reservice a little later on. Okay, fine, looks like our radiator is SC beginning to carry the load. I'm looking at about 51 degrees

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SC on the evap up at temp. CAPCOM Roger. CAPCOM Apollo 10, Houston. Gene, everybody thinks I might have given you the wrong word. What - and to clarify it we want the back pressure valve closed. Over. SC Okay, in other words you want steam pressure auto switched to MANUAL and you want me to go to increase, is that correct? CAPCOM Affirmative. SC Okay, well, I'm in MANUAL now and I'll go to increase. SC Houston, this is 10. Do you want me to leave the water flow in AUTO after I do this? CAPCOM Stand by. CAPCOM 10, Houston, you can leave the water valves in AUTO. SC Roger, understand. CAPCOM Hello Apollo 10, Houston on the S-band through Honeysuckle. How do you read? Over. Roger, Houston, Apollo 10 reading you SC loud and clear. CAPCOM Roger, Tom, same old. The S-band is really great today. SC Roger. I've never seen the Comm better. It's great, Charlie. CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1250p, GET 102 22/1

CAPCOM Apollo 10, Houston. We will have LOS at Honeysuckle at 1 + 06. We will see you over Guaymas at 1 + 28.

SC

Apollo 10, roger.

PAO This is Apollo Control at 1 hour 5 minutes into the mission. The station at Honeysuckle Creek in Australia has loss of signal. Flight Director Glynn Lunney is taking checks with the controller here in the Mission Control Center. Everybody gives him a GO. The service propulsion system looks good, the reaction control systems on both the service module and the command module look very good. The environmental communications officer is pleased with There is one minor problem in with the E-comm. his system. You heard Charlie Duke and Gene Cernan discussing the steam pressure and evaporators during this Australian pass. There is a belief that the primary evaporator may have dried out. These evaporators, there is a primary and a secondary, they are used for cooling purposes when the radiators are not on the line. They cool by evaporating our boiling water. They are sometimes referred to as water boilers. We may reservice the water boilers and again we may not. E-comm wants to take a look at it over the States and see whether it needs to be reserviced. The radiators are working very well and there's the secondary evaporator. It is in good shape. We really have no need for the primary evaporator. So E-comm will con-tinue to take a look at that, but it is not really a problem. The station at Guayman, Mexico, will be next to acquire Apollo 10 at 1 hour 28 minutes. This is Mission Control Houston.

APOLLO NEWS CENTER HOUSTON, TEXAS

Postlaunch Briefing CST 1:02 P.M. May 18, 1969 Kennedy Space Center

PARTICIPANTS

Rocco Petrone, Director of Launch Operations Jack King, PAO

APOLLO 10 POSTLAUNCH BRIEFING, 5/18/69, CST 1:02P

Okay, I think we are set. KING At the request of many of you - you asked to have some of our people to come over from the control center a little earlier, and we have Rocco Petrone, who is the Director of Launch Operations for the Kennedy Space Center. Rocco is also the Launch Director for the Apollo Missions, and the preparations and the countdown here at KSC. Now for planning purposes, I think the best thing to do is the pass over Guaymas is going to be about 2:20, excuse me, 2:20 PM Eastern Daylight Time. We suggest that we cut off the conference at that time and certainly no later than that. We would like Rocco to bring you up to date on the countdown operations and the mission as it stands at this time in orbit. I will then take 10 minutes of questions from here at the Press site, 5 minutes of questions from Houston, and then I think for everybody's benefit, I think it would be best to get back to the mission. There will be some angry or sad faces but I hope you understand. We'll take 10 minutes here, 5 minutes in Houston. And we'd like you to wait for the mike when the questions come up. I'd like now to introduce Rocoo Petrone, the Launch Director for Apollo 10.

PETRONE Well, I'd like to summarize by saying we got off on time; as I guess you all know. We essentially had a smooth count. We did pick up the count, our terminal phase, at 2:49 this morning. We had a few small difficulties to resolve during the count, however we had purposely put in a one hour built in hold at T-3:30 in the count; it turned out the way things moved, we actually were about 30 minutes ahead of our preparations. At one time, Tom Stafford did kindly remind us that maybe on the next one we'd have to crew up to 20 minutes less. The problems we looked at, I guess I'd say the significant problems - one, we did have some concern of loss of pressure of a ground conditioning, this conditions this inner stage of the instrument unit in the SIVB - the upper dome, where your liquid hydrogen is; we did see a loss in pressure. Right after picking up the terminal count. We did analyze that, from all we could see and assess, we were a bit concerned by the temperature - in other words, would it hold properly? We assesed that it would, and I must say that it did; the temperature up there did function exactly like what we saw in countdown demonstration. This unit - I must add - is only used for liftoff. Our concern would have to be then, would we have the right temperature in the instrument unit where all our electronics are at liftoff. And we did. There were 1 or 2 minor problems in the facility when we brought up our liquid oxygen pump - we did find a fuse blown; we had to go out (dead air on tape); we did have to readjust the helium regulator out on the launch umbilical tower and this came up right shortly after picking up the count. I would say after that, that things did go

11A/1

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11A/2

PETRONE - very smoothly. The planned lift off time was the time as set, 12:49. The SIVB cutoff was at 11:47, or 4 seconds more than planned and insertion into orbit then would be 11:57. The parameters we achieved, and this now is early data, was 103.6 nautical miles by 101.1 nautical miles. I guess you all heard the transmission from the crew during the boost phase, and they seemed to be both impressed and enjoying it immensly. There was one anomaly detected, I believe the only one today, and that was the primary water boiler system dried out. Let me add - this is not a part of the system we discussed at the press conference yesterday, which is a water seperator system, takes water out, or moisture out of the 02 loop - keeps the cabin at the right humidity. This is a boiler for cooling that is one of two. The crew was requested to shift to the secondary - the secondary did come up properly; as I left the launch control center, the reports were coming in from Carnarvon Australia, the second water boiler had come on line properly, the first water boiler they were getting ready to reservice; this would be done on the pass over the States. I must add we have seen water boilers dry out on previous launches. It's not an uncommon thing. And we have been able to bring them back up, through service and procedures. I'm sure many of you have followed the previous launches of Apollo. You will recall a number of water boiler dry outs. So we are going to attempt to reservice the primary, the secondary is now working. Let me also add that for TLI, our mission rules, flight rules, do not call for either of the boilers to be up. Course we'd like them up. We have a radiator system aboard for primary cooling. The radiators in themselves are redundant. On Apollo 8 we learned that the heating load can be handled by the radiator loop itself and there we have redundancy with two loops. The water boiler primarily serves the purpose of helping the radiator when a peak load comes in. For a short transient. The water boiler is not functioning all the time. So then it sits there sort of on idle, ready to assist the radiator loop if there is a peak load. We feel from Apollo 8, these rules were derived before this mission, that we understand the heating loads to the moon, and in the vicinity of the moon, and therefore, the rules do not require both boilers to be functioning for a GO decision of TLI. And its not that element alone, as you all know, there are many, many other things being looked at now, and will be looked at, before the decision for TLI, translunar injection, can be made.

KING Before we go into questions, there were some questions about the exact launch time, we had it at I believe 7 tenths of a second off the planned launch time; we refined that a little bit; 569 millioneth seconds off planned launch time of 12:49 PM Eastern Daylight Time. APOLLO 10 POSTLAUNCE BRIEFING, 5/18/69, CST: 1:02P 11A/3

PETRONE I'd like to add to that; we've had 5 Saturns and I would refer to the time of takeoff as the way we set our clock. There is always a question of a few mila seconds, but when I see one of these large ones take off, I'm willing to accept it at 12:49.

I guess we're ready to go into questions KING now - there are going to be many press conferences before this mission is over; I'd like to suggest that we confine the questions if possible to what has transpired thus far. Mr. Whitkin.

QUERY

...working for TLI?

PETRONE Dick, we do not. The mission rule actually we can go without either boiler because the radiators which are redundant on themselves, do take the prime load. The boilers are just an excess. Of course we would like to have it up; we're going to attempt to reservice on this next pass over the states.

QUERY Was there any repetition of the vibration that you go on 8 and 9 with the engine?

PETRONE I did not hear the conversation from the crew any comment on the vibrations. Tom did say - Tom Stafford - I believe as the S 1C was getting ready to go through max Q, I believe he said, "Several things are starting to shake in here." What he is referring to is the normal buffeting, that is not the thing we have seen. There was some other conversation later down the line but I do not recall myself hearing any reference to the thing we have referred to as POGO, or the vertical oscillation.

KING Please wait for the mike as we goo along so we can record all your questions. Go ahead Harry. Harry Pease, Milwaukee Journal. I wonder QUERY if Rocco could say a word about the RCS prevalve opening; what occurred there and how it was cured? PETRONE

Okay. In the checks that were going -

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In the checks that were going on PETRONE this came up at about 10 o'clock last night. We did discuss it amongst the many parties involved both here and at Houston, the designers at Downey, California. What had happened, in servicing there is a thing called a diaphragm that prevents the fuel from going down to the valves. Now we have two systems, A and B, reaction control system for the command module. On the oxidiser side of system B the diaphragm you might say gave way letting the fluid go down to the main valves. Now in flight it's going to do exactly this. As you pressurize your tanks - now this would happen on reentry - the fluid would go down to the main valves. In looking at the status it was decided it was also an isolation valve which we have in there. These are two valves in series. There's a main valve and an isolation valve. We could use the isolation valve as the diaphragm in a sense. Therefore it was decided mainly so there would be no pressure buildup while in space, to close the isolation - they would normally be closed - vent out by opening that valve - now this would not burn at this time - it would vent and I believe the answer was about 3.6 pounds of oxidiser in order to vent it out of that line, close Then in effect we have the two values closed both of 北北。 which we have the leak test characteristics of, and in a sense the isolation valve then is doing the function of the diaphragm which had broke and let oxidizer get down to the main valve in the reaction control system. Again, on system B, one of the two redundant systems.

KING Go ahead, Harry. I think he has a follow up to this.

QUERY In Gemini 8 when you plot the prevalves on the RCS system you considered that reason for ending the mission. How does this differ?

PETRONE I really cannot compare this hardware with the Gemini. I'm not that familiar with the Gemini spacecraft. I do know roughly what you're referring to. I recall the mission but the exact hardware here by having the isolation valve we can close and by having the main valve, in effect we have a system there - see, it's not pressurized at this time. We have another valve upstream keeping high pressure off of the fuel system until the reentry. At that time we, say we blow a squib valve that lets pressure come in, then that puts that system under high pressure. Right now the system's under semething like 25 or 30 pounds. There's very low pressure in there and with two valves we don't see, have any concern of it leaking.

QUERY

How do you service this boiler when

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it comes over the states next time?

Well, Dick, the crew, when the boiler PETRONE dries out, there is a checklist procedure. We go through this in the altitude chamber when we make our runs here with the crew. The various steps essentially are to let water in - let it in a certain rate, and then you want to get boiling. The boiler is exposed to the vacuum of space and you achieve a water flow through there at a certain rate and you then get boiling on one side as you let water come in the other. As the water boils up in space it cools the boiler and we then take water glycol through there to be cooled as it goes through these plates. The procedure has been used many times in space. Some of you may recall on Apollo 8, may recall once as the crew, as they were coming around the moon they reported that the water boiler had dried out and they serviced it. I know on reentry I believe there was a dryout of one of the boilers and Bill Anders, in fact, did some servicing as the command module was on its reentry path, before, of course, it entered the atmosphere. It's a fairly well-known procedure and they'll be going through this very shortly. It's well known and we've used it many times.

KING We appear to have a three man conference going here. Go ahead, Regie.

QUERY Sorry, but I have an uneasy feeling you're trying to tell us that translunar injection is looking a bit doubtful. Could you estimate the chance?

PETRONE I don't believe I've said that and I don't mean to leave that impression. At the same time we haven't said yes. We allow ourselves as you know an orbit and a half onto the second orbit. I've said at this time our mission rules do not call for both boilers to be on line for the reasons I explained at quite some length. I've not said we're looking doubtful. However, I do want to say we've got more to look at across the spectrum.

KING I will take three more questions from here. The hands I see right now. Mary, go ahead. These two right here and then we'll switch to Houston.

QUERY Mary Bubb, Fairchild Publications. Rocco, why do these things go dry? Is this sort of characteristic of the beast?

PETRONE Mary, I cannot answer that fairly bacause, I'm saying in looking at it, if we knew we would take steps to put a fix in. When you say characteristic I first have to say yes, we do see this happen. We've seen it happen in our altitude chamber runs but exactly why, it was like this servicing situation we had yesterday with this wick, in wetting of it. There are sometimes conditions that

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force you to repeat it. But we don't know exactly why.

QUERY Mr. Petrone, can you run through the figures for ignition and cutoff times for various stages and the staging sequences?

Okay, again, we took off at 12:49 PETRONE and I'll take the milliseconds to myself and say 00. S-IC center engine cutoff was at 2 minutes, 14.7 seconds. The outboard engine cutoff on the S-IC was 2 minutes, 41.1 sec-S-IC/S-II separation was 241.8. I think all of you onds. will recall that Tom said, "That's quite a sight." Each one of the crew when they've returned, on the debriefing, have spoken of that sequence of staging. It must be quite a jolt and quite a sight. S-II ignition was 242.5. We jettisoned - see, the second plane separation was at 3 minutes, 11.5 Center engine cutoff on the second stage was 7 minseconds. utes, 40.1 seconds. S-II outboard engine cutoff was 9 minutes, 12 seconds. S-II/S-IVB separation was 9 minutes, 12 seconds point 9. S-IVB ignition, 9 minutes, 13 seconds. Then S-IVB cutoff was 11:47. I believe that's the number I have. KING

KING Okay, Tom, we'll take the last question here and then we'll switch to Houston.

QUERY Colonel Petrone, that big cloud that was in front of the, that kind of obscured the rocket as it was going up the tower, was that because the flame pads on this launch pad are different, shaped differently, or pointed in a different direction?

PETRONE No, they're pointed the same. The flame trench is north south on both pads. However, pad B is somewhat west, so from this press site your angle of looking at the plane would be a little different. But the trenches, the flame trench is exactly the same on pad A, pad B. Same orientation.

KING 8700 feet between the two pads. Okay, we're now ready to switch to Houston for about 5 minutes of questions there, please.

PETRONE Jack, let me take a few seconds. This is Houston. To see if the conference there has generated any questions among the newsmen who are here in the auditorium. Hold one.
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PETRONE

Evidentally a whole lot.

QUERY This is directed to Petrone. Rocco, when will we know and you know whether the boiler situation is such that TLI can be made?

PETRONE I'd like to point out again that that status of that boiler, according to our preplanned mission rules, the primary boiler does not have to be in a functioning condition to make TLI. We are going to attempt to service it. As I left the Control Center about 30 minutes ago we were going to attempt that as we made this pass over the states, attempt to reservice the primary boiler. The secondary boiler was functioning properly.

QUERY Will the first part of that question be answered again. We didn't get the transmission here in Houston.

PETRONE The decision for Translunar Injection does not depend upon the primary boiler being reserviced. I gave the reasons at the first part of the conference here, that the main part of the cooling load, not the purpose of this boiler and radiator. The main part will be taken by 2 radiators for the planned mission. The boiler it affects sits there to help when you reach a peak condition. During the Apollo 8 mission for the planned profile it was seen that essentially the boilers that handle the radiators could handle the load by themselves, that we could expect. So therefore the boilers do not become mandatory for the translunar injection decision.

QUERY The center engine of the second stage was cut off about 2 minutes early. Was this an attempt to prevent POGO?

PETRONE It was cut off early with the time I gave earlier because there were oscillations observed both on Apollo 8 and Apollo 9 and as we condintued to study, and this is still under active study we just felt it was prudent to cut the engine off before we get into the time frame of the engine giving us these oscillations. The oscillations appear to depend upon the height of the liquid in the stage. So at a certain time when you know your height we cut that engine off. We compensated for it by burning longer. This was all planned and the S-II did perform according to plan.

GREEN This is Houston. That is all of the questions that have been generated here. We'll return it back to you at the Cape.

KING Okay, thank you very much. I do have several announcements here. The latest number we have on the first television pass will be starting at 3:49 p.m. Eastern Daylight time if all goes well. Our second matter of interest is to the press here particularly. Barbara Cernan was here to observe the launch, and if the mission continues in this manner she will be happy to meet the press

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Anybody who desires to interview her should KING be available at 5:00 p.m. Eastern Daylight time at the Quality Courts Motel in Cocoa Beach. I think there are 2 pools there, I'll have to find out which one it is. Just a minute. We have a little statement here. Mrs. Barbara Cernan, wife of Apollo 10 lunar module pilot Eugene Cernan, will meet the press at 5:00 p.m. today at pool side behind the Quality Courts Gemini Room in Cocoa Beach. All media representative who wish to cover Mrs. Cernan's conference may either drive their own vehicles to the motel or ride one of the NASA busses departing the press site for Cocoa Beach following the Post Launch Press Conference. I guess one final thing, we had planned another conference here for after TLI and after the television pass. We will not have Mr. George Low, who we thought was going to participate. He wants to fly back directly to Houston. The participants would be Dr. von Braun, Dr. Debus, Mr. Lee James from the Marshall Space Flight Center, and in all probability Rocco again. You you people interested in a conference such as that; it would be obviously quite launch oriented. Somebody say something. Okay, we'll have it. Thank you very much. We'll see you after TLI. Yes, it will be out here. The time will be up to the TV pass, so let me see, we'll hack it in at, what did I say, 3:49 - probably in the area of 4:50 I would expect, 4:15 to 4:30. I think everybody is going to be tied up in one variation or another on TLI and then the television pass, so why don't we take a hack at 4:30 as the time? Thank you.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 13:30, GET 141 23/1

PAO This is Apollo Control at 1 hour 40 minutes. Apollo 10 has just passed over the east coast of the United States. During - we are still in contact at The crew has extended the docking probe. Grand Bahama. John Young reported he could hear it go out and Charlie Duke has passed up the TLI information and also some pads for several abort times right after TLI. We have the tape of this pass over the United States, starting at Guaymas. We will play that for you now. CAPCOM Hello, Apollo 10, Houston through Guaymas, standing by. Roger, Houston, read you loud and SC clear. CAPCOM Rog, you're 5 by. SC Okay, we are ready to extend the docking probe when you are. Roger, stand by. CAPCOM SC We've got to get a go on that temperature measurement. CAPCOM 10, Houston. We are ready for you to extend the docking probe and you will have to stand by on the temp until we get high bit rate. SC Roger. SC Okay, we will count down. 5, 4, 3, 2, 1, extend. CAPCOM Rog, copy. SC Probe extend doing great. CAPCOM Roger. SC We could feel it klunk. CAPCOM Rog. SC We could hear it go out I bet it's all the way out. CAPCOM Roger. You say you heard it go out? SC Yes. CAPCOM Okay. Hey, we will have that P27 for you over Bermuda at about 1 + 40 and we've got a TLI plus 90 pad, if you are ready to copy, 10. SC Stand by. SC TLI + 90. Go ahead, Charlie. Roger. CAPCOM Roger. TLI + 90, SPS/G&N, 63556 - 148 + 135003554487 - 05484 - four balls 1 + 66232180239 001, apogee is NA, perigee is + 00175, 66458, burn time 73766199242087167. SC Hello, Houston, this is 10. CAPCOM Go ahead. SC Houston, we lost S-band for a second there. I got everything to HANA, go after that. CAPCOM Okay, Gene. HP + 0017566458737

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1443, GET 254 29/1 CAPCOM - roger. Is it a - give you a feeling like it - 2.2 Mach in the 104, something like that, just a little rumble? SC Yes, kind of, but not as much. We are starting the maneuver now and we will tell you later. CAPCOM Roger. PAO S-IVB is maneuvering to separation attitude. SC 57 direct O2 coming off. CAPCOM Roger. PAO Alitude is 1598 miles, velocity 30,077 feet per second. SC We show ourselves at the attitude, over. CAPCOM We confirm, 10, you are go for sep. SC Roger. We are going to check the thrusters here now. CAPCOM Again, you are go for power arm and go for sep. That's John Young. He will do PAO the docking to the LM. PAO He is now in the left seat flying the command/service module. A minute and a half from separation. The command and service modules will separate from the S-IVB at about -SC Houston, this is Apollo 10. Could you confirm the firings, over? CAPCOM Say again. SC Could you confirm the thruster firings, over? CAPCOM Stand by. 10, Houston. We confirm all the rotational input, we did not confirm the translational - as far as we are concerned, you are go. SC Roger. CAPCOM 10, we did see + and - X on the translational. SC Rog. SC 10, Houston and now 22 looks good to us. SC We are zips. CAPCOM Roger. PAO Apollo 10 is pitching around now the Guidance Control officers says, pitching around and then will come back in and dock with the Lunar Module. Altitude now 3 thousand 580 nautical miles, velocity is down to 25 thousand 401. SC That world is just incredible. There goes a panel Charlie.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1443, GET 254 29/2

CAPCOM	Roger. How do you read me King.
SC	Loud and clear. We don't have the S-IVB up
but there goes a panel.	×
CAPCOM	Roger.
SC	That world is incredible.
CAPCOM	Really moving?
SC	Holy moly, I sure hope we can show
it to you, I really do.	
SC	Okay, I got the S-IVB.
CAPCOM	Roger.
SC	And there goes another panel.
CAPCOM	Rog. All retrograde, we hope.
SC	I don't know what (garble) it is
up here right now.	
CAPCOM	Yeah.
PAO	Those are the SLA panels that
house the Lunar Module.	They've been jettisoned.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1454, GET 30500 30/1PAO Those are the SLA panels that house They've been jettisoned. the lunar module. Charlie, I've got the world on SC closed circuit here, so we're going to try and get high gain. CAPCOM Roger, standing by. SC Okay babe, there's high gain. The TV is on. I should be coming down to you and I'll have to adjust it as we come along into the S-IVB. CAPCOM Hey, it's beautiful Gene. We got the black and white now with a little time delay on the color. Hey, we got the S-IVB coming into the top. The Sun's really shinning on it. SC Okay, I'll try to adjust it for you. CAPCOM Hey, we got the color now. PAO You're on the air babe. Oh. that's beautiful. 80 Have you got the color? Yes sir. It's looking great. CAPCOM I'm sorry it's tilted a little bit. SC That's the best I can do with the brackets. CAPCOM No sweat, we got it right in the center of the screen Gene. It looks like the Sun's really bright on it. SC Tremendously so. CAPCOM The Sun's got the S-IVB, the LM sort of blotted out it's so bright. Hey, your zooming in looks really good, Gene. SC Charlie, I've got it closed down all the way. Does that help any? CAPCOM Rog, the - in the center of the LM now, we still got a couple of real bright spots but it's looking real good in the color. We can see the prob, correction, the drogue. Gene, it's really looking good. It's the silver panels that are reflecting back real brightly. SC There awful ... that's right now too. CAPCOM Rog, the resolution is fantastic. You're drifting off just to the right a little bit. 10, Houston, you can't believe the picture we're getting. The resolution is really fantastic. SC I'll tell you, this monitor makes How's the color, Charlie? it great. CAPCOM Say again. SC How's the color? CAPCOM It's really beautiful, Gene. You've got it framed just perfectly. SC Hey, I think the color would be

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1454, GET 30500 30/2

beautiful once we can show you the SC Barth. CAPCOM Rog. Old Snoopy sure looks good. Yep, he sure do. Old Charlie Brown SC is a mass of cord and wire floating around here though. I can imagine. CAPCOM 8 C Houston, Charlie Brown. I've settled down now on the zoom and the closing range you see is the closing range we've got. CAPCOM Roger, we copy. Gene, if it looks like to you, we have a bright spot. It may be on your vidicon, coming in on your vidicon tube on the black and white. It's right above the drogue. Now we've got it in real life. SC The camera is fully in the shade. That's just a reflection coming right off the - right off of Snoopy. CAPCOM Rog. 10, we're afraid you might be burning a hole into your vidicon tube. Move it off to the - a little bit off her, Snoop. I think those panels are so bright, we might be getting problems with the vidicon tube. SC All right. I can just cover it up for a while if you like. CAPCOM Stand by. 10, Houston. We'd like the LM - Snoopy back again if you could give it to us. SC I'd be glad to. CAPCOM Hey, that's looking great now except for a couple of fingers there or something. SC Good resolution, that's what they were. CAPCOM You got your big hands in the way. Hey, I don't know what you did but the - it's really beautiful now. Really great. SC We're just a little closer. CAPCOM Hey, the color is great, Gene. Yea. How's that for the front porch. SC CAPCOM Oh boy, that's beautiful. SC Hell, I got to watch it on TV too. I've got - can't see out the window. CAPCOM Hey, what's that guy doing on the front porch. SC That's a green man, Gordo. John estimates 50 feet close. CAPCOM Roger. SC Well, all I can say it's really happening and what hasn't happened you haven't seen yet. CAPCOM Roger. Really great, ready to leave here.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1454, GET 30500 30/3

PAO That was Gordon Cooper. He and Charlie Duke are both on the CAPCOM console. And that orange platform is the front porch.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 3:15, CST 1504 31/1 Charlie, we can't be more than about SC 5 or 10 feet away. CAPCOM Roger. 10, it's looking real stable, we show CAPCOM you closed in tightly. Be docked in a second, I hope. SC CAPCOM Roger. 10 , Houston, you're looking good. We CAPCOM can figure your marking on your rendezvous window. Looks like you just docked. Roger, we're on the captures, we haven't SC fired yet. CAPCOM Roger. Gene, we can read the numbers on the LM CAPCOM docking window. SC Snap snap and we're there. Got 2 grays. CAPCOM Roger. SC You saw us docking, Charlie. SC We didn't get any master alarm. Everything looks good. Roger. Didn't look like there was hardly CAPCOM any after-dock post-docking of oscillations. SC Yes. SC Okay barrells coming off. CAPCOM Roger. 10, that's a great picture of the quads. CAPCOM I'll try and take you on a quick tour. SC We're - I may have to hold you up for a little bit here. SC Okay, John's going down to the LEB and I'm going to the left seat now. Roger, Tom. We're standing by. CAPCOM Apollo 10, Houston, we'd like for you CAPCOM to safe the logic. PAO That was one of the reaction control system quads you saw there at the last. We're coming back up here now with another picture. Altitude 6469 nautical miles, velocity 21,280 feet per second. Charlie, you're going to have to look at SC the same picture for a while until we get this (garbled) check complete. Roger, we understand you are busy. CAPCOM SC Okay, I marked it. SC Houston, this is 10. We are in the process of attempting to pressurize the tunnel.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 3:25, CST 1515 32/1 SC Hello, Houston. This is 10. We're going to go ahead and spare the TV here for about 10 minutes till we get a little bit squared away. CAPCOM Rog, understand. SC We'll be back with you shortly. CAPCOM Roger. Can you give me a call when you got time to copy an evasive pass? SC Okay, I will. PAO This is Apollo Control. Gene Cernon indicates he's going to have the camera off for about

10 minutes while they do some work. We'll continue to stay up in case we get any communications. SC Be docked in a second, I hope. CAPCOM Roger. 10, Houston. You're looking good. We can figure your markings in a rendezvous radar. It looks like you just docked. SC Roger. We had a capture. We haven't fired yet. CAPCOM Roger. Gene, we can read the numbers on the LM docking window. Snap, snap and we're there and got two SC grays. CAPCOM Roger. SC You start em docking, Charlie. SC We didn't get any master alarm. Everything looks snug. CAPCOM Roger. Didn't look like there was any hardly any after dock - post docking evaporation. SC Okay, firing is coming off. CAPCOM Gene, that's a great picture of Roger. the quad. SC I'll try and take you on a quick tour. We're - I may have to hold you up for a little bit here. Okay, John's going down to the LEB, and SC I'm going to the left seat now. Roger, com. We're standing by. CAPCOM CAPCOM Apollo 10, Houston. We'd like you safe for logic. Charlie, you're going to have to look at SC the same picture for a while until we get this ... check complete. CAPCOM Roger. We understand you're busy. SC Okay, I'm watching. Houston, this is 10 We're in the process of attempting the pressurize the tunnel. SC Hello, Houston. We're going to go ahead and suspend the TV here for about 10 minutes till we get a little bit squared away. CAPCOM Rog, understand. SC

We'll be back with you shortly.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 3:25, CST 1515 32/2 CAPCOM Roger, Gene. Give me a call when you got time to copy an evasive pass. SC Okay, I will. 8C Charlie, go ahead. I'll take the evasive over. Roger. You're ready to copy. We have CAPCOM a P30 pad evasive maneuver SPS/G&N 63556 plus 091 minus 021 004 390900. 981 is plus 3 balls 51 plus 5 balls plus 00190. How do you copy? I'm still with you. It's just ... I SC got gloves on yet. CAPCOM Okav. Want me to slow down? SC Yeah, just go to where you are. Rog. 061255358, apogee and perigee are CAPCOM The rest of the pad is N/A and no ullage. N/A. 0019700300150. SC Charlie, repeat real pitch and yaw. Rog. CAPCOM Roger. 061255358. Did you copy? CAPCOM Apollo 10. Houston. Do you read? END OF TAPE

Houston, this is 10. CC Roger, 10. We read you now. We had a handover to Goldstone and lost you for awhile. How do you read me? Okay. I've got you on OMNI and SC I'll copy the rest of the pad on OMNI until I get high gain back I got roll of 061, pitch of 255 and give me your YAW. again. CC Roger, YAW. 358. SC Okay. Purpose is evasive. FPFG and APS 63556 plus 091 minus 021 004 390900 981 and plus 00051, plus all balls, plus 00190, rule 061 255358, DELTA VT is 00197, burn time is 003 and DELTA VC is 00150. CC Roger. Good read back, Gene. CC Roger good readback, Gene. CC Apollo 10, Houston, the S4B's here are getting ready to do a auxiliary hydraulic pump cycling which you may feel and we will have a nonpropulsive

event in a few minutes, also. Okay. Roger. I would reckon SC that possibly 10, latches 10, 3 and 4 are roughly going to be one shot in progress from the position of the But G. But they all are automatically made. CC Roger. We copy, John.

SC It's just like downtown up here. CC Okay. You have seen it before. SC Houston, this is Charlie Brown. How do you read me high gain? CC Roger. 5 by. SC Okay. We're just getting the hatch area squared away at this time. CC Roger. Get the umbilicals connected? SC Yes. We just now completed that. CC Roger. SC Okay, Houston, we're reading 2 volts on systems step meter 4D and it just bounced back to four tenths of a volt so I guess the heaters are cycling or something on the LM. CC Roger. CC Hello 10, Houston, Telecom sees the LM current that looks nominal. SC Okay, thank you.

APOLLO 10 COMMENTARY, 5/28/69, CST 15:26, GET 32700 33/1

Apollo 10, Houston. Do you read?

CC

SC

33/2 APOLLO 10 COMMENTARY, 5/18/69, CST 15:26, GET 32700 SC Hello, Houston, Apollo 10. CC Go ahead, Tom. SC Okay. When we pressurized the LM, the Mylar all blew out of the tunnel hatch there and we have got a spacecraft that has beaucoup of insulation in it here. It looks like it didn't leave a big enough hole. Just like the same way when the LM forward tunnel insulation used to blow out. CC Roger. Copy. You lost every bit of the mylar in the back side of the hatch? SC Not every bit, but a whole bunch of it. SC Oh, just a little of it, Charlie. CC Okay. SC But, of course, they do away with it on 107 and SUBS. CC Okay. You got lots of pieces floating around? SC A few. CC Okay. SC Just a little snow.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1543, GET 354 34/1 This is Apollo Control at 3 hours, PAO 54 minutes. We have 2 to 3 minutes of tape at this conference at the Cape. We'll play that for you now. Houston, Apollo 10. SC Go ahead, Tom. CAPCOM SC Okay. When we pressurized the LM the mylar all blew out of the tunnel hatch there and we've got a spacecraft that has beaucoup insulation in here and it here look's like they didn't leave a big enough hole. Just like the same way when the LM forward tunnel insulation used to blow out. CAPCOM Roger. Copy. You lost every bit of the mylar on the back side of the hatch. SC Not every bit but a whole bunch. SC No, just a little bit of it Charlie. CAPCOM Okay. SC But of course they do away with it on 107 and subs. Okay. You've got lots of pieces CAPCOM floating around? A few. SC CAPCOM Okay. SC Just a little snow. CAPCOM Hello Apollo 10, Houston. We still show the EDS power on and the EDS breakers closed. Would you turn the power off and open the breakers if you've got a second? SC Okay, power coming off. SC Hello Houston, this is 10. We've got the logic on and we're standing by for your go for power on. CAPCOM Roger, stand by. You have our go for power on, 10. SC Okay. Power's coming up and on. CAPCOM Rog. SC 10 Houston. The S-IVB is still venting not propulsively. PAO We have TV coming up again right The Command Module Service Module and the LM have now. just separated from the S-IVB. SC Houston we have cryo pressure light 02 tank 1 and 2 are reading about 800. CAPCOM Roger. CAPCOM 10, we'd like to have you turn the fans off. SC They are off.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1543, GET 354 34/2

Houston, we're maneuvering around SP right now at the quarter S-IVB area according to the accepted attitude. CAPCOM Roger. Houston, that was fans in auto SP or off on the 02. CAPCOM ON Gene, on. There on. ON. SP CAPCOM Rog. SP Okay, Houston, we can see the IVB now. Roger. Out of which window, Tom. CAPCOM John's looking out the hatch SC window. CAPCOM Rog. Houston, it's the S-IVB in the TV SC right now. Roger. We got it right over the CAPCOM quad - thrusters there Gene. That's it. I'll see if I can bring SC it into you. Right. Thanks. CAPCOM CAPCOM 10, that TV is really fantastic. It looks like the dome there of the SC IVB's gold. CAPCOM Roger. SC It looks like we have good separation systems and no problems. CAPCOM Roger. It looks about the size of a quarter to us here, Tom. What do you estimate your range? SC I'd say at least 300 feet now, CAPCOM Rog. SC Are you getting anything Charlie? Rog. Gene. That zoom was real CAPCOM good. We have the S-IVB, the sun's real bright on it. SC How's the focus? CAPCOM Looks real good. That LM antenna is showing up real bright. SC Hello Houston, Apollo 10. CAPCOM Go ahead 10. SC Roger, I wish you'd tell Dr. Von Braun, Lee James, Kurt Davis and Rocco Petrone thanks a lot for all the people who worked on the great ride. Rog. We're going out to the net-CAPCOM works now. I think they probably heard it, but we'll pass it on though. You tell the people who worked SC on that machine, we sure appreciated it. CAPCOM Rog. It looked beautiful from here. CAPCOM Did you move the camera, Gene? SC Say again. CAPCOM Did you move the camera? SC It's up the hatch window. John's got it now.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1543, GET 354 34/3 CAPCOM Okay. SC In fact you can see the IVB's attitude thrusters firing there. CAPCOM We haven't been able to pick that up yet, IVB's really good. SC Yeah.

APOLLO 10, MISSION COMMENTARY, 5/18/69, GET 4:04, CST 15:53 35/1 The IVB's really good. CAPCOM I'd estimate now that we're a good SC 300 to 400 feet away. CAPCOM Roger. And we're slowly going away. We're SC starting to see one side of it. CAPCOM Roger. CAPCOM And 10, Houston. ... can see your thrusters firing up there on the S-IVB. Good show. I can't even see him from SC He must be about 2500 miles away. here. Laughter. You're looking out the wrong CAPCOM window. I'm sure going to like Snoopy, because SC that's all I'm going to see. Distance from the earth now 13,531 miles, PAO velocity 16,063 feet per second. Okay, I've got the IVB out my window now . SC SC Okay, Houston. This is CDR. I've got the IVB out of my window here. Roger, Tom. It's looking great. CAPCOM It's a pretty hot bright network. We'd like you to keep the camera moving around so we don't burn anything. Houston, this is 10. Can you see all the SC particles around us? CAPCOM Negative, Tom. All we got is the SIVB, and it's a real bright blob. SC Yeah, okay. Looks like -CAPCOM Is your ALC switch on inside or exterior/ interior? SC On interior. You want to go exterior? CAPCOM Let's try that. That better? SC On the black and white it is. CAPCOM Stand by on the color. We got that delay. Hey yeah, that's a lot better. It took all that wash out, out. Looks good. Charlie, we're looking for the earth SC right now. We'd like to show it to, but we can't find it. CAPCOM Roger. It's down there somewhere. That's a smart comment. Ask the navigator. He should know. SC He's the housekeeper right now. SC Okay, Houston. Now this is Apollo 10. We want to get ahead and get some other things done. We're going to go ahead and turn off the TV for a while. CAPCOM Roger, copy. PAO This is Apollo Control at 4 hours, 10 minutes. Tom Stafford indicates that's all of the television for a while. We're sure he'll give us enough notice when he wants to come back up with it. We're 28 minutes away from

APOLLO 10, MISSION COMMENTARY, 5/18/69, GET 4:04, CST 15:53 35/2

the nominal evasive maneuver time, how-PAO ever, both the ground and the spacecraft are GO for this maneuver and at crew option they could perform it early. This will be a 19.7 feet per second burn with the service propulsion system, the big engine in the service module, retrograde burn. It will put the SIVB out ahead of the Apollo 10 spacecraft, the dock configuration. Then shortly after the burn the remaining propellants in the SIVB will be vented through the engine, be a propulsive vent.

Then, we're still moving away from the SC SIVB, but that rascal is foresighted right at us. CAPCOM

Roger, Tom.

PAO There will be enough energy in this propulsive vent to put the SIVB on a trajectory that will go around the trailing edge of the moon and then into solar orbit. This is the sling shot maneuver. Distance from earth now 14 449 miles, Apollo 10's velocity now 15 635 feet per second.

PAO This is Apollo Control at 4 hours, 14 minutes. We still have about 3 minutes worth of tape left that accumulated during the news conference at the Kennedy Space Center. We'll turn that tape over to the transcript typist, and we'll continue to stay up alive through this evasive maneuver.

APOLLO 10 COMMENTARY, 5/18/69, CST 16:03, GET 4:14:00 36/1 PAO Apollo 10 is now 15,023 miles away from the earth. The velocity is 15,364 feet per second. CC Apollo 10, Houston, we would like you to verify that the suit circuit return value is open. Thank you Charlie we got it. SC CC Roger. Hello, Houston, Apollo 10. SC · CC Go ahead, 10. SC Okay, estimate now that we are out a good 1000, 800 to a 1000 feet before BN. Have moved out laterally, oh, maybe 400 feet. CC Roger. SC It looks like out of the bird direction we will be in will put us in the right direction, if we keep moving lateral CC Roger. Copy. SC Houston, Apollo 10, we are in burn attitude. *CC Roger. We copy. CC Apollo 10, Houston. We'd like for you to turn off the 02 CRYO fan. 02 CRYO fan, CHARGE. SC SC Houston, this is Apollo 10. We are back on OMNI. We were getting a bad squeal on our S-band. CC Roger. Copy. SC Is that okay, or do you want to look at this one on high gain. CC Stand by. It looks good on OMNI. You can stay where we are. 8C Okay, Houston. Apollo 10 coming up to 5 minutes. We are going to start our gimbal drive check. CC Roger. Copy. SC YAW 1 on. Pitch 1 coming on. CC Roger. SC Pitch 2 coming on. CC Roger. SC YAW 2 coming on.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 4:34, CST 16:23 37/1

This is Apollo Control. Tom Stafford PAO running some gimbal checks on the SBS engine prior to this evasive maneuver. We're about 3 minutes, 57 seconds away from that maneuver which will occur at 4 hours, 39 minutes, 9 seconds. Duration of the burn 2.8 seconds, delta V 19.7 feet per second. Apollo 10 is 17 529 nautical miles away from the earth, its velocity 14 368 feet per second. The weight of the combined vehicles 94 271 pounds. Okay, Houston. Coming up on 2 minutes. SC Delta V thrust A normal. CAPCOM Roger. SC Mark 1 minute to the burn. CAPCOM Rog. SC 30 seconds. CAPCOM Rog. SC 20 seconds. Burn. CAPCOM Roger. SBS shows 90 BF5. SC CAPCOM Roger. SC Engines off. CAPCOM Looks like a good burn to us. SC Okay, we have - you see the residuals plus 1 2 tenths and 5 tenths. CAPCOM We copy. CAPCOM 10, Houston. That burn looked real good to us. I think the SDS is GO. SC Roger. And we're leaving IVB way behind. CAPCOM Roger. SC Houston, Apollo 10. All the pulse burned. ... are cleaned up. CAPCOM Roger, Tom. We copy. Stand by. SC Roger. Could you give us a - before wa pick up the BCT at 12 hours, could you give us an angle so we can look at the earth out of one of the windows? CAPCOM Rog. We're going to have an update on that flight plan maneuver for you. Stand by. CAPCOM 10, Houston. We're about 95 percent sure that we're going to skip midcourse number 1. Give us some time to look at the data, and we'll get back and confirm that with you definitely. SC Okay. CAPCOM And 10, Houston. When you dock your suits, we'd like each one of you to read - give us a reading on your suit radiation dosimeters, please. SC Rog. SC Houston, this is 10. You want to go ahead and start charging battery 5? CAPCOM Stand by. CAPCOM That's affirmative, Gene. Go ahead.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 4:34, CST 16:23 37/2 You can start the battery charge. CAPCOM Okay. SC Apollo 10, Houston. With somebody down CAPCOM in the LEB, we'd like a readout of the LM CM delta P. John ... will get it for you. Roger. SC CAPCOM Rog. Roger. We're reading 8 tenths right now. SC Roger, copy. 8 tenths. CAPCOM Make that 8500. SC CAPCOM Okay. Apollo 10, Houston. In about 3 minutes CAPCOM we're going to have a short LOX dump on the saturn. Okay, we can't see it. It's just long SC gone from us. CAPCOM Okay. Hello Houston. This is 10. SC Go ahead. CAPCOM Okay, I'm reading 100.5 percent oxidizer SC and 101.2 percent fuel. My unbalance went from - on that short burn - from a minus 15 to a minus 200. CAPCOM Roger. We copy. CAPCOM 10, we'll have that attitude for you for the right-hand hatch window for the earth in a couple of seconds. SC Okay. SC Yes, Charlie. CAPCOM Is that okay, or do you want the hatch window? SC Right hand's alright. CAPCOM Okay. With the right hand, we could use the SC mount then. CAPCOM Okay. SC The last time I saw it it started to look - the last time I saw it it started to look like a medicine ball. CAPCOM Rog. SC Okay. Apollo 10, Houston. We have an update CAPCOM for your P23 attitudes and stars if you care to copy at this time. SC Okay. Go ahead. Roger, Gene. At 5 hours this attitude CAPCOM for the P23 as listed in the flight plan is incorrect. We'd like you to have a roll of 180 pitch of 167, a yaw of zero. SC 180, 167, 000 at 5 hours for P23. That's affirmative, and we've got an CAPCOM update to your stars also on page 3-9 if you're ready to copy. SC Yeah, go ahead.

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET 4:34, CST 16:23 37/3

CAPCOM You ready? SC All set. CAPCOM Okay, roger. Set 1 is now ... number 37, and it's near side. Set 2 is a peacock number 42, and it's near horizon. Set 3 is also peacock 42 near horizon.

The diffice prime burned,

APOLLO 10 COMMENTARY, 5/18/69, CST 16:38, GET 44900 38/1 CC Set 3 is also Peacock, 42 near horizon. and the last 2 sets 4 and 5 on Antares far horizon. Did you say Peacock set 3 was SC far horizon? CC Negative, near horizon for sets 2 and 3 on Peacock. SC Okay. Okay. CC The reason for the update, we forgot we had Snoop out there. CC Okay. CC Hello, Charlie Brown. This is Houston. We've got that attitude for the Earth out the right-hand window. It's a row of 277 pitch 187 YAW 15. apollo 10, Houston. сc CC Hello 10, Houston. Over. PAO This is Apollo Control. Apollo 10 just passed the 20,000 mile mark. Now, 20,007 miles from Earth, velocity is 13,508 feet per second, weight 94,096 and one-half pounds. CC Hello, Apollo 10, Houston. Do you read me? Apollo 10, Houston, in the blind. CC Hello, Charlie Brown, Houston. Over. Hello Charlie Brown, Houstón. CC Over. CC Hello Apollo 10 Houston, over. CC Hello Charlie Brown, this is Houston. Do you read? Over. This is Apollo Control. PAO We are receiving data from Apollo 10. Charlie Brown. This is Houston CC Over. PAO Having some difficulty with the voice communications. The communication officer says it looks like Apollo 10 may be trying to lock on with the high gain antenna now. Hello, Houston, this is Apollo 10. SC CC Go ahead, Tom. We are reading you now. CC 10, Houston. We are reading you intermittent.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1649, GET 500 39/1 Hello, Houston, Houston, how you SC read? CAPCOM Roger. 55 zing, how many. Houston, Apollo 10. How do you SC read? Reading a 5 by how many. CAPCOM Apollo 10, Apollo 10, this is CAPCOM Houston. How do you read? Over. Stand Houston, do you read? SC SC Hello Houston, Houston. This is How do you read? 10. capcom Rog. Read me a 5 by zing how many. Reading you alright now. I've SC been having a lot of trouble with the omni's and the high gain borrows. We get about 3/4 signal strength and the noise gets so bad and apparently your not hearing. That's affirmative. We've been CAPCOM having the same thing. We think your going from our omni a little bit too fast and not giving us a chance to get locked up real good. I guess we're on the omnies now and we're hearing you 5 by. Okay. I'm on omni C right now. SC We've got the earth here and we'd like to be able to go high gain and show it to you, you configure. CAPCOM Stand by. We're .configured network say to go. You can go high gain. SC Okay. This is Apollo Control. PAO Five hours, 4 minutes Apollo 10 is going to try to bring us another live color TV show, showing the earth. We'll stand by for this transmission. Apollo 10's distance from the earth now 21 119 nautical miles, velocity 13 174 feet per second. Charlie, if you see this, it's SC going to be out of this world, literally. CAPCOM Rog. Stand by Gene. SC Okay. We can see exactly all of ... CAPCOM Your cutting out Tom. SC Are you giving me a signal now? I'm looking right at the good old U S of A there. CAPCOM Rog. 10, Houston. We're looking for CAPCOM the TV. How does the high gain signal strength look to you? SC It's loud and clear. CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1649, GET 500 39/2 Still nothing Charlie? SC PAO Picture coming up shortly. SC I figure we should be over the United States, Mexico Hey, it's really beautiful Tom. SC It's coming in great. SC You ought to see it up here, Charlie. SC We've got the whole globe, there. SC Yes, you're looking right at the United States there. SC Rog. SC See the Rocky Mountains sticking Can't tell whether you have any out. Baja, California. fog in LA or not but Alaska is pretty much fogged in. Rog. CAPCOM SC It's really a beautiful picture. SC We'll just let it go here for a couple of minutes. Okay, thanks. Do you know on your CAPCOM monitor, which way is the North Pole to you? We've got it up at the northeast corner? SC That's right Charlie. The northeast corner is the North Pole. CAP COM Okay . SC You can see clouds cover the northern part of Alaska and it comes down in part over the northeast part of Canada and I can see out into the New England area, we've got a low pressure area out of there. CAPCOM Roger. SC The color is fantastic. It really is, SC Okay, and it looks like the Rocky Mountains are rich color to me. The rest of U.S., Baja, California, that really stands out like all brownish and the oceans are blue but there are so many clouds out to the northeast of the United States, you can't believe it. Covers the Far East over to Europe as far as you can see, Rog. We feel that we've got a CAPCOM

brownish spot that's pretty hard to pick up just exactly what we're looking at but we do see the brown and the clouds out over the ocean about the center of the globe. APOLLO 10 MISSION COMMENTARY, 5/18/69, GST 1949, GET 500 39/3 Yeah, eksy. The brown spot is the 80 Rocky Mountains down around New Mexico up into Colorado. CAPCOM Roger. This resolution is fantastic. The 8C LM you can count the rivets on it and yet the earth and the colors are really beautiful. Okay, well I san clear a bit on a SC certain part of the earth here, I'll try to slip in on the Rocky Mountains and California. Rog. Stand by Tom. CAPCOM . How's that Charlie, better? SC CAPCOM We're looking at it on the black and white here, it looks great. Stand by here it comes in on the color now. SC That is really fantastic. We can pick out Baja and the smog over LA and we see Mexico and we go off to the east, in our picture, and come into the Rockies area. The Baja, California and the Gulf, they really stand out beautifully. Okay we'll move it around. SC Looks like we've get some clouds CAPCOM down over New Orleans and down that way. SC Yeah. Okay Charlie, that's full soom. CAPCOM Okay, this is get to be the greatest sight ever. You ought to see it up here. SC Hey Tom, boy. It is really fantastic. CAPCOM Could you get Baja, in a little bit, we're showing this deal to the Pacific now. Okay, we've got the Baja now on the right hand side of our screen and it's right in the center new. We can see Mexico and the clouds up over the Rockies. It's really a fantastic sight. Almost see the freeways in LA. Right. I'm going to move down SC you can take a look down by the Gulf of Mexico now. CAPCOM Roger. Charlie, it's so hard to describe. SC You can go right up pass Alaska and you can see the polar cats. It's incredible. CAPCOM We see it all here, Gene. The colors are really beautiful. That's great. And the blackest SC black that you'd ever could conceive is the setting for all this. CAPCOM Rog.

APOLLO 10 COMMENTARY, 5/18/69, CST 17:00, GET 51100 40/1 SC that you ever could conceive. There's a study for all this. CC Roger. SC which the people of New York have a little bit of cloud cover there. It goes all the way down, back down by the Cape. Roger. You guys are really This is fantastic. giving us a great show. We just want to thank all the SC people who helped get us up here, Charlie. I know. CC Roger. SC That includes the tax payers, also. SC Charlie, you know, you blink your eyes and you look out there and you know it's three dimensional, but it is just sitting out there in the middle of nowhere and it's unbelievable. CC We copy, Gene. We are getting a real idea now, for the first time of what you are really seeing out there. The colors on the oceans are just as blue as they can be and real white clouds all over and the land is a real deep brown - almost a reddish brown. SC And the North Pole - the Anartic area is solid white and snow-covered. CC Right. SC It's brown in the Rocky Mountains and orange down in New Mexico and becomes a little more of a purplish orange ---CC Roger. We see all ----I took you off there, Tom. We see all that and it is looking good. SC You can actually pick out what I think is the San Waukee Valley, just on the west side of the hills. CC Roger. SC I am going to open the zoom and bring it back the other way. CC Roger, 10, would you check your TV servo power. We show it on. Sorry, I must have knocked it SC on there when I was wrestling around here. CC Roger. CC Boy, we are looking at a black background now. SC There, you have the whole Earth. CC Roger. It is really beautiful. Tom, we can even pick up the little tip of the northern part of South America down below Baja.

APOLLO 10 COMMENTARY, 5/18/69, 27:00 CST, 51100 GET 40/2

Yes, it's coming in now. SC CC It's really blue, you guys. SC We are looking right at you. Looks like a few clouds right now in Houston. It's sort of a constant overcast CC here in Amoca, but we have never been. You are right on the edge of SC what might be some clouds, but certainly to the northeast of that area, you're clobbered. CC Roger. SC Okay John is going ahead through P52 here. CC Roger. SC I think I can see all the way up into the New Foundland area now up along the eastern coast that is not covered. Roger. You know, it looks to CC us that it is just completely clouded up over that way. You might say we have moved up SC the last couple of hours. CC Well, I'll say. We got you at about 26,000 miles here - or a little bit more. Okay, I am going to put the zoom SC on 55 which will give you the exact resolution we have. CC Roger. SC And just for the record, it looks to me like a pretty nice place to live. CC Roger. And we see you at P52. SC Okay, 55 on the zoom and that is about exactly the same thing we are seeing now. CC Well, that is really fantastic. CC 10, can you see the Hawaiian Islands? SC Negative. Too much cloud coverage. CC Okay. SC Houston, this is 10. Do those gyro torquing angles look okay to you? Stand by. CC Roger, they look okay to us, John. CC SC Okay. You can't verify these stars with the LM on right now. CC Roger. Are these your P23 stars? SC Negative. These are P52 stars. CC Okay.

APOLLO 10 COMMENTARY, 5/18/69, CST 27:00, GET 51100 40/3 10. Houston. How do the stars look CC in this attitude? In the telescope, I have difficulty SC telling the stars from the particles right now. CC Right. SC There are some that look like stars but I have not been able to stop long enough to really see if they are or not. Through the sextant they CC Okay. are okay? SC Affirm. CC Okay. SC The Barth is just starting now to take on a - a little bit of the terminator is coming across and we are losing the roundness on the bottom side. CC Roger. SC I should be on the eastern side. CC Roger. We are seeing that now coming in. SC I hope the colors are as good down there as they are up here. CC Absolutely fantastic. That is the only way I can describe it. It's really beautiful. Nouston, I have a question. Does SC that picture fill up your whole screen? I want to correlate it with the monitor. CC Negative. We got quite a ways to go before we fill up our screen, Tom. It looks about the size of a basketball or so. It's pretty hard, you are zooming in now and we are just about to fill up the whole picture. SC Okay. The monitor has a little different aspect, we show ----CC All right. Okay. CC Apollo 10, Houston. We are ready for the P27 update, if you can give us PU and accept. Okay, we want to get busy here. We are going to kill the TV for awhile. CC Roger. Thanks a lot for a good show, 10, it was beautiful. Right about now, from top to bottom, we have the whole Earth, and we still have some on the side. CC Roger. It looks beautiful from here.

APOLLO 10 COMMENTARY, 5/18/69, CST 27:00, GET 51100

PAOThe distance is 22,781 miles.CCSomebody is crying in his beer.SCNo, I think he is happy, too.ccI am kidding.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1708, GET 51900 41/1

CAPCOM Hello Apollo 10, Houston. We'd like for you to put the 8-band squelch switch off and when you're changing on these to pause 30 seconds in each position so we can get a good lockup.

SC S-band squelch is off. CAPCOM Rog.

PAO This is Apollo Control at 5 hours, 21 minutes. Tom Stafford has indicated they are going to close up shop for a little while as far as communications are concerned. Apollo 10 is 23,059 miles away from the Earth. Its velocity 12,646 feet per second. We'll come back up if there is any more air to ground. This is Mission Control, Houston.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1545, GET 35600 42/1 SC Houston, we still show the EDS power on and the EDS breakers closed. Would you turn the power off and open the breakers if you've got a second. CAPCOM Okay, power coming off. SC Hello Houston, this is 10. We've got the logic on and we're standing by for your go on power R. Roger, stand by. You have our go CAPCOM for power on, 10. SC Okay, powers have come up and on. CAPCOM 10, Houston. Rog. The S-IVB is still venting nonpropulsively. SC Rog. We're going to separate in just a minute. CAPCOM 10, we'd like you to stand by until that vents over in about 2 minutes. Okay, we're standing by for your SC go for set. CAPCOM Rog, Tom. 10, Houston. The vents over, we're go for sep. SC Roger, understand and we are go for sep. Houston, I'll turn the TV on on this one. CAPCOM Roger. Okay, I'm going to count down to sep. SC CAPCOM Roger, standing by. SC Three, two, one, go. Snoopy's coming out of the dog house. CAPCOM Roger, and we got the TV. SC Houston, we had a CYRO pressure light 02 tank 1 and 2 are about 800. CAPCOM Roger. 10, we'd like you to turn the fans off. SC They're off. Houston, we're maneuvering around right now to acquire the S-IVB. Going in a sep attitude. CAPCOM Roger. SC Houston, that was fans in auto or off on the 02. CAPCOM On Gene, on. SC They're on, on. CAPCOM Rog. SC Okay, Houston. We can see the IVB now. CAPCOM Roger. Out of which window, Tom. SC John's looking at it out of the hatch window. CAPCOM Rog. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1527, GET 53800 43/1

PAO This is Apollo Control at 5 hours, 38 minutes into the Mission. Apollo 10 is 25,033 miles from the Earth. Velocity 12.157 feet per second. Glynn Lunney and the black team of flight controllers getting ready to hand over to flight director Milton Windler and the gold team at this time. I beg your pardon, that is the maroon team. Milton Windler and the maroon team. There have been a few brief conversations on air to ground. We'll play those for you now. SC Houston, this is 10. How are you reading our OMNI? CAPCOM 10, this is Houston and we're reading We had a little noise there a minute or you loud and clear. so ago. It sounded like the S-band was getting weak. Okay, we're in now and I believe SC we're on the OMNI D right now. CAPCOM Roger, OMNI delta. Apollo 10, this is Houston, over. SC Go ahead, Houston, Apollo 10. CAPCOM Roger, we're through with the uplink. You can have the computer back and up telemetry to block and on your primary evaporator we'd like you to secure the H2O flow. It is H2O flows off. We recommend not trying to service the system until LOI, over. SC Roger. Hello Houston, this is Apollo 10. CAPCOM Apollo 10, this is Houston, over. SC Okay, just for information, I don't know how far away, it's far away, but we can tell that there is still a SLA panel out there just spinning around slowly and reflecting sunlight. CAPCOM Roger, do you have anymore information on apparent size, range, or anything like this on it. SC Oh, it's the size of Venus but it's obviously a star panel because you can see it rotating slowly and reflecting light. CAPCOM Rog, this is Houston. Roger, out. Apollo 10, this is Houston, over. We're maneuvering auto maneuver to SC an attitude to start delta V-23. CAPCOM This is Houston, copy. SC Looks like our RCS fuel budgets in real good shape. CAPCOM Roger, we concur on the RCS fuel budget. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1752, GET 603 44/1

This is Apollo Control at 6 hours, PAO 3 minutes into the flight of Apollo 10. At the present time, our spacecraft velocity is 11, 602 feet per second and are now at an altitude of 27,546 nautical miles from earth. Here at Mission Control, Plant Director Milton Wendler and his team of flight controllers have taken over from Glynn Lunney we have a change of shift press briefing scheduled in the auditorium of building 1 in about 5 minutes from now. We've had some brief conversation with the crew since the previous announcement. The crew is advised that the midcourse correction nominally scheduled to take place at 11 hours, 33 minutes will be postponed until the second opportunity which will be about 26 hours 30 hours, Ground Elapsed Time. The reason for postponing the midcourse correction until the second opportunity is the fact that the change in velocity required will be very little greater for the second opportunity and this will lessen the chance that further midcourse corrections will be needed on route to the moon. At the present time, we'll play back the conversations we've had with the crew and then stand by for any further communication. Houston, this is Apollo 10. Have SC you already loaded that variation measure for us? CAPCOM Stand by. CAPCOM Apollo 10, Houston. Stand by. If you've had the right hook-in SC numbers in there, I just don't know if the option is right. Apollo 10, this is Houston. Roger CAPCOM we loaded that in your racer board. Should be good. Apollo 10, this is Houston. Did CAPCOM you copy? SC Yes sir. Thank you Bruce. CAPCOM Roger up. CAPCOM Apollo 10, this is Houston. Over. SC Roger. Go ahead. Roger 10. There will be no mid-CAPCOM course correction number 1. We're going to do away until the nominal time of midcourse correction number 2 to start with the midcourses and instead of just passing you the POI plus 11 pad at this time, we liked to pass you the TLI plus 11 the plus 25 and the plus 35 hour pad. The last one will be allowed under the assumption that we don't have a midcourse correction, until then, we'll update it after midcourse correction number 2. For your information, the delta V of midcourse correction 2 at 26 hours and 33 minutes will be about 48.9 feet per second which is only about 2 feet per second larger than we'd require for a midcourse correction number 1 for the nominal time, over. SC Roger. It sounds like a real great idea. Sounds good. CAPCOM Okay, if you're ready to copy, I've APOLLO 10 MISSION COMMENTARY, 5/18/69. CST 1751, GET 603 44/2 I've got 3P 37 pass to pass. CAPCOM Okay, stand by. SC Looks like the S-IVB did a good SC job for us and also what we calculated on that separation burn. Put us right down the money. CAPCOM Yes, indeed. SC Okay, Bruce go ahead. Roger. P 37 block data for PLI CAPCOM plus 11 hours 01330 5201 minus 16504637 over. SC Go ahead. CAPCOM TLI plus 25 hours 027305795 Roger. minus 16507028. SC Okay. CAPCOM Roger. TLI PLUS 35 hour pass. 037305037 minus 16509435 read back over. TLI plus 11 is 013305201 minus SC 16504637. Plus 25 is 027305795 and minus 1657028. And 35 is 037305037 minus 1650 minus - correction 9435. Roger, Apollo 10. CAPCOM Read back is correct and for your information you are now in free return trajectory. Your entry angle is very steep currently about 65 degrees, in the event of lost comm you could correct this with P37 over. SC Okay, understand. Thank you. SC 65 degrees. CAPCOM Yeah, like nearly vertical. SC Hello Houston. This is Apollo 10 over. CAPCOM Go ahead, Apollo 10. Okay. Should I go ahead and turn SC my H2 purge line heater off, I may have forgotten it. I've still got it on now. CAPCOM Stand by. CAPCOM Apollo 10, this is Houston. Roger, go ahead and turn off your H2 purge line heater and under our revised schedule of passing pads up we're not currently planning to send you any PADS at GET of 12 hours, over. SC Okay, fine.

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET 6:38, CST 18:27 45/1

PAO This is Apollo Control at 6 hours, 38 minutes into the flight. At the present time, our altitude is 31 300 nautical miles. During the press conference, Tom Stafford requested that the ground pass up attitudes for an unscheduled television pass. The crew hopes to get additional television coverage of the earth as the earth continues to receive. We've passed up those attitudes and are standing by for television transmissions from the crew. We've also got about 4 minutes of tape conversation. We'll begin playing that back for you now, and if the television transmission begins from the spacecraft we'll interupt with that. CAPCOM Apollo 10, this is Houston. Over. SC Go ahead, Houston, 10. Roger. We'd like you to do an optics CAPCOM calibration at the end of this P23. Over. Rog. What star do you suggest? I can't SC see any of them out here much. Rogar. CAPCOM Stand by. And that was the end of it near as I can SC figure. CAPGOM Okay. Apollo 10, this is Houston. We're CAPCOM recommending that you use star 33 Antareous for the optics cal. Over. I thought you'd say that. SC CAPCOM We know you can see that one. 10, is it your intention after you finish with this to return to TV? Over. SC Yeah, we'll give you another look as soon as we finish this. SC Yeah, could you give us an attitude sort of a PTC attitude that would enable us to - to see the earth? I'd sure - we'd sure appreciate it. CAPCOM Roger. We're working on the attitude I don't believe that the TV and the PTC are compatible. now. SC No right, Bob. Give us an attitude so we can make an auto maneuver show on the TV after we finish here. Roger. We'll have it in a minute or so. CAPCOM We can hold the camera out the side hatch SC and it's compatible with the PTC, don't you think? CAPCOM Stand by. CAPCOM Apollo 10, this is Houston. Over. SC Go ahead. On the TV we're working towards CAPCOM Roger. using the camera out the right-hand window, although the hatch window would be compatible with PTC, we can't keep the high gain antenna lock all the time during PTC, and did you power down the B mags? We show both of them off. Over. SC Negative. I've got both B megs on.
APOLLO 10 MISSON COMMENTARY, 5-18-69, GET 6:38, CST 18:27 45/2 CAPCOM Roger. We'll have to look at that. We're going to hand over from Goldstone to Hawaii at 6 hours, 30 minutes GET. The TV will still be through Goldstone. And have you had your VHF on since TLI? Over. That's affirm. We're called to turn it SC off in 7 hours. CAPCOM Roger. We haven't been copying it. SC Yeah. We've been in VHF simplex since about Tananarive. CAPCOM Rog, understand. Simplex alpha. SC Confirm. SC Houston, This is Apollo 10. We could really do great star landmark on Baja, California. Boy, it's wide open. CAPCOM Roger, 10. Point conception is clear as a bell. SC CAPCOM Apollo 10, this is Houston. Over. SC Go, over. CAPCOM Roger. For TV coverage put the earth in the right-hand window, we recommend you roll to 263 degrees and hold your present pitch and yaw. Over. SC Roger. CAPCOM And in the previous conversation I asked you about the B mag status. We had erroneous TM indications down here. It looks like you're in good shape. SC Roger. Los Angeles looks clear today except for a little smog in the way. SC Houston, what was that roll angle again? CAPCOM Roger. Roll 263 degrees. Over. SC 263. Right. SC Hello, Houston. Apollo 10. CAPCOM Apollo 10, this is Houston. Over. SC Roger. Just wanted to check one thing on the SPS burn. I show 90 psi on my thrust chamber pressure indicator. I just wondered how that correlated with telemetry and what do you think of the engine. CAPCOM Roger. Stand by. I'll check that out. SC Roger. CAPCOM Apollo 10, this is Houston. It's going to take us about 5 minutes to dig out the data for correlation on chamber pressure and SPS status. When you called that down previously right after the evasive maneuver I didn't hear any groans down here. People seemed to think it was fairly good and -SC No -CAPCOM Go ahead. Go ahead. SC Okay -SC Houston, Apollo 10. We were looking from about 100 to 105 psi. We know if it's a single bank ... it would be a little

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET 6:38, CST 18:27 45/3 SC less, but we're looking ... Looking for 100, but we know a gage error could be most of that. Roger. We'll get you a good correlation CAPCOM from the data. And, if you'll successfully complete the optics calibration. Over. SC Takes a long time to get to Antares, Bruce. CAPCOM Roger. PAO This is Apollo Control. We're continuing to stand by. We estimate that it may be several minutes before the crew has completed activities and is in a position for television transmission. We don't have an accurate time estimate on how long that will be, but we'll continue to stand by. At the present time the spacecraft velocity is continuing to drop off 10 739 feet per second, and our altitude is 32 135 nautical miles from earth.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1837, GET 64800 46/1 CAPCOM Apollo 10, this is Houston, over. SC Go ahead, over. Roger, further analysis shows that CAPCOM that roll 263 degree angle they gave you is not compatable You're going to have to put the with high gain antenna. camera out the left hand window and we're working on a new attitude for you for that and would you verify that your attitude set switch is in the GDC position, over. SC I told you GDC position once. No Bruce, it's in IMU. CAPCOM Roger, would you go to GDC please. SC Okay. Houston, this is Apollo 10. The best guess is that that trunnion in calibration is 89995. CAPCOM Apollo 10. Houston. Understand 8995 for the trunnion. Roger. Now what number do you want SC us to load into noun 87? Four balls 5. Stand by. 10, this is Houston. There's CAPCOM no need to load a number in. Just hit proceed and go from where you are. 10, Houston. You copy. Roger, that's what we did, Bruce SC and, of course, we're all done so that will be good for the next time we disturbe a horizon. CAPCOM Roger, out. We loaded a zero when we first SC started this thing which probably accounts for some of the update. CAPCOM Roger. Houston, Apollo 10. Do you have a SC new attitude you want us to go to. CAPCOM Roger, stand by. Apollo 10, this is Houston. Your TV attitude is roll 023 degrees, pitch 181 and yaw 041. This gives you high gain antenna angles of pitch plus 28 degrees, yaw 307, over. Roger. Roll 02300, pitch is 181, SC yaw is 041, pitch is plus 28, and yaw is minus 07. Negative, read back again please. CAPCOM SC Roger. Roll is 023 degrees, pitch 181, yaw 041. The high gain antenna's pitch plus 28, yaw 307. CAPCOM 10, read back correct, out. SC Houston, Apollo 10. We're starting maneuver to that attitude. CAPCOM Roger, 10.

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET 6:59:30 CST 18:48:30 47/1 Apollo 10, this is Houston. Over. CAPCOM SC Go ahead, Houston. Roger. On telemetry, we showed 95 psi CAPCOM for SPS chamber pressure during the burn, and that is about right for a one-bank operation. All the data that we've got down here looks nominal. The SPS is looking very good. Over. Real fine. We showed 90. I knew SC Okay. there could be some instrument errors. I just wanted to correlate. Roger. 95 is the numbers that we've CAPCOM got. Okay, roger. We're going to the TV SC attitude now. Roger. 10, if you'd be interested, there CAPCOM is a possibility of a waste water dump during TV. Okay, great. You can substitute another SC time if you want to. CAPCOM Apollo 10, this is Houston. On your high gain for the TV pass, we suggest that you go from wide beam width to medium due to your increasing distance from the earth. Over. And I suddenly have it over here. SC Okay. CAPCOM Roger. We'll give high gain a try now. SC PAO This is Apollo Control at 7 hours, 6 minutes. We're continuing to stand by for an unscheduled television transmission from the spacecraft and waiting for the crew to get the spacecraft in the proper attitude - the antennas properly located. At the present time, our altitude is 34 099 nautical miles from earth. We're traveling at a speed of 10 428 feet per second, and we'll continue to stand by. SC Hello, Houston, Apollo 10. We have high gain lock. Apollo 10, this is Houston. Roger, up. CAPCOM Okay. In fact, I can now see the SC The subsolar point is right over the Hawaiian Islands. Hawaiian Islands. You can see them from here. CAPCOM Roger. We haven't got you on TV yet. SC Okay.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1858, GET 70945 48/1 SC How does that look, Houston?

CAPCOM 10. Houston. That's not coming through yet. SC Okay, we got it here. It looks real good on the monitor. CAPCOM You're filling up about 80% of the screen vertically. Okay, again it's kind of an awkward SC position to hold it but again you can hardly see Baja, California, Mexico real well. CAPCOM Yes indeed. If you could roll the camera right or left 90 degrees and then zoom a little more, we could fill up nearly the whole screen. How's that, Bruce? SC CAPCOM There you go, 10. That's good. Right, and we've got the North Pole on the right of our screen down here and the Atlantic Ocean was the terminator at the bottom of the screen. SC Rog, that's correct. Looks like a beautiful sight. And either you have clouds over the Sierra Nevadas or their snow caps at this time, I can't tell which from here. You can still see the San Joaquin Valley. CAPCOM Roger. 10, Houston. We're -Houston, we're going to zoom in on SC it a little bit and also we're deactivating the VHF at this time. CAPCOM Roger, copy deactivating the VHF and zooming in. Okay, hold it about there. SC You can see that subsolar point well in this picture. verv CAPCOM Yes indeed. We can see the very bright spot on the surface of the water that is the subsolar point. SC Does it look gold? CAPCOM Negative. It looks silver, about the same color as the clouds here only obviously brighter. SC You can see night time coming over on the Eastern part of the United States, too. CAPCOM Roger, and while you're doing this we'd like to uplink you PTC REFSMMAT, go to PU and accept. SC PU accepted. CAPCOM Roger. 10, this is Houston. Can you describe for us the area that the northern clouds seem to be obscuring. SC Yea. They start up in the northwest territories of Canada and actually ring out to Alaska and from there they go down just about to the Canadian, United States APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1858, GET 70945 48/2

SC border and go on east. But the whole northwest pacific, across northern Canada and over to Greenland is all obscured with just a solid white mass of clouds as you can see in the - up near the North Pole.

CAPCOM Roger, we can see the California coastline and Baja, California down in the lower right hand corner of our screen.

SC I've zoomed down a little bit. Now you can really noticed those clouds that cover about the northern, looks about the northern third or quarter of the Earth there.

CAPCOM Roger, 10. Up in the vicinity of Alaska, we see a swirl. Does that look like a storm system or low pressure area, to you?

SC Yea, you've got a swirl out there right on the - off the coast of Alaska. How are the colors coming through down there, Bruce?

CAPCOM Oh, the colors are coming through beautifully. The oceans are a beautiful blue-green. We can see the land masses in a brown to redish-brown. The vicinity of the North Pole, the clouds and ice caps seems to be saturating a little but on the whole it's all coming through nicely.

SC Okay, good and the area right east of the Sierra Nevadas now I guess around the Rockies, as night time starts to spread over the United States, is becoming more of a purplish-red. You can see Texas, Oklahoma and that area becoming more of a purplish-red and the rest of it is still a bright red. A bright red to brown.

CAPCOM That's right. We can see the terminator quite clearly moving up from lower right hand corner of our screen.

SC Roger. It's really amazing the cloud cover we have here and the swirls that you can see through.

CAPCOM Apollo 10, this is Houston. We have a computer problem here that delayed our REFSMAT uplink. We're ready to go now though.

SCOkay, we are in PU. PU and accept.CAPCOMApollo 10, this is Houston. You allplanning any interior shots this pass?SCSCWe can turn on the flood lights

for just a minute here, CAPCOM

Okay.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 1906, GET 718 49/1 SC Okay, we are going to go around and shoot an interior now. CC Roger. SC As soon as we get all arranged around here, we'll show you a quick inside shot. CC Roger. SC We're at locked. Rog. CC Roger. Okay, you're coming through on our black and white monitor now very well. We'll see the color in a minute. Okay, John is just sitting up side down SC here in the LEB. CC Yeah, we see Smiling John down there? SC He's just turning around down here. CC In living color. CC Tom you came through really great. The colors are fantastic. CC We're looking into the LEB now and looking at John Young on our right. You need the focus a little when you get in closer. SC How does that look? SC Beautiful. Coming through nicely. SC Okay. CAPCOM Looks just like you, John. SC Wait just a minute. CAPCOM Are you in the interior position in the camera? SC Over here is Gino. CC Roger. We're looking at Gino right now. Understand you all haven't got your suits off yet. John has his suit off and all stowed. SC Gene and I don't. Okay, we got a good look at the CC DISCS a few seconds ago as you panned past it. SC Okay. Okay we see your pack on the screen CC right out can you zoom in on that a little. CC That's coming through loud and clear now. That's the best I can do. I'll SC try to focus it closer. CC Roger. That's the one on the front cover CC of your flight plan, I believe. We can read the writing on the program. SC That's confirmed. CC It's really coming through beautifully down here. CC Okay, we see your name plate, there Stafford. SC That's how to tell who it is. That's how I can tell who it is. CC

APOLLO 10 MISSION COMMENTARY, 5/18/69 CST 1906, GET 718 49/2

SC All right. You can see the sun coming in over SC my shoulder and on top, it's really tremendous. Yes, indeed. Certainly is bright CC there. For your information, all these SS are at F22. CC Roger. In fact, that's what we shot SC the earth at F22. CC Roger. SC Looks like you got some suntan yesterday, Tom. SC Right. I have to stay healthy there Charlie. I'll take it back over here to SC my left window to show you earth again. Roger. CC Okay 10, we're getting the earth CC We've got the terminator to our left and it looks now. like the south pole on the top of the screen. Apollo 10, this is Houston. We're CC going to have a communication handover at about 7 hours 30 minutes GET or about 4 hours from now and the black and white is really looking good. The color is showing a little bit of saturation on the white and now could you tell us the position of your ALC switch over. Stand by. It's in outside SC CC Roger. SC It's in outside CC Apollo 10 this is Houston. We showing the orientation reverse from which you had a few minutes ago, convenient for you to turn the world upside down or rightside up yet? SC Yeah, we could do it. SC Houston. I'm just wondering if this target that I'm tracking out here in the sextant might be the S-IVB by any chance? CC Sorry could you give us some

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET7:28, CST19:16 50/1 Houston, I was just wondering if this SC target I'm tracking out here in the sextant might be the SIVB by chance. CAPCOM Can you give me some angles on it. Mavbe we can do something with that? SC Roger. You're looking at them. 6517 and 80857. CAPCOM SC How's that, Bruce, are we right side up? It's looking good, Tom. CAPCOM SC You can see the terminator really starting to move across the United States now. Yes indeed. Would you say the terminator CAPCOM is about over the Rocky Mountains now? SC No. Now it's starting to get darker. You can see the shadows from the Rocky Mountains out on the plains in Eastern Colorado and New Mexico, but it's darker more over to the Louisiana and east part of Texas. This picture is coming to us from an PAO altitude of about 36 300 nautical miles. CAPCOM Apollo 10, this is Houston. Over. SC Go. CAPCOM Roger. On the perimeter of the earth on our monitors we're showing a few little bulges that look like they're in the scanning equipment - the horizontal scan on the monitor that stays fixed in a position on the monitor is the image moves up and down. Do you have these on your monitor? SC Houston, 10. We lost you during that switch over for a minute. I think we got you again. CAPCOM Reading you loud and clear now. Roger. SC Okay. What was it you said about bulges? CAPCOM Okay. On our monitor down here, both black and while and color, we're showing a little bulge that looks like it's in the horizontal sweep system, and we were wondering whether this indentation in the surface of the earth as it appears on your monitor was present or whether it's in our equipment. SC We see it on our monitor too. CAPCOM Roger. SC Okay, Houston. This is Apollo 10. We're going to have to terminate the TV now and stand by to get some other gear squared away. CAPCOM 10, this is Houston. Understand that would you be interested in showing a water dump? We're having some problems with the waste water transducer. We're interested in dumping down to zero to verify the transducer. Over. SC Stand by. SC Houston, here we go for a waste water dump.

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APOLLO 10 MISSION COMMENTARY, 5-18-69, GET7:28, CST19:16 50/2 Stand by. We'd like to count you down CAPCOM on the dumping and monitor at our TM as well as on board. Over. Roger. I thought you only wanted to do SC these things before a maneuver. Yeah. Well, we've got midcourse correction CAPCOM number 1 which we canceled. Stand by. SC Okay. CAPCOM 10, this is Houston. Roger. We were going to go ahead and do this at about 10 or 11 hours anyway to verify the transducer. Okay. SC SC How soon do you want to start the waste water dump, Houston? CAPCOM It'll be ready in about 2 or 3 minutes, Tom. SC Okay. SC Houston, 10. Are you getting some black spots on your clouds? 10, this is Houston. Roger, we're getting CAPCOM what looks like glare coming off of a window or perhaps glare off the lenses - sort of a thin mask over the view of the earth. SC Yeah. Okay, well I tell you what. We're going SC to go ahead and turn it off now. CAPCOM Roger, out. PAO That TV transmission lasted a total of about 24 minutes giving us some excellent views of the earth and of the interior of the spacecraft. We'll continue to monitor the air-to-ground conversation. CAPCOM Apollo 10, this is Houston. SC Go ahead. CAPCOM Why don't you go ahead and run Roger. your P52 through the PTC REFSMAT now and we'll get the waste water dump when you're through with that. We'll have a flight plan update for you here shortly. With an eye towards clearing the way to commence your sleep period or rest period early if you so desire, and if you'd be working on any questions you may have or problems for us that we can work while things are quite here, we'll be standing by to receive them. Over. SC Roger, Houston. Okay, Houston. We're realigning right SC now to the PTC REFSMAT and we're going to gyro torque. This is Houston. Roger out. CAPCOM END OF TAPE

APOLLO 10 COMMENTARY 5/18/69, CST 19:27, GET 73855 51/1

PAO This is Apollo Control at 7 hours, 41 minutes, and at the present time the spacecraft is at an altitude of 37,321 nautical miles and the velocity has now dropped down below 10,000 feet per second and is currently reading 9,935 feet per second. During the previous transmission, you heard the crew advised that because of the fact that they won't be doing the mid-course correction at the time scheduled originally at 11 hours, 33, it will be possible, if they desire, for them to begin their rest period a little early. We will continue to stand by for any further conversation, bring the circuit up in the event we hear from the crew further. This is Apollo Control at 7 hours 42 minutes into the flight of Apollo 10.

APOLLO 10 COMMENTARY, 5/18/69, CST 1954, GET 8:05:00 52/1

This is Apollo Control at 8 hours, PAO 5 minutes. We have had a couple of brief conversations with the Apollo 10 crew since our last report. We will play back the tape and bring you up to date and then stand by for any live conversation with the crew. SC Hello Houston, 10. CC Apollo 10, this is Houston. Over. Okay, I have been looking at about 39 SC maybe 39.2 volts on this battery for about the last 20 minutes, do you want me to keep going to 39.5. That's on Battery A? CC That's affirm. SC CC That's affirmative. Keep charging until you get to 39.5. SC All right. 10, this is Houston. I have the CC waste water dump procedure here. SC Stand by. SC Okay, you can go ahead with the procedures. CC Roger. We would like you, when you start to dump until the quantity indication stops decreasing and then continue dumping for 5 minutes or until you get a go from us to discontinue dumping. We would also like to get a mark from you when you start to dump. Your onboard readout will probably stop decreasing prior to a zero indication due to the instrumentation calibration and we will be ready to start this whenever you are through with P52 and whenever it is convenient with you. SC Okay, now you want us to do a waste water dump until the quantity stops and then for 5 minutes or until you give us the go. Right? That's correct. CC SC Okay, we are ready to go ahead with the waste water dump at anytime here. Roger. Proceed with the waste CC water dump. SC Houston, mark we are dumping. We started 15 seconds ago. CC 10, Roger. We are showing a slow decrease on ITM data. CC Apollo 10, this is Houston. It's our intention to secure the TV lines down here unless you desire otherwise, over. Roger. That's good. We; re all SC finished here for today. We got other things we have to take care of.

APOLLO 10 COMMENTARY, 5/18/69, CST 1954, GET 8:05:00 52/2 CC Roger. Out. Houston, Apollo 10. Did most of SC the color look pretty good on your monitor, Bruce? Oh, it really looked beautiful, CC Tom. It really did. SC Okay. Good show. Thank you. SC Snoopy has been awful quiet out How is he looking to you? there. Stand by. 10, this is Houston. CC The only parameter we can see from the LM is the currents through the translunar bus tie. We have no reason to believe that Snoopy is anything but nominal though. Over. SC Roger. Been monitoring the current here. Looks good. CC Roger. Likewise. SC A normal, relaxed configuration. CM LM, CM DELTA P gage is now down to five tenths, for some reason. CC Roger. Your CM DELTA V down to five-tenths of a PSI. SC I guess that goes hand in hand with our cabin pressure. SC Houston, Apollo 10. CC 10, this is Houston. Go ahead. CC 10, this is HOuston. Go ahead. SC What does your waste water show? CC Okay, Tom, we are showing about 20.5 percent. SC Good. CC 10, this is Houston. SC Go ahead. CC Tom, could you give us a hack on what your waste water is indicating up there, please? SC Waste water is indicating now 20 percent. CC Roger, I understand. 20 percent. SC Okay. It's about what you said. Right? SC Well, it shows about 18 percent. CC Roger, Tom. We are showing about 5 percent less than you down here.

Okay.

SC

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APOLLO 10 COMMENTARY, 5/18/69, CST 1954, GET 8:05:00 52/3

SC Do you want to give us a hack when you want us to stop it? CC Roger. We will give you a hack. SC All right.

PAO During that series of conversations, you heard Tom Stafford advise that he had no further plans for television today. Here in the Control Center, we have had a change of capsule communicators. Astronaut Joe Engle has relieved CAPCOM Bruce McCandless. A short while ago, the spacecraft just crossed the 40,000 nautical miles marker. Current altitude reading is 40,156 nautical miles and the speed is 9,556 feet per second. This is Apollo Control at 8 hours, 11 minutes into the flight of Apollo 10.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2024, GET 08:35:00 53/1

This is Apollo Control at 8 hours, PAO 35 minutes. The current altitude now is 41,067 feet and our velocity is 9,447 feet per second. We're presently in conversation with the spacecraft. We also have some accumulated tape. We'll pick up the tape and then continue to follow whatever live conversation develops. 10, this is Houston. Could you CAPCOM give us a hack when your waste water quantity stops decreasing? SC Okay, I'll keep watching here Joe We're indicating about 5 percent. Roger, we're showing just about CAPCOM zero and that's just about the same difference we've been running all along. SC Roger. Houston, Apollo 10. The waste water quantity has stopped decreasing, showing about 4 to 5 percent as close as I can read the gage. CAPCOM Okay, Tom. Thank you very much. Do you want us to terminate the SC dump. CAPCOM No, we want to hold for about 5 minutes here, Tom. We'll give you a call when to turn it off. SC Roger. CAPCOM Apollo 10, this is Houston. SC Go ahead. CAPCOM Okay, Tom. You can terminate that waste water dump now if you want to. SC Okay, turn it off. CAPCOM Roger and 10 we've got an update for your eraseable memory table here, a few new numbers for you and we've also got a flight plan update when you're ready to copy. Okay, we're kind of busy right now, SC Joe, taking suits off and scrambling around in here. CAPCOM That will be fine. Just give us a call when you've got some time. However, we would like to get into that PTC as soon as it is convenient for you, Tom. Okay, John's already aligned to the SC REFS/MAT. CAPCOM Okay. SC Hello Houston, Apollo 10. CAPCOM Roger 10, go ahead. SC Okay Joe, go ahead with any updates you've got here. CAPCOM Okay, fine Tom. I guess the first thing is this eraseable memory table. I've got 3 new numbers for you on that for 03, 4, and 5 in column B.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2024, GET 08:35:00 53/2

SC Okay, go ahead. CAPCOM Okay, for row 3, 03 the number is 00012, row 04 the number is 13256, and for row 05 the number is 33266 and that's all for that one. Roger, for row 03, 0012, row 04, 13256, SC row 05 is 33266. CAPCOM Roger, that's affirm on row 3 that was 3 balls 12. SC Roger, 3 balls 12. Okay, Tom. I got some flight plan CAPCOM update items here if you're ready to note them down now. Go ahead. SC CAPCOM Okay. First off we're going to delete all the midcourse 1 burn data. We'd like for you to set up the PTC as soon as it's convenient for you and we'd like the FDAI scale at select at 5015. We'd like to monitor that dead band a little closer. And we'd like for you to go ahead and perform the battery vent and if you could we'd like to have manifold pressure before and after the battery vent. SC Roger, for stand by. CAPCOM And again on your schedule fuel cell 02 purge and also canister A change and finally terminate the cabin purge. SC Roger, what time do you want the cabin purge terminated? CAPCOM Stand by, I'll find out. Okay Tom, we'll go ahead with that cabin purge on your check list the way it is on your schedule right now in your flight plan. SC Okay. CAPCOM 10, coming back at you on that cabin purge, you can do that whenever it is convenient for you. Whenever it looks good. Whenever you have the time them. Okay. One thing we've noticed here SC Joe is that the 02 flow eye light keeps coming on and we're running pretty high. I guess we can expect this until we close the vent, right? CAPCOM Roger, that's affirmative, Tom. SC All right. CAPCOM 10, this is Houston again. Tom, we'd like for you to continue that battery charge also as long as we can. We'll terminate that just prior to your sleep period. SC Okay. CAPCOM and I guess just 2 more items is all. We're going to delete the P37 pad. TLI plus 44 and TLI plus 53 and that will be updated post sleep, after your

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2024, GET 08:35:00 53/3

CAPCOM sleep. And you can preform your presleep checklist and start your rest period whenever you want to. SC Okay. It takes quite a while to get everything reconfigured around here. CAPCOM Roger, understand. SC Yea, we're just getting around to eating now, too. CAPCOM Okay, very good. Have you had any problem servicing those bags out of that food preparation spout, Tom? Did the water keep coming out at all after you pull the bag off? Haven't got to it yet. SC CAPCOM Okay, fine. SC Houston, Apollo 10. Battery vent completed, manifold read 1.55 on the 4A test meter before, and 0.60 afterwards. CAPCOM Okay, thank you Tom, very much. SC Houston, Apollo 10. CAPCOM Roger 10, go ahead. SC Yea, can we hold on about another 30, or 40 minutes, before going to the PTC rest, while we get this food squared away? CAPCOM Roger, your convenience, Tom. SC Okay.

APOLLO 10 MISSION COMMENTARY, 5/18/69,CST 20:54, GET 9:05 54/1

This is Apollo Control at 9 hours, 5 min-PAO utes into the flight of Apollo 10. The spacecraft is currently at an altitude of 44,838 nautical miles and the speed is about 9,000 feet per second. It's been relatively quiet both here in mission control and from the spacecraft since our previous This period of time is set aside for the crew to report. have their evening meal, following that they'll have some housekeeping activities aboard the spacecraft getting set for a rest period. The crew has been advised that they can begin their rest period somewhat early because of the deletion of the first midcourse correction. That midcourse correction has been postponed until the second opportunity at about 26 hours, 30 minutes ground elapsed time. We do have a brief amount of tape. We'll play that for you now.

SC Hello, Houston 10. We're never going to get up to 39 1/2 volts I'm still looking at about 39.2 in that battery A charger, but I'll leave it on if you want me to.

We'd CAPCOM Okay, Gene. This is Houston. Rog. like to leave it on just as long as we can, and try to get it on up there to 39.5 or so, and we'll take it off before you go to sleep though, we'll remind you. SC

Okay, Joe.

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2119, GET 931 55/1

This is Apollo Control at 9 hours, PAO 31 minutes. At this time, the flight of Apollo 10 continues to run very smoothly. The spacecraft is now 47,034 nautical miles from earth and the Command Service Module and the LM combined had a total weight of 94,027 pounds. It's continued to be rather quiet, both here in Mission Control and conversation with the spacecraft. We do have about a minute to a minute and a half of tape we'll play back for you now. CC Apollo 10, this is Houston. CC Apollo 10, Houston. CC Hello Apollo 10, this is Houston. Do you read me? MCC Goldstone, Houston. Contact Net 1. GOLDSTONE Go. Goldstone. MCC How do you read? GOLDSTONE I hear you loud and clear. Roger, Stand by monitor for MCC CAPCOMs transmissions. CC Apollo 10, Apollo 10, this is Houston. SC Go ahead Joe. CC Roger, Gino we'd like to feed up a nav update period if you could give us , we could do that while your eating. Your still eating? Is that affirmed? SC Yeah, we're eating and we're finishing getting out of suits and cleaning up you've got pu and here comes accept. CC Okay. Thank you very, very much. MCC Goldstone, Houston contact conference. Voice Control Houston contact conference. MCC Goldstone, Houston contact conference voice check. GOLDSTONE Contact MCC Voice check. How do you read? GOLDSTONE I hear you loud and clear. MCC Roger. Thank you, SC George, turn your computer and I'll go ahead and start my oz purge CC Set the clock. We are through. I didn't want to bother you because you are still eating there. SC No problem. I'll start on fuel cell 3 on the oz CC Okay. Stand by to monitor. PAO It appears we'll have no further conversation with the crew at this time. As you heard Gene Cernan mention they're finishing their evening meal at the present time and the flight plan shows that they will be doing a routine oxygen purge of their fuel cell. This will be to remove any impurities which may

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2119, GET 9:31:0055/2

PAO -have collected in the fuel cell during the course of the mission and they will also, within the next 30 minutes or so be changing one of the lithium hydroxide cannisters which remove carbon monoxide from the spacecraft atmosphere. As we mentioned early, the first opportunity for midcourse correction. scheduled for 11 hours, 33 minutes into the mission has been postponed. Earlier in the day, the Flight dynamics Officer reported that the midcourse correction, if done in 11 hours and 33 minutes would require a velocity change about 48 or correction about 47.3 feet per second. By delaying this midcourse until 26 hours 30 minutes at which time the second opportunity would come up, the correction delta velocity would only be about 1 and 1/2 feet per second greater or about 48.9 feet per second. And it was felt that by waiting this additional time would gain additional tracking information approve the knowledge of where the spacecraft was and perhaps reduce the possibility of needing further midcourse corrections on route to the moon. At 9 hours, 37 minutes, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET10:02, CST21:52 56/1

This is Apollo Control - 10 hours, 2 min-PAO utes into the flight of Apollo 10, and currently, the spacecraft is traveling at a speed of 8 507 feet per second, and it's about 49 650 nautical miles from earth. Since our previous report, we've had about 1 or 2 minutes of conversation with the spacecraft. After finishing their evening meal, Gene Cernan had a brief conversation with flight controllers here in mission control concerning this morning's liftoff. We'll play back that tape for you now. SC Hello, Houston, 10. The fuel cell purge is -02 purge is done. CAPCOM Okay, thank you Gene. SC Okay, Joe. How are things going down there? CAPCOM Well, things are just looking real well down here, Gene. Looks like you're doing a real good job. How'd the liftoff look to you? SC CAPCOM Beautiful. Oh, I'll tell you, man. SC That's one C is a real ride. There's no question when your light off and lift off the ground and then you go through MAX Q and after that it's smooth as silk. Till you come near staging and than all Hell breaks lose. CAPCOM Boy you guys sure made one heck of a racket getting out of there. SC Is that right. That's probably cause of the east wind. CAPCOM Yeah. That wind was drifting and blowing in the right direction. It really rattled the cages around there. SC I would have liked to have seen the expression on Tracy's face on that one. CAPCOM I'll bet that was priceless. CAPCOM Apollo 10, Houston. SC Go ahead. The T&D looked real good on the TV it looked CAPCOM just like it does in the simulator. SC I'm glad we're able to show it. It worked out pretty good from here. John did a real outstanding job of turning his vehicle around and plugging in. CAPCOM Yeah. It looked real good. In fact I thought there for a while you were just running a taped replay from the simulator. SC That's all it is, babe. They've just got a better visual for it. CAPCOM That's right. You've got a good model up there to work with. capcom Goldstone, Houston. Contact voice check net conference.

APOLLO 10 MISSION COMMENTARY, 5-18-69, GET10:02, CST21:53 56/2

CAPCOM Goldstone. Read you loud and clear How me? CAPCOM Roger. Loud and clear, Thank you.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 10:31, CST2220 57/1

PAO This is Apollo Control at 10 hours, 32 minutes. Apollo 10 now 51,847 nautical miles from earth and traveling at a speed of about 8300 feet per second. short while ago we heard from John Young aboard the spacecraft. He advised that the crew has now started the passive thermal control which is a slow rotation rate of the spacecraft to maintain proper thermal equilibrium. At that rotational rate it completes 1 revolution about every hour. We'll play back the tape conversation that we've had with the crew and then stand by for any live communication. SC 10, over. SC Houston, Apollo 10, over. CAPCOM Apollo 10, Houston here. Go ahead. Okay. I think we're set up in the PTC SC REFS/MAT with a 20 degree dip and round about 275 degrees or thereabout. CAPCOM Okay, thank you, John. SC Can you ask a guy to take a look at that, and see if it got - got all in there. It's not always clear that some of these orbital numbers getting get down in that thing. CAPCOM Yeah, we'll check it out, John. CAPCOM Apollo 10, Houston. SC Go ahead, Houston. Apollo 10. CAPCOM Okay, Tom. All that - all that REFS/MAT stuff looks good. What we'd like to do is take over the antennas. Next time you go to either BRAVO or DELTA if you'd give us a call, we'll take over then. Okay, I'll give you a call. SC CAPCOM Fine, thank you John. SC Okay, Joe. I'll give you the OMNIS at this time. Stand by until I get you one. CAPCOM Roger, thank you. SC Hello, Houston. This is 10. CAPCOM 10, go ahead. SC Okay, I'm on OMNI and A, but that's not I can't get a good lock on - on B right now. what you want. CAPCOM Okay. That's alright, Gene. When you get to B let us know. SC Okay. CAPCOM Either - 10, this is Houston again either BRAVO or DELTA let us know and we'll try it - we'll get it from this end. SC Alright. CAPCOM Have you changed out that canister in the ECS yet? SC The canister has just been changed. CAPCOM Okay. Thank you Tom. SC Houston, I can fly on D right now only 1 switch in D and the other in B if you'd like. CAPCOM Okay, be fine, Jim. Good idea.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 10:31, CST2220 57/2

SC Houston, 10. I'm in DELTA right now. CAPCOM Rog. Understand, Gene. On DELTA. SC Hello, Houston, Apollo 10. Roger 10. Go ahead. CAPCOM SC Tell your friendly man on the left side there of you Joe that at CDR has taken aspirin burn, CMP 2, LMP 2, and the LMP also has one lomotil in the log. CAPCOM Roger. Got it. Thank you. SC Rog. Apollo 10, Houston. When you get a CAPCOM chance, the man on the left would like to have DDR readouts for all three of you. What? SC CAPCOM TRD, I'm sorry. Dosimeter readouts. Man, I think they're all stowed in the SC suits. CAPCOM Okay. SC Houston, Apollo 10. CAPCOM Roger, 10, go ahead. Okay, Joe. One thing we'd like to do -SC we're thinking about going to sack out now. Is to go ahead and shut the waste vent there, and so we'll - we won't have any 02 high flow lights. And also, what time do you want to terminate the battery charge? Okay, Tom, this is Houston. CAPCOM You can go ahead and terminate that battery charge anytime now. We have a few other things we're going to pass up to you, and let me make sure I get them all lined up here, and I'll give them all to you at once. Okay, battery charge coming off, and last SC relay bust circuit breaker (garble) Okay, roger, we copy. CAPCOM SC Okay, that fixes you up. SC And we want to go ahead and shut that bat down, so we won't 02 the power level (garble) Good. That's a good idea, Tom. CAPCOM Houston, Apollo 10. SC CAPCOM 10, this is Houston. Go ahead. Okay, Joe, You got an update to the flight SC plan or anything? We don't have one right now, Tom, we've CAPCOM got some other little things we're going to pass up to you here in just a minute. Okay, we're all clear to sack out shortly. SC CAPCOM Good. We'll have it to you here in about 2 or 3 minutes. SC Okay. Okay, Apollo 10, this is Houston. CAPCOM SC Okay, Joe, ready to copy.

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 10:31, CST 2220 57/3

Okay, we've got about six or seven things CAPCOM here, Tom. First off, we notice that RHC number 2 power switch is still on and we'd like to have that off. Okay, you want that off? SC That's affirmative. CAPCOM It's off. SC Okay, the second thing we'd like to advise CAPCOM you if you want to get a hold of us during the night anytime, the best mode is down voice backup. SC Down voice backup. CAPCOM That's affirmative. Okay, the next item, Tom; we'd like to CAPCOM have the LM CSM Delta P pressure, if you can get that for us please. Stand by. SC CAPCOM Okay. We'll have that for you in a little bit, SC go ahead. CAPCOM Okay. We're going to be watching this waste water H2O buildup during the night and we'll keep monitoring that. And we'd like to take over the OMNI switching and to do that we'd like to have you go to high gain, the high gain omni switch to omni, if you would.

CC ... and we would like to take over the OMNI switching and to do that we would like to have you go to high gain - the high gain OMNI switch to OMNI, if you would. SC Okay, High gain OMNI coming up. CC Roger. And we would to confirm that S-band antenna is in OMNI and bravo. SC Omni and bravo. CC Okay, very good. I guess the only thing is we would like to have your comments on how that TPC is going. How it looks from up there. I believe I've got ---SC Okay. SC Looks very slow, Joe. Very slow. SC WE've got all the window shades up and we are slowly rotating here and you can tell the spacecraft has started to cool down right away. CC No kidding. SC It feels real good in here. CC That's real interesting. SC Pardon me? CC I said that is real interesting to hear that it is cooling down that way. SC Yep. SC Gene is sacked out. He is underneath the right couch. CC Who is sacked out? SC LMP. CC Roger, okay, CC Are there any questions that have come up up there that you would like to have us work on tonight while you are resting? SC No, the only thing, it was just because we probably haven't seen it in the simulator and forgot it in the debriefings is that 02 flow, like I'm reading .8 on the 02 flow right now. We've got thtt vent shut. Is that supposed to be the normal flow? Should be lots less than that, shouldn't it? CC Roger, Tom. ACOM says it will take that a little while to come down to lower value. Okay. SC

APOLLO 10, COMMENTARY, 5/18/69, CST 2230 GET 10:41:10 58/1

58/2 APOLLO 10 COMMENTARY, 5/18/69, CST 2230, GET 10:41:10 Okay, Houston, as far as we can see up here, all the systems just look real fine. How about down there, Jim? CC Okay, it looks pretty good. Let me clarify one foot setting here with flight Tom. Give me about half a minute here, and I'll be right with you. SC Alright. CC Okay, the LM CS - LM CF Delta-P gauge is reading 0.6. CC I understand. 0.6. Thank you much. CC Okay, Apollo 10, this is Houston. SC Go, Joe. CC Okay, Tom, I guess about one more thing, or two more things. One of them is we did want to verify these antenna switches. I may have confused you some on that. On the S-band antenna we want one in OMNI and one in Bravo. Is that - is that where you had them? That's where we have them. SC CC Okay, very good. One's in OMNI and one's in Bravo. SC CC Roger. CC Okay Tom, the other thing I guess we need is the onboard readout for the battery. That's for the flight plan there. I'll get that out. Okay. Roger, we'll go ahead and SC get them for you. CC Okay, thank you. SC I'll call them down. SC Okay, Houston. Apollo 10 ready to call in the readings to you. CC Roger, ready to copy, Tom. Okay, Joe. pyro battery C is 36 SC OMNI. This is BAT C is 36.8. Pyro battery A is 37.1. Pyro BAT B is 37.1, RCS A is 93.0, B is 93.0, C is 99.0 and D is 94.0. CC Okay, roger. We got all those, Tom. Thank you. SC Roger. And it looks like we should be running well ahead of our RCS budget, here. CC Okay, that's good. Okay - Okay, Tom, I guess the CC part in shot here, flight says all the consumables look real good. Everything's looking real good for tonight. SC Okay. CC Okay, I guess that'll do it. You'll have a good sleep, and we'll see you in the morning. SC Yes, it sounds like shortly we'll soon be about 55,000 miles out, huh? CC Yes, that's right.

APOLLO 10 COMMENTARY, 5/18/69, CST 2230, GET 10:41:10

58/3

SC Sounds like a long way from home, Joe. CC You guys covered a lot of ground today. SC Yeah. I'll tell you, when that Saturn starts moving out, you can tell it's going to cover a lot of ground. CC (Laughter) SC I would have sure like to seen that from the ground, too, Joe, I bet that was - when that big bear lifted off. CC Boy, that was a beautiful sight. SC Could you see us all the way through staging? CC Yeah, it - there was a little cloud there. You disappeared for a while then you broke out into the open again, and there were - there were two decks that you went through, but you could - you could track it a long, long way out. SC Roger. CC That wind was blowing just about the direction you were talking about. It really rattled the cages over there at the VAB. SC I could imagine. CC I tell you, it rattled a few cages in the TLI, too, around here. SC That TLI frequency was a little bit too much. We thought sure it was coming unglued. It wasn't anything bad or anything, but just those oscillation shields, not POGO's but just vibrations. CC I'll be darned. SC Very great, very interesting. SC Not quite as bad as the 104 when you throttle chop out in mock 2 and (garbled) CC 10, this is Houston again. SC Go ahead. CC Tom, did that water taste - could you taste any chlorine at all in that water when you first started using it? SC You bet your sweet bippy we did. CC Has it - has it gotten any better? SC Yes, it's gotten lots better. But there was chlorine in it to start with. CC Okay. SC That is a good theory, Joe, it just don't work. But it's mighty good, though, it taste like mighty good water right now. SC Hello Houston; 10 here. CC Go ahead, Tom.

APOLLO 10 COMMENTARY, 5/18/69, CST 2230, GET 10:41:10

SC Hey, since we got off on time and when we serviced that water, do we have to chlorinate that stuff tonight? CC Stand by. The man on the left is talking.

END OF TAPE

58/4

APOLLO 10 MISSION COMMENTARY, 5/18/69, CST 2243, GET 10:54:10 59/1

Hey Joe, you're right about that SC drogue, it worked. CAPCOM It's got to work one more time, John. SC I know it. CAPCOM Then I'll be around to collect. Right. SC CAPCOM On this chlorination, it looks like as per flight plan, we'd probably better go ahead and chlorinate. Has the ... been coordinated? SC CAPCOM Yea, I'm afraid it has, and if you chlorinate tonight, you get rid of a lot of that taste by the time that you use it in the morning. I'd advise you to drink all your water before you chlorinate though, and then give it the shot, and by morning, it won't be quite so bad. SC Okay, but I thought they said if we got off on time we could probably go 2 days without it. Is the Cape talking to Houston these days? CAPCOM I don't know. I'll find out. SC Okay. PAO This is Apollo Control. It appears that we'll have no further conversation with the crew at this time. They either are, or will shortly be in their rest period. Tom Stafford advised about 15 minutes ago, that Gene Sernon, had begun a rest period, under the right hand couch, and reported at that time, that he and John Young were also beginning their sleep period shortly. Apollo 10 is now 54 thousand 4 hundred 87 nautical miles from earth, traveling at a speed of 8 thousand feet per second. We just had a call from the spacecraft. SC The latest consensus on that chlorination. Oh I'm sorry. I thought we'd CAPCOM passed that on. I'm afraid we've got to do that Tom. As per agreement with the doctors. SC Alright. Hey how about checking -CAPCOM Go ahead. SC Yea, there was supposed to be some agreement that if the water was serviced right, and we lifted off on time, we wouldn't have to do it for a day or two. CAP COM Yea, I know. We've already wrestled that one out, and we lost on that. SC Okay. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 11:05:40, CST 2254, 60/1 BLANK TAPE. - Dead Air

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 11:25, CST 2314 61/1

PAO This is Apollo Control at 11 hours 25 minutes. We've just been advised by Tom Stafford that he and John Young are now beginning their rest period. Stafford also advised that he had chlorinated the onboard water supply. We'll play that tape back for you now. Hello Houston, Apollo 10. SC CAPCOM Roger. Go ahead, Tom. SC Okay, we've put in the chlorine and just shot the buffer to it now do you want the potable tank inlet valve open? It's been isolated all this time, do you want it open. CAPCOM Negative. You want to leave that closed, Tom, until tomorrow. SC So you want to have some really good chlorinated water, then, huh? CAPCOM I'm afraid so, we've been wrestling that one out, but it looks like we've got to put it in again. SC All right. I know what you mean. CAPCOM SC Okay, but you just want to leave it closed, right? CAPCOM Right, John. SC Okay. SC Hello Houston, Apollo 10. Roger, 10, go ahead. CAPCOM SC Okay, I'm about to finish that ambial thing and we're going to sac out. And I've got the duty for tonight and the sleeping bag up into left seat so if anything comes up give me a call. CAPCOM Okay, Tom, we sure will. Have a good night's sleep. CAPCOM We got a lot of eyes looking down here. SC Okay. CAPCOM I guess in discussing this chlorination thing, Tom, if we get through this first one, why that's the worst one, and we get on the schedule then, the 24-hour schedule where you give it the chlorine in the evening and it has time to dissipate by morning, by the time you wake up. SC Yeah, the only question I want to know, is we've got a brand new load of water and it was completely isolated plain when we put it onboard the spacecraft and why do we have to give it another shot? CAPCOM Well, it turns out that I guess they feel that the chlorine becomes pretty inactive as far as killing bacteria in about a 24-hour period, and when we chlorinated it this morning, if we were to wait to get on this schedule where you chlorinate it in the evening which is really the best time, because you drink the water and then you chlorinate and it has time to dissipate during the sleep cycle, then by

APOLLO 10 MISSION COMMENTARY, 5/18/69, GET 11:25, CST 2314, 61/2

CAPCOM

morning it isn't quite so bad and in order to get on that cycle, we had to do it tonight. Okay.

SC PAO

It appears that Stafford and Young will be beginning their sleep period at about 11 hours 30 minutes ground elapsed time and that's about an hour and a half ahead of the original flight plan schedule and Stafford reported about 35 or 40 minutes ago that Gene Cernan had already begun his rest period under the right-hand couch. Young and Cernan resting in the sleep stations under the right and left hand couches with Cernan under the right hand couch and Young under the left hand couch and Tom Stafford as you heard will have the duty tonight and will be sleeping in the sleeping bag on the left hand couch. At 11 hours 29 minutes into the flight. Apollo 8 is now 56 372 nautical miles from Earth and traveling at a speed of 7908 feet per second. This is Mission Control, Houston.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CST 0006, GET 12:17:00 62/1

PAO This is Apollo Control at 12 hours 17 minutes. We've had no conversation with the spacecraft since our last report. Tom Stafford reported at 11 hours 30 minutes, ground elapse time, about 47 minutes "ago, that he and John Young would join Gene Cernan in beginning their rest periods. A short while ago, flight director Milton Windler, went around the control center and reviewed the status of the spacecraft with all flight controllers. That status is very good at this point. At the present time Apollo 10 is nearing the 60 thousand mile mark, on route to the moon. Presently 59 thousand 963 nautical miles from earth, and traveling at a speed of 7,627 feet per second. At 12 hours 18 minutes into the flight, this is Apollo control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CST 0049, GET 13:00:00, 63/1

PAO This is Apollo Control at 13 hours into the flight of Apollo 10. A short while ago we received a call from Gene Cernan aboard the spacecraft. He reported that the crew had noticed frequent firing of their attitude control thrusters, and they want an update from the ground on whether or not this was normal, and whether or not flight controllers here in mission control felt this would adversely effect their reaction control system propellant budget. The response from the ground to both questions was negative. They did not seem to feel that there would be any adverse effects on the propellant budget, and did not see anything abnormal in the thruster firing. We'll play back that conversation for you now.

SCHouston, Apollo 10, over.CAPCOMRoger, go ahead 10.SCI'm wondering if you can

SC I'm wondering if you can tell me anything about the way this PTC refs PTC T and N system is operating. We seem to be noticing quite a few thruster firings in here, and we are wondering what kind of on time propellant consumption we're going to have out of this sort of thing.

CAPCOM Okay, let me take a check and see if that's normal to be firing that often.

SC Hey, it seems to be kicking. We get on the edge of the dead band just almost all the time.

CAPCOM	Rog, okay.
CAPCOM	Apollo 10, Houston.
SC	Go ahead, Joe.
CAPCOM	Okay, for no longer

CAPCOM Okay, for no longer than was in monitering it looks like the fuel consumption in this mode isn't too bad at all. In fact it's just about what they figured you'd be using. We would suggest that you go back through and zero out your attitude. That'll give us some help there, and unless the thruster firing is bothering, as far as sleep is concerned, we'd suggest that you stay in 20 degree dead band. We could go to 30 degree dead band but we'd rather stay in 20 unless it's bothering you.

SC I don't think I understood exactly what you're saying. You're saying that actually it's going to take less gas to go back and start over again, than it would to keep on going like this or not.

CAPCOM Well I think the idea of zeroing out your attitude ... is that you won't get some firing for a while. Is the firing bothersome as far as the sleep goes, or you just concerned about fuel consumption alone?

SC Well everytime the engine fires it wakes you up.

CAPCOM

Yea, I can understand.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CST 0049, GET 13:00:00 63/2

CAPCOM I don't know that 30 degrees would be that much better. You're still going to get some firing, it would probably be a little bit longer between firing.

SC Yea Joe, the thing is kind of amazing what was pointed out on 9 and seems like a real flexible structure when it fires in pulse. The whole thing shakes and it goes through about 3 cycles when it's fired. I mean the structure vibrates for about 3 cycles.

SC Also the roll is up now to 3 tenths of a degree per second just about and there is some yaw in there and some pitch.

CAPCOM This is Houston. Roger go ahead Tom.

SC

Go ahead.

CAPCOM Tom, looking at it, Tom we don't really see any way to get away from it. We could go to 30 degree dead band but you'd still get the thrustor firing, that means they'd still be waking up. As far as fuel consumption is concerned, it doesn't look, from the data that we've got monitering it no longer than we have, it looks like it's just what they figured. The fuel consumption isn't going to be too big a factor, but I can understand the thrustor firing is waking you up, and I'm not real sure how to get away from it. I guess we're going to have to scratch our heads a while on that. The only advantage to zeroing out these attitudes, is that it'll be a while before it fires again, but it eventually will start firing.

SCYea I was just wondering how much fuel it'sgoing to take us to go zero them out and get all set up again.
CAPCOMRog, I think fuel-wise you're justas well off to leave it like it is. We just thought that
we might be able to get away with having ... giving you a little
time before they started firing again to get back to sleep.
SCOkay, we're just going to leave it

like it is for awhile, okay.

CAPCOM

CAPCOM Okay. Well I don't think the fuel that you'd use zeroing out the

attitudes, Tom, would be anything to worry about. It will give you a little time to get back to sleep before it starts firing again. So I guess, that's kind of your option depending upon how bothersom it is. If you want to give that a try well you could.

SC Well why don't we give it a try, and see how she goes.

Okay.

PAO As you heard in that conversation Stafford and Sernon remarked that the thrustor firing seem to be keeping them awake. Stafford remarked as to how the thrustors, when they fire, seem to cause the entire system
APOLLO 10 MISSION COMMENTARY, 5/19/69, CST 0049, GET 13:00:00, 63/3

PAO to oscillate about 3 cycles. The resolution to the problem was not too clear, and apparently there is not a great deal that can be done about it. Capcom, Joe Angle, said that we would continue to scratch our heads about it here on the ground and see if something could be done to minimize the amount the thrustors fire to maintain the passive thermal control attitude, but that at this point it didn't seem that there would be a great deal that could be done about it. At 13 hours 8 minutes into the flight, Apollo 10 is at an altitude of 63 thousand 5hundred 27 nautical miles from earth, traveling at a speed of 7 thousand 3 hundred 67 feet per second. This is Mission Control, Houston.

APOLLO 10 COMMENTARY, 5/19/69, 1328 GET, 0116 CDT

PAO This is Apollo Control at 13 hours 28 minutes. Our spacecraft now at an altitude of 64,938 -64,938 nautical miles, traveling at a speed of 7,271 feet per second. We've had one additional brief conversation with the crew concerning thruster firing. We'll play that back for you now.

SC We're going back to sleep now. CC Okay, Tom, we'll keep trying to work out a way to keep those things from firing so often. That's - that kind of caught me by surprise, but I can see where that would wake you up alright. Does that - did it give you pretty much of a jar or is it noise that wakes you up.

SC Well, it's a dull thud Joe, and the whole stack vibrates in dance of about 3 cycles. Kind of a boom- rumrum-rum-rum, you know, for about 3 cycles.

Yes.

SC We're real loud but -CC Okay, we copy, Tom, and we'll keep working that problem trying to figure something out here, a little more satisfactory.

SC Yes, I think it's the vibration forming the noise. It's not - it's just a real light thud when the jet fires but the whole stack goes to a real bending vibration for about 3 cycles. They get in some real minor cycles which you can feel and this is what keeps you awake.

CC Yeah, okay, I understand. I guess the only - only alternate that we've got right now is that we could go to that wider deadband, but you'd still get the firings, at just a little bigger air holes is all.

SC Yes, we'll stay and see how this works out. I got all the lights turned back and I'm going back to sleep. CC Okay, sorry about that. We'll see

Alright.

you later. SC

CC

Okay, sorry about that. We'll see

PAO Here in Mission Control, at the present time, we are going through a change of shift. Pete Frank and his team of - his orange team of flight controllers coming on to replace flight director, Milton Wendler, and the maroon team. The capsule communicator on the upcoming shift will be Astronaut Jack Lousma. At 13 hours 30 minutes into the flight of Apollo 10, this is Mission Control.

END OF TAPE

1.14 2

APOLLO 10 COMMENTARY, 5/19/69, CST 0144, GET 13:55:00

This is Apollo Control. 13 hours PAO 55 minutes ground elapsed time. Apollo 10 presently is outbound for the moon at a distance of 66,823 nautical miles from earth. And traveling at a velocity of 7.145 feet per The orange team of flight controllers headed up by second. flight director, Pete Frank, has taken over here in Mission Control, and it is estimated that the maroon team flight director, Milton Wendler will be at a press conference in the main auditorium, building 1 at MSC for a change of shift press briefing, within the next 5 or 10 minutes. He's now putting on his jacket and is leaving the mission operations control room. Crew apparently is asleep now. We've had no recent communications in the last half hour or more, or at least since the orange team came on. And at 13 hours 56 minutes ground elapsed time, this is Apollo Control.

END OF TAPE

65/1

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 15:01:00, CST 2:50, 66/1

PAO This is Apollo Control at 15 hours 1 minute ground elapsed time. Apollo 10 still coasting outward toward the moon and it is continuing to decelerate. The velocity has dropped now to 6867 feet per second. And the spacecraft now is some 71 240 nautical miles away from Earth. The Orange Team flight surgeon, Ken Beers, reported recently that the crewmen apparently are sleeping well at the present time. And all is going quiet here in Mission Control. The flight director is getting briefed from his various console positions on the present status of all the systems; the guidance system, and so on. And at 15 hours 02 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/19/69, CDT 0350, GET 1601 67/1

PAO This is Apollo Control. 16 hours 1 minute ground elapsed time. Apollo 10. according to the space digitals display here in the control center is now some 75,104 nautical miles away from earth. And traveling at a velocity ever decreasing of 6,640 feet per second. Apollo 10 - Apollo 10 presently is being tracked through the antenna at the Honeysuckle Creek, Australia tracking station. With handover to Madrid antenna at half past the hour, some 28 minutes from now. Crew's still asleep, at some 4 hours remaining in the sleep period. The only additions to the preflight flight plan has been a new set of stars for the program 23. This is lunar navigation, which is star and earth horizon sightings. At 25 hours, a new group of stars is being generated and will be read up to the crew after they wake up. And water dump at 23 hours 30 minutes, other than that, the previously published flight plan is still in effect. And at 16 hours 2 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/16/69, CDT 0450, GET 17:01 68/1

This is Apollo Control. 17 hours PAO 1 minute ground elapse time. Apollo 10 at the present time is 78 thousand 855 nautical miles away from the earth continuing to decelerate in velocity. Now showing a velocity of 6 thousand 435 feet per second. The latest estimate on the track or trajectory of the S4B third stage following the locks blow down, or the sling shot maneuver after the LM had been extracted from the S4B, shows that the stage will pass by the moon's trailing edge or eastern LM at approximately 79 hours ground elapse time. We'll miss the moon by some 17 hundred nautical miles. The crew of Apollo 10 still asleep at this time. All systems are functioning almost perfectly. And a little over 4 hours remain in the sleep period. This sleep period was extended from the previous planned 9 hours to approximately 11 hours, when they went to sleep earlier than scheduled. Wake up time is still with the premission flight plan. And at 17 hours 2 minutes ground elapse time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 18:03:30, CDT 0552, 69/1

PAO This is Apollo Control 18 hours 03 minutes ground elapsed time. Apollo 10 presently now some one-third the distance out to the moon, is now showing on the display here a distance from Earth of 82 659 nautical miles traveling at a velocity of 6240 feet per second. During the sleep watch here in Mission Control, the Orange Team, about an hour ago, had played back for it the onboard television from earlier in the day. When most of the flight controllers that are on duty now were home sleeping, the events of the day earlier the liftoff and all the TV passes took place and most of them consequently missed it. Things are rather quiet here in the Control Center. The crew still asleep. All systems in the spacecraft are functioning extremely well. And at 18 hours 04 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/19/69, CDT 0649, GET 1901 70/1

This is Apollo Control at 19 hours PAO 1 minute ground elapsed time. Space digitals showing positions in velocity for Apollo 10, now show velocity at 6,077 feet per second. Altitude above earth at 85,999 nautical miles. And we have here a weather forecast from a spaceflight meteorology group, of the weather bureau, ESSA, which said this morning that weather conditions in the planned landing areas are expected to be satisfactory for the next three days. Ocean areas of concern should have partly cloudy skies winds, 14 knots, seas 4 to 8 feet, temperatures 70 to 76 degrees. The Atlantic area should have widely scattered showers each day. The outlook for the end-of-mission area, that is at 15 degrees 7 minutes south latitude by 165 west longitude, is satisfactory. Crew is still asleep at this time, scheduled to be awakened at 21:30 ground elapsed time, which is about two and a half hours from now. And the control center's still rather quiet, everyone boning up on the flight plan activities and preparing for a handover in some 2 hours to the black team of flight controllers as they come aboard. At 19 hours 2 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 20:01, CST 0750 71/1

PAO This is Apollo Control 20 hours 1 minute ground elapsed time. Apollo 10 presently is some 89 499 nautical miles away from earth, continuing to slow down in its 2 and a half day trip to the moon. Velocity is now 5914 feet per second and here in Mission Control we are still monitoring the rather easy rest period of the crew, the first sleep period for the mission. We've got about another hour and a half in the rest period after which the crew will have their status report, get a consumables update from the Control Center here, also flight plan update for the coming day's activities, purge the fuel cell oxygen, and they will be given a new set of stars for the Program 23 exercise, that is the star and earth horizon lunar navigation at 25 hours. It seems the original set of stars has some interference because of the field of view restricted by the lunar module out the window while in a docked configuration. Incidentally, the combined weight of the 2 spacecrafts, the LM and the command service module now stands at 94 027 pounds. We are now tracking through the Madrid antenna and will continue to track for another 5 hours, handing over to Goldstone at that time. All going well in the mission of Apollo 10, and at 20 hours 3 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 0850, GET 2100 72/1

This is Apollo Control, 21 hours, PAO 1 minute Ground Elapsed Time, as Apollo 10 nears the 100,000 mile mark in its trip from earth out to the moon. The distance now stands at 92,836 nautical miles, continuing to decelerate. Now showing velocity in feet per second of 5,765. The crew has still not called back to the Control Center here, although the Flight Surgeon reports that Stafford and Cernan apparently are awake and John Young is still in a rather deep sleep. Members of the Black Team of Flight Controllers are beginning to drift into the Control Room here to take over from the Orange Team. The handover time will be half past the hour. We'll monitor the air-ground continuously and pick it up when the conversation does resume and the crew does wake up and begin their day's work, get their breakfast, and so forth. And at 21 hours, 2 minutes Ground Elapsed Time this is Apollo Control.

APOLLO 10 COMMENTARY, 5/19/69, CST:0920, 2132 GET

KING This is Apollo Control; let's join the conversation in progress with Apollo 10. SC Hey we've got a morning weather

report for you; you may be interested in it.

CC Okay, go ahead. SC Roger; it's a European/African weather report. Portugal is clear. Spain - western Spain is clear, eastern Spain along the Med is under clouds. Italy -Italy is clear south of about Rome. Sicily - Sardinia and Corsica are under partly cloudy to cloudy skies. Greece is clear. Greece clear. Turkey is under very scattered clouds. Bulgaria is clear with partially scattered clouds, but the rest of Europe is mostly under the clouds. There's a large part of the Soviet Union north of the Black Sea that's in the clear, but the rest of it appears to be under clouds too. Arabia appears to be clear. Israel clear. Jordan clear. Libya and Egypt are clear except for a cloud strip along the center of the country that runs from Saudi Arabia across the Sinai Peninsula. Africa is clear in the desert to the north and cloudy farther south. It's clear pretty much to the south except for the Cape where South Africa appears to be under the clouds. That's your morning weather report from about 100 000 miles.

CC Roger. Thank you Apollo 10; the only thing missing was the music.

CC It looks like you're starting out the day real good there; we've go - go ahead. SC That's a special effects we are not

carrying today.

CC Looks like ole Charlie Brown is motoring right along in good shape there; your consumables are ahead on everything, and Snoopy is hanging in there real well too. Your midcourse correction will be on time and will only be 49 feet per second. And we have a flight plan update when you are ready to copy.

SC Okay, stand by. We want to get a couple of pictures of Europe; we're getting in position right now.

PAO This is Apollo Control now, waiting for conversation to resume; that global weather report was by John Young. Apparently at 100 000 miles out, he has a pretty good view of what the cloud cover and the weather situation is all over the visible face of the earth. We'll stand by monitoring this circuit for resumption of conversation.

73/1

APOLLO 10 COMMENTARY, 5/19/69, CST: 0920, 21:32 GET

PAO This is Apollo Control; while we are waiting for the crew to get things sorted out so they can continue the flight plan updates and beginning the day's activity, Flight Director Glenn Lunney is briefing his team as they come aboard, and on all the things that have to be done today. Here comes the crew. CC Go ahead Tom. Good morning. CC How do you read me Tom? SC Roger; loud and clear - like I told Jack earlier; we had a real great night's sleep - all 3 of us feel tremendous this morning and it looks like we're running ahead on all consumables. Roger. Good show. The only thing CC we really have for you when you can get squared away is a flight plan update - and we need some RCS totals I think on the consumables - that's about the only thing. SC Okay - you ready to copy? CC Roger; go. SC I'll give you - okay. On ring A: 91 percent. On ring B: 94 percent. Ring C: 96 percent. Ring D: 92 percent. Roger; we copy all that. CC PAO This is Apollo Control; Tom Stafford reported the percentage of propellants remaining in the various quads instead of rings, he said rings, although he probably meant QUADS on the Service Module. A, B, C, D - 91, 94, 96 and 92 percent, respectively on those 4 quads. We'll continue to monitor for further conversation - the various slips of paper being passed around here with all the flight plan updates - and Capcom is getting ready to jump in; let's listen. SC - your update. CC On the flight plan Gene? Roger. SC Yes, that's affirm. CC Okay, at crew convenience, we'd like you to get your personal dosimeters and put them on your person; it's no big deal on that, so if you don't feel like unstowing the suits, it looks like they are still on the suits, so it's your convenience on that. And at no later than 23 plus 30, we need a waste water dump. And for John's P23 - go ahead. SC Okay, I was going to say John wants to get a P52 in here before the midcourse, before that dump. CC Roger; that's why we scheduled it no later than 23:30 Tom; we thought that would be convenient time to get it in - the P52 about an hour later. SC Okay, Charlie; go ahead. CC Okay - and at 25 plus 10 the P23 sightings again, we forgot that Snoop was out there, so we have an update for your attitudes and for the stars for set 3 and 4. The attitude - we'd like a roll of 078, pitch

73/2

APOLLO 10 COMMENTARY, 5/19/69, CST: 0920, 21:32 GET 73/3

A pitch of 010 and a yaw of 000. CC Okay, for sets 3 and 4 -Okay, what about the stars? SC Okay, I'm giving you those now. Sets CC 3 and 4 for - for substitute nunki - N - U - N - K - I, 37 and far side. Charlie, you cut off set the stars SC again; all I got was roll, pitch and yaw. Okay, for sets 3 and 4 - Nunki instead CC of Antares, and we want the far side on Nunki. Okay, is 1, 2 and 5 the same? SC CC That's affirmative. Okay - I got 20 - let's see - for SC P23, roll 078, pitch 010, and yaw all zeroes, and sets 3 and 4 changed to Nunki far star. That's affirmative. And at 27 hours CC after the midcourse, we'll have an update for you on your P37 pads for 35 and 44 and 53 hours. SC Alright. And that's all we got this morning CC on the flight plan. Okey doke; I think I got it all Charlie. SC We'll get that waste water dump in prior to 23:30 and we'll make a valiant effort on the dosimeters. Roger, we copy. And as soon as you CC settle down to breakfast, we'll, if you like, we got a news summary here we'll be glad to read up to you. SC Okay, guess you can go ahead and read it right now if you'd like. Roger. Stand by. Let me get this CC squared away here with Flight and we'll be with you in a minute. Okay, we'll just wait for you to SC continue on here; go ahead with the planned 02 purge at 22 hours, is that correct? CC Stand by. That's correct, Gene. SC Okay. CC Hello Apollo 10, Houston. We'd like you to give us a little idea of how the thruster activity disturbed you during the night and whether we could go ahead and continue on tonight with the same plan. Yep Charlie. Roger. What happens SC is if you've ever flown a B-47 or even a C-133, it seems like a loose dynamic structure after the thruster fires; the noise doesn't bother you at all; it's just the dull thud, but then you have an oscillation to 3 or 4 cycles after with just a little minor oscillation that damps out. There's no problem; just keep on going; we slept good. Okay, fine Tom. CC SC Charlie, it gives me the feeling like just a little minor pulse waves that big engine bell back there around just enough to vibrate until it damps out. CC Okay, fine. Well we'll continue on then.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 928a, GET 2140 74/1 SC - just a little minor pulse waves that big engine bell back there around just enough to vibrate until it damps out. CAPCOM Okay, fine. Well, we will continue on, then. Surgeon, as I came on this morning, said that it looks like you all were sleeping like a log. How was your position on the couch there, Gene? Real comfortable? SC Yes, pretty good. Okay, fine. Well, we will continue CAPCOM on, then. SC . . . CAPCOM Say again. SC Okay, for your friendly man on the left, my dosimeter reads 26021. CAPCOM Roger. SC Okay, Charlie, mine is 15030. CAPCOM Copy. SC And mine is 05027. Rog, John, 05027. CAPCOM SC I believe that's right, Charlie. CAPCOM Right. SC These are very small numbers. CAPCOM Roger. It's pretty early.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 21:45 CDT 0933 75/1

PAO This is Apollo Control at 21 hours 51 minutes into the mission. We will continue to stand by live. CAPCOM Charlie Duke does plan to read up a news summary to the crew. Apollo 10 is now 95 629 miles from the earth, velocity 5 648 feet per second, and we're showing a weight of 94 027 pounds.

CAPCOM 10, Houston, we're ready with a summary of news and sports as compiled by your friendly third floor astonisher Jack Riley and his office. Are you ready?

SC
CAPCOMMan, we is just about ready for anything.
Roger. This is a news team of McCandlessand Duke then.Newspapers, television and radio are concentrating
on the flight of Apollo 10. The Houston Post banner read "Apollo 10
out of this world" and for the first time in memory the entire
front page of the Post is all space news. The news wires are
commenting on the quality and quantity of the TV transmissions
yesterday.

CAPCOM Senator Barry Goldwater paid surprise visits to the Stafford and Young homes yesterday. He said he came to Houston because he had been to the Cape before and each time the launch had been postponed. Other than the Apollo 10 mission, the world has been relatively quiet.

CAPCOM In other news highlights, Leonard Bernstein left his position as conductor of the New York Philharmonic Orchestra.

CAPCOM Govenor Rockefeller is in Latin America this week on a presidential assignment.

CAPCOM And a Siamese cat in Vancouver, Washington is mothering 3 baby skunks who are orphans.

CAPCOM A Chicago art collecter paid \$12,000 for a 120 year old paper weight.

CAPCOM And U.S. Air Force planes are seeding clouds in the Phillipine Islands to combat drouth conditions.

CAPCOM In the sports news, the Astros beat the Cubs for the second time in 2 days. The Sunday afternoon battle at the Astrodome ended with the Astros on top 6 to 5 before a crowd of over 13 000. In other games it was Los Angeles Dodgers 6 Pittsburg 5; St. Louis 6 San Diego 5; Atlanta 8 Montreal 3; Philadelphia 9 San Francisco 8.

CAPCOM And in the American League it was Baltimore 5 K.C. zero; Detroit 8 Minnesota 2; Washington won 2 games with Chicago both by 3 to 2; New York beat California twice, 3 to 1 and 1 to 0; and Seattle beat Boston 9 to 6.

CAPCOM The trials at the Indianapolis speedway were washed out yesterday.

CAPCOM And Majectic Prince who won the Preakness on Saturday may not run in the Belmont Stakes June 7. The horse's owner reports the horse is tired and has lost weight. Too bad. Majectic Prince is in the first horse since 1948 that has a chance to win the triple crown. APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 21:45, CDT 0933 75/2 CAPCOM And here is your horoscope readings for today, Apollo 10. Tom Stafford: You should concentrate on finishing things that you have already started. Today's pace will be moderate. Use this time to take inventory. CAPCOM And Geno your horoscpe reads: Give careful thought to your working and driving habits. Do something nice for your friends. CAPCOM John Young: You will have a slow day today. This will give you time to concentrate on the work ahead. You will enjoy your surroundings and companions. CAPCOM And the weather in Houston is beautiful this morning. The sky is clear and temperatures will rise to the low to mid 80's. Last night a clear thin crescent of the moon was visible. And this finishes the first annual McCandless/Duke radio cast. Over. CAPCOM Roger, Good morning Charlie. CAPCOM Good morning, Bruce. SC You guys are too much down there. That's fantastic. SC Boy, you out do me. I quit. You can give the weather next time, too. CAPCOM Roger. SC That was tremendous. SC You're going to put someone out of business down there if you don't watch out. CAPCOM Maybe you guys. SC Hey, we'll keep fanning the peacock up here and you guys keep talking. CAPCOM Okay, fine.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 0944, GET 2156 76/1

SC Hey, we'll keep fanning the peacock up here and you guys keep talking. CAPCOM Okay, fine. Hello, Houston. Apollo 10. SC CAPCOM Go, 10. SC Okay, we just want to get this on the record. When we woke up this morning and took a drink out of the water gun everything was just great and everybody had a good drink, and then I took a drink and it is absolutely horrible. CAPCOM Roger, that's kind of what we figured. SC Yes, it started out earlier this morning it was good and then I got a horrible slug of chlorine and my mouth is still burning. No problem. And so did John. Okay, I guess you were getting a CAPCOM good -SC Just thought I'd get it on the record. CAPCOM Rog, Tom. I guess you were getting it out - the good stuff was in the lines there out of the tank, perhaps, or something. And once you got the tank water it was bad. We kind of figured. SC Yes. CAPCOM Hello, 10. Houston. Go ahead, Charlie. SC CAPCOM Hey, rog. Gene, last night when you chlorinated the water did you - we'd like to know if you left the potable tank inlet valve open for 10 minutes after you chlorinated. SC We discussed that with - we discussed that with the ground and they said no. Okay, we'll - I don't quite under-CAPCOM stand the problem. We'll, from this end, we'll square it away and get back with you. On this waste water dump, we'd like you to give us the word exactly when you plan to do it. We have telescopes just about all over the world going to photograph this thing and we'd like to give them as much notice as possible, over. SC Okay. CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 944a, GET 215630 77/1

PAO This is Apollo Control at 22 hours 4 minutes. There is a discussion going on in the Control Center here now concerning procedures that may be able to eliminate this strong chlorine taste that Tom Stafford was talking about. The E-comm officer is working the problem. Charlie Duke will probably be passing up some suggestions on clearing that problem up. We are showing now Apollo 10 96,235 miles from earth at a velocity of 5,624 feet per second. We will continue to stand by live for any transmissions.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 949a, GET 220130 78/1 PAO This is Apollo Control at 22 hours 8 minutes. Charlie Duke is going to put a call to the crew here very shortly. Apollo 10. Houston. Before you use CAPCOM any of your water to mix any of your food, would you hold off? We're trying to get this resolved, over. Okay, Charlie, we thought the chlorine SC would taste better in fruit juice than it does by itself. We've already pressed on. CAPCOM Okay. It's probably going to be pretty horrible. Stand by one, we will have some word for you. CAPCOM Apollo 10, Houston. SC Go ahead. CAPCOM Roger, Tom. Last night when you chlorinated and we told you not to open the potable tank inlet, it turned out we didn't get any of that chlorine mixed and now that stuff is in the line and when you draw off from the gun, it's not mixed at all with -

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 0954, GET 2206 79/1

CAPCOM Yes, we can tell you like it. SC Yes, we all (garble). CAPCOM How did you sleep last night? CAPCOM Apollo 10, Houston. SC Go ahead. CAPCOM Roger. Tom, last night when you chlorinated and we told you not to open the potable tank inlet, it turned out we didn't get any of that chlorine mixed and now that stuff is in the lines and when you draw off from the gun it's not mixed at all with any of the water. So we recommend that you open the potable tank inlet now and take a bag and draw off about a bag full of water and then get rid of it, over. SC Charlie, I'm going to go Roger. ahead and give you an O2 purge now. CAPCOM Roger. Okay, Charlie, that's why I asked SC the question last night. SC Purging fuel cell 3. CAPCOM Well, I didn't get a briefing on it, John, but it looks like we just gave you the wrong word, over. SC Yes, that's why both of us were asking quite a few questions. If we had a complete isolated service water tank why would we want to slug a slug of chlorine into it when no new water had come in? That's a good question. CAPCOM CAPCOM 10, Houston. On your orange juice this morning, we recommend that you probably not drink - you not drink that and you consider getting rid of it. It's possibly almost pure chlorine in the juice. SC Okay. PAO This is Apollo Control at 22 hours, 16 minutes. We'll take this release line down now and come back up when there is further conversation. They're calling now. CAPCOM 10. SC Okay, the LM's (garble) is up to nine tenths today. CAPCOM Roger, copy, John. SC It's point 09. CAPCOM Rog. SC Point 9. CAPCOM Point 9, got you.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1026a, GET 2237 80/1

PAO This is Apollo Control at 22 hours 37 minutes. Apollo 10, 98,084 miles from earth, velocity 5,547 feet per second. We have a conversation in progress. We will tune in. SC Houston, Apollo 10. How much no-

tice for that water dump, over.

CAPCOM Roger. Just as much as possible, 10, and that's all I can tell you. We would like an hour or so, I guess. Looks like we got - why don't we go ahead and plan it for 2230, 2330 as planned, John. We will put the word out.

S C CAPCO

Rog.

CAPCOM We will put the word out for 2330. This is Apollo Control. Astronomers PAO at a number of observatories throughout the world will attempt to watch this waste water dump scheduled for 23 hours 30 minutes into the mission. The midcourse correction is scheduled for an elapsed time of 26 hours 32 minutes 56 seconds. It will be done with the service propulsion system, 49 feet per second delta V. Duration of the engine firing, 6.7 seconds. With this maneuver, we will be doing part of the correction to place Apollo 10 over the proper ground track at the moon. We want the same ground track that the Apollo 11 spacecraft will follow. We will attain part of it with this maneuver, and then the remaining part with the lunar orbit insertion number 1 burn. This is Mission Control Houston.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 0954, GET 2206 81/1

This is Apollo Control at 22 hours, PAO 59 minutes. Apollo 10 is 99,263 miles from earth. Velocity is 5,500 feet per second. We had some brief air-ground conversation just a few moments ago. We'll play that for you. CAPCOM Hello, Apollo 10, Houston. We'd like you to close the potable tank inlet valve now. Okay, I'll do it. SC SC Houston, this is 10. CAPCOM Apollo 10, this is Houston. Go ahead. SC On this cycle the cryo fans, how long do you want us to leave them on? Stand by. Apollo 10, this is CAPCOM Houston. On the cryo fans, 2 minutes for each tank. Same for H2 and O2, over. SC Okay. CAPCOM Roger, out. PAO This is Apollo Control at 23 hours, 4 minutes. The Flight Surgeon, Dr. Willard Hawkins, advises that the radiation exposure to the crew to date is the equivalent of about three chest X-rays. This includes that received during passage through the Van Allen radiation belt, the area of highest radiation. We're having conversation now. Houston, this is 10. SC CAPCOM Go ahead, 10. SC Listen, you guys were so good to us with the news this morning that we thought we'd bring you a little disc jockey work from up here if you're prepared. CAPCOM Roger. SC This is Tom and John on the guitar and the three of us singing. CAPCOM Okay. SC Here it comes; we're ready. (Recording of Up, Up and Away played here.) SC Sure hope you enjoyed the last one. CAPCOM Hey, that was really beautiful. Somebody's voice is changing though or you stowed somebody away up there. SC I thought that song was sort of apropos. CAPCOM It really was beautiful; it was really great, you guys. Y'all been practicing a lot. SC We had trouble stowing the base drum aboard but other than that it came out pretty well. CAPCOM Rog, we got you.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 0954, GET 2206 81/2

SCDelta 5 psi makes your voice a littlehigher, Charlie.
CAPCOMOh, oh, that's right. I forgot.Are we having an encore or are you saving your next renditionfor later on?
SC
CAPCOMNo, that's enough for one day.Yes -

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1058a, GET 2309 82/1 SC - no, that's enough for one day. CAPCOM I believe it (laughter). SC Got a few more, Charlie, but we will save them for a while. CAPCOM Rog. PAO That's another space first for Tom Stafford, although it probably won't rank as high in the technical annuals as the first space rendezvous he and Wally Schirra performed.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 23:20, CDT 1109 83/1 This is Apollo Control at 23 hours PAO Apollo 10 is 100 378 miles from the earth traveling 20 minutes. at a velocity of 5 456 feet per second. We are in conversation with the crew concerning the water. CAPCOM Hello 10. Houston. SC Go ahead. CAPCOM Roger. We were wondering when you drew off your water to purge the lines at what point you took it off. We think you ought to do both the drinking water supply and the food preparation unit. Over. It's too late now, Charlie, we've already SC gone through it. CAPCOM Could you tell us where you drained Roger. it off, Tom? SC Yes, in my grape juice. CAPCOM Okay. SC It came off the food servicing thing. CAPCOM Did - -SC By the time you had already got the word to us. Don't sweat it, Charlie, okay? CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY 5/19/69, GET 23:28 CDT 11:17 84/1 This is Apollo Control at 23 hours PAO 28 minutes into the mission. Apollo 10 is 100 808 nautical miles from earth, velocity 5 439 feet per second. We have given Apollo 10 a GO for the waste water dump at 22 hours 30 minutes, and here is that conversation. Houston, Apollo 10, over. SC CAPCOM Go ahead, John. SC Got a GO for the dump at 23:30. CAPCOM Stand by. CAPCOM 10, Houston, you are GO for the dump. At 23:30. SC Rog. Thanks. SC Okay, Houston, Apollo 10, we've started the water dump. CAPCOM Roger, copy, Tom. SC And it's really filling the sky out here. Charlie. CAPCOM Roger. SC Boy, it really is. SC Hey, Charlie, is this to fix the problem so it doesn't mess up the tracking? Is that what you're trying to do? That's affirmative, John. We would have CAPCOM had the dump before - we wanted to dump as close as possible to our midcourse, before midcourse, and if this one goes as planned we won't do another one until LOI and we'd be over the limit. SC Understand. CAPCOM 10, Houston -SC Houston, Apollo 10 for comparative -Go ahead, Charlie. CAPCOM I'm sorry I cut you out, Tom, go ahead. SC I was just going to say for comparative sighting if we try to look at this stuff with the telescope there is oh, a fact of 10 or 20 times the number of particles we have from our other dumps, but the particles are all about maybe 1/10th the size. CAPCOM Roger, we copy. CAPCOM 10, E COMM just corrected me. It looks like we will have to do the dump once a day. We scheduled it at this time as close to midcourse as possible and yet still allow you we hope to clear it away so you can do the P52. SC Yes, there are a lot of stars out there right now. CAPCOM Yes, I'll bet. CAPCOM 10, I overlooked the consumables update we owed you at 23 hours. If you would like to copy that we have it for you any time. SC Okay, go ahead.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 23:28, CDT 1117 84/2 Okay, at 22:30 GET your RCS totals were CAPCOM 92 percent across the board. We had an H2 total of 48. pounds, and an 02 total of 565 pounds. Okay, Charlie, that's at 22:30? SC CAPCOM Roger. SC Houston, Apollo 10, over. CAPCOM Go ahead. Okay, I've got something out here now SC tracking that - wonder if that could be the S-IVB. It keeps seems to rotate and glimmer. It's not a particle. CAPCOM Roger, Stand by, Tom, I'll see - correction, John, I'll see if I can get you some word on that. It's a long ways off. SC CAPCOM Okay. SC It doesn't even fill the center of the reticle. It goes about half the width of the reticle. CAPCOM Roger. The width of the line in the center of SC the reticle. CAPCOM Roger, copy. Shaft is 94-7 and trunnion is 38-7 right SC now. Roger, we copy 10, we're copying down CAPCOM your attitude and your shaft and trunnion and it will take us a while to run it out. The FIDOS are busy with the midcourse right now. SC Okay, sure, that's something you can do post flight if you want to. CAPCOM Roger, your water dump is okay. You can turn it off.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1125, GET 2336 85/1

CAPCOM Rog, and your water dump is okay. You can turn it off. SC Rog. SC We're in pressure release 2 now. CAPCOM Rog. PAO This is Apollo Control. Apollo 10 dumped about 18 pounds of water from 26 pounds down to 8 pounds of waste water. This is Apollo Control at 23 hours, PAO We're showing Apollo 10's distance from the 41 minutes. earth now at 101,466 nautical miles. Velocity 5,414 feet John Young reported he is tracking something per second. in the optics that rotates and glimmers, and it's a long way off. He believes it may be the S-IVB, the third stage of Flight Controllers here will attempt to verify their booster. that a little bit later. They're busy now on the midcourse correction and following that work they will take a look at where the S-IVB is and attempt to verify for John whether that is indeed what he is seeing. Houston, this is 10. We're going SC to run through the main regulator checks if you want to watch it. CAPCOM Roger, we're standing by. PAO This is a test of the redundant components of the environmental control system being performed now. CAPCOM Hello, 10, Houston. We'd like you to repeat the second reg check here. We noticed a funny on the manifold pressure. Okay, well, I let it - I pushed it SC in and then I let it out. Would that account for it? CAPCOM Stand by, I think so. I didn't hold it in the full time. SC I pushed it in for about 2 seconds and then I let up on it and then I pushed in on it again. CAPCOM Roger, the E COMM's would feel warmer if you'd just do it one more time for us, John. 10, Houston. Check looks okay to SC us. SC Okay. I'm sure glad about that. Charlie. CAPCOM Say again. SC I said I'm sure glad that thing works. CAPCOM Yes. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 23:50, CDT 1139 86/1

PAO This is Apollo Control at 23 hours 51 minutes. Apollo 10's distance is now 102 017 miles, velocity 5 392 feet per second. Spacecraft weight 93 872 pounds. This is Mission Control Houston.

APOLLO 10 COMMENTARY, 5/19/69, CST: 1142, 235300 GET 87/1

This is Apollo Control at 23 hours, PAO 53 minutes and we are in conversation with the crew. Hello Houston, this is Charlie Brown. SC CC Go ahead Charlie Brown. SC We finished the ECS redundant component checks, and everything looks good from here. CC Roger; we copied it all Gene; looks GO to us, too. SC Okey doke. Sure appreciated the little news bulletin - plan another one tomorrow, will you? Roger, we'll have our morning report, CC when we first come on for you. Yeah Charlie, we just can't tell you SC how great that sounded this morning; that was just tremendous. I'm glad you enjoyed it. CC SC Especially that horoscope - we wouldn't want these guys to do anything wrong. No sir. You gotta watch 'em John. We appreciated your little rendition from 90 000 or so out too. SC Got that through the sextant. Boy, you could see everything. We could see - you could see the Nile Delta just like you were down there; you could see the whole island of Crete, you could see Italy, you could see the whole - you could see the whole coast of Europe, all the way around except its all in the clouds. CC Roger. Must be a fantastic sight. SC A little later if we can show it to you - it's just beautiful. CC Roger. CC How does the sextant bring out the landmarks John; do you think you'll have any trouble tracking from way out there? I don't think you'd have a bit of SC trouble. I think it'd be a piece of cake; those places that are open that we always planned to use for landmarks like that Coast and land down off of Arabia down there; it's just as clear as a bell right now; yesterday Baja California was wide open too. CC Roger. We could see that real clearly on the TV. It would really be a piece of cake to track - to do any star landmark work. CC Roger. CC If you have any trouble looking at the stars before the dump - could you see all the stars you wanted to see John? SC Didn't see any stars with the LM on there Charlie except in auto optics. CC That's what I meant. SC Some - (break in tape) Sometimes you can see stars; there's about a 10 or 20 degree angle when you are directly opposite the sun where you can see stars.

APOLLO 10 COMMENTARY, 5/19/69, CST: 1142, 235300 GET 87/2 CC Roger. But you can't see them - you can't SC tell what stars they are - so it wouldn't be any good for P51, however, I did recognize what I believed to be Mars off the earth and Jupiter, because of its 4 moons, so you could use those for P51. CC Roger. CC How are the particles - do you still have the particles around now? Are they all gone? I can see a few out the left side SC window - but within about 5 to 10 minutes, most of them have dissipated. CC Roger. SC The dump particles are so fine; they don't see to be as big as the other one that came from the waste system dump that we make - and they are not as persistant apparently too. CC Roger, we copy. Well, I can tell you from here that SC Cuba has got some thunder bumpers over today. CC Roger. SC John, through the sextant, can you really get an idea of the 3-dimensional affect to the clouds? SC No, it just sorta looks like a picture. CC Roger. SC To me anyway. SC I don't know how far along the coast I could see before the earth went out of the optics, but it looked like the Gulf Coast was open today too. Maybe I was looking at the wrong place here; that's real hard to see right now. CC Roger. When we came in this morning, it was clear as a bell outside; I don't know what it's done the last couple of hours though. Just got the word - it's still clear outside. SC It looked clear down that way. Except for the smog. CC Yeah. That's John Young discussing the PAO weather with Charlie Duke. END OF TAPE

This is Apollo Control at 24 hours PAO 5 minutes. Distance is 102,742 -CAPCOM Go ahead. SC Hello, Houston. Go ahead, 10. CAPCOM I've been looking at the earth with SC the binocular and it's quite a sight, but right to the left of it in my field of view is this rotating object John saw a little while ago and I'm looking at it through the binocular and sometimes it appears to be the S-IVB or else it's the SLA panel, but it's definetely got three dimensions and it's rotating at quite a fair speed. I can sometimes pick up the nozzle on it, which makes me believe it might be the S-IVB. Roger. Say again the position CAPCOM with respect to the earth, Gene. Well, I've got the earth on the SC right side of my right hand window and it's perpendicular to the terminator of the earth. CAPCOM Okay. On the lit side or the dark side of the terminator? Well, it's perpendicular, the termi-SC nator got both sides, doesn't it? I'd say, it's from North to South Pole, it's toward the east. Okay, that's what I was trying to CAPCOM dig out. I probably said it wrong though. We got the back rooms working on where the S-IVB should be. We should have you some word here in an hour or so probably. How big does this thing look to you in the binocular, Gene? Well, I can see it rotating and it's SC bright all the time and I get bright glare glints off it. It's rotating and it's definitely got three dimensions. I've seen something in the last day that I thought was the SLA panel along with it, so this may be what it is. CAPCOM Roger. CAPCOM Hello 10, Houston. We're going to switch ground stations. You may get some noise for a couple of seconds. SC Houston, this is 10. CAPCOM Go ahead. SC Okay, and then down quite a ways, maybe 30 degrees from the first one, I've got a second rotating object that's moving in the center up there and of course, it's much, much further away and all I can tell is that it's rotating and that it's glistening. CAPCOM Roger. SC Hey, Houston, maybe we got that program alarm by accidently hitting the mark button, but I don't think we did. CAPCOM You don't think you accidently hit it, John?

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1152a, GET 2403 88/1

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1152a, GET 2403 88/2 No. SC CAPCOM Roger. We thought that's what had happened. SC Tell me this. Called up VERB 5 NOUN 9 just then and we've got to reset the TTC? Stand by. CAPCOM CAPCOM 10, Houston. That's negative. You do not disturb the TTC. PAO Gene Cernan is oberving those objects through a minocular, that's half of a binocular. SC Hello, Houston, Apollo 10. CAPCOM Go ahead, 10. CAPCOM 10, Houston. Go ahead. Hello, Houston, Apollo 10. SC CAPCOM Go ahead. CAPCOM Hello, Apollo 10, Houston. We are reading you 5 by. Go ahead, Tom. 10, Houston. Do you read? CAPCOM Yes, now how do you read, Charlie? SC CAPCOM 5 by, Tom, you were coming 5 by all the time. SC Oh, okay. I just wanted to give you a star visibility data point. Just a second ago, when the sun was in the right side window, number 5 window, I can see on the Southern Cross, Acrux and alpha beta Centauri out my left window and that's the first time we've been able to see it. CAPCOM Rog, good show. And we couldn't - John couldn't SC see many other stars, just the real big ones, you know, like alpha beta Centauri and Acrux. Now as the sun moves on around, they've disappeared, but that's the first glimpse of any stars I've gotten. CAPCOM Roger, we copy. SC Rog.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 24:20, CDT 1209 89/1

PAO This is Apollo Control at 24 hours 29 minutes. The Guidance Officer reports that Apollo 10 is realigning the inertial measurement unit, getting set up for the second group of cislunar navigation sightings, John Young using the onboard optics will do some cislunar navigation tasks by measuring the angles between various stars and the earth horizon.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1221, GET 1432 90/1 Houston, Apollo 10. We're auto-SC maneuvering around for the P23 navigation. CAPCOM Rog, we copy, Tom. And, John, the guys in the back room yesterday on your 949 were really hopping. If you could pause a little bit longer today on that display they'd appreciate it. And when you calibrate the trunion bias, they said we'd get a better reading if you between each calibration, if you'll move the trunion off and then back to its position so we get a better average on the calibration, over. That's what I was doing. I was SC moving it off and bringing it back on. CAPCOM Roger, that's fine. SC How far off, how far off do they want to go? I didn't get that number. Stand by. CAPCOM John, the GUIDO's say any movement will be fine a degree or so and then back is all we need. Okay, I was moving it in both direc-SC tions too. CAPCOM Okay, fine. Good show. SC About a degree -CAPCOM Hello, 10, Houston. In this maneuver to your P23 attitude, if you have to switch antennas it'll take a command reset. SC Okay.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 24:48, CDT 1237 91/1

PAO This is Apollo Control at 24 hours 48 minutes. We are in conversation with the crew again. Hello 10, Houston. We'd like you to try CAPCOM to get the high gain locked on for the P23 so we can have the high bit rate. SC Okay, we'll give it a try, Charlie. CAPCOM Roger. SC Houston, I'll give you a VERB 64 as soon as we finish this auto maneuver. CAPCOM Roger. 10, Houston, We've got the - some angles CAPCOM for you on the high gain, Minus 52 on the pitch and 270 yaw. SC Okay, fine. SC Hello, Houston, 10, that should be high gain. CAPCOM Roger, we got it. Thanks much. SC Okay, and that's medium band width. CAPCOM Roger.
APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 24:55, CST 1244 92/1 PAO This is Apollo Control at 24 hours 55 minutes. Charlie Duke is in conversation with John Young. John reports having a problem calibrating the optics because the light scattering in the telescope prevents him from seeing the stars. Here's that conversation. Houston, I hate to admit this, but there SC aren't any stars that I can find right now to calibrate these optics on. CAPCOM Roger, stand by. It's got to do with the position of the SC earth and how much light we're getting through there and everything. CAPCOM I - say again, John, you were cut out. SC It's got to do with the way the sunshine is shining off the earth, how much light is getting scattered back into the telescope, and how much is coming in off the LM. It's really blanking out all the stars. CAPCOM Roger, stand by. CAPCOM Apollo 10, Houston, if you don't think it will get better in 5 minutes or so and you still can't see anything we'll just skip it and try again later when the geometry gets better. SC Okay. SC Okay. PAO This is Apollo Control at 24 hours 57 Apollo 10's distance now from earth 105 372 nautical minutes. miles, velocity 5 267 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1259, GET 2510 93/1 This is Apollo Control at 25 hours, PAO 10 minutes. We're in conversation with the crew. SC houston, this is 10. What do you want me to use for a trunnion angle, what we got yesterday, or put in zeros? Stand by. 10, Houston. CAPCOM Leave the bias as it was yesterday. CAPCOM 10, Houston. Did you copy on the trunnion? You can leave it the same as yesterday. Rog, that's what I did. SC CAPCOM Rog. SC That 649 four balls plus four balls one must be a mistake. CAPCOM Roger, we copy you. That's a pretty good mistake. Yes, that's what I'm saying. Up SC here in the left seat it's the best mistake I've seen, Charlie. CAPCOM Rog. How about that, Charlie? SC CAPCOM That's really beautiful. It's unbelievable, as a matter of SC fact. They must have zeros (garble) on your matrix. This is Apollo Control at 25 hours, PAO 12 minutes. Flight Dynamics Officer Phil Shaffer reports that Apollo 10 will be half way to the moon in terms of mileage at an elapsed time of 27 hours, 31 minutes, 34 seconds. The mileage at that time will be 112,991 miles. And according to the flight plan, the Apollo 10 crew will be having lunch at the midpoint. SC Here we are again. CAPCOM You guys are really sharp. Yes, John's doing a great job. SC He's having trouble seeing that from all the sun reflecting around him. CAPCOM Yes, we were imagining he was. Excuse me, did I cut you out? Go ahead, John. SC When the star gets down beneath the on the earth, you can't see it in the background. You just have to pull it out of the earth and imagine which way you have to pull that handle to bring it out above the horizon so you can see it. CAPCOM Rog. Well, whatever you're doing is right. Looks good. SC I don't know whether it's right or not. CAPCOM Eisele's sitting here and he says you set the W matrix to zero.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1259, GET 2510 93/2 SC Good idea. PAO This is Apollo Control at 25 hours, 18 minutes. Showing present distance 106,423 nautical miles. Velocity 5,228 feet per second. Houston, did you get the first one SC on Nunki? CAPCOM Roger, sure did. Here's number 2. SC CAPCOM Rog.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 25:28, CDT 1317 94/1 PAO This is Apollo Control at 25 hours 28 minutes and we're in conversation with the crew concerning the star/earth horizon navigation sightings. SC Okay, Houston that finishes the first set on star 37. We'll do set 3 and 4 on the same star as your direction. CAPCOM Roger, it's primarily for an altitude calibration. SC Okay. CAPCOM 10, we're C & F. SC Roger. Looks good from here. SC Okay, how much time do you really need to get that kind of stuff? Can you give me a GO when you see each one of them, Charlie? CAPCOM Stand by, I think I can. CAPCOM 10, when we get the data we'll give you a GO. CAPCOM And John, you've been giving us plenty of time on that so far. SC Okay. CAPCOM You can go. SC Roger, that completes - okay right there. Stand by. SC There's another one to go. We can make another one if you want to SC if it's just a horizon cal. CAPCOM Roger, John, we can need one more mark on Nunki. CAPCOM You can go. CAPCOM 10, you can go ahead. CAPCOM You can go. CAPCOM 10 you can go. SC Okay, Houston, that completes the total of 5 sets there and we're ready for your P27 update for the midcourse. CAPCOM Roger, stand by. SC Okay. CAPCOM Hello 10, Houston, if you go to POO and accept we have a load for you, state vector, target load, and a PIPA bias update. SC Okay, going sim 6 set to POO and you've got it. CAPCOM Roger, Tom, and if you're ready to copy we have a pad for you. SC Stand by. SC Okay, Charlie, fire it. CAPCOM Roger, as you know it's a midcourse 2 SPS/G&N. 63153 plus 090 minus 021 026 325610 minus 00398 plus 00109 minus 00258 099 184 359. Apogee and perigee are NA 00487 004 - correction 007 00440. Sextant star is 45 2050

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 25:28, CDT 1317 94/2

CAPCOM 292. The rest of the pad is NA. SC Okay, Charlie, for MCC2 SPS/G&N 63153 plus 090 minus 021 026325610 minus 00398 plus 00109 minus 00258 099184359. Apogee and perigee are NA. Burn time, or DELTA-VT rather is 00487, burn time is 007, and 00440 sextant star is 45 2050 and 292. CAPCOM Roger, that was a good readback, Geno. Your set stars are Deneb and Vega 148 013 and 018 no ullage. SC Roger, give me pitch and yaw again, please. CAPCOM Roger, 013 and 018 and you're going to be in the burn attitude you're going to be looking at the sun. The sun is 4 degrees off from the X-axis and we think with this roll angle that the LM will block it out completely, though. SC Oakie Doak. I've got Deneb and Vega at 148 013 and 018 no ullage and roger on the sun. CAPCOM Roger. Okay, Houston, 10, I have one other SC question. CAPCOM Go ahead 10. SC Okay, Charlie, you know in the flight plan we penciled in and said that if we did this correction we'd trim plus X to 2/10 of a foot per second if the residuals were less than 2 feet per second. You still want that to go? CAPCOM That's affirmative. Okay, thank you. SC CAPCOM Roger. 10, we've got your state vector and the CAPCOM target load in and we're doing the PIPA bias now. SC Roger. CAPCOM Hello Charlie Brown, this is Houston. Your high gain angles for in the burn attitude will be yaw 180 pitch at minus 55.

APOLLO 10 COMMENTARY, 5/19/69, CST: 1332, 254300GET 95/1 This is Apollo Control at 25 hours, PAO 44 minutes. This midcourse burn -10, Houston; we got the load in now; CC the computer is yours. SC Roger, going to block. SC - go ahead. CC What Tom. I cut you out there. Did you copy the high gain antenna angles for the burn attitude? SC Roger, Charlie, we sure did. An d I'm going to go ahead to the B30 and B40 so so we can do the star sextant check and then we'll swap seats for the burn. CC Roger. CC Hello 10; Houston. Hey, when you guys get to burn attitude, if you'll take the sextant to a shaft of 161.5 and a trunnion of 032.1, you should see the SIVB; over. SC Okay, that was a shaft of 161.5 and 032.1 on trunnion. CC Affirm. SC How far away do you suppose it is? We didn't get that number; hold on CC It'll take us a minute or two. Gene. At 25 hours, 46 minutes distance PAO is 107 845 nautical miles; velocity 5176 feet per second. Weight 93 872 pounds. This midcourse burn planned for 26 hours, 32 minutes, 56 seconds. CC 10 Houston. The final say that the SIVB should be 1680 miles away - that's nautical. 1680 - roger. Long way. SC CC Sure is. SC Okay, we're starting the AUTO maneuver to the burn attitude. CC Roger. PAO This midcourse will be a duration of 7 seconds; a change in the velocity of 48.7 feet per second; we'll be posigrade and out of plane to the right. Toward the sun - first part of the maneuvers that will bring Apollo 10 into the proper inclination to cross the lunar equator on the same ground track that Apollo 11 will follow. SC Hello Houston; Apollo 10. CC Go ahead 10. SC Okay, Charlie, since we used tank A on the first seperation maneuver, we assume you want us to start this on bank B - then you want us to open both banks after 3 seconds? Over. CC Stand by. SC Okay.

APOLLO 10 COMMENTARY, 5/19/69, CST: 1332, 25:43 GET 95/2 CC 10, this is Houston. We'd like you to start on bank Bravo and put bank Alpha in at 3 seconds. SC Okay - Roger. Just wanted to reconfirm. CC That's affirmative Tom - and we'd like you to discontinue charging battery B at 26 hours. SC Okay, at 26 hours.

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APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1347a, GET 2558 96/1 Hello, Houston, Apollo 10. SC CAPCOM Go. 10. And we've finally got a good view SC of the moon. Hey, rog, that's - waxy crescent CAPCOM there, it's not very much but glad you see it. SC Yes, we can see the sunlight and also we can see - actually can see the other part of the moon in the earthshine. CAPCOM Good. Nice to know where we're going. SC Rog. Can you pick out any landmarks? CAPCOM No, not from this distance. We've SC got a lot of reflected light coming off of the LM, Charlie. CAPCOM Roger. SC But it does look bigger, Charlie. CAPCOM Yes, I bet it does. SC Looks bigger than it did. Okay, I keep cutting you guys out. CAPCOM I'm sorry. It's amazing to see how much of it SC you can see in earthshine. CAPCOM Rog. SC And the whole back side of it is lit by earthshine. Looks like it's a full, full moon from earthshine. SC Yes, and the earth gets smaller. It's sure nice to be able to see where you are going. Yes, I guess it is pretty comfort-CAPCOM ing. Well, we've got you pretty close. After this midcourse, we will have a perigee of about 58 miles. But in relative ratio, it hasn't SC gotten that much bigger as the earth has gotten that much smaller. CAPCOM Roger. PAO At 26 hours 4 minutes, Apollo 10 distance is 108,727 nautical miles; velocity is 5,144 feet per second. CAPCOM Hello Apollo 10, Houston. Is the sun bothering you at this attitude? Not yet. We're just about to finish SC the roll maneuver in about 20 more degrees and I can't see that it is. I think you did a good job of blocking it out. The sun is to the left. CAPCOM Rog. SC Looks like we're going to be able to see stars because the LM is shielding us from the sun. CAPCOM Rog, good.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1347, GEI 2558 96/2

PAO Tom Stafford reported the crew got its first good view of the moon at an elapsed time of 25 hours 58 minutes. The display which shows distance was not being generated at that time, but the distance at that time was approximately 108,600 nautical miles. Gene Cernan reported the moon looks bigger from that distance. Hello, Houston, 10. SC CAPCOM Go ahead, 10. Okay, I can see the stars real good SC out the side window. I've got Sirius out my side window, but even out through the rendezvous window I can look up there and I've got Orion and Rigel there. Rog. Boy, old Snoop really, when CAPCOM the sun is on the side, he must really block it all out. Yes, and I've got the moon right up SC above the x-axis. It's a beautiful sight. CAPCOM Rog. We envy you. Hello, Charlie Brown, Houston. CAPCOM We would like you to discontinue battery B charge now. SC Rog, Charlie, thank you. SC Hello, Houston, Charlie Brown. On that trunnion for the S-IVB, was that 32.1 or 3.21? It was 32.1, 10. CAPCOM SC Okay. SC Okay, Houston. The star check went good and I've moved to the center seat, John's moved to the left seat. CAPCOM Rog. SC - was just about a half of a degree off. CAPCOM Roger, 10, we copied. PAO This is Apollo Control at 26 hours 19 minutes. Apollo 10's distance from the earth is now 109,468 nautical miles; velocity is 5,118 feet per second. Spacecraft weight is 93,872 pounds. We are 13 minutes 26 seconds away from the midcourse correction.

APOLLO 10 MISSION COMMENTARY, 5/19/59, CDT 1408, GET 2619 97/1

SC Coming up on 10 minutes. Mark, 10 minutes to the burn, and we're in burn attitude all squared away, Houston. CAPCOM Roger. We'd CAPCOM Hello, Apollo 10, Houston. like to get a time hack quick here. We're counting down to the burn and we show 11 minutes, 25 seconds, mark. SC Okay, our event timer may have goofed up on us a little bit. Roger, we showed you load the proper CAPCOM take time of 26:32:56:10. SC Yes, that's what we - we set our event timer at 47 minutes (garble) counting down. CAPCOM Roger, I'd like to give you a hack at 1045. SC Okay, the event timer jumped 2 minutes on us someway. CAPCOM Roger. We were all right on the seconds. SC CAPCOM Coming up on 1030, Tom. I'll give you a mark. Mark 1030. SC Charlie, would you give us another hack in 10 minutes so we can set our timer? CAPCOM Roger. CAPCOM Apollo 10, Houston. Passing 1005. Stand by for a mark at 10 minutes. Mark 10 minutes. SC We're synched. CAPCOM Rog. PAO This is Apollo Control at 26 hours, Distance is now 110,000 miles. Velocity 5,099 30 minutes. feet per second. We're 2 minutes, 36 seconds from the midcourse maneuver. SC Okay, Houston, coming up on 2 minutes, going to normal on bank B. CAPCOM Roger, copy.

APOLLO 10 COMMENTARY, 519/69, CST: 1419, 26:30 GET 98/1 - 30 seconds. Engine on; it looks PAO good. SC Burn is complete. CC Roger, copy. SC And I'm going to proceed to 0 16. CC Roger Tom. Burn looks good to us. SC Okay, there's plus X, minus 9/10 and I'm going to ullage it back to 2/10. CC Roger. There's 2/10. SC CC Roger. SC Residuals minus 2/10, zero and plus 3/10. CC Beautiful. SC Proceed. CC Roger. CC 10, Houston; it looked really good to Could you guys feel the second bank coming us - one question. in? SC I didn't feel it as a matter of fact. CC Roger. SC I was busy turning it on, I really didn't check the chamber pressure too well. It looked like it jumped a little. CC Roger. SC About 4 psi. Our Delta VC on that was minus 4.4. CC Copied. SC Charlie, the fuel remaining is 99.4 oxidizer is 98.0 and the pugs meter bounced around quite a bit and ended up at 400 decrease. CC Roger, copied Gene. PAO And at 26 hours, 36 minutes, we are showing distance of 110 324 nautical miles - velocity 5105, feet per second, and weight 93 419 pounds. And that midcourse correction was very successful - it'll give us a 58 nautical mile perigee. SC Hello Houston, Apollo 10. CC Go ahead Apollo 10. SC Okay - why don't we try to kill two birds with one stone - and let's go ahead to the PTC attitude and also we can get high gain to the earth and get a picture of the earth with the TV as it comes up. CC Roger; will do. We'll have the set angles for you in just a minute. SC Roger. CC And Apollo 10, Houston. We'd like to move the pad updates down to about 27:45 so it's not to interfere with the TV. SC Okay

APOLLO 10 COMMENTARY, 5/19/69, CST: 1419, 26:30 GET 98/2

PAO And the indications from Tom Stafford are that he is going to turn the TV on earlier than scheduled the schedule called for it at an elapsed time of 27 hours, 15 minutes - but his remark seems to indicate that he will turn it on prior to that time.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 26:40, CDT 1429 99/1 Apollo 10, Houston. CAPCOM Go ahead. SC CAPCOM Roger, 10. If you - when you go to the PTC if you point it north we can give you a set of angles that will give you earth through one window and the moon through another. SC Okay. Hello Apollo 10. Houston. We have some CAPCOM PTC angles for you and then some high gain angles and also we'd like for you to reinitiate battery B charge. Over. Okay, stand by. SC SC Go ahead with those angles. CAPCOM Roger, John. Roll 307, pitch 090, yaw 000. That places the moon in window 5 and the earth in window 1. High gain antenna pitch 005, yaw 265. SC Thanks much. Charlie. CAPCOM Roger. SC Houston we get this ... pressure light on oxygen tank 1, which we heard we might get and wonder if we hadn't ought to - it went back out - if we shouldn't maybe cycle the fans. I guess they just cut in the heaters itself automatically. CAPCOM Stand by. SC Looks like the heaters just came on automatically and are kicking it back up themselves. CAPCOM Roger, stand by. Apollo 10, Houston, we'd like to hold off CAPCOM on the cycle in the fans and wait until our next scheduled time and see what happens. Okay, Charlie, the light just went back SC out. I theorize that the heater may have come on and kicked it back within limits. CAPCOM Roger, we concur. And the caution and warning looks ... SC CAPCOM Roger, we concur. SC Houston, Apollo 10, we're maneuvering into the new attitude now. CAPCOM This is Houston, Roger out. SC And Houston, Apollo 10, how soon will you have the results of the midcourse we made? CAPCOM Apollo 10, this is Houston. Superficially the burn looked pretty good, but it will take about an hour for us to reduce the high speed data. Over. And to get tracking. SC Roger. Thank you.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1439, GET 2650 100/1

SC Roger, thank you. This is Apollo Control at 26 hours, PAO 51 minutes. Apollo 10's distance from the earth, 111,091 nautical miles. Velocity 5,078 feet per second. Weight 93,419 pounds.

Charlie, that's going to be a good SC We got the earth in the left window and the moon attitude. in the right, but I don't think we'll ever see the moon on TV. It's just too thin and too dim.

CAPCOM Roger, Houston. Roger, out.

It looks like you've got a great SC attitude for the earth. I've got it out my left window and it looks like the Gulf Coast is clear.

CAPCOM Roger, 10. The network down here is ready for the TV whenever you are. I have an update to your PTC attitude mode though.

Stand by.

SC attitude. Okay, Bruce, go ahead with that new

CAPCOM

SC

Stand by one, Tom. Roger, Apollo 10. Last night in your PTC mode apparently you were bouncing off the edge of the yaw deadband causing more thruster firing than we'd anticipated, so we've come up with a revised procedure which we hope will get the spacecraft settled down and more smoothly into the PTC mode. Basically it follows the procedure on page Golf 1-94 of your checklist except that you select 0.5 degrees deadband, and then I have some thruster configurations for you. Are you ready to copy?

SC

Roger, go ahead.

CAPCOM After you get through the Roger. enter at the end of flashing 5018 in the checklist, we'd like you to disable all jets on quads Charlie and Delta using the auto RCS select switches. Wait 20 minutes, then switch manual attitude pitch and yaw acceleration command mode and enable all jets using the auto RCS switches. Initiate your desired roll rate which we show as three tenths of a degree per second, and then when roll rate is attained, go to accel command in roll. Increase the deadband to the desired value, manual attitude pitch and yaw rate command of 30 degrees deadband. Over.

SC Okay, you said after you do the 50 interim at 5018 disable Charlie and Delta jets with auto RCS Then wait 20 minutes, go to manual attitude pitch switches. and yaw accel command, and enable all the jets. Then initiate your three tenths of a degree per second in roll rate and then go accel command in roll, and manual attitude rate command in pitch and yaw. Was that what you said there, Bruce?

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1439, GET 2650 100/2

CAPCOM	Roger, that's what I said.
CAPCOM	10, Houston. Say again.
SC	Could you - why don't you explain
what we're doing	here?
CAPCOM	Okav, we're trying to get you set
up in a stable p	osition and all damped out and then initiate
very carefully a	nd slowly PTC and then open up deadband. We
hope this will c	ut down on the thruster firing and keep you
from bouncing of	f the side of the vaw deadband with more
thruster firings	and consequent noise and vibrations than
you had last night.	
SC	I got you.
CAPCOM	And $-$ go ahead, 10.
SC	Okay, John's copying that down and
we've got the tu	be locked on to yours.
sc	Okay, but really what we're trying
to do here is ju	st get the thing real stable before we start
and then we're g	oing to a 30 degree deadband just like before.
right?	
CAPCOM	That's right.
SC	Okav.
CAPCOM	And down there on steps E and F
vou can go into	manual attitude roll accel command in order
to initiate your	roll rate if you like.
SC	Okay, you've got the TV coming at
you now.	
CAPCOM	Oh, roger, we don't show it on the
color vet. Let	me check it out on the black and white monitor
here.	
PAO	We'll have a picture very shortly.
CAPCOM	I don't show it on the color vet.
Let me check it	out on the black and white monitor here.
Okay, we're seei	ng the earth on the black and white. It's
filling up about	one third of the screen vertically. Look-
ing good. Okav.	you're on the color now and looking beauti-
ful. Okav. we'v	e got the North Pole over to the upper right
hand corner - th	e right hand edge of our screen. Do you
have a commentar	v from up there 102

 have a commentary from up there, 10? SC Yea, okay. It looks like the North
Pole and most of Russia is covered with clouds. The United
States is pretty much wide open. In fact, the Solar Subpoint
is right over the Gulf of Mexico now.

CAPCOM Roger, 10. Could you give us a narrow beam on the high gain antenna?

SC Okay, Houston. I've got the full zoom on it so you can see we're quite a bit further away today than we were yesterday. APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1439, GET 2650

CAPCOM Yes indeed.

SC Rog, what you see there. What you see there is a little bigger than we actually see it since I have the full zoom on it.

END OF TAPE

100/3

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1451, GET 2702 101/1

- what you see there is a little SC bigger than we actually see it, since I had the full zoom on it. If you look to the south, you can see all of South America there, and west of the Andes is clear. CAPCOM

Roger.

SC And in the tropical rainforest over Venezula and Brazil and Columbia, you can see the clouds that hang over there all the time. I noticed how clear it is west of the Andes.

CAPCOM Roger, we can see that on the left of our screen. The landmasses don't seem to stand out quite as clearly today as they did yesterday.

That's correct. A lot of it is SC the cloud cover and also you can see night time moving over Europe now. You've got a real weird cloud formation coming around down - just a minute. Let me get a refocus.

It's a real peculiar looking cloud SC It comes off of what looks like Labrador and goes swirl. all the way across the ocean into Europe.

I'm having a little harder time SC holding it today because of the narrow beam that we have with the zoom lens. We're out at maximum zoom now.

Roger, it's coming very nicely CAPCOM here. Would you confirm you are in the exterior on ALC. SC Right, we're exterior on ALC.

CAPCOM Thank you.

SC I'll open it up to about a 55-mm and show you exactly how it appears to us.

CAPCOM Roger, we're -

SC Sure are a lot of clouds down there.

CAPCOM We are standing by for your zoom out to show us the relative size as it appears to you. Okay, right. Right there is about SC how the earth appears to us now. We've made a few miles since yesterday.

CAPCOM Yes, indeed. Roger, we show you about 115,000 nautical miles out here in our plots. Looks like about halfway.

SC How are the colors coming Yes. into today, Bruce?

CAPCOM Oh, the colors are coming beautifully, Tom. I'm amazed at the fidelity. The sea seems to reproduce the same color from day to day, so it looks like you guys have a pretty stable piece of equipment.

SC Okay, again you can see Baja, California, coming in there just real clear and the Rocky Mountains, particularly starting into Mexico going up through Colorado and Wyoming are coming in.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1451, GET 2702 101/2 Roger, I'm having a little difficulty CAPCOM picking out the land masses down here today. That's because of cloud cover then. SC It looks like broken clouds over the southeastern part of the United States. Northeast has a little bit more, Looks like Canada is all flocked over today and over that big cap that goes up over the North Pole and over to Russia is just followed overcast. Rog. We can pick up part of CAPCOM South America. Must be the Andies, just west of the terminator down in the southern portion of the globe. SC Bruce. You should see all of North and South America from where you are. We're going to zoom it in again SC here. Show you a little bit closer. That's maximum zoom right now on the camera. CAPCOM Roger. It's a beautiful sight. We're SC sitting here and it's almost like Science Fiction looking back at us. Bruce. CAPCOM Right. We can pick out the continents more clearly. I'm voting for the world being SC round if there's dissenters. CAPCOM We'll record your vote on that issue. SC You know yesterday we said the San Joaquin Valley was very evident. It sits on a bowl. Even thought we're looking at it obliquely, you can still pick it out in the western United States. Just like a big ball carved out of the coastal and the Sierra Nevada Mountains. CAPCOM Roger. CAPCOM Apollo 10, Houston. The SPS data has been looked at on both the midcourse 2 and the evasive maneuver and all the data is good. We'd like to get you to cycle the ALC switch once so we can observe the effect on the picture down here. SC Okay. Let me go back to our monitor. Okay, here we are. CAPCOM Roger. You just hold it steady and then cycle it a few seconds interior and back to exterior first. It's in interior now. SC CAPCOM Oh we can really see you working out down there. SC Coming back to us again. CAPCOM Beautiful.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1451, GET 2702 101/3

And Tom's cutting on the F stop SC now a little bit. Beautiful. What F stop are you CC using? CC Did you stop it down 1 or 2 stops more. It seems like the definition is clearer. SC There's F22 right there. CC Okay: Hold it there. CC 10, this is Houston. When you stop it down we get a second or so of excellent definition and no saturation and then it tends to saturate again up in the North Polar region as though the ALC weren't quite picking up --

102/1 APOLLO 10 COMMENTARY, 5/19/69, CST: 1459, 2710 GET - plus 4 region - as though the ALC SC weren't quite picking up the insensity of the highlight. Earth, we will not be able to see SC the moon because, through the TV, because we got the sun, right up beside the right hand window. CC Roger, understand. SC We'll bring you on inside the spacecraft if you like. Okay, before you do that, would you CC open the lens up about 2 stops slowly and then stop it down fairly rapidly for us? Okay, they are coming open now. SC (garble) CC Roger; go ahead and bring the camera inside now if you like. SC I can see what you mean about the saturation. Just kind of a candid view down here looking down at this distance, you could never tell anybody inhabited the place. CC Roger. SC Okay, we're gonna take you inside. That's probably been said before. Okay, we're picking up your trans-CC mission from inside now. SC Houston, this is obviously our patch; how is it coming through in color? Not so good really; it looks like CC you got some rather intense lighting from the back and the side - if you could get the lighting more directly on the patch it would be better. SC Yeah, that's the sun coming in. CC Roger. We got John coming through nicely on the tube. What was the 3 fingers for? SC The ... of the day. Oh, that's beautiful. CC SC We were gonna put some more things in, but we just ran out of time. CC (loud laughter) Roger'z Is this also your emblem? SC This is another emblem. SC Do you see any resemblance between the card and the guy holding the card? CC Now that you mention it. SC Does he carry the briefcase. Good grief Charlie Brown'z Now you're gonna bring on that wizzer here. CC Okay, we got Snoopy now. CC Boy he's been quiet for 2 days; he's

102/2 APOLLO 10 COMMENTARY, 5/19/69, CST: 1459, 27:10 GET gonna get a chance to do a little SC woofing here in the next couple days. Roger. We notice the resemblance CC there too. SC Thanks a lot. I didn't know Tom had a big nose like that. Take you over to Gene-o's side of the spacecraft. Roger; picking up Gene now; you've CC got rather strong back lighting from the window. That's the spirit. You all enjoying CC the window shades there? SC There; is that any better? CC It is indeed. SC We didn't get a chance to shave this morning before this show; I hope that doesn't bother anybody. No, it doesn't bother us. The CC definition is real good; we can just about read your wrist watch there Gene. CC Roger; looks like it says about 1600. 16:05? SC 1605 Cape time. CC Roger, we copy. SC Houston. CC Roger. We synchronized our watches here. SC Beautiful. Beautiful. Looks like we have a good piece of gear here. CC Yes, it does. SC ... give you a wizzer, give you a wizzer of TP over here.

APOLLO 10 MISSION COMMENTARY, 5/19/69, GET 27:18, CDT 1507 103/1 One of our problems is trying to figure SC out which way is up and which way is down. And it's beautiful one time you have your SC If you don't like things right side up you can go upchoice. side down. CAPCOM Roger, down here, okay, we've got one of you in each direction. SC It's really a ball up here living in 0-g, believe me. it's the only way to fly. SC Once you get going the cost for individual SC passenger mile becomes rather reasonable. CAPCOM Roger, we copy. I notice, boy, it sure picks up the sun's SC reflection and density no matter where you go. That little reflection is coming out of my window behind me. That's all right. What F stop are you all CAPCOM using now? We're on about 28 I believe here, wait SC a minute. Yes, about 22 to 28. CAPCOM Your center, roger out. SC No good color? CAPCOM Yes, it is. SC You might notice the dynamics here. SC I just do whatever he says. CAPCOM Say, Tom, the flight engineer wants you to be sure you log all your exercises. SC I got you. SC Like I said earlier, this isn't fanning the peacock, but it's the best we've got. Boy, with dynamics like that you guys ought CAPCOM to be pretty good at this PTC mode. SC I mean to tell you. SC Right, that's why we got about 10 hours sleep last night. CAPCOM Roger. That's perfect zero gravity there. Boy, SC I'll tell you there's nothing like it. CAPCOM 10, this is Houston is there (garbled) Are there any sort of air currents there affecting anything you can feel? SC Just a ... a little movement. Watch the sun out here, Roy. CAPCOM That's in effect - we discovered a long time ago. If you watch it long enough, it'll go out. SC It's really hard to stabilize some so so they won't move. CAPCOM Roger. I remember that from Gemini 10. SC We discovered a ... effect up here, but we can't find which way is up.

APOLLO 10 MISSION COMMENTARY, 5-19-69, GET 27:18, CST 1507 103/2 Gene, could you move the camera around CAPCOM slightly. I've got a very bright spot coming in the window, I just want to make that you don't burn the target with the F2F28 F-stop. Yeah. I'll try here, Bruce, to get it SC away from some of that if I can. CAPCOM Roger. Oh, it's really looking good now. Beautiful CAPCOM color here. SC Now we got three objects going. This is a real testimonial to prove you CAPCOM were there, in case there were any doubters. If you want to know what kind of men go SC to the moon, there's a good looking one right there. Could you believe it? Some people still don't. SC That's all right if you'll just send us SC some music. Oh, you want music. Well we'll give you CAPCOM some music at the conclusion here. Okav, we'll take you back outside now. SC CAPCOM Roger. SC While Tom's showing you that, we've got another little rendition we'd like to put your way. CAPCOM Roger, we're standing by. SC Here it comes. This - this is just so that you guys don't get too excited about the TV and forget what your job is down there. CAPCOM We're ready for what we're about to recieve. SC We don't mean it all. Just wanted to send some thrust back to SC you. CAPCOM Roger. Thank you for your thoughts, and with this view of the earth it looks like the United States the land mass of the US is showing up better now than it was a few minutes ago. SC Right, Bruce. I can really see them. Looks like the New England states are kind of clobbered in there. CAPCOM Right SC But the main part of it's coming in real good. And again you can see the great American desert, the Rocky Mountains and the Sierra Nevadas there. Oh it's just beautiful on the - the transients CAPCOM before it saturates there. SC Okav, I'll try to give you another one. CAPCOM All those little glimpses are good, but you've got to be fast to catch them. SC Is it - I'm trying to hold it as steady as

APOLLO 10 MISSION COMMENTARY, 5-19-69, GET 27:18, CST 15:07 103/3

SC I can. Is it looking okay? CAPCOM Yes, you're doing a good job on holding it. This is Apollo 10. On the monitor, it SC appears that I have a couple of little bumps and ragged edges. Is that coming through on the black and white? CAPCOM Yes, it is. It's coming through on the black and white and of course in the - the color that we've got here, it looks like it's in the horizontal sweep. Yeah. I noticed it when we first turned SC it on it didn't have that until it really started to saturate. CAPCOM All right. We saw those little bumps yesterday also. It was at the end of the transmission SC yesterday. CAPCOM Right. SC Okay, we'll go ahead and terminate the TV pass here. I just wanted to play a little music for you so we have something up here when it gets lonely during the PTC mode. CAPCOM Roger, Apollo 10. We enjoyed the TV and the music. END OF TAPE

APOLLO 10 COMMENTARY, 5/19/69, CST 15:17, GEI 27:28:00 104/1 CC Roger. Apollo 10. we enjoyed the TV and the music SC We'll be talking to you tomorrow. Adios. CC Roger. I hope you will be talking to us before tomorrow. PAO This is Apollo Control at 27 hours, 30 minutes. Apollo 10's distance is 112,952 nautical miles, velocity is 5,014 feet per second. That TV transmission lasted about 27 minutes. CC Apollo 10. This is Houston. MARK you are half-way. Over. SC Roger, thank you. SC Based on present trajectory analysis, it looks like no more mid-course corrections will be needed prior to LOI. Over. SC That sounds beautiful. CC You are right on the money. SC It's cheaper to keep going than turning back, eh? I tell you it looks beautiful going away and it is going to look even better coming back. CC Roger. SC What kind of perigee are you endorsing these days there, Houston? CC About 60 miles pericynthian. Did you see the S-IVB from your burn attitude? SC No, we could not see it. We might have been off in roll. I did not want to fool with that too much. CC Roger. SC I did not see it, but we are on the star, all right. CC Roger. We were just curious to know if you had seen it. SC Hello, Houston, Apollo 10. CC Go ahead, 10. SC Roger. Just want you to give our regards to Chris and all of the people in CC and tracking networks. Looks like all the computers are working down to the last bit. Giving us that 60 miles perigee is pretty fantastic. CC Heard you, Tom. We will pass that on. SC We'd better watch it for the next couple of days just to make sure, don't you reckon?

APOLLO 10 COMMENTARY, 5/19/69, CST 1517, GET 27:28:00 104/2

I don't reckon that we will CC desert the MOCR here. I think there are a few people planning on sticking around, at least until you get into orbit. Okay. That's really burning it SC right down to the old slot, though man. That is really great if it does it. SC You can tell Phil Shaffer to keep smiling. I can see him from here. Who am I suppose to tell, Tom? CC SC Phil Shaffer. CC Apollo 10, this is Houston. Prior to mid-course correction 2, we set your X-strip of bias to zero and as a result of this, you have to update your erasable memory table and the contingency book. I have one line update for you. SC Okay. We are getting it out now. Go ahead, Bruce. CC Roger. The E memory table, column A, line 3. All balls. Over. SC Okay. Got all balls, column A. line 3. CC Okay, and when you are ready to copy, I have your P37 block data for TLI abort, 35, 44 and 53 hours. SC Stand by here. SC Okay, Bruce, go ahead. CC Roger. CC Roger, 10. I am ready to go ahead. SC Go ahead, fire. CC TLI plus 35 hours 037305071 minus 16509435 over. SC Why don't you read them all, Bruce, then I'll give them back to you. CC Roger. TLI plus 44046306695 minus 16509414 TLI plus 53 055305499 minus

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1527, GET 27:38 105/1 -5499 minus 16511833 over. CC Okay. TR plus 35 is 037305071 SC minus 16509435 Plus 44 is 046306695 minus 16509414 Plus 53 is 05530599 minus 16511833. Roger, Can read back correct out. CC Okay Bruce we've done the maneuver SC to the place where we disable all the jets we're going to wait here 20 minutes. Is that right? That's affirmative Roger. All the CC iets in quad Charlie and delta. Okay. You know we've got the AC jets CC off right now. You know that, don't you? CC Stand by. CC Roger 10. What we're attempting to do is get you down to a single thruster firing at a time for attitude ... correction. Smallest couple we can get. SC Roger. PAO At 27 hours, 41 minutes distance is 113, 513 nautical miles. Velocity 4,995 feet per second. SC Hey, Bruce is the theory behind PBC once initiated it never fires another jet. Isn't that the theory? CC I think that's the theory. Stand by, I'll confirm it. SC I'm just pulling your leg. CC They say that's the theory. I see a lot of fingers crossed. SC Yeah, that's why I brought it up. CC Roger. SC Man if it works, it will be the greatest thing since CC You cut out half the sentence. SC Yeah, there was a delay in the transmission there. The speed of light. That's peanut butter. CC Roger. Copy. Greatest thing since peanut butter. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1535, GET 2746 106/1

This is Apollo Control at 27 hours, PAO The Apollo 10 crew is now reestablishing passive 50 minutes. thermal control of PTC. That had been originally established vesterday to control the thermal environment of the spacecraft. Yesterday the roll rate in the passive thermal control was I degree per second which meant that the spacecraft would rotate one full revolution per hour. It's being reestablished at 3 degrees per second or 3 revolutions per hour. The procedure has also been modified in an attempt to cut down in the thruster firings. There's been considerable amount of conversation between John Young and CAPCOM, Bruce McCandless about this procedure. The Flight Dynamics Officer, Phil Shaffer, as you heard expects the pericynthion, this trajectory at the Moon to be right at 60 nautical miles without any further midcourse corrections. We will continue to track the spacecraft and see if further tracking confirms this. The one midcourse correction we've done so far was - the burn was right on time, 26 hours, 32 minutes, 56 seconds. The preburn target was for 48.7 feet per second, velocity. We actually achieved 48.9 feet per second. Apollo 10 is now 113 - 114,032 miles from Earth. Velocity continuing to drop, 4,978 feet per second now. We will take the loop down and come back up if there's further conversation.

APOLLO 10 MISSION COMMENTARY, 5-19-69, GET 27:55, CST 15:44 107/1

PAO This is Apollo Control at 27 hours, 55 minutes. We have a correction on the last commentary. The roll rate established yesterday for passive thermal control was one tenth of a degree per second, not one degree, and the roll rate being established now is 3 tenths of a second. 3 tenths of a degree per second, not 3 degrees per second.

APOLLO 10 MISSION COMMENTARY, 5-19-69, GET 27:59, CDT 15:48 108/1

This is Apollo Control at 27 hours, 59 min-PAO utes, and we're back in conversation with the crew. Hello, Apollo 10, Houston. We'll have CAPCOM a ground handover at 28 hours even GET. Rog. Who are you handing us to, Charlie? SC Say again. We're handing you over to CAPCOM Madrid. That's a nice place. Will you Okav. SC start speaking Spanish to us now, Charlie? I don't believe I could do that. How CAPCOM about buenos dias? Is that good enough? Ah, si senor. Muy bien, gracias. SC CAPCOM Buenos noches. SC Good english is good enough for me. CAPCOM Rog. SC Buenos noches. CAPCOM I got a hard enough time speaking english. That's all right, Charlie. You just keep SC talking grits. I understand it. SC Charlie, not to sound corny or trite, but it really is like another world out here. Say again, Gene. CAPCOM I said at the expense of talking corny SC and trite, it's really another world out here. CAPCOM Rog. SC I like to say roger. SC Houston, 10. We - we're starting a roll rate now. You want me to initiate omnis, take care of the high gain? CAPCOM Stand by. CAPCOM Roger, 10. We'd like you to select omni BRAVO. SC Houston, this is 10. How do you read on BRAVO? CAPCOM Roger. You're coming through about 4 by with a lot of background static, Gene. SC Okay, how now? CAPCOM That's fine. SC Okay, Houston. We've got the dead band set up. You want us to go back to the CMC and all up. CAPCOM Stand by. SC Don't look to me like it's going to last very long there, Charlie. CAPCOM Roger, John. When you did that verb 46 inner a couple of seconds ago it collapsed the dead band back to 5 tenths of a degree in adapt. You'll have to reinitialize again. SC Okay. SC I'm showing a - I'm showing a 5 degree -

APOLLO 10 MISSION COMMENTARY, 5-19-69, CDI 15:48, GET 27:59 108/2

showing a 5 degree deadband. CAPCOM Roger. We wanted a - we want you to do us a 40 - a 30 degree deadband. Stand by one. We'll get you squared SC away. CAPCOM Gene, okay. Okay, there's your 30 degree deadband, SC which is what we had unless the numbers didn't get in there. CAPCOM Roger. Stand by. SC Houston, what - what I want to find out is, do you want us to go back to CMC in AUTO on the pitch and yaw channels from excel command. Do you want us to rate command giving it back to ADAPT. That's affirmative. We want you to go CAPCOM to CMC and pitch and yaw manual attitude and rate command. Okay. And that's where we are. SC CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1557, GET 2808 109/1

PAO This is Apollo Control at 28 hours, 13 minutes. Apollo 10's distance from the Earth is now 115,010 nautical miles. Velocity 4,945 feet per second. This air ground loop is very noisy. We've had no conversation for some time. We'll take it down and come back up if there is conversation.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1609, GET 28:20:00 110/1 This is Apollo Control at 28 hours, APO 20 minutes we're back in touch with the crew of Apollo 10. Go ahead there, Houston. SC Roger. We'd like to proceed with CC the PTC auto react check at 28 hours. Follow the procedure as in the flight plan except for one change and that's one addition I should say and that's tape recorder to 4. Understand. Proceed with the SC auto react check at 28 hours with one addition. Tape recorder to 4, CC Affirmed. SC Want to go ahead and do that now, Charlie, is that correct? CC That's affirm, Gene. SC Apollo 10, Houston. Your high gain antenna angles of 90 minus 40 are good for the roll left. Roger. Hey Charlies, we're up SC there eating a new meal a little late as usual and what'll you know. We had a chicken salad sandwich. CC Hey, how does it taste? SC Would you believe, like a chicken salad sandwich. SC Hey, great. SC Sounds like a real gourmet special there. We'll record that comment. CC SC That's real important. CC Rog. We'll record that comment good chicken salad sandwich. SC You noticed he didn't say good corned beef sandwich. SC I got that. CC We'll ask about that next. SC No need to ask. CC You guys, how's the water tasting now. Have you've got up enough nerve now to try any more of it. SC Yeah. It's real good Charlie. No problem at all. CC Rog. Tom. SC The taste is Okay Charlie. There's an awful lot of air bubbles in it would you. You know. CC Rog. SC Which is hard to understand since we took all the clothes off. CC We'll have the E Comm guys scratch their heads on that and see if they can come up for the reasons for that. SC We had this same problem in Gemini. It's just hard to keep air out of water, I guess. CC Okay. SC Houston. It looks like we just went to dead band start.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 1609, GET 28:20:00 110/2

PAO This is Apollo Control at 28 hours, 24 minutes. Distance now 115,544 miles velocity 4,928 feet per second. This line's very noisy. We'll take it down and come back up again if there is further conversation.

APOLLO 10 COMMENTARY, 5/19/69, CST 16:19, SET 28:30:00 111/1

PAO This is Apollo Control at 28 hours, 30 minutes. CAPCOM Charlie Duke is talking to Gene Cernan. SC Hello, Houston. Houston, how do you read? CC Roger. You are coming in fine, Gene. CC Hello, Apollo 10, Houston. DG you read? SC Hello, Houston, are you reading? CC Roger, we are reading you. 5 by. SC Yes. This is OMNI D. Haven't been able to do anything with this react mode. My signal strength goes from about one-quarter to two-thirds back and forth. Apparently you haven't been reading it all. CC We have had nothing but static. Stand by one . Let me see what ECOM SAYS. CC Hello, Apollo 10, Houston. Those numbers we gave you were too late, when you went to high gain they were too late. We'll recompute some angles for you and get them off to you. Over. SC Okay, Charlie. CC Apollo 10, Houston. Those numbers in the flight plan for the roll left are good and about five minutes. if you'll try in about five minutes you'll know, it should work. SC Okay, Charlie.

APOLLO NEWS CENTER HOUSTON, TEXAS

CHANGE OF SHIFT BRIEFING MAY 19, 1969 TIME: 6:00 P.M.

PARTICIPANTS

Glynn Lunney - Flight Director Phil Shaffer - Flight Dynamics Officer Jack Riley - PAO
APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02 PM CDT 14A/1

RILEY One announcement before we get started. At 7:00pm here in the auditorium a Mission Planning and Analysis Division film, Lunar Orbit Rendezvous, will be shown, and Ken Young, from that division will be here to answer any questions you might have. This evening we have Glynn Lunney, the Flight Director and Phil Shaffer, the Flight Dynamics Officer on this shift. Glynn will give a summary of the shift.

LUNNEY Okay. I thought we might go back a little bit. We haven't had a conference since yesterday. Isn't that right? And just briefly review what happened on the previous two shifts before the one we were just on, which wasn't much of anything. Last night, as I told you yesterday, we were going to delete midcourse 1 which would have occurred in the first day period for the pilots, and we did that. So with that deletion, things got pretty quiet, and it was just a matter of closing up the cockpit and settling things down for the night, which was done, and the crew were essentially away for sleep at about - about 12 hours into the flight last night. All three of them - on this flight all three men are sleeping at the same time, and we're leaving the vehicle in automatic control with the spacecraft computer doing the controlling. At one point during the night, the commander reported after about an hour or so that he was disturbed by the firing of the thrusters. We queried him about it the next morning and it appears that rather than the noise of the thrusters themselves, he's more - felt kind of a loose feeling in the vehicle like perhaps the gimbal engine was moving around, and after a firing stopped the vehicle tended to move around a little bit, and I guess it was just a little more annoying than anything else. Tom did report this morning that all three crew members slept very well last night, and all felt in great shape. As you know who have covered the flights in the past, usually we have some difficulty getting a good night's sleep in for the men onboard, but they seem to do much better than on previous flights last night. At least I would conclude that from the tone and the words that Tom used this morning. We were able to verify with tracking on the saturn stage that it's going to go around and actually sling shot past the moon on the right-hand side with the spacecraft going around the left-hand side according to plan, and then it will be going by the moon at an altitude a closest altitude of about 1700 nautical miles at 78 hours and 50 minutes into the flight. So we'll get there higher and later than when the spacecraft does. The rest of the time was sleeping. Woke up this morning, and my team came on about 09:30, and we had a relatively relaxed day also. Let's see, we went through things like a news report from the two capcoms. We did have a problem with the water in

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LUNNEY that the way in which the water was chlorinated ended up giving a slug of chlorine to the crew this morning when - after they took a couple of drinks out of it, they finally got to the place where the chlorine was still standing in the line. Essentially, this happened because of a mix up in the communications with the pilots. They had asked if they should open the potable inlet, which would have allowed the chlorine to be forced on into the tank and mixed some, however, the men in the control center at that time assumed that they had already done that part and that the pilots were asking whether they should leave the potable inlets open all night, which was not according to plan. So they said, "No, you got to close it up for the night," which was done. It turned out it was never opened. So in the morning Tom got a slug of the chlorine, but he felt later on that they'd gotten over that problem, and we advised them to draw some of the water out and throw it away which they apparently did. And it did do one job by ruining his grapefruit juice. There are a number of reports in the morning that we had to pass up consumables and flight plan updates, and all these things went according to flight plan. Based on the reading we have, as to the delta pressure from the cabin to the LM tunnel, we don't have to do anymore special work to enrich the oxygen in the command module level. Will go along normally, and the leak rate in the LM will be fine such that the oxygen environment we had in the LM will be satisfactory. We're doing this primarily as a time line exercise that concern being the Apollo 11 mission where we'll have to do an EVA. Water dump was done at 23 hours and 30 minutes - dumped about 8 pounds of water. We did the usual checks on the ECS system. We got a visual report on the - I guess you would call it a weather report from the CMP this morning - from John Young. Also, Tom Stafford reported on star visibilities, and he was able to pick out a couple of stars when the light was right, that is when the sun was well shaded. They did have a little trouble with the lighting in - when we did a test called trunian bias, and that was of no real concern to us. We proceeded into the program 23 test. During this - this test was actually accomplished two things. We took a series of marks which were incorporated in the navigation system. All of the marks, and you probably heard those comments about all zeros and point 1 and that - that was a measure of how much change was being introduced, that is to say how accurately we were adding marks to the state vector knowledge on board. The measurements indicated we were very accurate in updating the spacecraft vector. We also tooks these marks in order to get another definition of the horizon that the pilots are

seeing. There's work going on to reduce that state in the

14A/2

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control center, and we would expect to LUNNEY decide sometime in the night whether we would update the number in the spacecraft computer. With the mission following a normal timeline from now on, we won't have to use that That's only done in case the pilots would lose number. communication with earth and would have to use their onboard system to navigate them back. We then started preparing for the midcourse 2. It being a midcourse that we did today, as a result of skipping midcourse 1 yesterday. The midcourse was about 48.7 feet per second and about 26 1/2 hours just as in your flight plan. Phil has a lot of the numbers here if people are interested in them later. The burn was done essentially pointed at the sun so that the vehicle was shaded. It was interesting to note that with the LM shading the sun, the pilots are able to do a lot more star identification which would allow us - in future flights or if we had to on this one - to come up from scratch and realign the platform, so that was good to know. We did, since there were some reports, often offer the crew about seeing panels or SIVB - or the SIVB and not knowing which it was we did give them a sighting to the SIVB of the - when they were in burn attitude, but they really didn't have much time to work on that, and they didn't want to maneuver the spacecraft at all to - to really try to pick it up, so we didn't get any - any sighting of it at that time. Shortly thereafter the - the TV pass - the TV period was initiated, and then it went on for about a half hour. I guess the actual time was slightly less than a half hour. After that we were engaged in doing two things, one which took us a long time, and I guess it's still being talked about over there. We were doing something with the high gain antenna. Now, the way we do the passive thermal control during the night is to slowly roll the vehicle so that it's uniformly exposed to a different heating and cooling cycle but uniformly throughout the spacecraft so that everything reaches a nice comfortable equilibrium temperature. And the problem is that we would like to see if we can acquire the high gain antenna and get the high bit rate which we will need when we get out to the moon everytime the vehicle makes a rotation. That's the purpose of this high gain AUTO reacquisition test which we just did, and which was fairly successful on a couple of reaquisitions. Now the point of all that is if we for some reason wanted to stay in high bit rate at the moon or if for some reason we had some trouble with our omni antennas, we could selectively do this and having done this test, proceeded with some confidence in reaquiring the high gain antenna everytime the vehicle rolled around. This would be of interest to us during sleep periods when we wouldn't have the pilots to assist us

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LUNNEY in keeping the comm up. The other thing that was going on when we left the control center was attempting to set up the passive thermal control mode again tonight as well as possible. What we found last night during the course of the passive thermal control and what was causing the thrusters to fire was essentially the vehicle was staying off on one side of the deadband, and it was -

END OF TAPE

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eventually the vehicle was staying LUNNEY off on one side of the dead band and it was over kind of like that and it would kick it back in with the thruster but it wouldn't go very far on account it would kind of come back and hit the dead band again and it was happening on the order of every 1 to 5 seconds we were getting the firing to bring it back in. Now we would like to have this thing behave a little more like a dead band system ought to where it will go from one side to the other. Maybe a time period of maybe 15 to 30 minutes so as to minimize the firing and the usage. In either case, we don't have any problem with the full usage since we are still ahead on the flight plan. But we would like to try to do this thermal control as well as we could. What we're trying to do right now is set it up so that we have as many as zero as possible any other rates in any other axes and then introduce a very controlled rate to see if the vehicle can be made to stay more in the middle of where we want it. I guess, how that turns out remains to be seen yet and I suspect in a couple of hours we'll have some idea whether that's going to be any better. The difference on this flight than Apollo 8 is in of course we had the Lunar Module out in front so that inertia, the moments of inertia, let me use that for a moment, about the roll axes are not very high compared to the moments of inertia about the other two axes and the vehicle wants to tend to wander more than it did on Apollo 8. So that's what we think is causing us to sit on the dead band. I guess I should go back and recap a couple of things. Summary on the day. Basically what we had to do today was to get the midcourse 2 off which we did about what we had decided it was going to look yesterday. Midcourse came off very well. We looked at all the data from the Service Propulsion System on both evasive maneuvers yesterday which was a little less than 3 seconds long and the burn today which was just about 7 seconds long. All that data is right down the middle of the line so that we have every confidence in the Service Propulsion System. The performance on all the other systems on board is staying very nominal. We're still ahead on a flight plan in the Service Module RCS area. The hydrogen and oxygen are behaving normally The usage rate is just about normal. We don't have too much more to do tonight. Essentially the men will be cleaning up the cockpit and having their last meal and settling down for a night's sleep. With things going as they are, I would very much expect that we would not do midcourse 3 tomorrow I believe, I'm getting ahead. At the rate it's going, it doesn't look like we would be doing midcourse 3. However, as you know, it takes awhile to build up an accurate solution with the tracking and that's what's going to go on now all night with the men evaluating that data think that's a summary of what went on in the last 24 hours for you and at this point, I guess we should go to questions. Have you found out what Cernan QUERY

did with this chlorine he got in his mouth? Did he spit it

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Did he swallow it? Is the OUERY -out? chlorine floating around in the spacecraft? LUNNEY

Say again.

OUERY Do you know what he did with this chlorine when he got it in his mouth? Did he spit it out? LUNNEY I expect he spit it in a napkin

and put it in a bag.

QUERY You said the state vector was very accurately established in this spacecraft. How accurate is their track. How does it compare with the ground track here, their determination of their position?

Phil, why don't you talk about LUNNEY that a little bit.

SHAFFER I looked at it about half way through the tracking sequence and looked at it again at the end. And since we have not sent them a new state vector in the very near pass, they had reduced the position errors by about 30 percent by the end of the tracking and then about 10 percent half way through. So it was really doing quite well. The earth return perigee uncertainty this I remember was about 3 miles from that data, which was very good.

LUNNEY Get the microphone down there. QUERY You say the earth return parigee was 3 miles, what about the Lunar pericynthion in. Did not specifically look at it SHAFFER but it would be less than that, I think. QUERY I've got 2 nice ones and a nasty one here.

LUNNEY

Welcome to Houston again.

QUERY When you read out the data on where the S-IVB would be now, would it conceiveably have been in sight from the Apollo 10.

LUNNEY I don't know. It was 17 hundred miles away. It's hard for me to believe that they were seeing that. If I had to guess, I would guess that they seen the slop panels which are more nearly in the path that there in although they are pretty far away too. And there're seeing just an occasional glint off that stuff. If I had to guess, that's what I would guess they were seeing.

QUERY When you spoke of this dead band wavering last night, you said the thrusters were firing every one to five seconds. Was that --

LUNNEY No minutes, minutes. Every 1 to 5 minutes. Excuse me if I said seconds. That was incorrect. APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69 6.02 p.m. CDT 14B/3

QUERY And now for the nasty one. Chuck Berry was very specific over at the Cape about the crew not doing any self medication. That anything they took would be prescribed by the doctors on the ground and according to last night's transcript, each member of the crew took 2 aspirin tablets, Cernan took a Lomotil and went to bed early and yet there isn't any conversation earlier to cover this. A. Is somebody sick? B. Was there a private radio conversation or more than one private conversation?

LUNNEY To my knowledge, and from everything I can judge from the data we have and the tone of voice and the TV we have on the men, there's absolutely no question in my mind that anybody's feeling bad up there. They seem to be feeling great and in answer to your second question, there have be no private conversations.

RILEY This morning, the Soviet press had some not too complimentary things to say about the spacecraft or the quality of the spacecraft and the dangers that Apollo 10 has undertaken, I wonder what your reaction is to that?

LUNNEY Well, I hesitate to say in this group. But I haven't even had time to read the American press but I guess aside from that, I think the performance of the vehicle speaks for itself.

QUERY When you talk about dead band and last night, I believe there was a lot of conversation about 20 percent, ah - 20 degrees and you say this spacecraft was only going half way.

LUNNEY It was 10 in the stayover at one side of the 20 degrees. In other words, it was staying over there 20 degrees yawing and kicking in a little bit. Maybe 5 degrees to 15 you know and come back out to 20. It was just hung over on that one side.

QUERY The 20 degrees refers to 20 degrees either way.

LUNNEY Yes, plus or minus from the top. QUERY Fine.

LUNNEY And by the way, tonight we're going to open that up to 30's. We may see the same thing at 30 but...

QUERY The music that was played back. Was that on the Sony machine that they carried aboard on a cassette?

LUNNEY	Yes. It was on a Sony recorder.
QUERY	Cassette.
LUNNEY	Yes.
QUERY	Two questions. But first, would

you pursue that point about this drift off. Have you any mark on what's causing it?

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LUNNEY Not really. I guess the best theory we have is the one I tried to explain about the fact that the vehicle is much more inclined to go in a pitch or yaw direction than it is at roll. The whole technique here is to get the vehicle rolling stably and not go in pitch or yaw. Any small disturbance in either setting it up or even once you've set it up, tends to make the vehicle go in pitch or vaw. It may happen again tonight. However, I wouldn't make too much of it in light of the fact that even with the thrusters firing that often, compared to what we'd like them to fire, we made a point of questioning the Commander this morning as to whether that interfers with his sleep and his comments indicate that he's quite satisfied he and his crew are getting a good night's sleep. It's just was something apparently that he was a little surprised by.

QUERY I'm sorry. Maybe I misunderstood you. I understood you to say 8 did not drift as much, anywhere near as much.

LUNNEY Oh, you recall we kept a man awake actually doing this thing in Apollo 8 manually, if you recall. I mean we had an automatic control system. But we had a man watching it all the time, plus we didn't have the LM onboard which tends to make the vehicle.....

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LUNNEY ---all the time, plus we did not have the LM on board which tends to make the vehicle more want to go into the direction of PITCH and YAW and less in the direction of roll. Okay.

QUERY Now the other question I had was as a result of this water incident today, has anyone dropped their food intake? Is there any indication that they may have a queasy stomach for a little while?

LUNNEY No indication at all of any stomach problems and no indication of any change in the food.

QUERY Those color TV pictures that we saw, were very entertaining and very interesting, but are you finding that they are serving or likely to serve any practical purpose for Mission Control?

LUNNEY Yes, to answer your question. Both during this flight and certainly in future flights. I guess the TV on board is a relatively new thing compared to things like pressure gages and temperature transducers; however, in the kind of work that we are doing and hope that we will be doing in the future, the television makes an obviously, a very good way of presenting a problem or situation or just status to the people on earth. The questions have been asked here about the health of the men - and I don't think you have to look at very much of that television to realize that the men are in great shape and feeling just fine. Right there you have an immediate advantage in assessing Apollo 10 and as we go along, I think we will find more and more use for the camera like EVA and things like that.

QUERY I would like your opinion why Apollo 10 is lucky enough to have no house problems. Is the crew doing these head exercises Dr. Berry has prescribed. Have you heard anything about it? Have they reported that they are doing it regularly or ---

LUNNEY No. They have not reported especially doing any exercises in that regard. I suspect they are doing some. I personally don't know what to attribute it to, primarily because we don't fully understand the nature of the problem there. However, it appears that being forewarned is being forearmed and the crew is doing just fine in this regard as far as we can tell.

QUERY Could we have a comparison, please, on the PTC roll rate between Apollo 8 and the initial roll rate for Apollo 10.

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LUNNEY Yes, you can get that, but I forgot off hand. It seems to me they were the same, but I am not positive about that. We can get that and send it back over.

QUERY One more question on the passive thermal control. I thought I had it straight two or three weeks ago, but I am a little confused from things I am hearing now. Glynn could you go through again the method of the PTC, is it roll or is it YAW. There was to be something different this time and yet you are discussing roll here during the overnight period. Would you clarify the whole PTC method being used on this flight.

LUNNEY Yes. What is being done here is physically very similar to what was done on Apollo 8. It is different in that the control system is different and it is different in that the weight of the vehicle and the inertia is different. Basically, you could stand the vehicle approximately on its tail between earth and the moon and the sun being over here and you roll it around at about a tenth of a degree per second and just expose different sides of the spacecraft alternately to the sun and to the cold space on the shaded side and you do that whenever you are not exercising the vehicle in a specific fashion like during midcourse. Essentially, it is the same process that we used on Apollo 8. The control technique is a little better in that with this control technique we don't have to leave a man up monitoring it all night and we can put all three men to sleep at the same time which is good from a flight planning point of view. And, secondly, this business of having the LM on is probably making it a little more unstable. I still don't think I satisfied---

RILEY Okay. Let's get a followup question, then we will go over it.

QUERY A followup then. Are the rates so slow that during these TV transmissions they can hang into the same window with the camera?

LUNNEY No. As a matter of fact, I don't believe we have done any TV at all yet in this except for probably the TV that was done last night inside the cockpit. Whenever you see something out the window, it is not done with that roll going on.

QUERY A few hours ago Jack gave us a figure on the half-way point that the spacecraft had traveled on this flight of 112,000 odd nautical miles and I am still a little bit confused as what line that APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02PM CDT 14C/3

QUERY refers to it. In other words, how far along the line were they when they reached the half-way point with a line between the earth and the moon, as their relative positions existed today or as their positions will exist tomorrow or the next day or ---

LUNNEY That's the trouble with doing things like that and I will let Phil Shaffer explain it to you.

SHAFFER Thank you. (Laughter) The question was when do we get to the half-way point and the only thing I could do right then was find out when the altitudes, relative to the earth and relative to the moon. would be the same. So, actually, the earth, the moon and the spacecraft were making a triangle with two sides being equal, the line between the earth and the moon being the third side.

QUERYInaudibleRILEYOkay. Wait for the microphone.QUERYIn connection with the salestead'squestion.We have got a number of figures as to wherethis point of equal gravisphere begins.Is it 15,000,30,000,35,000 miles from the moon, or what?I justwant to try to get straightened out on it.Inaudible

SHAFFER It is about 33,600. Nautical? OUERY SHAFFER Nautical. Affirmative. From the center of the moon? OUERY SHAFFER Right. OUERY You got a GET for that point? Yes. It's about 6151. SHAFFER From the center of the moon? OUERY SHAFFER Center. Let's get the question right RILEY there.

QUERY You say that the music that came from 10 today was already on a cassette that they took up with them or a tape?

LUNNEY It is a little tape that they use on a sound recorder and I think that how it actually works is that they have music on it until they erase it and use it up to record their own voices, so they are gradually running out of music, and putting more voice on it. I'm told that is how it works. APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02PM CDT 14C/4

OUERY Have the precise times for LOI-1 and for the time coming up from behind the moon, have they changed at all from the flight plan?

I am sure they have changed a LUNNEY little bit from the flight plan, but actually we don't know what they are yet, Mark, until we track this thing. We don't even know if we are going to make another mid-course yet. So give us a couple of minutes either way and we will let you know the night before what the best estimate is.

If you skip the mid-course OUERY correction No. 3, will that still bring the Apollo 10 into a pericynthion about 60 nautical miles above the moon?

SHAFFER It will be very close to 60. It is going to take us about 6 to 8 more hours of tracking data to know better than that.

What would be your estimate QUERY right now of the range the order of error right now?

SHAFFER	
QUERY	
LUNNEY	
SHAFFER	

What would you like? I'd like an answer. Well, okay. That's not that unknown--No, it's really, it's between

58 and 62 probably. QUERY Let me try two on you.

Is there any danger to the astronauts from solar flares? I heard that coming in here LUNNEY tonight and I called over to check our network and there are no alerts or anything like that. Somebody asked They had heard about a report that we were going to me. have a flare, but we are not aware of anything like that going on, so I don't know where that came from. Have you had any problem of QUERY

chlorine gas escaping into the capsule? LUNNEY

None that we know of.

QUERY One last question on PTC, When the spacecraft, the hot spot or the warm Glynn. spot rotates around to the dark side, where does the heat go? Is it just disappiated into the spacecraft itself?

LUNNEY Well, yes, when you get into the cold side, it is just disappiated into space and it just averages out.

QUERY What I mean is, there is no medium outside to conduct it away. There is no atmosphere or anything, so is it just ---

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LUNNEY It can be radiated away, just like the radiators radiate heat, out of the spacecraft.

QUERY Back to the cassettes. Prior to this they have not had those little Sony portable tape recorders that we were aware of, had they, however, had these cassettes?

LUNNEY No. Do you recall in the past, we used the same recorder for voice recording that we used to record the telemetry, you know, the thing we are dumping all the time, and we found that the pilots putting their voices on it and we using the tape recorder to record the telemetry and getting these two, not necessarily time sequenced desires together, it led us to a lot of who is going to use the tape recorder and if you followed Apollo 7, I am sure you heard all that. So, what we did, we got a little recorder that they could use for voice and they can plug it in and have at it and it is completely independent of the telemetry systems. Greatest thing we have done.

QUERY Is this simply a way of trying to justify getting a music machine, a music making maching on board, or --

LUNNEY No. If you covered the flight now, you know that we had a real, not bad, but cummbersome problem with - the pilots wanted to debrief something and get it recorded, we wanted to record a burn or something and get that data down and we were always vying for use of the tape recorder and plus we had a - not either one of us could use it when it was being dumped, etc. This has just turned out to be an immensely more practical and efficient way to do business.

QUERY Do they have more songs on that left that we may hear?

LUNNEY Well, I was told today that we might hear some more, so we will see.

QUERY Do you know what they are? LUNNEY No.

QUERY With all the TV Tom Stafford says he is going to provide us, is there a certain amount of telemetry that we are losing? I understand that there is no high bit rate when using TV?

LUNNEY No. That is not correct. The

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I understand there's no high bit rate RILEY while you're using TV.

No that's not correct. The only constraint LUNNEY we have on the television is that we can't dump the telemetry data from this tape recorder that we were just discussing, you know which is recorded in most cases behind the moon. Now, when we have to do that, we will interupt the television and dump the recording. Okay?

About that question regarding that, SHAFFER what about power consumption? Is there a limit to -

No, we're in good shape for that. That LUNNEY doesn't take anything to speak of.

OUERY Did these midcourse adjust at very high reentry angle that you would have had on the free return?

LUNNEY Yes, we had a high entry angle of what Phil, previous to that?

SHAFFER As I remember it was about 70 degrees I think. It was very steep.

LUNNEY. And we now have an entry angle which is on the order of -12 degrees, and that's a very comfortable thing for us. That means we're on a free return - we're well captured. 12 degrees is steeper than we would reen 12 degrees is steeper than we would reenter, but it would only take a 10-feet per second maneuver out around the vicinity of the moon to put that right back where we wanted it. So we're very comfortably on a free return.

You've intrigued me with this - with your OUERY answers about the passive thermal control. I don't want to go back to that.

Good.

LUNNEY

OUERY I want to get to your reference. You use the phrase several times - the weight of the LM making the space ship unstable. Now are you redefining weightlessness, and if you will answer that, I'd like to follow it up.

LUNNEY No, I'm really trying to use terms that will come across as well as they can. I'm really talking about the moments of inertia of the vehicle. Okay? And just - and that's just to measure how susceptible it is to move it.

QUERY I just want to - I'm going to ask three questions, but they can be answered bing bing bing. As I understand it, we're still not sure what's - Young and Cernan saw when they saw this rotating object. Is that correct? LUNNEY

That's correct.

QUERY Then too, they - you said Stafford got a slug of chlorine. Was he the only one that got the slug of chlorine?

LUNNEY Yes. Now, what happened there was that you know, we put the chlorine in here, but there's a lot of water run down into the gun. So they all got a drink of

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LUNNEY water out of the gun, and by that time Tom was lucky enough to be next in line for the slug which had then come up to the gun. And of course once he got that, the other two men stood by while we drained it a little bit.

QUERY And this is for the PAO. I've already been hearing remarks about, well if there's a way the way you can prevent space sickness according to Doctor Berry is, you wiggle your ears in space. Could we get somebody to come over here and show me, if not the other people just what the hell these head acrobatics are that they do or whether they just wiggle their ears or what?

RILEY Who would you like to wiggle their ears for you?

LUNNEY I wouldn't ask him a question like that. QUERY I'm asking the PAO. I'm not asking the distinguished members of the panel.

RILEY We'll certainly get one of the distinguished phsicians to come over and wiggle their ears for you. We'll try to do that. Down here -

QUERY When you were discussing the chlorine with the spacecraft this morning and they reported it, you asked at one point you asked them could you tasts any chlorine and the answer was made, "You bet your sweet bippy we did." Who answered that? What said that?

LUNNEY I don't I don't recall. I expect it must have been Tom, because well I didn't hear that quote. It must have been Tom, because he was the man who got the -

QUERY It sounded like Young, and I - it made it sound as though they had all tasted it. You're quite sure that Stafford was the only one who - who drank it.

LUNNEY To my knowledge that's right, but I'll go back and ask again.

QUERY Did the flight surgeon have anything to say about what the effects might have been if this mouthful of chlorine and/or water had been swallowed at that concentration?

LUNNEY No, as a matter of fact, it has happened a couple of times in the past.

QUERY

You mean they've swallowed it?

LUNNEY Cunningham got a shot of it on Apollo 7, and I guess it's just very bad tasting stuff, but no permanent effects or anything like that if that's what you're looking for.

QUERY Well, he had swallowed it on 7? Is that right?

LUNNEY I don't know as he swallowed it, but I know he got some on his mouth.

QUERY In connection with the chlorine I would like

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02 PM CDT 14D/3

QUERY to know the volume of the tank of the drinking water.

LUNNEY QUERY LUNNEY

QUERY

You would like to know what? The volume of the tank of the -

LUNNEY The portable tank holds 36 pounds of water. I don't know how many cubic inches that is, but the problem with the stuff is getting it in the tank is getting it mixed. If it just site in the line, which is apparently what it did this time, of course there's no mixing with that large volume of water.

QUERY Do you have two tanks on the space ship? LUNNEY Yes. A postable tank, that is to say drinking water, and we have a waste tank which we use for supplement need evaporators - when we need to boil water with evaporators.

Thank you.

QUERY Would the slug of chlorine that Tom Stafford got be similar to awallowing some water if you were in a chlorinated swimming pool or would it be more concentrated than that?

LUNNEY I suspect it's more concentrated than that this morning.

QUERY The astronauts can look out the spacecraft window and see stars. Why can't we see stars when the television camera goes to this black?

LUNNEY I guess it's just not sensitive enough to pick them up. I'm sure that our television people here could maybe answer that better than I do, but it's seems to me it's just a matter of that. Just being light sensitive enough to pick that up.

QUERY Wasn't there a plan? You may have answered this cause I've been traveling part of this period. Wasn't there a plan to have them draw water off the night before, put it in a bag, and spin the gas out of it and use it the next day?

LUNNEY Yes, but let me tell you what you're talking about. In the first place, we loaded water that we hoped to make as drinkable as possible at the cape, and we sealed that tank up - the portable tank. We didn't let any fuel cell water come into it. Now the subject you're talking about has to do with wanting to separate hydrogen gas from the water when you get to drinking it in earth orbit. Now, or in the spacecraft. You get into this when you started to replenish the drinking water supply with the fuel cell water which has the hydrogen. Now we're going to open the portable water tomorrow at 36 hours, sometime tonight. At that time, we will start accumulating water from the fuel cells in the portable tank that we then use for drinking, and then with this accumulation and the APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02 PM CDT 14D/4

LUNNEY experience we had with the hydrogen bubbles in it, we're then going to go to this procedure where they put it in a bag and spin it up and separate the gas and then relieve the gas out of the bag before they drink. Okay? I was checking my press kit this after-QUERY noon looking for the exercise that Tom Stafford was performing with John Young and didn't find it. I was just wondering if that was approved by Dr. Berry or not? I don't expect that it's approved by LUNNEY Dr. Berry but -RILEY The gentleman in the beard - the one with the beard. Glynn, you - you're not going to chlorinate QUERY the water with hydrogen bubbles in it are you? LUNNEY Yes. Just as we have in all the previous flights. What kind of - what amount of acid is QUERY produced in that reaction? LUNNEY I don't know. I'm sure it's small but there must be OUERY some hydrochloric acid produced. Okay, I'll have somebody figure it out for LUNNEY you. QUERY How much gas is in that water? Is it like an extremely carbonated drink, or is it mildly carbonated is it a great volume of gas? LUNNEY Oh -QUERY I heard someone - I heard the figure 60 percent mentioned by one of the astronauts in an interview. LUNNEY They may have been talking about the gas in the water when we are replenishing from the fuel cells. I don't know what the number is, but I'll try to find that out too. QUERY The consequence of that is how much gas is released? Is that a significant amount of hydrogen - after you

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/19/69, 6:02 PM CDT 14E/1

QUERY The consequence of that is how much gas is released. Is that a significant amount of hydrogen after you've separated?

LUNNEY Oh. I see what your asking. No that was part of the look that the people took at this before we went to this kind of system to be sure that the amount of gas we were releasing in the cabin was then no problem, and I don't know what the numbers are but they assured themself that that did not represent a problem in the cabin. And of course, we have scrubbing of the oxygen all the time in the cabin.

QUERY In the TV sequence, this afternoon, did one man take all of the pictures, or was the camera passed around?

Well.

QUERY If it was passed around, could you give me a brief idea who is which?

LUNNEY Well, I can only judge, as you can from the picture. When we were only taking a picture of one man I wasn't sure of who was holding it. I think Gene was probably holding it, Gene Cernan most of the time. When we were taking pictures of two men, it was the other man holding the camera. I probably can't help you very much beyond that.

QUERY Okay. One more question here from Mr. Griffith.

QUERY On the firing of these thrusters, that went on from every 1 to 5 minutes during the whole eleep period or during part of it.

LUNNEY Approximately.

QUERY During the whole sleep period.

Like a pullman train.

LUNNEY

QUERY I understand there are no questions at the Cape. Is that still true?

RILEY About this movie Lunar Orbit Rendezvous, in about 5 minutes, we expect a short while after the start of the movie, that Ken Young will arrive so we're going to give it as much continuity with the change of shift briefing as we can.

QUERY Say John, why don't you have a doctor come over to the news center and wiggle his ears for me.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5-19-69, CDT 19:54, GET 32:05 122/2

SC imagine it'll be DELTA and BRAVO like we normally have been doing. And you want the S-band normal voice -

APOLLO 10 COMMENTARY, 5/19/69, CDT 2004, GET 32:15 123/1

---I imagine it will be a SC DELTA delta and bravo like we normally been doing and you want the S-band normal voice mode of voice switch off and you want the down voice back up. CC Roger. SC And we will be waiting for a water dump after 45 hours tomorrow. CC Roger, that's affirmative. Over. SC Okay. When you are through with the dump, you can let me know and I will set up the OMNIs. CC Roger. We will give you a call. SC Houston, this is 10. CC Go ahead 10. Over. SC Bruce are you going to want to knock off the battery charge before sleep time tonight? That's affirmative. CC SC Okay. Apollo 10, this is Houston. We CC have a state vector to uplink for you, if you give us accept on our up telemetry. Do not, I say, do not enter Verb 37. Over. SC You want accept, huh? Okay, here comes accept. Proceed. CC Roger. You are in accept now. SC Can you guys send a vector with that thing running like that? CC 10, this is Houston. Negative. You need to hit proceed for us. CC Roger, thank you. Thank you. For your information your trajectory is looking good. We'll have a lunar flyby pad for you here shortly. Your go for flyby in the event of lost Comm. Over. SC Sounds good. Thank you. CC You are welcome. CC Apollo 10, this is Houston. We are through with the uplink. You can go back to block on up telemetry and we'd like to continue checking batteries as long as it's convenient prior to your turning in for the evening. Over. SC Okay. Roger. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5-19-69, CDT 20:16, GET 32:27 124/1

SC Houston, 10. Looks like we're about to break lock. You want me to go OMNI? CAPCOM Rog. You can go back to omni at this

time.

SC

Okay.

PAO This is Apollo Control. We appear to have a fair amount of noise on the communications circuit at this time. The crew should be shortly getting the spacecraft ready for their sleep period. They will be, among other things, chlorinating their drinking water supply, setting up the communications system for their sleeping period, and changing out one of the lithium hydroxize canisters that removes carbon dioxide from the spacecraft atmosphere. The sleep period, a 9 hour rest period, is scheduled to begin at 35 hours ground elapsed time, or about another hour and a half from now. At the present time the spacecraft is 126 784 nautical miles from earth traveling at a speed of 4 576 feet - feet per second. This is Apollo Control at 32 hours, 30 minutes.

APOLLO 10 COMMENTARY, 5/19/69, CDT 2056, GET 33:07 1

PAO This is Apollo Control at 33 hours, 7 minutes into the flight of Apollo 10. At the present time the spacecraft is 128,445 nautical miles from earth and the velocity is 4,528 feet per second. The Apollo 10 is continuing preparations for their sleep period which is due to begin about an hour from now, about 34 hours ground elapsed time. They are somewhat ahead of the flight plan in preparations for the sleep period and could possibly begin a little before that time. Since our last report we have about 3 or 4 minutes of taped conversation with the crew which we will play back for you now.

CC Apollo 10, this is Houston. WE would like you to confirm if you selected OMNI, OMNI antenna bravo on board and we'll take over the switching between bravo and delta from down here. Over. CC Roger. We are reading you

weak with noise in the background. Over. SC Okay. In order to get you, I had to go to OMNI delta and it looks like we may be losing you. I'll go ahead to OMNI bravo and you can

do the switching.

backup.

CCRoger. Thank you.CC10, Houston. Radio check. OverSCRoger. Reading you loud andclear OMNI bravo.How do you read?CCRoger. We are reading you fine.

SC Okay. We are in down voice

CC Okay. A little clarification on that. We meant that when you secured for the evening, if you should need to contact us at that time, you would select downvoice backup, not that you should stay in downvoice backup all night.

SC Okay. We will just do it to voice again and if we need you at night time, we'll go to downvoice backup.

CC Roger. SC We're in normal voice. How do you read? CC Roger. That is much clearer and no noise in the background. SC Okay. CC Apollo 10. This is Houston. I have your flyby pad, P30 maneuver, when you are ready to copy. SC Stand by one.

APOLLO 10 COMMENTARY, 5/19/69, CDT 2056, GET 33:07 125/2 Go ahead, Houston. SC CC Roger, Apollo 10, this is Houston. Maneuver pad flyby SPS, G&N, noun 47 wait, 993353 plus 093 minus 021, zero 70442027, 981 plus 02256 minus 00327 minus 05263102351017, HAHP nonapplicable. DELTA VT 0573611705685, sextant star 402221334, the boresight star block nonapplicable. Now 61 latitude minus 2636 minus 165021180436171. GET .05 G 1662338, GDC aligned stars Vega 36, Deneb 43, roll align, 148013018 no ullage. Remarks. This pad is based on the PPC REFSMMAT docked configuration. Your height of pericynthion will be 886 nautical miles following this maneuver. CSM weight. 62634. LM weight 30719. Readback. Over. SC Purposes flyby by SPS and Okav. G&N 99353 plus 093 minus 021070442027 plus 02256 glad 00327 minus 05263 roll is 102351 and 017 now 44 NA. Are vou with me? CC Roger. So far correct. SC 0573611705685 402221334 boresight stars NA. latitude is minus 2636 minus 16502 1180436171 .05G is 1662338. CC Roger. So far so good. SC Vega is 36/deneb 43 148013018 no ullage, based upon PTC REFSMAT docked, give us a flyby at 886 miles and the CSM weight is 62634, LM weight 30719. CC Roger. Apollo 10 readback correct. Be advised that we are satisfied with the DELTA H values from the P23 sightings. Do not plan to update the value already loaded in erasable memory. Over. SC Okay. Fine, fine Bruce, what was loaded? CC Roger. 24 kilometers was loaded. So, you were over and under about the same amount on two different days. We figured the first set of sightings is probably the more reliable one. SC Roger. SC Houston. I got the onboard readouts. CC Roger. Go ahead. SC Okay. the CRYO fans have been cycled, bat C is 36.8, pyro bat A is 37 and pyro bat B is 37, RCS Ring A is 87 percent, B is 88 and C is 92 and D is 86. CC Roger, 10 understand battery Charlie is 36.8, pyro battery is alpha and bravo, both 37.0, RCS alpha is 87, bravo 88, Charlie 92, delta 86 over. SC That's correct.

Roger. Out.

CC

APOLLO 10 COMMENTARY, 5/19/69, CDT 2056, GET 33:07 125/3

PAO During that conversation, the crew has passed up the information they would need in the event there was a loss of communications between now and the time they would be approaching the moon. With this information they would be able to do a flyby of the moon at an altitude of about 886 nautical miles. The information also included the figures they would need for a maneuver to be performed at about 70 hours into the mission to do that flyby maneuver. At 33 hours, 17 minutes, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 2130, GET 33:41 126/1

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PAO This is Apollo Control at 33 hours, 41 minutes into the flight of Apollo 10. The spacecraft now at a distance of 129,918 nautical miles from Earth and the velocity down now to 4,485 feet per second and continuing to drop slowly. The spacecraft weight right now is 93,353 pounds. A short while ago we heard from the crew with their daily status report and we'll play that back for you now and then stand by briefly for any further conversation. Apollo 10, this is Houston. About CAPCOM all we've got left before you close up for the evening is your crew status report, over. Okay, Bruce. We're just changing SC out the canisters at this time. CAPCOM Roger. We'll be with you in a minute. Okay. SC we're going to end - terminate the battery charge at this time and we'll purge the fuel cells. CAPCOM Roger. SC Okay Houston, Apollo 10. CAPCOM Roger, 10. SC Okay, with respect to anything out of the kit. The CDR had 1 lomotil, CMP 1 lomotil, LMP 1 lomotil and the LMP also had 2 aspirin. CAPCOM Roger, understand. One lomotil each and 2 aspirin for the LMP. SC That's correct. CAPCOM Do you have the personal dosimeter readings? SC Stand by. Okay, you can add one to mine. This is the CMP. CAPCOM Understand, CMP is plus 1 from the last one. SC That's right. Okay, CDR, forgot what the total was on the last one. Mine now reads 26029. CAPCOM Roger, 26029. SC And the LMP is 15031. I believe that's up one. CAPCOM Roger, and for your information, the last significant digit there is actually 1/100, over, You're not moving much. SC Roger. CAPCOM Did you get the chlorine in oday. SC We're going to do that later on, we haven't gone to bed yet. CAPCOM Roger, out. SC The only thing left open I think is that -

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 2130, GET 33:41 126/2

Here in Mission Control at the PAO present time Flight Director Milton Wendler is polling the Flight Controllers to determine if they have any further information to be passed up to the crew before the crew begins their sleep period. We'll continue to stand by. Apollo 10, this is Houston, over. CAPCOM SC Go ahead, Houston, Apollo 10. CAPCOM Roger, 10. We have nothing else for you at the present time. If you have no further translations for us we'll bid you a good night and remind you to put the S-band normal mode voice switch off. SC Roger, the S-band normal mode switch to off (garbled) we can shut down here. CAPCOM Roger. And after that we're going to co-operate SC with you on down voice backup. We're going to chlorinate the water a little bit and then sack out. CAPCOM Roger, and if you need us give us a call on voice backup. Okay Bruce, sure will. SC CAPCOM Good night. PAO We appear to have lost log from the spacecraft signal momentarily accounting for the noise on the circuit. During that one portion where the noise also came in on top of Tom Stafford we could make out Tom reporting that he did plan to begin the sleep period shortly and that he advised that the crew would chlorinate the drinking water supply before going to sleep and then would begin their sleep period. That rest periods scheduled to begin at about 34 hours, ground elaspe time or about 10 minutes from now. At 33 hours, 51 minutes into the flight of Apollo 10, this is Mission Control.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 22:23, GET 34:34 127/1

PAO This is Mission Control at 34 hours, 34 minutes into the flight of Apollo 10. We've heard nothing from the crew since capcom Bruce McCandless bid them good night about 45 minutes ago. They're scheduled to be in a 9 hour sleep period, and we anticipate that they are either are or will be resting shortly. At the present time, Apollo 10 is 132 225 nautical miles from earth, and the velicity is 4 419 feet per second. This is Apollo Control, Houston.

APOLLO 10 MISSION COMMENTARY, 5/19/69, CDT 3100 GET 35:31 128/1

This is Mission Control, now PAO 35 hours 32 minutes into the flight of Apollo 10. We've had no further conversations with the crew since our last report. I anticipate that they are sleeping at this time. The spacecraft is currently 134,651 nautical miles from earth and the speed is 4,352 feet per second. Out here in Mission Control the activity has also quieted down as would be expected, flight controllers primarily observing the status of spacecraft systems and all of those seem to be functioning normally at this time. One of the displays that we have available to us shows the time at which the spacecraft will be crossing into the lunar sphere of influence. This is a somewhat arbitrary time but it is the point when here in Mission Control we will switch over from earth reference velocity and distance information to lunar reference. That time is currently listed as 61 hours 50 minutes 49 seconds ground elapsed time. At that point the spacecraft will be under this dominant influence of the moon rather than earth and the gradual decline we've been seeing in the velocity will reverse itself. The spacecraft will then begin to accelerate toward the moon and under the dominant influence of the moon's gravity. At 35 hours 33 minutes this is Apollo Control.

APOLLO 10 COMMENTARY, 5/20/69, CDT 0023, GET 36:33 129/1

PAO This is Apollo Control. 36 hours 34 minutes into the flight of Apollo 10. And the spacecraft now 137.243 nautical miles from earth. The velocity is 4,282 feet per second. All continues relatively quiet here in mission control. All of our telemetry information from the spacecraft indicates that all systems are functioning normally, and we also are informed by the flight director that it has now been about 6 hours since the last thruster firing. As you recall, we set up with the crew a new procedure for maintaining passive thermal control to minimize the thruster firing which interfered with their sleep last night. Apparently the modified passive thermal control mode is working out very well. By way of additional information on the spacecraft status right now, the weight is 93,353 pounds. We'll continue to monitor and report to you any significant changes in status of Apollo 10. As we said, everything continues to progress very well at this time. This is Apollo Control at 36 hours 35 minutes into the flight of Apollo 10.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0123, GET 37:34:00 130/1

PAO This is Apollo control at 37 hours 34 minutes. The Apollo 10 spacecraft is now 139 thousand, 7 hundred 16 nautical miles from earth, and the velocity continuing its very slow decrease, down now to 4 thousand 215 feet per second. Here in mission control we are preparing to hand over shifts. Flight director Milton Wendler will be relieved by flight director Pete Frank and his orange team of flight controllers. We do not anticipate a change of shift briefing. Flight director Wendler summarized activities for us on this shift reports that continuous tracking since the midcourse correction performed at 26 hours 33 minutes, shows the trajectory to be very close to the nominal. He said we expect no further midcourse corrections on route to the moon based on current tracking, and a new passive thermal control mode now with a higher revolution rate, some 3 revolutions per hour, compared with the 1 revolution per hour thermal control used last night appears to be working well to minimize the thruster firings that disturbed the crews sleep last night. Wendler noted that we haven't observed any thruster firing since setting up this passive thermal control mode more than 7 hours ago. He also noted that we maintained good data flow from the spacecraft, which shows that all systems are functioning normally. This is Apollo Control at 37 hours 36 minutes.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 39:01, CDT 0250, 131/1

PAO This is Apollo Control 39 hours Ol minute ground elapsed time. Apollo 10 still enroute to the moon is now at a distance from Earth of 143 201 nautical miles. Continuing to decelerate now showing 4123 feet per second in velocity. Cabin pressure aboard Apollo 10 is 4. - now at 4.9 pounds per square inch; temperature 75 degrees. A partial pressure of carbon dioxide in the cabin is now showing 1.2 millimeters of mercury. The only bioinstrumentation coming down on telemetry from the spacecraft is on the command module pilot and his heart rate is in the high 50's - around 57; it fluctuates somewhat from time to time and a respiration rate of 8. Apollo 10 is being tracked at the present time through the Honeysuckle antenna. The handover to the Madrid antenna will take place at 41 hours ground elapsed time, which will be about 2 hours from now. Some 3 hours 57 minutes remaining in the sleep period. And at 39 hours 02 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0350, GET 4001 132/1

PAO This is Apollo Control, 40 hours and I minute ground elapsed time. Apollo 10 presently is 145,602 nautical away from earth, upbound toward the moon, continuing to decelerate. Velocity reading is now 4063 feet per second. The so-called moon sphere of influence, where the speed begins to increase again will not take place until tomorrow at about 61 hours 50 minutes ground elapsed time. The Apollo 10 system status sheet that's put out by the spacecraft analysis people, and the one for the time of 39 hours ground elapsed time, is quite brief. It covers a single page and most of the entries under the various systems sav all systems performance - normal. In the cryogenic quantities of hydrogen and oxygen for the fuel cell, the tank 1 cryogenic hydrogen shows 79,7 percent remaining, tank 2, 81.4 percent remaining, oxygen tank 1, 82.4, tank 2, 82.7. In the batteries some 105.2 amp hours are remaining in batteries A. B. and C. That's a total figure. All temperatures are normal in the modified passive thermal control mode in which the spacecraft is being spun up a little faster than it was last night, now rolling up 3 revolutions per hour instead of 1 revolution per hour. And this faster rate apparently requires no additional attitude control by the digital auto pilot to keep the spacecraft oriented to proper direction where the sun angle is 90 degrees to the longitudinal axis of the spacecraft. And over from the Honeysuckle antenna to the Madrid antenna is about an hour away. Two hours 56 minutes remaining in the sleep period. And at 40 hours 4 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/20/69, CDT 0450, GET 41:01 133/1

This is Apollo Control. 41 hours PAO 1 minute ground elapsed time. Apollo 10 presently is 147,951 miles outbound from earth. And just approaching 4,000 feet per second, 4,004 feet per second, in velocity. Continuing to deccelerate. In the manned space flight tracking network, we've just handed over to the Madrid antenna, Madrid, Spain, after having tracked for several hours with the big 85-foot antenna at Honeysuckle creek in Australia. The crew has less than 2 hours remaining in the sleep period - the present sleep period. We have 1 hour and 58 minutes remaining till wakeup time. All going well aboard the spacecraft; all systems still functioning normally; crew still asleep, no word from them in the past several hours since the sleep period began; and at 41 hours 2 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0550, GET 42:01 134/1

PAO This is Apollo Control, 42 hours 1 minute ground elapsed time. Apollo 10 is now 150,000 miles -150,257 nautical miles away from earth upbound toward the moon, traveling now at a velocity of 3948 feet per second. The crew is still asleep with less than an hour remaining of the sleep period. A bit whimsy here in one of the displays in the Mission Control Center, its actually a projection of pages of the flight plan on a large ten by ten background TV projector. They've borrowed Snoopy's dog house and show him asleep in the usual manner on his back on top of the dog house, and down toward the bottom of the page where it says "in sleep period" he's bailing out of the top of the dog house, jumping down to the ground. And other news about the next mission, Apollo 11, the Apollo 11 stack roll out to launch complex 39A at Kennedy Space Center has been delayed somewhat to install a protective cover, a raincoat sort of a device over the space-Its been some delay in getting this installed craft stack. properly and its estimated the roll out will begin at 9:00 Central Davlight Time. And at 42 houus 2 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0652, GET 43:03 135/1

PAO This is Apollo Control. 43 hours 3 minutes ground elapse time in the mission of Apollo 10. Distance from earth 152 thousand 609 miles. Velocity now 3 thousand 891 feet per second. We've passed the time of the end of the sleep period, however we've heard nothing from the crew and it's not planned to give them a call until 44 hours unless they're first heard from here in mission control. At 44 hours the consumables update and flight plan update are scheduled as well as cycling the fans in the cryogenic storage tanks for oxygen and hydrogen, and a few other items to take care of. Realignment of the inertial measurement unit, and a change of the lithium hydroxide canister for removal of carbon dioxide from the cabin atmosphere. A discussion is going on here in the control center as to whether midcourse correction number 3 will really be necessary or not. The current track predicts pericynthion arrival on the back side of the moon at 61 nautical miles. Serious consideration is being given to not doing midcourse correction number 3. We'll continue to moniter the air ground circuit and come up with the conversation when it does commence. And at 43 hours 5 minutes ground elapse time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0659, GET 4310 135A/1

SCHouston, Apollo 10 transmitting onregular S-band omni voice. How do you read? Over.
CAPCOMReveille, reveille, all hands musteron the flight deck for calisthenics. How do you read?
SCLoud and clear. We had a littletrouble routing up all hands this morning.
CAPCOMWell, we decided to let you sleep

in a little bit, and if you want to get up at your leisure that's fine with us.
APOLLO 10 COMMENTARY, 5/20/69, CST: 0223, 43:34 GET 136/1 PAO This is Apollo Control, 43 hours, 34 minutes; let's join the conversation in progress with Apollo 10. SC - round up all hands this morning. CC Well, we could kinda let you sleep in a little bit, and if you want to get up at your leisure, that's fine with us. Yeah, sorta looks like we've got a SC hard day of EGC. That thing didn't fire thrusters once last night; my hats off to you; that's great. You were right; we were gonna mention CC that to you - and it looks like a good way to go; that's a good solution. SC Economical too. CC Apollo 10, Houston. John, are you the only one who is up yet? SC (static) CC Roger. PAO This is Apollo Control; while we're waiting for the noise to be taken off the air-to-ground circuit, apparently its a data noise and a matter of shifting antennas. We've had word from the Cape that the Apollo 11 roll-out has been delayed to 11:30 AM Central Daylight Time; we'll continue to monitor the air-to-ground from Apollo 10, and leave the circuit open. This is Apollo Control, while we are waiting for the air-to-ground conversation to continue, the distance from earth is now displayed as 153 929 nautical miles, velocity now 3860 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 728, GET 4339 137/1

CAPCOM Apollo 10, Houston. When you get settled down and get breakfast there, we've got some information just to pass along when you've got time to listen. Roger. I better go down to the end SC compartment and hold reveille. CAPCOM Say again, please. I said I've got to go back to the SC aft compartment and hold a little reveille. SC Hello, Houston, Apollo 10. CAPCOM Good morning, Apollo 10, this is Houston. How do you read? Loud and clear. Hev, this is really SC a great place to sleep on the way to the moon, I'll tell you. CAPCOM Well, we let you sleep in a little Have a good rest? bit. Yes, about 9 hours solid. SC Good morning, Jack, how are you? SC CAPCOM Good morning, great shape. Understand you are a little slow on reveille this morning. Yes, if we had known you were down SC there, we probably would have heard the bugle. I expected to hear your feet col-CAPCOM lectively hit the deck before I finished reveille. SC Pretty hard to find out which way the deck is up here. SC How does the spacecraft look to you? CAPCOM The spacecraft is in real good shape. The CSM and LM systems are both in very good health and your consumables are considerably ahead of your flight plan. During the night - during the night with this PTC mode since initialization yesterday at about 30 hours, there were no jet firings. SC Roger, we could tell that last night, it doubles our analysis that we haven't fired one thruster since we started. Looks like we have a real winner here, Jack. CAPCOM Rog, that was a good solution. And also, you are riding right down the plot. Your third midcourse correction would be 7/10ths of a foot per second and so we are recommending deletion of that and your present perilune prediction without midcourse 3 is 61.8 nautical miles at 76 hours. SC Roger, sounds great. And in addition, your data on both CAPCOM command module RCS rings remains the same; your leak rate on ring number l is the same as yesterday. And when you have time to listen, we've got a little bit of news down here. SC Why not go ahead while we are fix-

ing breakfast, might as well listen to the news.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 728, GET 4339 137/2

CAPCOM Okay, you are right in the headlines. Among the biggest news events of yesterday were the three astronauts of Apollo 10. Millions of people throughout the world -

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 43:44, CDT 0733 138/1

Millions of people throughout the world CAPCOM saw some or all of what one wire service writer called the "Mini Show". Tom Stafford was called the star and John Young the supporting player because he appeared upside down throughout the show. Gene Cernan was listed as camera man. A now unemployed philosopher has pointed out that due to your efforts color television has reached new heights. Coleman Hawkins, jazz saxophonist, died at the age of 64. He was one of the innovaters of Beep-Bop during the late 1940's. President Nixon is reportedly in favor of keeping a 10 percent surtax past it's deadline of June 30, 1969. His spokesman, speaking to a House of Representatives committee, proposed that the 10 percent surtax be extended to the end of this year and then lowered to 5 percent. President Nixon also announced that he will meet with South Vietnamese President Thieu within the next 2 weeks, probably at Midway Island or some other Pacific Ocean location. In the sports world there were no major league baseball games played yesterday. Gardner Dickinson won the National Invitational Golf Tournament at Ft. Worth on Sunday with a 2 under par 278. The PGA moves to Atlanta this week for the Atlanta Classic. One closing note of special interest to the Apollo 10 crew is this story;. Chief William Red Fox of Philadelphia, who remembers his Uncle Crazy Horse fighting at the Little Big Horn, would like man to leave the moon alone because it's ruining the rainfall. The 99 year old Ocala Sioux chief summed up his reaction to the Apollo 10 moon shot in this manner: "It doesn't seem to rain much since man started messing around with the moon." And we are tracking you guys up there now at 154 221 miles, and you have slowed down to 3 853 feet per second. SC Hey, Jack, pass the word. I don't think I'll get back in time for the Classic in Atlanta. Roger, there will be another time. CAPCOM SC Also Jack, will you pass the word on to the Indian chief that I grew up in the Dust Bowl of Oklahoma, but I still don't think flying to the moon has anything to do with the rainfall. CAPCOM Roger, we'll pass the word, Tom. SC It's always nice to run across someone who is not a proponent of the atomic theory of weather production. SC We haven't had a chance to look out much here and give you a weather report yet. Roger, we're standing by, and how is that CAPCOM

moon looking? Is it getting bigger? SC I'm sort of afraid to look.

SC We still have all the window covers on since we just woke up.

CAPCOM Roger, relax and have your breakfast and let us know when you are ready to press on with the plan for the day,

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 43:44, CDT 0733 138/2

PAO This is Apollo Control. While the crew is eating breakfast the various updates to the flight plan are being passed to the spacecraft communication Jack Lousma here in Mission Control. Looks like a rather leasurely day according to the flight plan, and especially if it is finally decided to delete the midcourse correction number 3. Jack Lousma mentioned to the crew that the needed correction was something like 7/10 of a foot per second in DELTA-V, or velocity change, and that the predicted pericynthion on arrival at the moon at 76 hours, that's the pericynthion of course would be on the side opposite the earth, would be something like 61 nautical which is 1 mile off the desired pericynthion. We'll come -

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0738, GET 4349 139/1

PAO ... desired pericynthion. We'll come back up when the conversation resumes and at -SC Looking right over Suez Canal, Saudi Arabia, the Mediterranean, Africa, back into the parts of Europe.

CAPCOM

Houston, roger.

Jack, right now I'm looking at all SC of Africa which is almost totally clear with the exception of a few clouds on the western side. I can see across the Straits of Gibraltar. Some cloud cover just on the eastern side of the Straits. I can see Spain which is totally clear, Portugal, almost all of the Mediterranean except the north/ northwest corner of the Med, Greece, Crete, Turkey, Italy. They all look clear from here. Saudi Arabia, back up into the Soviet Union, is partially clear in great areas and actually almost back into parts of China where the terminator is, it's just sort of partly cloudy. There appears to be a big, long, wide cloud swirl out in the Atlantic west of Spain. Generally, it looks like I can see Zanzibar. Generally, it looks like that whole portion of Africa and eastward northeastward - is pretty clear today.

CAPCOM Roger, thank you, Gene, for the weather report.

SC And it's a magnificent sight, Jack. Beautiful.

PAO That was Gene Cernan giving a global weather report, what's visible from the spacecraft. Projecting a line from the center of the earth out through the surface to where the spacecraft is, its present position is over Saudi Arabia approximately 20 - 27 degrees north by 50 degrees east. We'll continue to monitor in case there is further conversation but it's unlikely there will be too much as they are now preparing their breakfast meal. They'll settle down to business in probably another 15 or 20 minutes with a crew status report, consumables update, flight plan update; also a state vector fed up to them from the ground, and go through a realinement of the inertial measurement unit for the day's activities, after having been in the rotisserie, or passive thermal control mode, all night, in which under the new scheme, there was not a single thruster firing to keep them awake during the night. And at 43 hours, 54 minutes Ground Elapsed Time this is Apollo Control.

APOLLO 10 COMMENTARY, 5/20/69, CST: 0743, 43:54 GET 140/1

PAO - further conversations; let's come back up on the loop.

PAO This is Apollo Control; while we are waiting for conversation to resume with the crew of Apollo 10, we'll pick up the days activities on the flight plan. Canister change, lithium hydroxide canisters which remove the carbon dioxide from the cabin atmosphere scheduled at about 46 hours; fuel cell oxygen and hydrogen purge at about the same time, noon meal at 47 hours, environmental control system redundant component check at 48 hours, 25 minutes. At 52 hours, state vector update from the ground, also maneuver pad and target load for midcourse correction number 3, should it actually be carried out. And just prior to the time for the midcourse correction, another alinement of the inertial measurement unit. The midcourse correction, if it is done, will come at 53:45 ground elapsed time. TV pass scheduled at 54 hours, running 15 minutes; this is through the Goldstone station in California - distance at the time of this pass will be 176 000 nautical miles from the earth and 39 000 nautical miles out from the moon. In about 56 hours, 30 minutes, the crew starts powering down, and what's called the pre-sleep check list, stowing all the gear, chlorinating all the water, cycling the fans in the cryogenic storage tanks in the service module, crew status report going into the sleep of communications, another canister change, and at 58 hours, ground elapsed time, they would begin a 10 hour rest period. We'll leave the circuit open for any further conversation.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 748, GET 4359 141/1

PAO - we will leave the circuit open for any further conversation between bites of the crew's breakfast.

PAO Considerable amount of line noise on the air-to-ground circuit, probably indicating a need to shift omni antennas. Except for a brief period of realigning the inertial measurement unit, most of the day will be spent in the passive thermal control mode.

PAO This is Apollo Control. The predicted closest approach to the moon for the third stage of the Saturn V, which injected the Apollo 10 spacecraft into translunar coast will come tomorrow. Wednesday, at about 642 central daylight time, at a distance of 1,779 nautical miles, sweep on by the moon, go into solar orbit. The line noise has decreased somewhat on the air to ground. We will continue to monitor here as the crew has their morning meal. Houston, Apollo 10. We're ready to SC copy the consumables update when they are available. SC Hello, Houston, Apollo 10. Apollo 10, this is Houston. Here CAPCOM we go with the consumables update. At GET 44 + -SC Jack.

CAPCOM Say again, please. CAPCOM Apollo 10, Houston. How do you

read?

SC Go ahead. CAPCOM Roger. The consumables update. Consumables update at GET of 44 hours, RCS total 86 percent, alpha 87 percent, bravo 85 percent, charlie 86 percent, delta 86 percent, H2 total 42.7 pounds, 02 total 526 pounds. We'd like today, in order to balance the RCS up to use AC roll instead of BD roll, over.

APOLLO 10 COMMENTARY, 5/20/69, CST: 0803, 44:14 GET 142/1

CC - roll; over. SC Roger on the consumables, and we'll switch over to IC roll instead of BD roll. Houston; roger. And this is 4 percent CC above the flight plan RCS. Roger. Houston, Apollo 10. SC CC Go ahead 10. SC Roger, Jack. Wish you'd pass on to Chris and Johnny Mayer that we think that this attitude for the PTC is really great because you can see the moon for just and also the earth - for just about a half of each rev; it's really tremendous. CC Roger, Tom. This is Apollo Control. Stafford's PAO reference there to the PTC really being great, meaning Passive Thermal Control Mode, that is that it was modified. He wanted to pass the word on that is was really great to Chris - meaning Christopher Kraft, who's Director of Flight Operations here at Manned Spacecraft Center and to Johnny Mayer, who heads up the Mission Planning and Analysis Division, the mathematicians and trajectory planners who come up with all the numbers associated with planning the missions. We'll continue to monitor the airto-ground loop for any further conversation from Apollo 10.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 44:09, CDT 0800 143/1 DEAD AIR APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 805, GET 4414 144/1

PAO This is Apollo Control. Down at the Spacecraft Communicator's console, the Flight Activities Officer is conferring with the Spacecraft Communicator Jack Lousma on the flight plan update, giving him all the necessary information to read up to the crew when they are ready to take the update. Standing by for resumption of air-to-ground communication.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0810, GET 4419 145/1

PAO This is Apollo Control continuing to monitor the air-to-ground for resumption of conversation. The spacecraft communicator Jack Lousma, within the next several minutes, likely will start reading up the flight plan activities, updates on the day's flight plan activities, to the crew, sorting out the last details of the few minor changes. Here in the Control Room, before Lousma begins the flight plan update reading, the circuit is still open on airto-ground to Apollo 10.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0813, GET 4424 146/1 This tape is blank APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 44:29 CDT 0818 147/1

SC	Houston,	this	is	Apollo	10.
CAPCOM	Go ahead	, 10.			
SC	Okay, Ja	ck.	One	thing	we'd

SC Okay, Jack. One thing we'd like for you to pass on to the Project Office is a bit about the only type of thing we want to pass on in real time as of this day on the system and again that's due to the water. There was lots of air in it for the initial servicing and it's continued just to get a ... a little bit, and the little hand held centrifuge all it does is slip the big bubbles to the bottom. I guess there is something about physics we don't understand, but we you will pass that word on to them and get them working on it and save some time, save about 7 or 8 days before debriefing.

CAPCOM Roger, we'll get the word to them, Tom, and also we have a flight plan update when you've had some breakfast.

SC

Okay, it will be about another 15 minutes.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0823, GET 4434 148/1

PAO This is Apollo Control. Apparently the crew is still in the midst of eating breakfast, not quite ready yet to take the flight plan update from the Control Center here. At 44 hours, 35 minutes this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0835, GET 4446 149/1 This is Apollo Control. Let's join PAO the conversation in progress with Apollo 10. SC - H2 tank 1 or 02 tank 2 at this time. CAPCOM Roger, we copy. SC And it just went on at this time. CAPCOM Roger. Understand you have cryo press light. Is that affirm? I'm reading it. It just went out SC It came on just as I cycled - turned the fans on and now. now it's out. I'm ready to copy that flight plan update. Roger, here's the flight plan up-CAPCOM date. We would like for you to initiate the charge on battery A and we'd like to have you give us a mark. And at 19 5145 we have a waste water dump due. 114 That's 5145? SC CAPCOM That's affirmative, and we're stand- - ' ing by for your crew status report and your PRD readings. Okay, we will give you the dosimeter SC readings first. CAPCOM Roger, go ahead. SC Okay, Jack, mine reads 26030. CAPCOM 26030. SC 5030 on the CMP. CAPCOM Say again. SC 5030 on the CMP. CAPCOM Understand 5030. SC That is affirmative. SC And the LMP is 15033, that's up two from 10 hours ago. CAPCOM 15033. And a report on how you rested last night. SC Tom was sleeping on his back and Gene was sleeping on his stomach and I was sleeping in the couch. And that's how we did it. CAPCOM Sounds pretty simple. SC It was great. SC Yes, Jack, the LMP probably got about 6 to 8 hours of pretty good sleep. CAPCOM Roger, copy, that's good. SC Okay, and you want a mark on when to start charging A, is that correct? CAPCOM That is affirmative. SC Okay, I'm ready to charge battery A right now. CAPCOM Roger. SC And the charge is on. CAPCOM Roger, charge on.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0835, GET 4446 149/2

SC Houston, is that all the flight plan update?

CAPCOM Apollo 10, Houston. That is affirmative. That's the end of the flight plan update for now and we're about ready to go on the state vector update and would like to have the computer, over.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0840, GET 4451 150/1

PAO This is Apollo Control. While we're waiting for the antennas to get sorted out for this state vector update, the space digitals display shows the altitude now, or distance from earth, at 156,728 nautical miles. Velocity continuing to decelerate, 3794 feet per second. We will continue to monitor air-ground to Apollo 10 as the conversation resumes.

CAPCOM Apollo 10, Houston. We're ready to uplink your state vector now if you'll go to ACCEPT on your TLM, over.

SCWe're ACCEPT in POO.CAPCOMRoger, and I have a couple moreitems on the flight plan update when you're ready to copy.SCGo ahead, Jack.

CAPCOM Okay, we had, on our sextant calibrations, during P23, some differences in DELTA H from yesterday and the day before and we need to check the trunnion bias to see if it's drifting. In order to do this we'd like you to, either before or after your P52 which is coming up, to do the steps of P23 which refer to the sextant calibration. And you can use any star, and I have the steps for performing this without going through the whole P23 if you need them. In addition, we've noticed that you have an imbalance in our cryo tanks; namely, that tank number 1 is lower than number 2, and we'd like to reverse this imbalance by reversing the heater configuration. However, we'd like to do this on our mark so that we can get the heaters in the proper point in the cycle. And so when the time comes up what we'd like you to do is turn off the heaters in tank number 1 and turn the heaters in tank number 2 to AUTO on our mark, over.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0845, GET 4456 151/1

CAPCOM - on our mark, over. SC Okay, standing by for your mark. Roger. It will be a while before CAPCOM the time comes up, Okay, let us know, and we will do SC it. CAPCOM Roger. It's likely to be as much And do you copy the information regarding as a half hour. the trunnion bias check? Roger, we will do steps in P23 that SC refer to the sextant calibration, either before or after P52. And we don't need any data on how SC to do that. CAPCOM Apollo 10, Houston. The uplink to state vector is complete, you can go to accept. Correction, you can go to block. SC We are in block.

APOLLO 10 COMMENTARY, 5/20/69, CST: 0850, 45:01 GET 152/1 ALL DEAD AIR -

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 45:06, CDT 0855 153/1

PAO This is Apollo Control and the circuit is still open to Apollo 10. However, the line noise is rather strong now as they break lock and rotating around in the passive thermal control mode with the omni antennas. In spite of the noise we will continue to monitor the air/ground circuit and leave it live.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 0800, GET 4511 154/1

PAO This is Apollo Control. The crew of Apollo 10 apparently is still in the midst of the realinement of the inertial measurement unit. Meanwhile the spacecraft is now 157,476 nautical miles away from earth. Velocity is now 3777 feet per second. The trajectory as tracked now shows that the pericynthion at arrival of the moon will be some 61 nautical miles, and this is one reason that the midcourse correction number 3 stands a good chance of not being done at all. Members of the Black Team of Flight Controllers are in the process of taking over from the Orange Team here in Mission Control. At each console there is a miniature briefing session going on as each man tells his relief about what has been happening during the night, the status of the systems, and any other thing that the man needs to know to do his job during the day. We'll continue to monitor the air-to-ground circuit to assume that the crew will call the Control Center here when they are through with their task of alining the platform to continue any discussion, possibly more global weather reports.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 46:07, CDT 0956 165/1

Ţ

SC	Hello Houston, this is 10.
CAPCOM	Go ahead 10.
SC	Okay, I'm ready to purge the H2 any time
you are ready.	
CAPCOM	Roger, stand by.
CAPCOM	We're ready 10, go ahead.

END OF TAPE

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APOLLO 10 COMMENTARY, 5/20/69, CST: 1001, 46:12 GET

	SC	Houston, the H2 purge is complete.	
The 1	line heater is C	DFF.	
	C C	Roger; copy. Hey, Geno, did you guys	
have	any trouble wit	th the canister changes?	
	SC	No, we're about to make one right	
now;	I don't think w	ve've had any trouble; stand by.	
	CC	Roger - the only reason I asked was	
I ren	nember during th	ne C squared, F squared, we had some sticky	9
ones	and was wonders	ing how it was going.	
	SC	Thus far, Charlie none have stuck.	
	СС	Roger.	
	PAO	This is Apollo Control at 46 hours, 23	
minut	es. Apollo 10	has just passed the 160 000 mile mark.	
Curre	ent distance 160	0 014 nautical miles; velocity 3719 feet	
	1 (1) 1 1		

per second. Flight Director Jerry Griffin will take over a large part of the duties today from Glynn Lunney; they are both at the Flight Director's Console, but Jerry will handle a large part of the duties, freeing Glynn for activities in preparation for lunar orbit insertion day tomorrow and the subsequent lunar orbit activities including rendezvous. We'll continue to stand by live, for any transmissions from Apollo 10.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1013, GET 4624 167/1

SC Hello Houston, this is 10. CAPCOM Go, 10.

SC Roger, I'm making a report on that optics tracking that we did this morning during REFSMMAT. On the - while we're still in PTC REFSMMAT realine, the optics tracking is about 10 to 20 times smoother and easier than it is in the simulator. It's just beautiful. The optics track-ing is absolutely no problem on medium speed in putting that star right in the middle of the reticle and marking on it. Just, just fantastic.

CAPCOM Rog, John, we copy. In medium speed it's really easy to track the star and put it right in the center. How's the visibility -

SC This auto optics has just been worth getting it. Well, there's still no way to recognize stars from P51's that I can see other than - probably you could do it if you put the whole lunar module and point it directly at the sun. In other words, if you went to gimbal lock or something like that, then you could point the, if you didn't have any other recourse, you could point the whole lunar module right at the sun and I think that would shield you enough so that you could recognize stars as constellations. But other than that, I haven't seen a single star or constellation through the telescope that I can recognize myself. CAPCOM Roger. Thank you for that report.

We'll pass it on.

SC Well, there's nothing we can do about that, I'll tell you that. But it's sure confident to see those things like constellations, you know.

CAPCOM Yes, I know what you mean here if you dump that platform. This optics tracking is good news though, if we can make that thing a lot easier.

SC Well, it would save you quite a bit of fuel cause to reinitialize that REFSMMAT, reinitialize that PTC, is probably going to cost you a little.

CAPCOM Rog. You don't think the three tenths of a degree has - didn't give you any trouble, did it, when you first got started there? Is it a little learning curve?

SC We're looking at about 2500, maybe a little less right now. No, there's no problem at all with it.

CAPCOM Great.

SC And the auto optics will track the star too. CAPCOM Right. This thing has really - I don't know whether you guys can tell it or not, but if you -

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the thing is really coupling up great. It looks like our angle of momentum vector is just right off - just off the roll axis and the thing goes off in pitch a little bit and couples back into yaw and the yaw goes off as the pitch decreases. And it looks like we're going to be rock solid here as long as we want to stay.

SC Right, I don't know who thought of it, but it sure works good. CAPCOM Rog. It took us a little while to

CAPCOM Rog. It took us a little while to get it -

SC It's interesting to note that even though we haven't fired a thruster up here (garble) 12 to 15 hours. This whole stack has a little function all to itself.

CAPCOM Rog. SC (garble) CAPCOM 10, you're fading out so we'll switch your antennas and get a better signal, over. SC Yes, every so often the whole stack just gives a little shudder. I don't know what it is.

APOLLO 10 COMMENTARY, 5/20/69, CST: 1033, 46:44 GET

PAO

This is Apollo -

SC - that we were concerned about doesn't seem to be a problem is that the LM on except for a ... except for reducing the brightness that prevents you from seeing stars and recognizing them as constellations. That's actual occlusion of the ... telescope and sextant; doesn't appear to be near the problem it was thought to be when we started.

CC Roger - good show. Des it look like what the pictures that you had been shown John?

SC Yes, it actually looks even less than that and its a good deal less than the things we had - worse case fixed up in the simulator to practice with.

CC Roger. You've put your artistic talent to work when nothing to do the next couple of hours, how about sketching us up a little view so we can maybe update the CMS when we get back down and maybe they can put a little cut out in there and get their picture to be real life. When you guys - we switched antennas on you, and Tom, we lost most of your conversation about the thrusters. If you'd like to repeat that, we're standing by.

SC I guess John ... Charlie, that even though we haven't fired a thruster for I'd say 12 to 15 hours, now, this stack has a motion all of its own - and on occasion, you'll hear a little shudder in it, a little noise, and they are getting very sensitive ... to every little motion. And it is amazing that the whole stack hasn't little motions and noises in it.

CC

Roger - we co -

SC ... glycol pumps to the suit - sounds like it might be some tank slosh or something of that nature but its really amazing how we can pick up these little things; occasionally the whole thing would just give a little shudder.

CC Roger. I was talking to the 9 crew this morning about it - and they said they had the same sensations when the LM was out front - at anytime they came up with any little movement, that the whole thing just seemed to shudder. We're - it's really amazing to sit here and watch how your coupling up in pitch and yaw and the CTC - the thing is that it never gets out of more than 20 degrees off from our initial attitude, then couples back in, and goes the other way. We think we are in pretty good shape.

SC Yeah - sounds like you came up with a real great solution here to save fuel and everything. ... Also like I passed on to Jack this morning - this attitude is fantastic because we can see the earth for about half of each one of our revs here.

CC Hey, well, really great. Is the ole earth getting a little smaller out there? SC Ah, you can tell we're a long ways from home now Charlie. CC Roger; I bet. 168/1

APOLLO 10 COMMENTARY, 5/20/69, CST: 1033, 46:44 GET

CC It was the Span people that came up with -

SC

As a matter of fact -I was going to say it was the Stan

CC people that came up with the PTC procedure, so once we got it straightened out on how to read it up to you, things seemed to be working real great; we are all real pleased with it.

Yeah, it feels good in here, and looks SC good as far as the attitude for the outside reference - we're getting a lots of pictures of the earth - and also the main thing, we're saving fuel.

CC Roger. Are your sequence cameras and the Hasselblad working okay?

SC Working slick as a whistle. CC Beautiful.

SC Hey Charlie, I was wondering - we got a little time to kill here - again each day we've been going over our lunar activities, just doing homework up here, about oh, a couple hours each day, so we'll be way ahead of the game when we get there, at least try to be, but one thing you people have never seen is Africa, and we got high-gain lock, we can call verb 64 and we'll show you a picture of what Africa looks like and you can - or I assume we are working through Madrid now -

CC Stand by - that's affirmative, we're coming through Madrid. Would you like to just put it on when you come around with high-gain and not stop the PTC? SC Yeah - we don't want to stop the

PTC - we want to save every ounce of fuel we can; we can show you just a few minutes of it; since we've got some time to kill here - in high gain - out the hatch window and the side window.

Stand by 10 - lets see 1f we get CC the networks configured right, okay?

SC Alrighty. Houston, Apollo 10. Go ahead 10. CC SC

Okay, just to reiterate, the only 2 anomalies we've seen on the whole spacecraft, and by-andlarge, the spacecraft is just performing beautifully, are these 2 items. I called one of them down to Jack and you heard about the other one, but just to summarize them - one was when the Mylar insulation, you, know, kind of blew out of the tunnel hatch when John pressurized the LM, then the second one is all the air in the water - now that was the initial servicing of the water at the Cape. As soon as we got into orbit, the stuff had lots of air in it. That's continued to bug us just a little bit, but those 2 are about the only -

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1040, GET 4651 169/1

SC - bugged us just a little bit but those two are about the only - the major things to start working on before we splash down.

Rog, we'll pass it on, Tom and we're CAPCOM going to start on that. 108 has got a hydrogen separator in it, hopefully, it's going to work. I don't know what we can do about it for 107, but we will pass this on and see what they can come up with. The TV stuff - we don't -SC

Hey, Charlie -

CAPCOM I was going to say, the TV stuff, we haven't got any lines called up and any time schedule for the satellite right now, but Madrid is continuing to record the stuff and then can play it back later, over.

Okay, we will give them just a short, SC about 5 to 10 minute one and then you can take a look at it later.

CAPCOM Roger, if you will stand by, we will have you some high gain angles for you.

Okay. I don't think you've ever seen SC Africa and Saudi Arabia and that part of the world yet, have you?

CAPCOM Negative. Is it real clear down there at this time?

Yes, Africa is great. It looks like SC All of Europe, Soviet Union, all down through the velvet. Balkans are socked in in that giant cloud cover you saw yesterday; but, Saudi Arabia, India, and all of South Africa is completely open and the inner-Tropical convergence zone is really beautiful. You can really see the total line down there, so we will just give you a quick picture of it.

CAPCOM Rog, fine. We will let you know when Madrid is configured and we will have you some angles in a moment. Later on, when we've got some time, we have got a few things we would like to discuss with you on the LOI, part of the LOI on your cue cards and some mission rules, over.

SC	Okay.
SC	That's a good idea, Charlie.
CAPCOM	Rog, and we will be up with that -
SC	Want to ask you if -
CAPCOM	Go ahead, John.

Okay. I was just about to ask you, in SC view of the chamber pressures a little lower than nominal if we didn't want to hedge a little on that chamber pressure that we talked about the other day. I don't know.

Well -

CAPCOM

SC Maybe our gage reading is just low. Rog, I kind of think its right. On our CAPCOM second cues, after the manual repress attempt for propellant press less than 160, we don't believe that if you see that

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1040, GET 4651 169/2

first cue, propellant press less than 160 that the PC is going to actually ually get that low. You know, as we've seen in sims, it really didn't go that low. Vector soft point on the second cue and also in the mode 1 and 2 regions, second from the bottom down there with the SPS injector valve closed after commanded on. With the one bank, you know we saw PC of about 95 on the evasive maneuver and with one bank actually closed, that PC down to less than 80 is really not a good indication. What we're recommending is that if you have, as an example, bank B is closed or appears closed on your panel, then you close bank A. If you are still burning then you've had an instru-mentation failure obviously and turn bank A back on and keep burning. If it shuts down, then you should abort anyway.

SC Okay. I think we've got that. We will talk about it a little more.

CAPCOM Okay. I just wanted to let you start thinking -

SC

CAPCOM

Keep talking, Tom, go ahead.

SC Okay. What we would like to know is, I think you can dig it up, what did you indicate on telemetry for the thrust chamber pressure when we had both banks on yesterday during that midcourse.

CAPCOM Stand by. I saw 95, but let's see what the strip chart says. Hang on. The engine was perfectly normal on, Tom, at 100 psi.

SC Okay, real good. Looks like we have about a about gage reading of about 5 psi in here.

CAPCOM Roger. I just wanted you all to start thinking about these - the cue card and we will get all squared away down here and let you - and when we get some time, we will discuss. I'll let you stand by for the angles and network configuration.

Okay.

. . .

SC Charlie, would you - you get through that conversation before I could get the cue card out.

CAPCOM I figured that's what was happening about halfway through. Since I have such a one-track mind down here, I just kept talking. Stand by, I think we've got some angles for you.

SC You sure do get excited, Charlie SC That's okay, we just love to hear you

keep talking.

SC

CAPCOM Okay. Hey, we've got some angles for you if you will go yaw 270, pitch 45 you should be able to pick this up right now.

SC Okay, Charlie, how are you reading in high gain? CAPCOM I'm reading you 5 by, Gene.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1040, GET 4651 169/3 SC Okay. I have to wait a couple of minutes for the world to come around. CAPCOM Roger. Hello, 10, this is Houston. CAP COM Madrid is standing by. You can turn on the tube any time. Hello, Apollo 10, you are barely readable. CAPCOM We request - if you read me, we request you go narrow beam. SC Charlie, we are narrow beam. How do you read? CAPCOM Reading you 5 by now, Gene. Tom's Rog. conversation was unreadable, however. Okay, well, we've been narrow beam ever SC since we locked up. CAPCOM Roger. Tom's beautiful now. PAO This is Apollo Control. We will not receive this television transmission live. It will be recorded at the Madrid tracking station. As soon as we have an estimate on when we will be able to replay this transmiswe will notify you. The satellite is not available to us at the present time for live transmission. CAPCOM - we request that you give us a mark when you turn the TV on so Madrid will get the word. TV is on in the interior now until we SC can get the world to come around. CAPCOM Roger. CAPCOM 10, Houston. Madrid is getting your SM ' carry up. SC You say they are receiving? CAPCOM Roger. It's weak now, but they are picking up your interior shots. SC Okay. Madrid reports a fairly good signal now. PAO Apollo 10's distance 161,363 nautical miles; velocity 3,689 feet per second. SC Okay, Charlie, we got the world now out of Tom's window and it looks pretty small in our monitor right now. We will try zooming it. CAPCOM Madrid is copying. Roger-SC Okay, it's going out of sight there. We will shoot a little bit of interior and it ought to come in sight in my window here in a minute or two. CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 47:02, CDT 1051 170/1

SC my window here in a minute or 2. CAPCOM Roger SC Interior wise we are giving them a look at the star chart which has got some colors for both the sun and the moon and some of the planets. Saturn. Jupiter. Venus, Mars. CAPCOM Roger. CAPCOM How about putting that pretty patch up there again. SC Okay, we'll do that. SC This is our star chart and how we identify the stars and the planets that we're looking at right nov. SC This is what we use for our star navigation. The earth is over here. CAPCOM Houston. SC Go ahead. CAPCOM Roger. Our signal stands about -Go ahead Houston, this is 10. SC Roger, Geno. Our signal strength CAPCOM is down about 10 db. We'd like you to go high gain to medium width and then back to narrow. Over. Okay, it's medium now and I'll go SC back to narrow. CAPCOM Roger. SC How's that? CAPCOM Stand by. SC Okay, the blue ball here, the big one, is the earth as it progresses through the heavens here while we're on this trip. The moon is in yellow and it also progresses through the heavens. I might bring out the famous Apollo 10 symbol patch. Roger, we'd like to - wish we were CAPCOM seeing this now but Madrid is going to record it for us and we'll see it later on. That was a beautiful astronomical description of the star chart there, Gene. SC I thought you could follow it a little bit closer there, Charlie, if I told you about that. CAPCOM Roger. Takes me a little while to catch on to those things. Where better can you give an astro-SC nomical description than in the astronomical heavens, huh? SC I think that's where we are. This PTC wrist band really helps you with the orientation of the stars, even if you can't see them you can have feel for where they ought to be, which is, I think, going to help us out. Roger, 10, we're still having a CAPCOM problem locking up so we'd like to have you go to wide beam for 30 seconds and back to narrow. Over.

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SC Okay, we're in wide beam. CAPCOM Roger, we'll probably lose the TV for a little while and we'd like for you to keep going the next time around and maybe we can get a better picture. Madrid is having a little trouble. SC Charlie, you wouldn't believe this, but right now outside my window I've got something, I don't know how far. It might be the S-IVB. It's just spinning around and reflected sunlight out there. CAPCOM Roger, if we can get our expert FIDOs going and compute and see how far the S-IVB should be right now from you. SC I can see it with the naked eve and then I put the binocular on it and I can see it spinning around and I wouldn't bet my life on it being the S-IVB, but it sure has got to be something like it. Roger, we hope so. We'd like for you CAPCOM to go back narrow beam width now, 10. SC Roger, we're back in there, Charlie. Roger, and we're getting a great CAPCOM signal strength now so we should be in good shape if you can give us one more pass on the tube we should get a good picture at Madrid. PAO That was Gene Cernan reporting that sighting. CAPCOM 10. Houston, Madrid is reporting a much better picture now, so we fixed it up. Okay, the earth ought to be coming SC through my window here in a minute, Charlie. Stand by. Roger, we're standing by. CAPCOM CAPCOM 10, Houston, E Comm says it looked like we locked up on our side lobe there the first time when we acquired with the high gain. Request that you stay in the wide beam width - for about 30 seconds, or a little bit longer before you select narorw. Over. Okay, we're all right now, though, SC huh? CAPCOM Roger, we're in good shape now. That was just for future reference. SC For all the folks at home that should be a pretty good picture of the stars and stripes. CAPCOM Roger, wish we were seeing it. CAPCOM 10, Houston, we are expecting a high gain loss in about 1 minute. Over. SC Okay, and here comes the earth. Let me get it for you first. SC Okay, now we've got it, Charlie. CAPCOM Roger. We've got about a minute. SC That's a good picture of the earth right now.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 47:02, CDT 1051 170/3

CAPCOM Roger, Madrid's got it. SC Okay, Charlie, that's maximum zoom. You should be seeing all of Africa, matter of fact, you should be looking down right at Madrid. CAPCOM Roger, we're beginning to lose the high gain -SC Garbled

APOLLO 10 COMMENTARY, 5/20. 69, CST: 1101, 47:12 GET 171/1

SC ... Madrid. CC Roger - we're beginning to lose the high gain 10; we're going to OMNI. Okay; that's a shame, cause it sure SC is pretty. 10, Houston, if you'll go to manual CC on the high-gain and we'll switch to OMNI. You're there. SC CC Roger; we have them. SC Boy, she's in a perfect spot now Charlie; that was a shame. CC 10; Houston. Due to our lock on, side-low problem about a quarter or half of that pass was a little weak; at Madrid, if you'd like to, Madrid is still configured and the next time you come around, they'd like some more TV; over. SC Okay, we got plenty of time here, and we're just going through reading about the lunar acitivities. How soon before we can get high-gain lock on? Stand by. CC CC It'll be approximately 10 minutes 10. Okay, we'll note that and let us know SC as soon as we have high-gain lock; we should be able to get it out the hatch window and my side window. Roger, and we'll come up with some CC more angles for you in just a minute. SC Okay. CC Apollo 10, Houston. If you've got your LOI abort card out - we can talk about it. SC Okay, we got it out Charlie. CC Okay - second line down after Manual Repress Attempt, your first cue - propellant press less than 160 and you got the second cue listed as PC less than 80; that's a soft number, and we don't think on the basis on Sims and systems data that you'll see a PC down that low, with the propellant pressed down at 160, and I'd drop down below that before we get down to 80. So - just think about it - its a soft number and we can discuss this later on, whether we want to scratch that or not. The only other comment on the card was down at, next to the bottom, was mode 1 and 2 only. On the SPS injector valve CLOSE - after commanding on. Your second cue again is PC less than 80, if you'll recall, the evasive burn, we were getting a PC of about 95 or thereabouts. So - that's really soft on that one. We suggest that we eliminate that cue and that we replace it with a statement that says, "Close the bank that indicates OPEN, and if you are still burning, its apparent instrumentation failure." If the engine shuts down, you are in an abort mode anyway, and you should continue with the LOI 1, mode 1 abort, at the proper time using one thing; over.

APOLLO 10 COMMENTARY, 5/20/69, CST: 1101, 42:12 GET

SC Okay, let me write that down and we'll go over it here. Charlie, I'm just looking through our rendezvous procedures here, and I just wondered if those guys had any second thoughts about some of those procedures. You know we can change them now but in a couple of days we won't be able to. CC Roger; stand by.

171/2

SC Charlie, I'm just kidding, about the changes.

CC Okay - we really did go through them. We did the backup set last night, and from cover to cover, and everybody's happy as a clam with all the procedures now, finally. We even are satisfied with your market schedule. Say again, Tom.

SC I told turtle not to have any more data priority -

CC He's locked out of the MOCR right now; we refuse to let him in. Back to the LOY abort card, my first statement, after manual repress attempt with propellant less than 160, we think we should substitute as a second cue, instead of the PC less than 80, there, that if you can confirm a drop in PC, then that's enough to indicate a true propellant pressure drop - and it would be enough to shut down on. Over. 10 - Houston, would you select OMNI Charlie for us? 10, Houston, have you got any thoughts on the updates for your LOI abord card? Or do you want to think about it some? SC Let us think about it for a minute Charlie - based upon that PC which we saw, with single bank, I guess maybe that ... CC Roger. We'll be standing by anytime - we'll have you some high-gain angles in a moment early for your next pass around SC Okay. SC Hey Charlie - I bet the Fido has an LOI pad for us, doesn't he? Right now? Say again 10, I cut you out. CC SC I said I was betting that Fido has an LOI one pad for us right now. He's working on it; we got some; Fido CC says he's got your SIVB about 3970 miles away. Well that must be it then, that I saw, SC cause it's really reflecting and tumbling out there. CC Roger. SC If you can see that far, but there's something out there. Is there anyway you could give us a vector to it - we could put it in the auto optics and let it go look for it.

CC Stand by. We've got a yaw of 270 and a pitch of plus 30 for the highgain at 24.
APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1111, GET 4722 172/1 CAPCOM plus 30 for the high gain at 24. for the lockon, over. SC Okay, we'll be with you. PAO This is Apollo Control at 47 hours. 23 minutes. The Manned Space Flight Network expects to be able to feed that television signal from Madrid to Houston in approximately 12 hours. There is a 12 hour reservation time for INTELSAT 3, the communications satellite through which the signal will have to be fed. The MSFN -We should be locked on narrow now SC on high beam - high gain. Roger, and our signal strength looks CAPCOM great, 10. SC Okay, you should be having something here pretty quick. CAPCOM Rog. PAO Madrid is receiving TV again now. CAPCOM 10. Houston. Madrid has a good TV picture. SC Okay. PAO The picture is being received in black and white in Madrid. It will be converted to color here in Houston. The Manned Space Flight Network says it will attempt to get the signal back here as soon as possible, but they estimate it will be approximately 12 hours. CAPCOM 10, Houston. The picture is still looking great at Madrid. SC Charlie, the Suez Canal appears now to be going into darkness. We're looking at most all of Africa, the Mediterranean Sea; Spain, Portugal are in view. So the folks down in that part of the area ought to be getting a good picture of themselves right now. CAPCOM Rog. I think they can broadcast that stuff out -SC (garble) CAPCOM I was just going to say, you know, I think they can broadcast that stuff out in black and white live. For the color it has to come over here and be converted and then be transmitted back into color for the people over in that area, but they're probably seeing it in black and white. SC It's a beautiful sight. All of Africa is brown again, of course, and the waters are very, very blue. CAPCOM Can you differentiate between the -SC (garble) CAPCOM Go ahead, I'm sorry. SC Charlie, picture just went off beyond

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1111, GET 4722 172/2

a quarter of our window now so it looks like that's about it for right now. CAPCOM Roger. SC And what did you want me to differentiate between? CAPCOM I was just going to ask you, looking at Africa -SC What was your question now? CAPCOM Looking at Africa, could you tell the difference between the Congo and the tropical forests in the, in the, say, the Mountains around Morocco and all the Atlas Mountains, and up around the Mediterranean, or is it all sort of the same brownish color? SC No, once you get to the tropical rain forests it changes colors. You can definitely see the Sahara and the Atlas Mountains, and when you go south of the rain forests it's not as green as you would expect, but it gets a less red and more of a, really a purplish-green tinge there, Charlie. CAPCOM Rog. SC You don't see the great - the bright green rain forest. You think you might, but it's the shade, it's the contrast that you notice. CAPCOM Yesterday when we were look-Roger. ing at South America live here we could see above the timber line in the Andes Mountains just very distinctly, a brownish color, and in the Amazon Basin and in the jungles around it, it was sort of a deep bluish, darker than the ocean by a considerable factor, but it was more of a bluish tinge down here. It's a purplish-bluish tinge and we SC can see - again, a lot of it has to do with the amount of haze and cloud cover on it. CAPCOM Rog. SC Charlie, it sounds to me like you're seeing it pretty much as we are. CAPCOM It was really spectacular color, 10. We're really - everybody is really pleased and happy with the quality. All the networks and all are just ecstatic over it. As we are here in the room. You guys have really been putting on a great show for us and we appreciate it. SC Yes, well it's not a show. We just want to show you what we can see from out here. Not many people get a chance to get this far and it really is a pretty exciting view. SC And we also just wanted to thank all the people who helped make it possible for us to get here too, Charlie.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1111, GET 4722 172/3

CAPCOM Right, we're passing it on, Tom, to the networks. This afternoon when we got the scheduled TV we'd like you to do the water bag trick, the food separators up in the - let's see how that will look. We might be able to pick up something on the live TV, over. We'll show you a new law of physics SC how the bubbles go to the bottom. CAPCOM Okay, that's what we'd like. SC Roger. SC Forgot to tell you, Charlie, I got your picture walking to work this morning. CAPCOM Oh. great. Walking to work? Yes, how come you were late? Charlie. SC it looks like Spain is mostly open today. I'm looking at it through the sextant. It really looks - it's beautiful. CAPCOM Rog, can you differentiate the -SC There's Barcelona. CAPCOM Excuse me, I was just going to ask you if you could differentiate the cities. Tell us about what you can see. Well, all you can make out is it SC looks just like a map, a small map, and well, you can see, for example, the Pyrenees. and you can see there may be cloud cover down along the coast there, down on the Mediterranean coast. You can see, almost see, I think, Gibraltar. CAPCOM Fine. SC And the Lisbon area over by Portugal In France, Marseilles is open. It looks seems to be clear. like there's a little cloud cover north of France. England is under the clouds. CAPCOM Can you pick out any of the islands

off of Greece, or say Sardinia, or down around Italy, Capri or Sicily? Can you see those islands?

SC It's pretty close to the terminator right now and it's a little smoggier today than it was yesterday. Yesterday Crete was very clear. I could see Cyprus and the Nile Delta is very clear right now. You can see the Nile; the Nile Valley really stands out, and -

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1121, GET 4732 173/1

SC Right now, you can see the Nile, the Nile Valley really stands out. And of course, the Sahara Desert is very clear, you can see the geological features of the desert. It looks like Lake Chad down there in the middle of the - middle of Africa.

CAPCOM Rog. Start talking about geology and we will have Jack Schmidt in the room in just a minute. SC I thought he was already there.

CAPCOM No, he's doing something over in the office today.

PAO That's John Young giving the description of the earth.

SC That certainly is an interesting weather pattern going across there. I can see right now in Brazil, it stands out very clearly on the horizon. And Brazil is covered with those little thunderstorms that build in a tropical area. It just seems like each tree has its own separate thunderstorms down that way.

CAPCOM Roger.

SC Boy, it's really a fantastic, just fantastic view. We can see right across the top of the world right now and it sort of looks like, I don't know exactly how we are oriented right now, but it sort of looks like the North Pole is open today, but it isn't very much open. The whole northern part of the world is under the worst cloud bank I've ever seen.

CAPCOM Rog. That thing has been there constantly almost since, it seems like, since you guys started the pictures back. Can you still see that strange looking storm system up over the Bering - I guess it was just south of the Bering Strait out over Alaska. Is that thing still there? It was a funny looking swirl.

SC The terminator runs down through Africa right now, Charlie, so we're starting to look at only about 3/4 of the world.

CAPCOM

SC So that part of the world hasn't come around to us yet.

CAPCOM Rog.

CAPCOM 10, Houston. We're estimating high gain loss at 37. We would like you to - at high gain loss, to return to omni bravo, and then we will handle the omnis from there, over.

SC Okay, Charlie.

Roger.

CAPCOM 10, Houston. Bruce has got a little message he cut out of the paper and I'd like to read it up to Tom if you are ready.

SC Stand by. Let us switch omnis, be there in a second, Charlie.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1121, GET 4732 173/2

CAPCOM

PAO This is Apollo Control at 47 hours 37 minutes. The TV can only be transmitted with the high gain antenna and there is a period in each of the revolutions that Apollo 10 makes for passive thermal control and antenna loses lock with the ground antennas. It is at this period that they switch to the omni antennas for voice communication, but television is not possible. Apollo 10's distance now 162,659 nautical miles; velocity 3,660 feet per second. We should be back in communication very shortly here. We will continue to stand by.

Rog.

SCHello, Houston, are you reading us?CAPCOMRog, reading you 5 by now.SCOkay, I went to omni bravo there and

left it there for about 2 minutes. I'm in delta right now, and when we lose signal strength, I'll give it back to you, I'll just go to omni in bravo and let you do the switching. CAPCOM roger.

SC Okay, you can read that message up, if you would like.

CAPCOM Rog. It's from Weatherford, Oklahoma, dateline. It says two young Oklahomans had high hopes Sunday when they tried to send greetings to Apollo 10 Commander Thomas P. Stafford, an Oklahoma native. The two youngsters, about 10 years old, were seen from a busy interstate highway by passing motorists. They were sitting on a hillside about 4 miles east of Staf-ford's hometown of Weatherford, holding aloft a printed sign with two small U.S. flags attached to it. The sign said, "Hello, Tom." Did you see it? SC No, we were trying to, but couldn't quite make it there, Charlie. Tell them thanks a lot for the effort. We appreciate it.

CAPCOM Rog, rog.

APOLLO 10 MISSION COMMENTARY 5/20/69, GET 47:42, CDT 11:31 174/1

CAPCOM 10, Houston, if you'll select bravo on the dunis we've got the D command in and we'll take over. SC Okay, you've got it. CAPCOM Roger.

END OF TAPE

4 . . .

APOLLO 10 MISSION COMMENTARY 5/20/69, GET 47:52, CDT 1141 175/1

PAO This is Apollo Control at 47 hours 53 minutes into the mission. Apollo 10's distance from the earth is now 163 198 nautical miles, velocity 3 649 feet per second. We'll continue to stand by live for any transmissions. SC Hey, Houston, this is 10.

ney, nousi

CAPCOM Go ahead 10.

SC Hey, Charlie, do you suppose a guy can really see 3000 miles with the naked eye in space? Stuff like the S-IVB?

CAPCOM Yes, every body is nodding their heads "yes" here. We think so. You ought to be able to see 4000 miles or so. That's a pretty big target out there and we think you ought to be able to see it.

SC Okay, well, I can definitely see it. We've been seeing it for a couple of days I guess and went to my binoculars and it looks more and more like, you know, it might really be the S-IVB.

CAPCOM Roger, FIDO said it's about 4000 miles. I guess that thing's about the -

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1151, GET 4802 176/1 - it's about 4,000 miles. I guess the CAPCOM thing is about the same plane that you all are. FIDO says you will have an update on your range -Yes, we see it. SC CAPCOM Go ahead. We see it fairly regularly, if we look SC for it as we rotate through this PTC. FIDO will have an update on the range in CAPCOM about an hour ro so for you. SC Okav. That is Gene Cernan in conversation with PAO Charlie Duke. Hello, Houston, Apollo 10. SC CAPCOM Apollo 10, this is Houston, over. SC Okay, we are going to go ahead and get the ECS redundant check out of the way at this time and then we are going to have our own little skull session about the lunar operations for about 3 hours or so. We won't be talking to you after this for a couple of hours unless we have some questions about the lunar operations. Roger, we copy. We're working on the CAPCOM S-IVB location vector for you. Do you want us to send that up when we get it? Yes, go ahead. SC CAPCOM Okay. Copy redundant component check. Okay, Houston, if you are watching, we SC are going to do the main regulator checks here. Apollo 10, this is Houston. CAPCOM Can you hold off on the component check for a minute or so until we get the high gain acquisition? Okay. SC SC Roger, we already started on it. CAPCOM We're showing yaw about 270, pitch +30 on the high gain antenna. SC Ah so. CAPCOM You should have acquisition right now. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 48:12, CDT 1201 177/1

Houston, 10, how do you read? SC Roger, loud and clear and ready CAPCOM to proceed with the redundant component check. SC Okay. Apollo 10, this is Houston. We copy CAPCOM the secondary evaporator operating now. We'd like for you to let it run for 3 to 5 minutes this time if you would. Over. SC That's affirm. CAPCOM Roger up. Hey, Bruce, how are things back there SC on the home front? Oh, they are pretty good. Everybody CAPCOM is watching you all via TV and the newspapers and things are going along nicely here. What about the home-home fronts? SC CAPCOM Roger, the 2 Barbaras were over here at Mission Control to watch TV yesterday. They seem to be going along pretty well. SC Okay, thank you. The 2 Barbaras are Mrs. Barbara PAO Cernan and Mrs. Barbara Young. Houston, 10, if you are satisfied SC with the secondary loop I'll go ahead and deactivate it. CAPCOM Roger, it looks good here, you can go ahead and deactivate, and we'll do a little checking on the home front situation for you and check back in a little while. SC Okay, fine, and the loop looks like it's operating pretty good here. CAPCOM Roger, we concur. PAO This is Apollo Control at 48 hours 22 minutes with the conclusion of that environmental control system component check the Apollo 10 crew has indicated they are going to spend the next couple of hours doing some homework for their lunar orbit activities. This is study time they've been doing every day since liftoff, and they've indicated they will not be, in all probability, doing much communicating during the next couple of hours. We will take the line down now and come back up if there is communications. At the present time Apollo 10's distance from the earth is 164 248 nautical miles, velocity 3626 feet per second. We

will take this loop down now after having been up live constantly for 3 hours and 27 minutes. We'll come back up if there are any communications. This is Mission Control Houston.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1216, GET 4827 178/1

This is Apollo Control at 48 hours, PAO 27 minutes. Charlie Duke is talking to the crew. CAPCOM Apollo 10, this is Houston. Stand by for the news from the homefront, over. CAPCOM Hey, 10, we just talked to -SC Go ahead. CAPCOM Okay, we just talked to Barbara Young and she's the only one that's at home. The other two are at least not home. Maybe out to lunch or something or out spending all your money. But Barbara Young is the only one at home and she says everything is all right, John, and she said she and Barbara Cernan almost fell out of the chair yesterday with your little demonstration of dynamics in zero g and thought it was real funny. But everything else is peachy keen at home, and we'll try to raise the other two gals later on today. SC Thank you. CAPCOM You're welcome. SC Tell mine to quit spending all the money, okay? CAPCOM Okay, we'll do that, Tom. SC I can see nothing's changed at my house. CAPCOM Rog. CAPCOM Apollo 10, this is Houston. Would you give us omni Bravo and manual on the high gain antenna, over. SC Socking it to you; here it comes. CAPCOM Roger.

APOLLO 10 COMMENTARY, 5/20/69, CST: 1231, 48:42 GET 179/1

PAO This is Apollo Control at 48 hours, 42 minutes and we are in communication with the Apollo 10 crew.

CC Apollo 10, Houston.

SC Over.

CC Roger, Gene; just talked to Barbara and she said she was home and that I didn't let the phone ring long enough, so she's mad at me. She said she received your letter yesterday and she ruined her makeup after reading it, and that everything was really fine; she appreciated it very much, and that Tracy is fine, back in school, and they were really enjoying your TV shows. Over.

SC Thank you.

CC Roger. Tom, we'll keep trying with

Faye.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1249, GET 4900 180/1

This is Apollo Control at 49 hours PAO into the mission. Madrid is handing over acquisition of Apollo 10 to the Goldstone station at this time. Apollo 10 is 165,543 nautical miles from earth. Its velocity: 3,597 feet per second. The only conversation we've had with Apollo 10 is to notify them of the acquisition handover. Here's the tape on that. SC

Roger, Charlie.

APOLLO 10 COMMENTARY, 5/20/69, CST: 1258, 49:09 GET 181/1

PAO This is Apollo Control at 49 hours, 9 minutes. The video tape of the television transmission recorded in Madrid will be flown to Houston. We will not use the satellite for transmission. Transport time is estimated at approximately 30 hours, so this video tape will be available in Houston sometime tomorrow evening. This is Mission Control Houston.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1316, GET 4927 182/1

PAO This is Apollo Control at 49 hours 27 minutes. There has been no further conversation with the crew. Apollo 10 is now 166,435 nautical miles from earth and its velocity is 3,579 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1320, GET 4931 183/1

PAO This is Apollo Control at 49 hours, 31 minutes and Gene Cernan is giving us a call. SC Hello, Houston, this is Apollo 10. CAPCOM Roger, 10, go. SC Charlie, I'm looking at the earth

now through the monocular and I can see the west coast of Africa; I can see Spain and Gibraltar very, very well. I can see just about 90 percent of South America, up through central America. I can see the whole Gulf Coast all the way to California, and on this side now, Cuba is very visibly clear. All of Florida is clear and the whole Gulf Coast is clear. I can look up the East Coast maybe to about the Carolinas, and then it appears to get a little bit cloudy. And it appears that the Great Lakes, I think I can make out Lake Michigan and probably Lake Superior. And then there are some clouds up in the northwestern central United States.

CAPCOM Roger, we copy.

SC There's some, okay, coming out of the North Pole down into the Central Atlantic, there are some very weird picturesque cloud formations. Swirls, not definite low areas, but big large swirls.

Rog, we copy.

CAPCOM SC

CAPCOM

This is about the best view I think

I've had -

Go ahead.

SC It appears to be about the best view that I've been able to have of the whole Atlantic and South and North America from where I am and it ought to be getting a little bit better as we go along.

CAPCOM Sounds pretty spectacular, 10. Can you distinguish the Bahamas region. In most of the photos it looked like it is definitely a greenish rather than a blue area. Can you pick out any of the islands or just, is Cuba the smallest - the largest - you can define?

SC Charlie, she's out of my view right now. As soon as she comes in in the right-hand window I'll take another look at it, but I think probably you can - now there are some clouds down in there as you just go off of Miami and off the Keys. There are some scattered cloud coverage down in the Caribbean which may make it difficult to pick some of those islands out.

CAPCOM Roger, just giving you an eye test. SC Okay, it appears that the whole Gulf Coast all the way across Mexico through Arizona, from Florida to California, you know, up J2 and J86 is clear as a bell. CAPCOM Rog. CAPCOM Rog. CAPCOM Rog, copy. It was beautiful when

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1320, GET 4931 183/2 we came to work this morning outside. I don't know what it's looking like now though. Hold on. You don't even have to go out. I'll SC tell you. CAPCOM Okay, everybody - the front row standing here says it looks beautiful outside. We'll have it coming around here in SC the other window in just a few minutes. Roger. 10, can you comment on any CAPCOM other -SC (garble) you guys like it down here -Say again, Gene, I cut you out. CAPCOM Go ahead, Charlie. SC CAPCOM I was going to ask you, can you comment on any of the - you made a distinct comment on the Nile Delta and the Nile Valley, can you pick out any others as they come into view, say the Mississippi. Is it as clear and is it as distinguishable as the Nile and the desert, or would you have a difficult time, over. We'll take a look at it as she comes SC through the window over here. CAPCOM Rog.

APOLLO 10 MISSION COMMENTARY 5/20/69, GET 49:38, CDT 1327 184/1

Hello Houston, this is Apollo 10. SC CAPCOM Go ahead, 10. SC Hey, Charlie, (garbled) SC Hello Houston, Apollo 10. Roger, 10, go ahead. We switched antennas CAPCOM on you, 10, and you were cut out, Tom, right when you began your conversation. Go ahead. Okay. We're working through the Goldstone SC now, right? CAPCOM 10, you're breaking up. Can you stand by about a minute until we get a better signal? SC Okav. CAPCOM Apollo 10, Houston, how do you read now? SC Roger, read you loud and clear. How me? You're about 3 to 4 by, 10. Go ahead, CAPCOM I think we can read you now. Yes, okay, Charlie. If you have a good SC contact with Goldstone we might just show you we've got some time to kill and we just might show you a quick 2 or 3 minutes of the earth on TV you might never see on our normal transmission because we're way past here. We can get Africa, part of Europe North and South America and it's pretty good if we can go high gain into Goldstone we could probably get it in about 10 minutes for you. Roger, stand by, we're at Goldstone CAPCOM active now, we'll see if we can configure the network and give you some angles. Stand by. SC Okay, Charlie, while you're doing that, your answer is I can see the Mississippi Delta very well as outlined against the Gulf of Mexico. Compared to the surrounding areas it's a grayish area. You can't really see the river basin or anything that might be a delta except the contour of the land. CAPCOM Roger, we copy 10. Okay, and your inlets from Florida all SC the way down towards Trinidad, there's a lot of broken cloud coverage but I can yet pick out islands other than Cuba down in that area all the way down through Trinidad, possibly islands in the areas of San Lucia and Martinique and down in that area. CAPCOM Roger. You really got some eagle eyes up there. We'll be with you in a moment with some angles. SC Well, I'm cheating. I'm using a monocular. SC I'll tell you one thing, Charlie. The map makers are pretty good. CAPCOM They'll appreciate that. Roger. SC I can definitely see up in the Great Lakes region now.

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 49:38, CDT 1327 184/2

Roger.

CAPCOM

SC Lake Superior and Lake Michigan are very clear. I can pick out one of the eastern lakes and then there is a big, long thin cloud bank that runs from northeast to southwest, probably starts around the middle of Misouri and then goes on up into the northeastern part of the United States that covers a couple of the other lakes.

CAPCOM Rog. Say, we're getting a better weather report than the 6:00 news.

SC Okay, we've got the tube all set up. When you give us the angles we can give you a quick 2 or 3 minutes of it and still continue with the PTC.

CAPCOM Roger, 10, the Goldstone is configured. Stand by, the E Comm's will have some angles for you in a second.

SC You ought to get an outstanding picture of the Gulf of Mexico, Florida, the United States is almost 80 percent clear and you'll get South America and on the right hand side near the terminator you ought to be looking at Spain and the west coast of Africa.

CAPCOM Roger, we're configured now, your angles are pitch 270, correction pitch 30, yaw 270, and it's a plus on the pitch and those angles are good for 3 minutes from now, at 51.

SC That was 030 on the pitch plus and 270 on the yaw, right? CAPCOM Right, if you try it now you can probably

get it.

APOLLO 10 COMMENTARY, 5/20/69, CDT: 1337, 49:48 GET 185/1 - you can probably get it. Stand CC by - the E-comms are shaking their heads "no" on that - try 51, 10. That's 51, okay. SC Tell them I'm gonna leave them in a little bit to see if we can do a little better than that. 10, we don't have the lines in from CC Goldstone, it should be recorded at Goldstone, and we'll play it in as soon as we get the lines up for the live TV coming up at 54 hours. SC Okay, Charlie, very good. CC Since we don't see it down here, if you guys will give us a running commentary we'd appreciate it. SC Okay. PAO This is Apollo Control; we will play this video tape immediately following the live television pass this afternoon. CC If you've come up with any questions out of your 2 hour skull session on the lunar orbit work, if you'd like to pass them on, we'll get the experts working on them; over. SC Okay. Houston, can you tell when we've got good high-gain lock? CC Stand by. SC Doesn't appear here that we've got a solid lock. CC Roger; we made an error in the calculations 10, and we estimating now at 53 before a good solid lock on on the main loads. Okay. Okay, there's solid lock on SC narrow beam wind. CC Roger 10; we're reading you 5 by; stand by and see if we confirm. Roger; we got a good lock. CC - ought to be getting a good picture. CC We got a good lock up - Goldstone is configured; ready to go. SC Okay, you ought to be looking at it now. CC Roger. SC Houston, how do you read on? SC Hello Houston, Apollo 10; how do you read on vox? CC I read you 5 by on vox, 10. SC Okay, I'll kinda narrate this Charlie; I'm kinda at an odd angle to hold it out the window. Again, you can see the West Coast of Africa, the Sahara Desert there all in orange, you can see the Atlantic Ocean with swirls of clouds over to the Eastern Part of Brazil; you can see the very weird cloud patterns that Gene described

APOLLO 10 COMMENTARY, 5/20/69, CDT 1337, 49:48 GET 185/2

- out over the Northeastern part of SC the United States; again, it looks like the North Pole, in that whole area around Canada is completely socked in.

Roger.

CC

SC The - again, the one thing that is really so amazing as you look at the earth is the amount of cloud cover that we have down there. Over the tropical rain forest of South America, there's just numerous small cumulus clouds.

CC Roger; can you describe the color as contrasted to say, the Andes or of the American Desert.

Roger, the color of the torpical rain SC forest there is more of a greenish brown - greenish brown versus a brown-orange on the tropical - on the American Desert and the Sahara Desert.

CC	Roger,	can	you	pick	out	the	Amazons?
SC	(garble	e)					
CC	Roger,	can	you	pick	out	the	Amazon
River?			5	-			

No - there's, I can't pick out the SC Amazon I am looking at it with my naked eye where Gene had the 28 power monocular. I do have the zoom on here. so you'll seeing it a little bit bigger than we are on the standard vision, so the earth as you see it there is bigger. And you can see the terminator, or night time, has moved over most of Africa at this time, and is starting to move over to Europe. It'll soon be night time in Spain, and therefore also it is getting daylight over in Hawaii there. The cloud patterns are utterly fantastic if you look out at them.

CC Roger 10, we copy. How about up around the clouds that I asked you about earlier up around the Bering Strait; is it daylight over there yet?

SC They are just starting to come into view and when we have our programmed TV pass, that's through Goldstone, we should be able to take a look at that cloud funnel situation. It was a beautiful swirl yesterday. CC

Roger.

SC But it's also amazing how some of the clouds are pure white and the other ones will look more of a brownish white - kind of a dirty white. Again, if you look, you could see, by Mauretania, going over to Brazil, the intertropical convergence zone that's always pictured on our weather map, is just a straight line right around the earth. It's really beautiful with occasional outdroppings of cumulus clouds.

CC Roger. Where are the brownish clouds located - over the deserts or just where Tom?

Right now the brownish clouds are over the tropical rain forest in the Atlantic Ocean. CC

Roger.

APOLLO 10 COMMENTARY, 5/20/69, CDT: 1337, 49:48 GET 185/3

- Tropical Rain Forest in Brazil. SC CC Roger; copy. We're about to lose you out our window. SC We'll stand by; Goldstone and Madrid CC were both recording the TV; get good signals both places. We'll stand by till you come out through the hatch window.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1347, GET 4958 186/1 As we say adios, we disappear be-SC hind our hatch window now. We will see you later. CAPCOM Roger. SC Cut it. SC That vox worked okay, I guess. Hey, 10, that vox was perfect. CAPCOM None of the words were clipped or anything. It was like talking to you in the same room, 10. It was really great. Okay, that's the first time I guess SC we've really used vox and it seemed to be okay at this end. CAPCOM Roger. You are not clipped at all. We are real pleased with it here, 10. SC Roger. CAPCOM 10, Houston. We will have you on the high gain for about another 8 minutes, over. ... coverage on the earth at all. SC You are completely out of view. John will be able to pick you up in the optics. CAPCOM Roger. SC Houston, Apollo 10, over. CAPCOM Rog, go ahead, John. SC Roger. In about another hour and a half you ought to be right underneath us. Boy, it ought to be the most remarkable picture of the United States ever made. The whole North American Continent is just standing out. It's really - and there is not too much clouds for a change. It's open. CAPCOM Great. SC - see you down from - Florida -CAPCOM Go ahead. SC You can see Puerto Rico, Haiti, Jamica, Cuba, Florida, the Bahamas are under cloud cover right now, but in general the whole United States, except for the New England states, and a path cutting through the middle of the United States, wide open. You can see the Great Lakes very well. CAPCOM Good show. We will be looking forward to your TV show live here in a couple of hours and we should be, as you say, about right underneath you, and ought to get a good view. Thanks a lot. SC Roger. Mexico and the Yucatan peninsula, even south of Central America into Panama. i can see parts of Venezuela, Columbia, and of course, most of Brazil is wide open. Chile seems to be open along the coast down there. Peru and Bolivia are probably under scattered clouds today. CAPCOM Rog. You guys are giving us great weather reports. SC You sure can see a lot.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1347, GET 4958 186/2

CAPCOM	Yes, like maybe all of it.	
PAO	That's John Young giving that	de-
scription.		

SC Charlie, I've got it out my window now and, like John said, it's so remarkably clear. Lake Superior and Lake Michigan stand out very plainly. There's just a patch, a little patch of clouds, on the Chicago-Milwaukee area, or else there is snow on the ground. I really think it's probably clouds, but you can almost pick out the States by the contour of the sea and the ocean and the lakes. And I can actually see the Mississippi, not see the river, but you can sort of see the Mississippi valley as it goes up the -

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 50:08 CDT 1357 187/1 see the river but you can sort of see SC the Mississippi Valley as it goes on up north from the delta. CAPCOM Is this through the binocular or by the naked eye, Gene? SC This is through the binocular, Charlie. Roger. Sounds like a spectacular sight. CAPCOM Wish we had had a stowaway up there with you. Hey, you know, you almost did until they SC wrote it in the OCP to get Joe Engle out of here. CAPCOM Yes. It's also very interesting to watch SC the continents come out over the horizon as the world turns more towards it the U.S. continent turns more toward it. CAPCOM Roger, we copy. And I agree now with John. SC You can see practically that whole island chain all the way down to Trinidad. CAPCOM We copy. SC It's hard to believe we is really here. Hey, you guys are a long way away. We've CAPCOM got you at about 170 000 miles, little bit more than that right now. SC 170, okay. Roger, you're still below, if the drawing CAPCOM is right there, you are still below the earth/moon plane, and be coming up at about 195 000 you'll be crossing through the plane and going a little above. Hey, we're trying to get some angles -CAPCOM Go ahead John. SC We're not much below it, right? We're pretty close. CAPCOM Roger, real close. SC You can watch the earth through the optics, plus or minus 57 degrees in the sextant, or you can pick it up and try to follow it for over 100 degrees. CAPCOM 10, Houston, we'd like you to select omni bravo and manual on the high gain. Over. SC Roger. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1405, GET 5016 188/1

PAO This is Apollo Control at 50 hours, 24 minutes. Apollo 10 is 168,353 nautical miles from earth, traveling at a velocity of 3,538 feet per second. PAO This is Apollo Control at 50 hours, 26 minutes. As an indication of how well this passive thermal control mode is working, Apollo 10 has not had a thruster firing since an elapsed time of 29 hours, 53 minutes.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1417, GET 5028 189/1

CAPCOM SC

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Hello, Apollo 10, Houston, over. Go ahead, Charlie.

Looking here ahead in CAPCOM Rog, John. the flight plan and we would like to give you your P27 update at 5205 or thereabouts, and hopefully we won't have to kill the PTC for you to do this realignment, you did such a good job this morning we think we can continue on in the PTC and let you do the realigning and we can get an update to you also in the PTC mode. And we are suggesting, since this thing is going so great that we just keep it going and put TV - that we could do TV also during PTC since it seems to be working fine and we will have about, at the present roll rate, we probably have about 10 to 15 minutes television with the high gain, so we can get the whole live TV and it will be partially exterior and partially interior and if that's agreeable with you guys, that's the way we would like to play it.

SC Okay, Charlie, but I - remember we were going to do a trunnion cal here one of these days, and I guess today isn't the day.

CAPCOM Well -SC We can't do that unless you stop the PTC, over. CAPCOM Stand by. We will see if that's

worth stopping for. Hold on. CAPCOM Gene, while we are waiting for

CAPCOM Gene, while we are waiting for the answer from the experts on the trunnion cal, we would like you to turn to the back of your flight plan to the mission rules summary and would like to talk about a few updates that we feel are justified at this time, over.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1425, GET 5036 190/1

SC CAPCOM SC

Okay, we're turning to it, Charlie. Roger.

SC Okay, we've got the flight plan out for this one; we're looking at it.

CAPCOM Roger, it's on the back page, Tom, on the LM stuff primarily. Looks like the command module's side is in good shape. But on the LM side, if you'll notice under the column Do Direct Return Abort For Loss Of we have an X beside the primary loop. We'd like to change that to both loops, that we'd have to lose both loops before we did a direct return, over.

SC Okay. In other words, you said it can go secondary loop because you figure the PGNCS would last for a period of time.

CAPCOM Roger, if we went on the secondary we would do the PDI abort sequence but it's such a short time frame from between the DCI and the direct return that we don't think that we should go that route just for losing a primary loop and we feel it'd be satisfactory coming back on a secondary loop with a PDI abort, over.

SC Okay, that sounds good to us since we've seen from the alti - the G & N system has worked in the altitude chamber without the cooler, we'll go along with that for sure.

CAPCOM Roger, these are suggestions, of course, and let y'all have time to concentrate over them and then you can come back with us if you - to us, if you disagree. And at the bottom of the page under the Do Not Perform Rendezvous For Loss Of, the next to the last line, we list RCS systems, and we had just an X - we say that we would not perform the rendezvous for loss of either RCS, A or B, over.

SC I think we agree with that completely, either one.

CAPCOM Roger, well, that's just slight clarification. And also, moving over under the same heading, RCS systems for the PDI abort sequence, we recommend that we do not go to that sequence for loss of one system. In other words, if we lose one RCS system we continue with the nominal plan, over.

SCI think we ought to talk that one over.CAPCOMRoger.SCLet us think about it for a little

while, okay?

SC I'm a little bit lost, Charlie. You say do not perform rendezvous for loss of either RCS system and then you say do PDI abort sequence for loss of either one, you continue the rendezvous, or what? APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1425, GET 5036 190/2

CAPCOM After you're committed to the rendezvous is our feeling. In other words, once you've done DOI, that after you've committed to the rendezvous, then you would not change that sequence for loss of an RCS system. That we would continue on nominally. And that's a tradeoff though. If you need time to figure in all that stuff, when you look at it, we just think we're better off with a nominal time line once we're committed, over.

SC Yes, we certainly like the nominal time line but the main thing is - depends on what you say the mean time to failure for that other system. If we lose attitude control we could be in trouble.

CAPCOM Roger, we agree, 10. We'll go - it's 2 hours we're talking about, of course, and we'll go either way you guys want to go. This is strictly a recommendation.

SC Okay, let us think about it for a little while, Charlie.

CAPCOM Roger.

SC Hey, Charlie, this failure is obviously between DOI and phasing because once you've done phasing you're committed to the nominal anyway.

CAPCOM Yes, that's affirmative, 10. We'd like - we look at also that, really, we feel, really, that what you're talking about is just 2 hours of stationkeeping because once you're passed phasing and you're down to one system, then you're on the RCS for most of the burns anyway. I shouldn't say 2 more hours of stationkeeping, it should say 2 more hours of attitude control.

SC Yes. I guess one reason - one question we have in mind, you know, is what caused you to lose that one ring; what was the circumstance that caused you to lose it and what are the chances that 2 hours is going to make a difference, you know, in whether you do a PDI abort or whether you do the nominal.

CAPCOM Roger, we -SC (garble) CAPCOM Go ahead, Tom, I cut you off, excuse me.

SC Yes, I think you're building up the time sequence. If it occurred earlier after DOI we might go into PDI abort. If it occurred real late (garble). CAPCOM 10, you're fading out. Unreadable now. We'll switch antennas on you. We should be back in a moment. CAPCOM 10, Houston. We're back; do you read me? SC 0kay -

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 50:45, CDT 1434 191/1

10, Houston, we are back. Do you read me? CAPCOM Okay, how do you read now, Charlie? SC You're 5 by, Tom. Look, we aren't just CAPCOM We feel like it's more of a real-time suggesting this. situation here and about what kind of failure we've had and how much time we've got and we play it real time. There are certainly situations where you'd want to come back with a doing a PDI abort sequence, so it was just something for you to think about and I think it's more of a real-time situation than a hard fast rule anyway. Over. Yes, that's just exactly what we were coming SC around to. It's awfully hard to write that rule down on paper and to say like if it happened early you can see what happens when you might do the PDI abort, but after - later on would it be time rushed to do the PDI abort in other combining circumstances you would probably go ahead with the nominal. Roger, we agree. CAPCOM SC Let's make us leave it up to real time. CAPCOM Roger, we agree 100 percent. We're with you. All right. fine. SC CAPCOM And 10, it looks more and more like the trunnion cal is becoming less and less of a priority here, and we're recommending tentatively now that we continue PTC on through that and get this later on, but we're checking with a few more experts on the problem. Over. SC Okay. That's your decision. Roger, we'll let you know, John. CAPCOM Charlie, would you pass on the word to SC Christopher C. that we're saving all this fuel so we can get him some good landmark tracking. Roger, we sure will, and Tom, I talked to CAPCOM Faye on the telephone just a minute ago, and all is real fine at home and they've really been ejoying your TV shows and all 3 of the gals think they are married to a bunch of hams after yesterday's show, and they've really enjoyed it a lot and everything looks real fine. Okay, thank you. SC How can you be a ham when you're just SC trying to show that the world's round? It's the interior shots that they were CAPCOM refering to, I'm sure. SC Oh, were those live? CAPCOM Roger. SC Hey, Charlie, I want to talk you a minute about the data since you were in charge of it. We've got some pretty interesting flight plan notes that were penciled and taped in at the last minute. We're wondering if you want

to see some of those down there?

APOLLO 10 MISSION COMMENTARY, 5/20/69, GET 50:45, CDT 1434 191/2 Roger, it's up to you guys whatever you CAPCOM think. Most of this goes out live, so if you want to show it, it will be fine. SC Well, since you did such a fine job on the data we thought we'd like, you know, to express our thanks. Roger, I take really not much credit for CAPCOM that. SC You might have to clear that with Gordo and Ed. Roger. Ed's sitting here right now grinning CAPCOM from ear to ear. One would think you guys were looking through -SC ... grinning about another -CAPCOM We didn't think you guys were -SC He won't grin long, I'll bet. CAPCOM Roger. Now we're trying to spare him. Sc He's gone all the way through the flight plan to the end. CAPCOM Roger. I'm glad to see you are reviewing all that data. SC We're trying to do our homework up here, Charlie. CAPCOM Right. Ed is Ed Mitchell, the Lunar Module Pilot PAO on the backup crew, and Gordo, of course, is Gordon Cooper, the backup commander. CAPCOM 10, Houston, we're GO without a trunnion cal and we'd like to stay in PTC. Over. Okay, sounds good to us. I don't think SC we've had a thruster fire in a long time. CAPCOM Roger. PAO This is Apollo Control at 50 hours 53 minutes. Apollo 10 is 169 456 nautical miles from earth, traveling at a velocity of 3514 feet per second. Spacecraft weight is 93 267 pounds.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1443, GET 5054 192/1

SC Houston, were you trying to call 10? CAPCOM Negative. SC You know, for information, I guess it caught me a little bit unexpected, but even with the S-band squelch on, you know we can hear this very fine, not annoying at all, but very fine, soft crackling in the background, but not typical loud S-band that drives you out

of your mind.

CAPCOM	Roger. Stand by.
CAPCOM	Roger, we got this - when we -
SC	Looks pretty much
CAPCOM	Go ahead, Gene.
SC	Go ahead, Charlie.
CAPCOM	I was going to say, on this end

when you break lock, it really is grim. We've got to get synched up on this delay here.

SC Yes, I know. When we cut each other out, I can hear my voice coming back to me that I said a second or two ago. But, we don't - when we break lock or we're changing antennas or one thing or another, with that squelch on, we can tell it, but it is very acceptable. Even right now, I've got a very low crackling in the background. Normally, on a good lock on, I don't.

CAPCOM Rog, I can hear that too down here in the MOCR, when we break lock, it really is loud down here. Of course, we don't have our equipment turned on and when we start getting a bad signal, it really is deafening almost.

It's the only reason I mentioned SC it was I'm surprised I hear anything at all with that squelch on, but I do. And it's really very good, because it's acceptable and yet detectable. CAPCOM

Roger.

APOLLO 10 COMMENTARY, 5/20/69, CDT: 1457, 51:08 GET

Houston; Apollo 10. SC CC Go ahead 10. Okay, Charlie, looks like we finally SC drifted out of deadband and fired a couple of thrusters. Roger; we see you at 30 on the pitch CC in here. Okay, Charlie, does it look like we SC should go back and start all over again or just continue on as 1s? CC G&C says it looks good just the way it is, so we just oughta continue in, and it looks like we're coming back into the deadband now, 10, so lets just leave it like it is and watch it for awhile. Okay - it looks like; I guess we've SC run about 20 hours on thruster fire; and it's pretty good. CC Roger; we concur. It was great. PAO This is Apollo Control; that thruster firing was at 51 hours, 10 minutes. The last thruster firing prior to that was at 29 hours, 53 minutes. At 51 hours, 12 minutes, Apollo 10's distance from the earth is 170 089 miles; its velocity is 3501 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/20/69 CDT 1507, GET 5118 194/1

SC Hello, Houston. Apollo 10. Roger. Go ahead 10. CC SC Roger. We seem to be waltzing off here against that yaw. Roger. Copy. Stand by. We'll CC look at it. We might want you to start up again. Stand by. Houston, Apollo 10. I don't know if SC whether you can read our telementry but we've had about a steady stream of firing for the last 4 minutes. CC Roger, 10. We're not copying your --you're in low bit right. We're not copying your booster firings. We noticed you're in the edge of the dead band, we're discussing this. Stand by. SC Okay. SC Okay, Houston, Apollo 10. We're continuing to fire about once every 4 or 5 seconds. Roger 10. We copy. Stand by just CC one more minute. SC Okay. SC There we go again. CC 10, Houston. we're recommending you go to min impulse and try to pulse it away from the edge of the dead band and then back to RATE command and then let's watch it. We had a debate whether we should stop PTC for a couple of hours or not. We're checking with the thermal people. Stand by. Hello 10, Houston. CC SC Go. Roger. You can discontinue CC PTC at this time and we recommend you select a attitude of 690 roll 307 and put us in a good TV attitude and then you can go, just drift, and we'll watch it for you and if you start getting out of that attitude then we can min impulse back. Over. SC Roger. Pitch 90, yaw 0 and roll 307. CC That's affirmed. 10, Houston. In this attitude, we'll CC have a high-gain antenna in a pitch of 023, yaw 265. SC 023 and 265, right. CC Affirmed. We're going to try and come up with some stars for you. For P52 and maybe a sextant correction a trunnion count too. We'll let you know on that. SC Roger.

APOLLO 10 COMMENTARY, 5/20/69, CDT 1521, GET 51:32 195/1 SC Okay, Houston. Apollo 10, we have maneuver to ROLL 307 PITCH 90 and YAW zero and holding in that attitude. CC Roger. SC Houston, do you want us to just turn the thrusters off now? Stand by. We are discussing CC that right now, 10. We've been doing it with that SC wide deadband. If we turn them off now, we'll just go all over the place I guess. Roger. It's your choice. We'd CC like you to stay near this attitude and we don't think you are going to use too much in wide deadband, so just keep them on and we'll be in good shape. SC Roger. CC John, it looks like you got a pretty good star for the trunnion cal. We are coming up and rechecking it for you and you can probably do your P52 in this attitude also and we'll have some star for you in just a minute. CC 10, Houston. Do you have a good view of the earth out of one of your windows? That is why we came to this attitude. There is a beautiful view SC Yes. out of the left side window. CC Roger. Couldn't ask for any better. SC We're going to change our seats around here. CC Roger, Tom. CC And we're coming up about 9 minutes away from waste water dump. We are ready any time you guys are. SC Hey, Charlie? CC Yes, go ahead, 10. SC Now it is all right. This bag is on the wrong end. CC Roger. You are defying the laws of physics. SC Yes. We'll show it to you in a little bit. Okay. We're standing by. CC SC Okay. John is all set to start Do you want the waste water dumped first? on the P52. CC I think that will ruin your P52. We're thinking about doing the P52 first. I don't think there is a big sweat on the water dump, but if you will

APOLLO 10 COMMENTARY, 5/20/69, CDT 1521, GET 51:32 stand by 2 seconds. Go ahead CC you can do your P52. SC Okay. 10, Houston. We should be able CC to get the high gain now with a PITCH of 023 and a YAW of 265. SC PITCH 023 and YAW 265. CC Roger. PAO This is Apollo Control at 51 hours, 44 minutes. Apollo 10's distance from the earth is 171,171 nautical miles, velocity is 3,479 feet per second. We'll continue to stay up live for any voice transmission. СC 10, Houston. We recommend for your trunion cal that we use star No. 31 Arcturus probably requries just a little bit of maneuvering. It looks like the best. Over. SC Roger. CC And, it looks like - I think that we passed on to you earlier today that we are skipping mid-course 3 and we probably will skip mid-course 4. It's in the order of 3.6 feet per second right now. We are leaning towards skipping that one also. Without the mid-courses, we have a perigee of 60.7 nautical and at LOI 1 we can achieve a 60 by 170. With LOI 2 we can get a 60 circular. So, it looks we are leaning towards skipping mid-course 4 also. SC Okay. That sounds real good. CC Roger. It looks like pretty good shooting from here.

END OF TAPE

195/2

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 15:36, GET 5147 10, we copy your torquing angles and your CAPCOM star angle difference. SC Houston, Apollo 10. Do you want us to go ahead with the calibration test at this time? That's affirmative. We recommend star CAPCOM Arcturus 31. SC Okay. PAO This is Apollo Control at 52 hours, 1 minute. The flight surgeon reports that the heart rates for each of the crewmen has been averaging in the lower 60's throughout the day. SC This is Apollo 10. Have you copied

196/1

verb 086987 there with us? CAPCOM Roger. We - stand by. We copy it.
APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1553, GET 5204 197/1 10. Houston. We're satisfied that CAPCOM the trunnion calibration is looking good to us. You needn't do any more. This is Apollo Control. PAO I believe that 89992 is probably SC These are right on the edge of the sextant. the best number. It's about to disappear out of it. Roger, 10. We copy. It's looking CAPCOM good to us. You can discontinue that. We have a loaded site for you. You give us to and accept and we'll send you a state vector. Roger, I'll load - unload the 89992. SC CAPCOM Roger, we copy. PAO At 52 hours, 5 minutes, Apollo 10's distance is 171,898 nautical miles. Velocity 3,464 feet per second. SC Houston, Apollo 10. When do you want our water dump? 10, we're through with your update. CAPCOM You can go back to block and we are debating now the dump. We got to get all the cameras configured. They want to try to photograph this again. We're looking probably at 5215 so we'll have an exact figure in just a minute. SC Okay. Houston, this is 10. CAPCOM Go, 10. The reason for the delay in between SC the start of P52 and initiating it was, when I went to look at the sextant the eye piece floated off and though we spent about 2 minutes scrambling around in here and it went over behind Gene's sleeping bag if you can believe that and what I've got here, I don't know. It couldn't have been off more than about 3 minutes. CAPCOM Rog, you can sleep with it in your pocket tonight. SC Yea, we're taping it on but that's the kind of thing I would think that ought to be sort of held in place by something better than tape. Roger, we agree. CAPCOM SC I think that happened to Dave on 9 too. CAPCOM Rog. PAO That's John Young with that report. CAPCOM 10, Houston. You can proceed with the dump at 5215, over. SC Roger, 5215. CAPCOM 10, Houston. We'd like to give you a GET time hack. We're coming up on 5213 and it will be on my mark 5213. 10, Houston. Mark 5213.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1553, GET 52:04 197/2 SC Roger, we are synced. Rog, did you allow for the speed of light there, Charlie? Yes sir. I got it one second early CAPCOM so you should have had it. SC Okay. Me and the retro can really count -CAPCOM SC (garbled) You've taken lots of lessons from (garbled) there huh. CAPCOM Rog. Okay, I've got the G&C clock going SC and it looks synced here. CAPCOM Rog. PAO Apollo 10 is far enough out now that there's a one second delay in transmissions between the Control Center and the Spacecraft and vice versa. Here comes the water dump. CAPCOM SC Houston, we're dumping. CAPCOM Roger, copied. Houston, Apollo 10. Has any of the SC telescopes been able to see the water dump yet? We haven't got word back on that CAPCOM yet, 10. It will probably be a while before they get their plates and things developed. I think they're taking pictures of everything and it takes them a while to get all that information back and so far we haven't heard whether they have been able to see it or not. We'll keep trying to find out that word for you and let you know. SC All right.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1607, GET 52:21 198/1

PAO This is Apollo Control at 52 hours 21 minutes Red Rover, who was most recently associated with Spider and Gumdrop is in the Control Center now monitoring the activities of Charlie Brown and Snoopy. Red Rover is also known as Rusty Schweickart, the Lunar Module Pilot on Apollo 9. Apollo 10 is 172,421 nautical miles from earth traveling at a velocity of 3,453 feet per second. Houston, Apollo 10. Did you SC transfer the VSM state vector to the LM slot or do you want us to? CC That's affirmative. We sure did. SC Okay I didn't catch it till last. CC Roger. CC 10, Houston. You can dump your dump now. SC Okay. PAO This is Apollo Control. The quantity of waste water dumped was 9 and 1/2 pounds.

APOLLO 10 COMMENTARY, 5/20/69, CDT 1521, GET 51:32 199/1

CC Apollo 10, Houston, John, we noticed after your trunnion bias check when you entered the 89992, we saw a flashing 59 come up instead of a 92 and we don't think that number got in. It's not any big deal but whatever the number is is okay, but we don't think it went in what you were trying to load. See that, Charlie, and (garble) SC CC Roger. We see your register. It looked like to us that instead of the proceed you did a Verb 32. We saw the 59 down here when you entered that number, John. Stand by on this display. I just called up 687, isn't the SC second register 89? Whatever it was supposed to be? CC Stand by. That is what it is supposed to be. I am not sure - hold on a minute, let me talk to the guy in the sky. please don't tell me it is not SC in there. CC 10, that location 87 is time shared and those numbers that we are looking at are results of marked data. The 89992 we don't care wheather it is in or not. The point was that - to incorporate that. when you entered it, it appeared to us that a Verb 32 was done instead of a PPRO to incorporate. We saw a 59 display instead of a 0692. SC Roger, Okay. CC That's really all we were trying to say, John. SC Okay. Yes. I know that. That is why I loaded it in there. CC All right. SC The next time we do one, if I don't get a chance to do a trunnion cal, I'll load that number. CC Okay. Fine. That's great.

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 1624 GET 52:45 200/1

PAO This is Apollo Control at 52 hours Apollo 10 is 173,614 nautical miles from the 57 minutes. earth. Traveling at a velocity of 3,429 feet per second. Hello Houston. Apollo 10. SC CC Apollo 10, Houston. Go. Okay, John was asking earlier SC about that storm center over Alaska. I understand you rotate her out and this developed into quite a system. We'll show it to you later on during the TV pass. CC Okay. SC How's it going Donn? CC Oh, pretty good, John. How are you getting along up there? This is just as great as you SC Great. said it was man. CC Kind of neat, isn't it. SC Yeah. Man. SC Hey Don. For the first half, this has been up most of the United States is wide open today and will be in the middle of the earth as you see it. CC Okay. SC Should be a pretty good view. CC All right. Thank you. PAO The CAPCOM now is Donn Eisele. The back-up Command Module pilot. SC ΕK SC Yep. We're about to pass over. SC Yea. SC Houston, this is 10. Over. CC Go ahead. SC Roger. Yesterday, I asked to give us a detailed briefing on how to use that water bag from the theory that we are probably doing something wrong. because it wasn't working then. We never got that. Over. CC All right. Stand by. PAO That was John Young and Charlie Duke is back on the CAPCOM console. Donn Eisele is still at the console too. CC Apollo 10, Houston. SC Go ahead. CC Roger. About this water bag stuff. We've got a procedure here we can read up to you if you'd like to listen to it. As far, while it is not working, we got no ideas, other than reading this procedure to you. We'd like to see it on TV when the time comes. I don't know whether that will help us or not but once we twirl it and see what happens and maybe somebody will have a smart idea at that time. Right now, all we got that offers procedure that we can read up. Over. SC Okay. Why don't you do that. See if that's what we're doing. Maybe that's why it's not working.

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 1624 GET 52:45 200/2 Okay. Here we go. It says Step 1. CC Fill the bag to approximately 1/2 full of water using the water dispenser. Did that. SC CC Okay. Did that. SC I copied. You did that. 2nd CC step. Squeeze the bag (laugh) Stand by. Yeah, I was afraid it was going to start SC about that smart. It's a pretty complicated mechanism SC we've got here. CC Okay, 2nd step. Squeeze the bag at the valve end to force the water into the opposite end of the bag. This will shorten the time pass of collecting gas during the spinning operation. Okay. 3rd step. Using the handle, spin the bag until separation is accomplished. This operation is to cause the gas to be collected in the valve end of the bag and the water at the opposite end. No. 4. If pick off or fold across center seam can maintain the separation of gas and water. Okay, then you open the pro valve and bleed the gas off and then close the valve and they say that ought to do it. Over. Quite a theory there. We'll give SC you a real term evaluation right now, Charlie. Okay. We can't wait for the TV. CC That's all with the only help we've got for the whole thing. Over. Just wait for the TV, Charlie. SC SC Charlie, you'll love it babe. You'll love it. CC Defies the laws of physics, huh? SC The minute -CC Go ahead. SC The minute till the earth bubble goes to the bottom and then sucks the water out around the bubble. CC Roger. We copied. Laugh. PAO That was Gene Cernan. SC Charlie. It works. CC I don't know about you guys. Hey, did you guys try to see if they were plain fruit juice bags or to separate it out. How - did you every try that? END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1704, GET 53:15 201/1

Hey, did you guys try just using one CAPCOM of the plain fruit juice bags to separate it out. How - did you ever try that? Yea, and Don the water stays with SC The bubbles condense from a thousand bubbles into the air. one or two big bubbles but that's all she writes. You can't get it out. It's not clear how you get rid of the bubble, once you get the big bubble, you end up drinking it along with the water. Like I told Charlie, the valves on the wrong end. I - spin the other end. Would you believe that air is heavier than water. That's my theory. Roger, maybe we've discovered some-CAPCOM thing here. That's all relative. SC 10, it may be that the surface tension CAPCOM on the inside of that bag is enough to keep the water from flowing through that constriction very well. Well at the end of the centrifuge SC turns, the big bubble is right in the bottom, quite a ways away from the constriction. CAPCOM Roger. It won't condense all the bubbles SC but the one or two big ones. CAPCOM Yea. Looks like the swing handle's on the wrong end of the bag, huh. The swing handle is on the right end, SC but the valve is on the wrong end. Well, which ever. CAPCOM SC It's a very interesting thing to study these bubbles in this water. CAPCOM Rog. SC Houston, Apollo 10. CAPCOM Go ahead, 10. SC Okay, I mentioned this morning, earlier when we were looking at the Earth, just to give you a preview John will describe it because it's on his window when we get there but the Eastern seaboard from about Carolinas on up just on the seaboard is going to be covered with clouds and then into the Atlantic. I mentioned a cloud bank - go ahead. Go ahead. We're hearing you. CAPCOM SC Okay, Charlie. And I mentioned this morning there was a long cloud bank from the Northeastern part of the United States into Missouri. It looks like now that that cloud bank goes from central Indiana up across Lake Erie north northeastward into Canada. CAPCOM Rog. SC Michigan, Lake Superior and the midwest are very clear except for that cloud and there's some

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1704, GET 53:15 201/2

clouds which appear to be over, oh SC maybe Kansas, Nebraska, I hate to say it but Oklahoma. I think there's going to be disagreement up here but I think it's Oklahoma, Colorado, Montana, up in that area and then the West Coast is clear and the southwest is all clear.

Roger, 10. We're looking at a CAPCOM weather map that was just brought in and we cast our vote with you Gens, the clouds are over Oklahoma and your description is excellent. It follows a - there's a low pressure up in the very far North turning from the Great Lakes northeastward into - and from - oh, I guess, it's up around the almost to Greenland it looks like here and from there the low pressure weather system with a front come down into the United States and touches the panhandle of Texas and it goes back on up into Canada again pointing towards Alaska and there's a band of clouds associated with that on this map so your description is very accurate.

Yea, and I think you'll see that big SC swirl of clouds Tom was talking about up Alaska way. CAPCOM

Roger, there's a -

Charlie, you asked Tom about the SC dense vegetation in South America. But if you look at the United States the Mexican and greater American deserts are that orangish-brown as he described them but when you look into the midwest and into the east you go the greenish-brown. It's not the bright orange-brown, it's a darker more subdued brown maybe with subtle hints of dark green in it.

CAPCOM Roger, we copy that. It looks like this cloud system out in the Pacific is associated with another low pressure system that's sitting probably north of Hawaii at about 40 degrees latitude. It's located about 150 degrees west so that's probably what's giving us the cloud pattern up off of Alaska.

That's affirm. That's going to be SC very easy to see.

CAPCOM

Okay, we're all -

SC And again the San Joaquin Valley -San Joaquin Valley looks like someone took a big spoon and it seems to be the one thing that I'm able to pick out very easily every time we take a look at the states. Looks like someone took a big spoon and just carved it right out of the coast.

CAPCOM Roger.

APOLLO 10 COMMENTARY, 5/20/69, CDT 1716, GET 53:27 202/1

CC 10, through the monocular or through the sextant, were you able to distinguish the features around say the San Francisco Bay area? Let me take a look, Charlie. SC PAO That is Gene Cernan giving the descriptions. There are lots of beaches down there. I sure ought to be able to distinguish some. CC Okay. SC Charlie, it is sort of semi -appears somewhat clouded up north as I follow the coast down to San Joaquin Valley and I can't really see anything that I can call San Francisco Bay from here. CC Roger. Probably some --- is it pretty hazy out on the coast there, up along the California coast north of Joaquin Valley and I can't really see anything off the west coast of California. It seems like they come just short of the coast line. CC Roger, we copy. SC Charlie, if I hold this monocular low enough, I can distinguish features down there on the coast line, up around the San Francisco area. CC Okay. Roger, Gene. Copy. SC And I tell you, if we had an apple to drop, it would fall right on Houston from where Right smack underneath us - right in the center of we are. the world. CC Roger. We are looking forward to this TV transmission here. SC Okay. I wanted to ask you about that, Charlie. Were they planning to go live with us on the hour, or could we turn it on earlier, what do you want? CC Stand by. We're seeing if Goldstone configured it for live. Stand by. Goldstone is ready. We are talking to PAO right now. We are standing by for a TV feed PAO now. CC Hello, Apollo 10, Houston. The networks and Goldstone is all configured. You can turn on the tube. PAO Apollo 10 is approaching 175,000 miles as it prepares for this television transmission. We are showing 174,754 nautical miles, velocity 3,406 feet per second. We'll stand by for the TV which should be coming up

shortly.

202/2 APOLLO 10 COMMENTARY 5/20/69, CDT 1716, GET 53:27 Hello, Houston. This is Apollo 10. SC You ought to be receiving something now. Stand by. It is not coming in CC here yet. SC Okay. We are just starting. CC Roger. Will it be exterior shots, Jim? Negative. We'll just start interior SC right away and then take you outside. CC Roger. And then we'll bring you back SC inside. But we will start inside, take you outside and bring you inside for the water bag. CC Roger. SC Let me know when you are receiving it. Roger. We will. The networks CC and all are configured for this, so we are standing by. Let us know when you are getting SC a picture, Charlie. CC Roger. Sure will. EECOMs are saying we got a 90 second warmup on that transmitter, so it might take just a little bit longer. Okay, we got the black and white coming in now. The black and white just came in. SC Let us know when you get color. Okay, we are seeing your patch CC now in black and white. Be just a few more seconds. Color coming now. PAO CC We just got the color, 10, on the vidicom here and it is looking real good, maybe a little bit focus, but the colors are good and it is a nice simple little patch we see. SC This is the peacock of Apollo 10. CC Roger. And we'd like to say hello from SC the 5 of us, if we may. CC Roger. Okay, you want me to be a straight man on that question and ask it? SC Try one. CC Okay.

APOLLO 10 COMMENTARY 5/20/69, CDT 1726, GET 53:37 203/1

CC Okay. Negative. Stand by one.Got a SC little technical difficulties here. We are still getting the color, CC 10. Inaudible SC Okav. Go ahead. CC Here's hello the 5 of us from on SC Apollo 10, here's Tom Stafford. He's a beautiful Tom Stafford CC there. He's in living color. John Young. SC We've got John. He's a little CC dark down there now, with the lights not on him, but we can tell it's John with his chin strap loose. And yours truly, Gene Cernan. SC Roger, we got you Gene. The CC sun is up pretty bright. The sun is pretty bright coming back out - now you are coming in better. We see you slipping down in the LEB. That's the three of us. SC Okay. Here's the other two on Apollo 10, the friendly Charlie Brown and our ever loving companion Snoopy. Roger. We got it coming in now. CC Okay. Color is on Charlie Brown and Snoopy a little dark. If you could get a little bit more light on them, it would be fine, but we can recognize the characters. They look pretty happy up there. How's that? SC That's fine. It looks a little CC dark on the color. Could you stop it open a little bit more - wait a minute. Okay, that is fine now. There you go. The red and the background on the cards are coming in fine. We are washing out a little bit on the white -Charlie Brown's coat and Snoop's face. SC Okay, you know that there are 5 of us up here. We'd like to take you outside and show you what the 5 of us are looking at. CC Roger. CC. Okay. We got the figures and the color and it looks like a half-earth to us now. It's a beautiful blue and we see the tremendous cloud coverage that you were talking about throughout the day, 10. SC Okay, Charlie, you are looking at the world right side up as we know it. The Gulf of Mexico goes down and to the right of the picture toward the terminator, North America is in the lower right hand

APOLLO 10 COMMENTARY 5/20/69, CDT 1726, GET 53:37

SC corner of the picture on the terminator. You can look up right smack in the center of the whole picture. If you can make out Mexico, it's Houston, right on the Gulf and North America goes up to about the 11 o'clock position on your picture.

CC Roger. We copy. We see primarily just the blues of the ocean and the whites of the clouds. The cloud patterns are pretty evident. Agree quite closely with the weather map I have. It is pretty difficult to pick out the land masses though, I must admit. We see one brownish area which appears to be in the American Desert, about the center of the globe right now.

SC Yes, Charlie, that's Mexico and the southwestern United States right there and Baja, California, is on the left of that and the right hand edge happens to be the Gulf of Mexico, if you can follow it at all, you will follow it right to Houston and then New Orleans.

Roger.

CC

SC It's awfully hard to ascertain the difference -- Okay, Charlie, it's hard to ascertain between the water down there in the Gulf and the land mass, because the whole eastern coast of the United States looks a greenish brown --

CC Roger. That helps us out here to locate ourselves, at least for me, 10, and I think I see what you are talking about now. We have one section of clouds that looks like it is almost a circular area - a clear area and then clouds appear to come out of South and Central America - swing out into the Pacific and in the center of that it looks like the clear area which I am saying is the southern part of the United States from Mexico along the Gulf Coast. Is that correct?

SC That's it, Charlie. The Gulf of Mexico is right smack in the center up and down of the world. If you follow the terminator down and went half-way and then went about half-way from there toward the rounder part of the earth, you will find the Gulf of Mexico on that brown area you are looking at, between Mexico and the southeastern United States, that's Houston right smack in the center of that clear area.

CC Roger. It appears --SC That clear area goes from Central America right on up into the states. APOLLO 10 COMMENTARY, 5/20/69, CDT 1726, GET 53:37 203/3

CC Roger, we copy. It appears that the land masses are washing out just about as much as the clouds. Can you open it up a couple of stops and then stop it down fast so we can get a second or two of sharper definition? Okay. Let us know when it is a SC little better. Okay, it was a little -- there CC you go, if you can hold that, but I think -- that's good right there. It is a lot better, 10. SC Okay. CC Charlie, we are full zoom on you and it's even hard for us to make out things with the naked eye unless we know where they are. So, I imagine it is going to be difficult for you. CC Roger. SC Okay, Charlie, the total globe that you see there is bigger than what we actually see, since we have the zoom lens on and it is probably about one and one-quarter times as we see it. CC Copy, 10. As I said earlier, we are primarily getting the globe on a black background and we see the whites of the clouds and the blues of the sea with an occasional glimpse of what I make out as land masses in the brownish. But, it is really difficult for an untrained eye to pick out the exact land masses. We are sitting here with the in-pad book. We got it to show the various sizes and with this diagram it is a big help. SC What you are saying, Charlie, is that we are too far away to give you a good picture. CC Boy, you sure are a long way away. CC I think what it is, 10, is the land masses and the clouds tend to wash out and it is a little hard to discern the difference, but looks like we can pick out the shapes of Yucatan, Florida and Cuba and the Gulf of Mexico. SC Charlie, let me ask. Do you see the area you said was a clear area and do you think you could pick up Mexico there? CC Roger. SC Okay, if you follow up, but you might think it is the Gulf of Mexico there and then go

might think it is the Gulf of Mexico there and then go straight north, you see a little V in the clouds and there's one going off to the right and a little thin sliver going APOLLO 10, COMMENTARY, 5/20/69, CDT 1726, GET 53:37 203/4

SC goes from Indiana on to the northeast part of the country and then that bigger blob that forms the left-hand side of the V is over the north central United States and then right smack in the center of the V is Lake Superior and Lake Michigan.

CC Roger. That is a good description, 10. It clears it up for me anyway, I can see what you are talking about now.

SC And then way up on the upper left-hand, maybe about 10 o'clock on the globe, you will see a funny cloud pattern that sort of looks like a sea serpent of some sort with his beak pointing ----

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 17:36, GET 53:47 204/1 You'll see a funny could pattern that SC sort of looks like a sea serpent of some sort with its peak pointing to the right. That's that cloud pattern that Tom was referring to up in the Alaska area. Roger. That's nearly apparent to us. CAPCOM When you stop it down, we can see that pattern. Some of the time, though, it's washed out due to the tremendous cloud coverage in that area. There it is, Charlie. That ought to be SC good. Okey. It just came in on the black and CAPCOM white. We'll see it in just a second. Okay, now we see what you're talking about. Looks like an inverted view almost. Now you ought to be - all right, now you SC ought to be able to see that - that V area I was talking about better too. Roger. It's coming in a lot better, Gene. CAPCOM Okay. If you got a pretty good view of SC the outside, we'll take you back inside for one last quick minute. Thanks a lot, 10, for that view, It's CAPCOM real good. We'll be standing by for the water bag trick. Okay. We'll take you back inside here. SC SC I'll take care of it. SC Ouestion for today - who is that? It looks like John Young with four sets CAPCOM No, two sets of eyes. of eyes in it. SC There you go. Let's call it four eyes. CAPCOM SC Looks like a World War I aviator. SC That's what happens when you look through the telescope to see the sun. Okay, it may sound like we've been loafing for the past couple of days, but we haven't. We've been real busy, and every spare minute we get we study our flight plan. So you see that pretty soon. we're going to be going into orbit, and we have a completely

different set of operations to go into that shows our pitch profile all around the moon for the first revolution. Tomorrow's a big day, and we're very much looking for it. Even though we're about 180 000 miles away from the earth, you never get away from studying.

CAPCOM That's a great picture, 10. We can see the - the various spacecraft attitudes with the dark side of the moon and the bright side. And we see the LM and the Command Module linked together and going into a LOI 1 burn attitude. It's real clear. You can almost read the writing on the pages.

Roger. Don't adjust your set. It's in

SC

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 17:36, GET 53:47 204/2

black and white. SC CAPCOM Roger. CAPCOM We can read on the -If you want to know where we're going -SC we'll show you a little bit of a chart of where we're going day after tomorrow, we ought to be seeing this in living moon color. Right now it's in the best black and white we've This is the area around landing site 2. got. Roger. Could you open it up a little CAPCOM bit, 10. We think maybe if you get a little bit wider F stop it'll help us out. Your pictures are a little bit dark. CAPCOM That's a lot better, 10. SC I can't see the F stop yet. CAPCOM Okay, 10. When Gene moved back, it helped out a lot. If you'll just pull the chart back, that's good now. We can - it's coming in a lot better. Gene, could you -The moral of the story is, John - the SC moral of the story is, John just said, you know you can study all your life and never finish studying and here we are almost a quarter of a million miles away, and we're still studying. Like Tom said, he's got two girls taking final exams this week, and this is his way of saying, "Get to work." CAPCOM Rog. SC He's not the only guy who'd better be studying. CAPCOM Okay, I'm sure they're listening. Would -Gene, how about pointing to a landing site 2 on the map for the folks. SC Okay. Landing site 2, I'll show you here in just a second. We'll be coming up from the bottom and I'll stop my finger up on the landing site 2. SC That's the area we hope to bring back some good pictures of in a couple of days. CAPCOM Roger. ... we'll eventually - that's the area SC where we'll eventually be actually landing on the surface of the moon. This area is probably just about visible from in the lighted - with the terminator moon lighted I mean from the earth at this time. Just about. CAPCOM Roger. We copy. That's one advantage we have. SC If you don't like to turn your pages, you can always turn youself instead. CAPCOM Commander, you're in real form today. SC We figure that, you know, there's always a way of making a picture run down hill and maybe even knowledge will make it run that way. SC Well, I guess that's the message to the kiddies in the country. If they can't get your homework

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 17:36, GET 53:47 204/3 SC right side up, go upside down. They might be able to absorb more that way. CAPCOM Roger. SC Looks like John's trying to hog a Why don't you - there you go, you picture there, Gene. pushed him out of the. You got - you got center stage now. What a ham. SC CAPCOM You want to see me push, watch what happens. That's called one finger power. SC CAPCOM Rog. Okay, this is Apollo 10 signing off. SC We'll give you one more picture of the earth here, that's all today. Oh, hold it. We want to show you the bag too. Rog. We'd appreciate that. CAPCOM The bag is full of - half full of bubbly SC water. SC And for those of you who are unfamiliar, there's the valve where the air and then the water comes out, and here's the handle, and notice they're both on the same side. Are you ready? CAPCOM Go ahead. It's pretty difficult - get some more light on it, 10. It's pretty difficult to see the bubbles from that position. SC I'll show you the bubbles after I stop. SC Okay, we're still open. SC Thousands of minute little bubbles. You wouldn't pick them up. You can barely see them with the naked eye, but they're there. 10, try spinning a little bit harder, CAPCOM and maybe that'll put the bubbles to the top. SC Man, I spinned it so hard a little while ago, I was going in the other direction. CAPCOM Rog. Gene, hold it up next to the LEB DSKY. We couldn't see any bubble there. If you got one together.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1746, GET 53:57 205/1 Hey, that's a good - you're really CAPCOM spinning it now. SC Okay, how's that for a bubble now? CAPCOM Okay, we got it. Okay, we see that bubble. Really a big one. And it's in the bottom. Charlie, SC about the only thing we get by spinning them is making the little bubbles into a big one and it stays in the bottom. Roger, is there any water left in CAPCOM the top of the bag, 10? No, there's no water in the top of SC the bag. All the water's out. We have tried it with semifilled bags, with full bags, with half full bags. What we really have been able to do, I think, is to get the bubble concentrated and then suck the water out from around it. Roger. Have you tried it filling CAPCOM up - filling the bag both top and the bottom of the bag and then spinning it? Yea, we tried that too. SC Well it doesn't look like it works CAPCOM then does it? SC Charlie, you can see the bubble real good can't you? CAPCOM Roger, we have it Tom. It's quite evident here to us. We'll have the experts look at this and maybe they can come up with something for later on this evening for you. SC Hey, Charlie. It is true though that water goes to the bottom of the bag. CAPCOM Rog. SC That phenomenon we have proved. Well when the air gets down there we can stop spinning the big bubbles at the bottom. CAPCOM Rog, we copy. SC Okay, this is Apollo 10. We'll take you outside for one last look at the Earth and sign off. CAPCOM Roger, thank you very much. Okay. 10, we just got the exterior view and we got the Earth in the center of the screen and it's a little bit different orientation this time, we see the North Pole up in the northeast about the 2 o'clock position on our screen now. And he'll rotate the camera over SC a little bit. He was just tilting it for ease of handling here. He's rotated it back now, Charlie. CAPCOM Roger. SC And from the 5 of us on Apollo 10, Tom Stafford, John Young, Eugene Cernan, Charlie Brown and Snoopy, we hope you've enjoyed it today.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1746, GET 53:57 205/2

Thank you much, 10. We appreciated CAPCOM the show. It was very nice. We'll see you tomorrow. Okay, and tomorrow we should be SC around the Moon. CAPCOM 10, Houston. Rog. SC Go ahead. CAPCOM Roger, Tom. On this water bag, the only thing we can suggest is fill the bag up completely full and then spin and then if you got - need more water fill it up again and then spin and try until it's completely full and then maybe slowly kneading that bubble up to the top and if that doesn't work then our only suggestion is going to the fruit juice bag and, or fruit bag and filling it up and then spinning it until you get a big bubble and then kneading it up to the top where the food part is and evacuating it that way. SC Roger, we've tried most of that but we'll press on here. And again we're all thinking here, if that's the only problem we've got on this mission we're going to be in great shape. CAPCOM Rog, we concur. SC Yea, I mean. You can tell what kind of shape we're in when we can talk about things like that. CAPCOM Rog. Hey -SC When the ships -CAPCOM Go ahead, 10. It appears just -You sure like to talk a lot, Charlie. SC CAPCOM I'm sorry. This time delay, I think's giving us some problem. If you just keep talking and when you hear me you're still downlinking and I'm still receiving you so if I interrupt you I'll just stop talking if you start or when I'm talking, over. SC Okay, real good, Charlie. We'll try to be more observant on that and again you might give us a time when you want us to start the VTC mode again and also I just want to check, is the color still looking pretty good on the TV? CAPCOM Rog, we thought it was real good here, 10. The Earth - the interior - hold on. Back with The interior shots in some of the darker portions you, 10. of the spacecraft looked a little dull. However, when you're in the flood lights everything was real fine. The exterior was very good we thought. The whites and the blues and the Earth looked fine. We think the colors are real good. Everybody's real pleased with the operation of the camera, over. SC Okay, real good and the main thing

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 1746, GET 53:57 205/3

SC too, I'm hoping that from the resolution that we have and on the device that when we get around the moon tomorrow we should show you some real good terrain features with the resolution we have on the instrument, over.

CAPCOM Rog, we're looking forward to that. We think we'll be in pretty good shape and we'll come up with a PTC time for you momentarily.

SC Charlie, were the pictures that we shot over the Straights of Gibraltar and the ones where we picked up South and North America over the whole Atlantic extremely drab. Did they get played back to you?

CAPCOM We haven't seen them yet. The ones from Madrid will take 30 hours for us to get those. The Goldstone we're going to play back shortly, 10.

SC Okay, I guess we're at about the distance where the resolution on the camera doesn't give you a chance to look at the Earth too closely. So I guess we'll probably wait till we get on back to get any good Earth pictures.

CAPCOM Roger, the colors are still brilliant but the resolution is fairly marginal now. You really have to have a map in front of you to pick out what you're describing. Hello Apollo 10, Houston. You can initiate PTC at your convenience with the same procedure as you'd like -

APOLLO 10 MISSION COMMENTARY, 5-20-69, CDT 17:56, GET 54:07 206/1

CAPCOM At your convenience with the same procedure as utilized last night. Over.

SC Okay. We're going to go ahead now and start to pick it up.

CAPCOM Hey -

PAO This is Apollo Control at 54 hours, 8 minutes. That TV transmission that was recorded at Goldstone several hours ago, will be transmitted to Houston and released at 6:00 pm central daylight time about 2 minutes from now. Duration is 4 minutes, 47 seconds. While we are feeding that playback of the television, we will record any live audio transmissions from the spacecraft and play those back after the television transmission.

SC I think we're one mission too soon for that one.

CAPCOM Rog.

The audio portion of the video replay has already been typed on transcript tapes MG185 and MG186.

PAO This is Apollo Control at 54 hours, 16 minutes. Apollo 10 is 176 221 miles from earth. Its velocity is 3 377 feet per second. We're getting ready for a change of shift here in the control center. Shifts will change at 6:30 central daylight time. We're estimating the change of shift news briefing for 7:00 pm. We have about 40 seconds worth of tape accumulated during the feed of the television from Goldstone. We'll play that for you now.

SCHouston, this is Apollo 10. Is thatprocedure still good for today. When we disable the C&Djets, do we disable the C&D - the C roll jets also?CAPCOMStand by. That's affirmative, 10. Wewant you to disable all jets on quads C and D.SCRoger. They're disabled.CAPCOMCopy.

SC Okay, the clock is started, then after 20 minutes, we'll go ahead (garble) the station. CAPCOM Rog.

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 1807 GET 5418 207/1 DEAD AIR APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 1822 GET 54:33 208/1 This is Apollo 10. Now we're SC 20 minutes after having started the PTC entry exercise. Roger 10. What do you want? CC Roger. We'd like you to disable CC BD roll. CC 10. We'd like you to disable BD roll and have AC roll on. Okay, we're in good shape. Excuse me. SC It's affirm. SC This is Apollo 10. We have set up the PTC roll rate. CC Sav again that 10. SC Roger. We have set up the PTC roll and it looks good. CC Roger 10. We're observing your roll rate and we'll be looking at it and be with you shortly. SC Roger, and Houston. How do you want me to handle the antennas. Do you want me to OMNI bravo this time or do you want me to wait? Stand by. We'll have some word CC on that. We would like you to discontinue battery A charging now. SC Okay. PAO This is Apollo Control at 54 hours. 44 minutes. The shifts are changing in the Control Center now. Apollo 10 is 177,149 nautical miles from the earth. Traveling of a velocity of 3,359 feet per second. We're estimating the Change of Shift News Conference for 7:00 PM, Central Daylight Time.

APOLLO 10, COMMENTARY, 5/20/69, CDT 1826, GET 54:47 209/1

This is 10. SC Hello, Houston. Roger 10. Houston. Go ahead. CC SC Looks like we're going to be losing high gain

track here in a minute.

That's affirm. We like for you to go OMNI, CC BRAVO and high gain antenna to manual please. SC

Okay, Guiseppe, will do.

CC Okay, 10, this is Houston. We'll be taking over control of the antenna now. and flight advises it looks like your PTC, you've got it set up as good or better than it was last night when you went 18 hours without another thruster find.

Okay, Joe, thruster in. Thank you. SC PAO This is Apollo Control at 54 hours 58 minutes into the flight of Apollo 10. Flight Director Milton Windler has reviewed the status of the mission up to this point with his flight controllers find everything virtually nominal at this time. The spacecraft presently 177,500 nautical miles from earth and a velocity of 3,352 feet per second. At the present time the Apollo 10 crew is involved in setting up the passive thermal control mode that they will maintain throughout their sleep period. Last night the mode used was to rotate the spacecraft at a rate of 3 revolutions per hour. We found this very satisfactory. Experienced none of the thruster firing during the passive control mode that interferred with the crew's sleep the previous night

APOLLO 10 MISSION COMMENTARY, 5-20-69, CDT 18:51, GET 55:02 210/1

PAO This is Apollo Control at 55 hours, 4 minutes. We anticipate the change of shift press conference will be beginning shortly in building 1. We will continue to tape and conversation with the spacecraft and play it back following the change of shift briefing. At this time Apollo 10 is 177,795 nautical miles from earth, and the velocity is 3,347 feet per second. This is Apollo Control, Houston.

APOLLO NEWS CENTER HOUSTON, TEXAS

CHANGE OF SHIFT BRIEFING MAY 20, 1969 TIME: 7:02 P.M. CDT

PARTICIPANTS

Jerry Griffin - Flight Director Astronaut Charlie Duke - CAPCOM Jack Riley - PAO

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SPEAKER - summary, he also has an announcement to make. This is Jerry Griffin who's been the Flight Director for this shift taking over for Glynn Lunny today and tomorrow while Glynn gets ready for the rugged Lunar Orbit days. Jerry does have an announcement to make and then he'll follow that with the summary of the shift.

Okay, I might add too that I do GRIFFIN have the parameters for tomorrows activities and I can go over those with you if you have questions about it. But I would like to begin with this announcement. Dr. Berry has asked the Flight Director to schedule a private conversation with the astronauts at 8 p.m. tonight. That's local time. Dr. Berry said he wished to query the 3 astronauts about the general condition of their health and he emphasized that his request was prompted by a desire for an uninhibited discussion with the astronauts about their general condition prior to LM activities. The crew members have said nothing to indicate that they felt any of the discomforts experienced by astronauts on some of the earlier Apollo flights. Now a summary of the private conversation will be released by the Public Affairs Office as soon as possible after the conversation ends and Dr. Berry, himself, will be available to brief the press as soon as mission requirements allow him to leave the control center and I suspect that that will be on the order of about 9 p.m. local. That may vary a little way, one way or the other. But that is the announcement and with that I'll go ahead and tell you about what we did today. I guess one of the things that we looked for in this mission, we pretty well proved today that there is a very inexpensive way to do passive thermal contorl. We established a PTC mode last night and it held throughout most of the day. Right toward the very end of the day we did come out of it to do some work in attitude. But as we came on shift this morning, this PTC mode was still continuing to work very well, in fact, we hadn't fired a thruster on the spacecraft since establishing that mode earlier the previous night. The Flight Plan today was pretty much as scheduled. Not only that, I'm sure most of you have heard the or have read the air to ground transmissions. I don't think I really have too much to comment on with maybe very few exceptions. We did have some - like this morning, John Young did do a P52, a realignment of the platform, pardon me, without coming out of the PTC mode. He did this while he was rotating and John said it was a very easy thing to do, that the optics seemed to track very well in auto-optics and that he could manually slough the optics and keep them on the stars very easily. Much easier than he could in the simulator. He also said that the LM occulsion

of the stars was not as bad as he GRIFFIN had been led to believe by looking at the simulator. I think Charlie at that time asked him to draw some sketches of what he could see so that maybe we can update the trainers here on the ground with that - exactly what you can see when you've got the LM on the front of the CSM. Another interesting thing that Tom reported - commented on and that - he said even without firing thrusters that the whole stack as it was rotating seemed to have its own little motions. Now and then it would - he could hear noises and a slight shudder now and then. The Apollo 9 crew also reported that same phenomenon and I assume it is in the dynamics of the structure, etc., as it rotates and wobulates and found out to be pretty interesting. Tom summarized that the - and I guess you heard a lot about this on the afternoon TV cast, the scheduled one that as far as he was concerned the only thing out of the ordinary that he had noticed was the gas in the water which we still don't have a real good handle on how to get that out of there yet and he also reiterated what he had mentioned vesterday was that the - when they pressurized the LM that the mylar insulation had blown off the tunnel hatch or at least part of it had and as far as he was concerned that was the only two things that he had noticed out of the ordinary. We also spent some of today, since it was a slow day, both on the ground and the crew in the spacecraft reviewing what we're going to do in the next 2 days which are going to be pretty busy. We - Charlie talked to the crew quite a lot about our LOI abort cues for tomorrow noon. In other words, what we have to see in order to abort. We went over some mission rules with the crew. And then the crew - we left them alone for 2 or 3 hours there and they actually did some studying on their own. Going over procedures for tomorrow and for the rendezvous date. We did get a couple of unscheduled TV passes in. One of those we've already played back from Goldstone and I understand that the tape from Madrid will be flown in here and will be available sometime tomorrow night. Incidently, from the time we established PTC last night until the time the first thruster fired indicating that we had finally hit a deadband, was 21 hours and 17 minutes. So we went almost a complete 24 hour day without firing any thrusters after we once established that roll rate. And incidently, that same procedure was established just prior to the time we left the Control Center and it looked like that it had been established very well once again. Very tight control about the 90 degree pitch plane. 21 hours and 17 minutes. Okay, and other than that we did the TV pass and that's the scheduled one that you saw and I think that's about it. Charlie, do you have anything to add?

DUKE No, not too much to add. I just think it was a real relax day for everybody. John did some real fine work with the optics during the PTC mode and the P52. As Jerry's commented, he didn't have any trouble at all tracking. We also did a trunnion calibration, a trunnion bias calibration this afternoon. This is in case we lose communications and the spacecraft has to return without contact with the ground. He does his own navigation. This came out very well also. We have very minor problems right now. We hope we continue that way. As Tom said that if all we have to worry about's air in the water then we're going to have a great flight. I guess we're ready for questions.

RILEY Let me make a couple of announcements. Immediately following this News Conference a couple of gentlemen from the Mission Planning and Analysis Division will be here to answer any questions you may have on the lunar sphere of influence, which I understand causes quite a bit of - and one other statement having nothing to do with Apollo 10 but apparently there have been some interest in it. No crew selections have been made beyond Apollo 12. There are a number of plans being considered for optional missions and flight crews dependent upon the outcome of Apollo's 10 and 11. Sheppard, Roosa, and Mitchell are canidates for future Apollo flights possibly as a crew. Now we'll go to questions on Apollo 10. Carl Abraham.

QUERY I had asked this afternoon if you could bring with you the latest numbers on times, initial velocities, length of burns, and subsequent velocities starting with the velocity before LOI 1 and ending up with the velocity after LOI 2 and the orbital periods and all that jazz. Do you have that with you by any chance?

GRIFFIN Well, I've got a whole list here and you mentioned a couple of things I don't think I have, but you want me to just kind of go through these.

DUKE Why don't you go over the whole thing.

GRIFFIN And then what we don't have we can get for you to fill in. Our current planning right now incidently for tomorrow is that we will probably not do in CC4. That possibility does exist that we will but all indications are right now and our trackings pretty well solid now that I don't think we'll do MCC 4 and we will be able to end up with after LOI 1 with exactly the nominal orbit we were shooting for, 60 by 170 and then 60 circular after LOI 2 with no additional corrections require part of that time. The LOS time, let me start here. This is when we're going to go behind the Moon the first time prior to

GRIFFIN LOI 1 and I'll give this to you ground elapse time. It's 75 hours, 48 minutes, 21 seconds. This will probably be updated by a few seconds tomorrow. The ground elapse time of ignition for the LOI 1 burn is 75 hours, -

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT

The ground elapsed time of ignition for GRIFFIN the LOI 1 burn is 75 hours, 55 minutes and 57 seconds. So it's - that's on the order of 7 minutes later. The DELTA-V and the LOI 1 burn is 2982 feet per second. 2982. The burn time is 5 minutes 53.8 seconds. I can give you the attitude for this burn is retrograde pitched up 22 degrees. Now, we will acquire after LOI 1 at 76 hours, 22 minutes and 45 seconds. 76 hours, 22 minutes, 45 seconds. If the LOI burn were not to be done the acquisition time would be approximately 10 minutes earlier and the exact time is 76:12:21 okay, we'll come around the front side of the moon. and we'll have loss of signal prior to LOI 2. It's 79:55:46. The ignition time for LOI 2 will be 80:22:34. The DELTA-V for LOI 2 is 138.5 feet per second, and the burn time is 13.8 seconds. Now the LOI 2 attitude is retrograde once again pitched up 10 degrees. Then we will acquire after LOI 2 at 80 hours. 40 minutes, 7 seconds. 80:40:07. And without the LOI 2 burn that acquisition would be 80:39:06. Now, if I haven't gotten the parameters that - any that you were interested in like velocity, see me after this thing, and maybe we can we'll call over and get what you mention.

QUERY If some transitory problem prevented the crew from performing LOI 1 at the time indicated but the problem got solved so that while they were still behind the moon, they could perform the maneuver on a second try, would they do so?

GRIFFIN You're talking about an ignition that didn't occur Art?

Right.

OUERY

GRIFFIN No, we've got to do that burn where we've got it scheduled. Granted, we could slip it a little ways a few seconds if there was an initial problem right at ignition, he could slip it maybe 10, 15 seconds, but if he hadn't got the problem finished by then, he'll come on out.

QUERY Can you tell us about the onboard navigation today. What is the condition of the state vector generated in the spacecraft and what about the - the effacy of using the earth horizon? I gather that Young, on the first day had no trouble using 24 kilometers for the blue line. On the second day, he did have trouble. What was his experience, today?

GRIFFIN Well, the only P23 sightings he did today were the trunnion. We didn't do any orbital navigation today. GRIFFIN It was not scheduled in the flight plan. It was a training calibration. The MIT people and our system's experts felt that the difference was due to a trunnion bias in his sidings, however, we ran that through and it was not it was not the trunnion bias. We didn't see a state vector on the ground. We did not get a dump. We uplinked in a MSFN state

15B/1

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT 15B/2

GRIFFIN - vector this afternoon at about 52 hours. And that was just because it was scheduled there. There was no - at least I can tell you that there was no gross deterioration of the state vector. It may have been off a little bit, but we updated it according to the flight plan.

Yesterday at the press conference the OUERY onboard state vector was about 3 miles off at the earth return perigee, off the ground generated vector. I wondered if that differential had changed any.

I suspect, and I am not quite - I didn't GRIFFIN I suspect that may have been as a result read the transcript. of incorporating marks after - during the P23. Now today we didn't do any incorporation of those marks, and I really don't know what the air was that they returned to earth point. We could find out for you.

Is this the first time you've had auto-QUERY matic star tracking on the guidance.

Negative. We've done that in all the GRIFFIN The auto - the auto optics routine you're talking missions. about where you actually let the optics drive by the computer. No, we've done that on all of the apollo missions.

OUERY Because of the extremely accurate marks you're getting, are you looking at all towards on relying solely on the G&N during some upcoming missions? Gee.

GRIFFIN

I'm talking about 13 and 14. Do you OUERY think you'll ever get to the point where -

We'll always have a vote with the ground GRIFFIN and the spacecraft merely because we have the opportunity to do it, and I don't think we would throw away one of those votes just for the heck of it. Now, obviously, there are certain cases even now where we have to rely on spaceguidance, and it is a very reliable system. It worked great. Of course, we've gone to that procedure for the launch phase abort logic. We're letting the onboard system be the one that gets us into orbit. So, no, I don't think we'll ever completely throw away this turn of machines down here on the ground, no.

QUERY Well, is it possible that the onboard system will ever be more accurate than I mean during the currently planned apollo series than - than the ground tracking?

GRIFFIN I suppose it's possible. We had no big hardware changes proposed though, so I assume we're going to have to live with the hardware capabilities that we have now, and there are certain biases and drifts and all that are in that that will probably live with for apollo anyway.

QUERY Let me ask it this way then. Is the limiting factor in the accuracy of the G&N a hardware or

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT 15B/3

QUERY software situation, or is it - or is it the experience in operating capability?

GRIFFIN It's all three of those. Certainly, if we had a larger computer, we could probably go one finer step level of accuracy in software. The state of the art of course will improve on hardware, and of course if you have a crew that gets more and more experienced, he is going to be able to do it better. So all three of those make a better accuracy.

QUERY I'm not sure who can answer this, but I'll ask it anyway. Last night at 9:30 each member of the crew took a lomotil. Would anybody care to comment on that? GRIFFIN Dr. Berry will comment on that when he

comes over in an hour or so. He's the guy to ask. OUERY During the color TV show, why does the

sky look blue out the windows instead of black?

GRIFFIN I don't know. I guess that's a good question. I guess the color reproduction there is just not exact. I know no reason for it.

DUKE I don't either. Yesterday it looked black to me. Today I did notice a bluish tinge to it. It might just have to do with our color processor. The - I might be getting into the area that I don't know that much about, but as I understand the system - as I understand the system, the signal today was received at Goldstone, sent to Houston, and our - we have a color processor over in the Building 8 here at the site, and it's then processed into color and it's sent over to us and then out to the network, and whether there was something in that or just something in the camera, I don't know, but I did notice the bluish tinge to it too.

QUERY Has there been any identification of the two objects which were seen yesterday. One fairly bright rotating object and another small one?

GRIFFIN No, in fact we will - then we had some problems on the ground here. I never did quite get squared away exactly what our problem was, but we're going to try to come up with some shaft and trunnion angles for the SIVB's so that they might look through the optics to make sure this object as recorded earlier was the SIVB. We never did get around to that for one reason or another. It kept slipping off, and we finally just didn't do it. To my knowledge, known yet, we're not quite sure what he was seeing. Likely the SIVB I assume. We don't know that.

QUERY And what about the present status of this oxidizer pressure

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:00 PM CDT

--- about the present status of OUERY this oxydizer pressure and the SPS?

6

The SPS or the command module, GRIFFIN Let me answer the SPS. There had been. I guess --RCS?

Yesterday, there was some problem OUERY of the SPS oxyidizer, whether it was a gage error or whether he was really seeing a soft --

Yes, that phenomena had been GRIFFIN seen on previous missions, incidentally. It's after a burn, the pressure tends to go up because of a large slug of helium you have thrown into the tank and it shut down near some overshoot there. And then the pressure tends to go down as the helium is absorbed by the propellent. or propellents and in this case it is the oxydizer. And as more of that helium comes out of gas and goes into solution, you decrease the pressure, of course. And that is what was seen. There is about a 3 or 4 psi drop, I think. Something on that order after the burn. And we are happy that that is a normal. Incidentally, that situation is much more pronounced when you have almost full tanks. As the tanks get emptier and you have -- more empty, I guess I should say -- and you have more helium in there, then the effect won't be noticed because there won't be as much absorption percentage wise by the oxydizer.

You mentioned RCS - there was OUERY some talk in the transcript earlier about a question of RCS pressurization. What is the status of that?

GRIFFIN Those are holding fine and doing exactly what we expected them to do. We are satisfied that the systems tight and going all right. Ring A, the last time I looked, I think was 37 psi at the manifold, I think, and Ring B, or Ring 2 was 35. So, we are satisfied with that situation.

PAO Get a microphone over here. please. One of you go over there and one of you stay here.

QUERY What is the prevailing theory of why bubbles go to the bottom of the bag? GRIFFIN (Laughter) Wish we could answer that one.

QUERY Is there any thinking on it at all?

GRIFFIN If you could have seen us standing in the control room center with Charlie with the bag spinning around and around, you'd know our problem.

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QUERY I assume in the control center, the bubbles go to the top.

GRIFFIN As you would expect, gas rises and if you fill a bottle up with a faucet, at once you see the bubbles rise. We don't have the answer for that. We feel like the surface tension of the liquid against the bag might be an explanation that you just can't generate enough radial g's on the bag to make it come to the top.

QUERY This quivering or shuttering, could anyone elaborate on why that might be occurring -and the noise.

GRIFFIN The noise is pretty easy to explain. You've got pumps and all going in the spacecraft. QUERY Sounds like -- could it have

anything to do with the temperature variations - cold and hot.

GRIFFIN

4

I suppose it could, but -

DUKE I think the biggest problem is we have a -- the ascent tanks on the LM are half-full and we might have some fuel sloshing in those tanks. And as it bumps up against one side, if it is going as a mass, could give you that quivering.

QUERY Another thing. What did Cernan write to his wife that would cause her to cry?

DUKE I have no idea. I guess that was a personal letter.

QUERY She said she cried. Did anyone ask her why?

DUKE No, I didn't. I talked to her on the telephone and it wasn't any of my business. QUERY You said earlier on lunar insertion

that there should be a burn time in 5 minutes, 53.2 seconds. What is the safety margin here if the rocket doesn't shut down? How many minutes can it burn safely?

GRIFFIN There is a way they can get it to shut down. Now in their monitoring they have an overburn limit and I think it is 2 seconds, isn't it? For LOI 1. There are two switches that they can throw in the cockpit and the engine is going to shut down. There is no doubt about that. So, what they do is they actually control that situation. If they don't get an auto shutdown, then they will shut the engine down manually.

QUERY So, they have a 2 second margin, and if they exceed that, then they would crash onto the moon.

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT 15C/3

GRIFFIN No. two seconds would not be enough to do it. It would take more than that. But, 2 seconds is way safe. As you can see, the second burn is on the order of 13, 14 seconds to get you to a 60-mile circular and it is done essentially at the same place in the orbit. So, even with a burn on the order of 13 or 14 seconds, you are only going to over LOI-1. you are going to be on the order of 60 circular. So, we are shutting off well prior to that time.

QUERY Do you have an explanation for why tripling the roll rate and the PTC mode seems to have solved your problems with the deadband?

GRIFFIN The dynamics of the thing, I assume. As you get the roll rate a little higher, I think that your angular momentum or your momentum vector is going to be more stabilized.

QUERY It is more like a gyroscope, then? A high speed gyroscope.

GRIFFIN That's right.

DUKE We probably in a little bit -we had a lot more stable vehicle when we started the roll rate, too, than the first night we attempted it. That also has a lot to do with it. Any small rate that you start with other than in roll will couple right in and you start spiralling out. This might have something to do with our problem the first night.

QUERY Am I right in assuming that there is no automatic sequence of events which will fire the service module engine for LOI, but the enabling button must be pushed five seconds before.

GRIFFIN That's right.

QUERY And that button must be pushed between 5 seconds and zero.

GRIFFIN That's right.

QUERY I have a few questions. One is any data being sent by telemetry to the ground from the LM at this point. Is it live in any way.

GRIFFIN No. The only thing that we have on the LM is -- and it's a CSM measurement -- is the -- well, we've actually got two -- and the other is a CSM, too. WE have the current that is being supplied to the LM heaters that we can monitor and that's on CSM telemetry. WE also have a gage that shows the delta pressure between the CSM and the LM tunnel, and the LM interior. Essentially, we can measure the temperature -not the temperature, okay -- measure the pressure in the LM and we can measure the current being supplied to the
APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT 15C/4

GRIFFIN
QUERYheaters and that's all.QUERYThe second question is, can youexplain the use of the word couple. You see it in the
transcript all the time.
GRIFFINGCouple into YAW or somethinglike that?
QUERYThis couples in with thatattitude rate.This couples in with that

GRIFFIN It means, let me see how I could say that, it couples, but it --

DUKE Let me try it. Actually, the proper term is cross couples. You take 3 axes of rotation and as you start rotating around one axes, the cross products of enertia, which I won't attempt to explain, but the momentem vectors around one axis and if the thing is not perfectly symetrical, such as a cylinder, then as you start rotating around, you pick up rotations in the other axes and when we say couple, we just mean the rotation about this axis couples into the rotation of this axis, so the thing starts doing this.

QUERY Fine, now I understand. And one question phoned to me from New York which I don't really understand. Perhaps you will. Will the TV be on tomorrow at approximately 72 hours, 48 minutes which I think is 10 minutes after regular schedule to catch a relatively significant event which is the spacecraft passing into the Umbra. At that point they will be able to take pictures of the Corona of the Sun, I suppose. Does that mean anything to you gentlemen?

GRIFFIN Yes. And in answer to your question, that is approximately correct. 72 hours and 20 minutes is what we have in the flight plan. They are going to leave that on until they do enter the lunar Umbra, although the flight plan does not quite show it that way. Tom said before liftoff that he intended to try to see the sunset, so I imagine it will be somewhere around 72:20 and it is like the other TV passes that we had, he has been getting on a little earlier than that and he will try to track the sun as it goes behind the moon.

QUERY This has probably been asked before, but can someone explain to me why it isn't possible to perform an LOI burn which would put the spacecraft straight into a circular orbit.

GRIFFIN	
QUERY	
GRIFFIN	

You could. If you could, why don't you? It is a two step process ---

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/20/69, 7:02 PM CDT 15D/1

GRIFFIN He could.

QUERY

If you could, why don't you? It's a - it's a two-step process to - it's GRIFFIN a safer - the over burned situation is not as critical for one thing. We're leaving ourselves enough margin here that we can do a very long burn and get a shut down and find out exactly where we are, and then we can update that second maneuver to - to a precise shorter burn to get us down to 60 circular, but it could be done with a single burn. In fact that - that was considered for a long time, and this two-step plan was one of the options it that we finally decided to go with.

QUERY Do you plan to after you go into lunar orbit to fire the LM radar at all before you detach and go down 8 nautical miles?

DUKE You mean the landing radar or the -Yes, the landing or -QUERY

DUKE Prior to undocking, we will have a rendezvous radar checkout. After undocking and the CSM separation performs its separation maneuver, then rendezvous radar will be locked on to the CSM for a checkout of it as far as range range readout goes. And prior to DOI we will activate the landing radar with a self test. We will have it on for the DOI burn just to measure temperature on the antenna, and then we will have a landing radar test in the flight plan scheduled at 8 miles when they go over the pericynthion.

QUERY What type of accuracy is projected for the landing radar at 50,000 feet?

DUKE I don't know. I can't give you an exact figure for that. There - there have been some studies, and if I can dredge this up, it was at 50 000 feet when it does lock on, we expect it to indicate 8 000 feet too low in altitude and there's a number for that that we can come up with for a velocity, and we'll - that - those numbers are available and we can supply those to you. There's been - an analysis done on that.

OUERY Would you please let me know the size and volume of the water bags?

DUKE It's a 4-pound bag. It'll hold 4 pounds of water which is approximately 2 quarts - half a gallon.

QUERY And the size? DUKE About this long, about that wide. QUERY Don't you know the exact number of the inches? DUKE I beg your pardon. The exact length? QUERY The exact number of the inches or feet or -DUKE It's - I would estimate 16 inches, but we can determine that for you and supply that information to you.

QUERY

Thank you.

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SPEAKER

Any other questions?

QUERY A quicky. Have you sorted out why the hydrogen bubble remains in the bottom of the bag yet? DUKE We tryed to answer that one earlier, and nobody knows.

SPEAKER Do we have another one over here while we're waiting? Let's get this gentleman's question, and then we'll get the one over there.

QUERY Just to clarify on this landing radar, I take it we shouldn't be too upset when we hear a figure of 42 000 feet. Right?

DUKE You'll have to check my numbers on that, but something of that order is correct. The radar is designed to lock in at about 35 000 feet, and so we're stretching the margin, but we - it's the only test we're going to get so we'd like to - we'd like to run what we can and get whatever we can out of it.

QUERY Some or one of us anyway would like to go eat after this. Can we be fairly sure that Dr. Berry briefing will not begin before 9:00?

DUKE No sir. He said he would come over as soon as possible, and we couldn't guarantee that it will not be before 9:00. Okay, I'd suggest. Now on the questions about the landing radar, I think you'll be able to get the answers from the query desk in the news center. If they don't already have them we'll make sure that they will be available over there.

DUKE You can also get the size of that water bag too. SPEAKER Yes, and the other questions that were

asked.

APOLLO 10 MISSION COMMENTARY, 5/20/69 CDT 1944 GET 55:56 211/1

This is Apollo Control at 55 hours. PAO 56 minutes into the flight of Apollo 10. The spacecraft now at a range of 179,455 nautical miles from earth and the speed is 3.314 feet per second. During the change of shift press conference, we had one brief conversation with the crew and John Young advised that he can now see both the earth and the moon from the windows of the spacecraft and he reported that the moon looked to be about the same size as the earth at this time but that all they could see was just a sliver of lighted portion. We'll play back that conversation for you now. SC Houston, Apollo 10. CC 10 Houston, go ahead. 8C Roger, you can now see the earth and the moon in the both windows. The moon is in the right window the moon is in the left window and the earth was in the right window. And you can see the moon just as the sun sets secluded behind the right window. There's a period of time there, less than a minute you can see the moon. It's a practically, a new moon. It's only a sliver from where we are. CC Roger. Copy. CC I bet that's a pretty good sight from there too, right John? 8C Right now the moon looks as big as the earth. Does that seem about right to you all? CC That looks right about right from the earth-moon transit graft we've got. They should look about the same to you. Can you see them pulling it about the same? No. We feel the moon pulling SC just a little bit harder right now Joe. Okay. Something's wrong. CC SC You say we're not in the lunar sphere yet? CC Not quite. 8C You forgot we can pull from here too. CC Okay. CC You guys are really throwing down You don't want to throw it out now. out there. SC No. We're just barely chugging along here. SC What's a stav B to this one Joe? CC I'm not really sure. I'll check that out. CC Push your nose over when you hear it verbal. SC All right. We're getting close to that verbal. CC Apollo 10, Houston.

APOLLO 10 MISSION COMMENTARY, 5/20/69 CDT 1944 GET 55:56 211/2

SCGe ahead, Houston. Apollo 10.CCRog, John, we'd like to switch yourhydrogen suit down a little bit and go to sleep config-uration. Tank 1 te auto and tank 2 off.SCTank 1 heater to Aute, tank 2 off.CCThat's for a fact.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 2021, GET 56:32 212/1

PAO This is Apollo Control at 56 hours, 33 minutes. Apollo 10 now 180,635 nautical miles from Earth and the spacecraft velocity is 3,292 feet per second. The crew will shortly be preparing to begin their rest cycle and that will be a 10 hour rest period. We'll also be passing up some final remarks to the spacecraft prior to the beginning of that sleep period shortly. We'll stand by here for CAPCOM to put in a call to the crew.

APOLLO 10 MISSION COMMENTARY, 5-20-69, CDT 20:38, GET 56:49 213/1

PAO This is Apollo Control at 56 hours, 49 minutes. We're in conversation with the spacecraft at the present time. Receiving a pre-sleep status report from the crew, and we'll pick that up for you at the beginning.

	CAPCOM	Apollo 10, Houston.
	SC	Hello, Houston.
	CAPCOM	Go, Apollo 10.
	SC	Roger. I got some onboard readouts for
you.		

CAPCOM

Roger. Ready to copy.

SC Okay. As we're taking it's 56 hours, BATT C is 36.8, PYRO BATT A is 37.0, PYRO BAT B is 37.0, RCS ALPHA is 86, BRAVO 86, Charlie 91, and DELTA 87. The radiation dosimeter readouts are commander 26032, the CMP is 05032, the LMP is 15035.

CAPCOM Okay, Apollo 10, I read back. Battery C is 36.8, Pyro A is 37, pyro B is 37, RCS A 86, BRAVO 86, Charlie 91, DELTA 87. RDU commander 26032, CMP 05032, the LMP 15035.

SC You got it, Ed, and we're in the process of cycling the H2 and O2 bands right now, and I think the private conversation handles the crew status report this time.

Roger. Roger. I've got a couple of CAPCOM things for you. We'll use the same comm setup we had last night. On your omnis B an S band normal voice mode off. If you need to call us, do it on down voice backup, and this configuration ought to give us about 50 percent high bit rate. The decision has tentatively been made to skip midcourse 4. You can sleep in until 71 hours if you so desire. We'll give you a buzz if there's any change on that. Your consumables right now look real great, Gene. We've got single tank capabilities at 200 hours at 50 amp consumption. Your batts are all above the red line and at this point, we can go even if your batt charger fails. And query, did you pass on the other conversation in the exercise info? We'd kind of like to know if you use the exerciser and how you like them.

SC Okay. Right now we've done a lot of isometrics up here today, and we have spent most of our time studying today. We've done alot of isometrics and haven't gotten to the exerciser. We plan to use it after we get through that big exercise with the suits that day.

CAPCOM You think you'll be strong enough after that?

CAPCOM Okay, Apollo 10, I guess that's all we have at the moment. You're free to start turning in and get 15 hours of sack time in if you want it.

SC Say that again about the single tank. I'm not sure I fully understood you.

CAPCOM We cut each other out, Apollo 10. Try

APOLLO 10, MISSION COMMENTARY, 5-20-69, CDT 20:38, GET 56:49 213/2

CAPCOM it again. SC Hello, Houston, Apollo 10. CAPCOM Go ahead, Apollo 10. Hello, Houston, This is Apollo 10. Over. SC Apollo 10, this is Houston. Reading you CAPCOM loud and clear. Go shead. Apollo 10, stand by. Goldstone having GOLDSTONE communication problems with Houston. SC Roger. Contact voice check. MCC Goldstone, Houston. GOLDSTONE Goldstone, MCC Roger, how do you read? GOLDSTONE Loud and clear. Roger. Stand by. I'll send you 3 short MCC keys. GOLDSTONE Rog. G's are GO. Thank you. MCC Roger. CAPCOM Apollo 10, this is Houston. How do you read now? SC Okay. We're reading you loud and clear DOV. Roger. Apollo 10. We lost our link out CAPCOM Where were we when you lost me? of the site. We were talking, ED. I don't know how SC much you got about the exerciser. We haven't really had a chance to take it out and use. We've been doing isometrics against the seat, the struts and so forth. CAPCOM Go ahead, Apollo 10. SC Hello, Houston. This is Apollo 10. Over. Apollo 10, this is Houston. Reading you CAPCOM loud and clear. Go ahead. Apollo 10. Stand by. Goldstone having GOLDSTONE some communication problems with Houston. SC Roger. SC - 71 hours, and some sort of a plan. And preferably I'd like to get the realigned change in our REFSMMAT in as soon as we wake up so if we have any problems with it we can resuffle them and keep going. Roger. John, we'll get to work on that. CAPCOM There's - there don't seem to be too many things to shuffle here. I personally doubt if you'll be able to sleep 15 hours anyhow. SC It's an admirable goal. CAPCOM completely agree SC What we plan to do is stay up a little bit later tonight. CAPCOM Say again, Tom. You were cut out on the last one. SC Roger. What we had planned to do is

APOLLO 10 MISSION COMMENTARY, 5-20-69, CDT 20:38, GET 56:49 213/3

SC just to when we saw this was coming up ahead we thought we could cycle ourselves better and we planned to stay up a little bit later tonight, and tell the friendly gentleman on the left we have not forgot the chlorination. CAPCOM Roger. Roger. One item I omitted, Apollo 10 is, with the omission of the midcourse, you can expect about 3 feet per second to get to the middle of the corridor if you have to fly by it, belay that 13 feet per second to get to the middle with no midcourse and take about 3 feet if we were to do it which we've decided not to at this time.

SC I think we should be able to afford that. CAPCOM That doesn't seem unreasonable at all.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 2048, GET 56:59 214/1

CAPCOM Apollo 10, Houston. Go ahead, Joe. SC CAPCOM Roger, Tom. Just to clarify here, I think Ed was talking to you about your trajectory and referenced the midcourse burn correction on the midcourse burn in your fly by. That was the LOI minus 5 burn that he was talking about. If you make it there it's a 3 foot per second correction and if you wait until fly by it will be a 13 foot per second. Roger, that's what we understood SC there, Joe, over. CAPCOM Okay, fine. I thought he said midcourse LOI, I wanted to clarify that. Boy, that's a fantastic target SC That's great. until retro. We'll agree there. CAPCOM SC Yea Joe, tell Glynn Lunney and Bill Schaffer and just all those good people who got the - total network and guidance operating, we can't thank them enough. That targeting is just utterly fantastic. CAPCOM Roger, that. They say it's their pleasure. SC Okay, tell them I'm going to save my praise until I see 60 miles above the Moon. CAPCOM Roger, that. During that last conversation with PAO the crew you heard them advised that we do not expect they will have to do the midcourse correction, designated mid course correction, for the trajectory as very close to the

nominal. Also the crew was advised that they will be able to sleep as late as 71 hours ground elapse time tomorrow

scheduled to occur at about that time. Dr. Charles Berry will be arriving at the News Center shortly for a briefing on this evenings private conversation with the crew. We expect that to begin shortly after 9 p.m. We'll continue at this time to stand by for any further conversation with the crew as they continue to prepare for their sleep period

because of the deletion of the midcourse correction

END OF TAPE

tonight.

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 2058 GET 5709 215/1 DEAD AIR

APOLLO 10 MISSION COMMENTARY 5/20/69 CDT 2123 GET 57:34 216/1

PAO This is Apollo Control at 57 hours. 35 minutes into the flight of Apollo 10. We've had no further conversation with the crew since we last reported. Although we do have a summary of the private conversation between Mission Control and the crew of Apollo 10 requested by Dr. Charles Berry. The astronauts were questioned about their general condition and gave Dr. Berry a brief Spacecraft Commander Stafford summarized personal report. by saying the general condition of the crew is excellent. He added "I feel great. We all feel just great". They were asked why they had each taken a lomotil tablet. Stafford replied that all three had been troubled with stomach gas as a result of gas in the water and had taken the lomotil tablet in an effort to relieve this condition. Stafford added that the lomotil seemed to help and was advised by Dr. Berry that this was satisfactory. Dr. Berry suggested that the crew increase its consumption of water Stafford replied that he was aware that water consumption was down because of the gas in the water but that the crew members were trying to drink more fruit juices and eat more of the wet food packs. Stafford added that he would try to increase the water intake. A general discussion of the condition of the spacecraft and the crew followed. Stafford said that he and the crew had been spending time reviewing upcoming activities. He noted that midcourse maneuver No. 4 would not be made, and requested that the crew's sleep period be extended. He was told by Flight Control, this would be done. And that concludes the summary of the private conversation. At the present time, Apollo 10 is 182,658 nautical miles from earth. A velocity continuing to decrease slowly down now to 3,255 feet per second. At 57 hours, 37 minutes into the flight, this is Mission Control, Houston.

APOLLO 10 COMMENTARY, 5/20/69, CDT 2225, GET 58:36

This is Apollo Control at 58 hours, PAO 36 minutes. Apollo 10 now 184,520 nautical miles from earth, travelling at a speed of 3,221 feet per second. Out here in Mission Control, Flight Director Milton Windler is reviewing the flight plan activities schedules for this shift temorrow when Apollo 10 will be in lunar orbit. We've had no further conversation with the crew since they entered there sleep period and that began about an hour and a half ago. And we're continuing to follow systems status on the spacecraft at this time. All systems continuing to function normally. At 58 hours, 37 minutes, this is Apelle Control, Houston.

APOLLO 10 MISSION COMMENTARY, 5/20/69, CDT 2339, GET 59:50 218/1

This is Apollo Control at 59 hours PAO 51 minutes. Apollo 10 now 186 thousand 851 nautical miles The velocity of the spacecraft if 3,181 from earth. feet per second, continuing to decrease slowly. We've had no conversations with the crew since they began their rest period at about 58 hours ground elapsed time. Prior to beginning their rest cycle the crew was advised that they would be able to sleep as late as 71 hours, which would give them roughly 13 to 14 hours of rest if they elect to Here in mission control we've continued monitoring use it all. systems and flight director Milton Windler reviewed the flight plan with the team of flight controllers here for tomorrow's activities in lunar orbit. Coming up at 61 hours 50 minutes 50 seconds we cross the sphere of influence at which time the spacecraft will begin the process of accelerating toward the moon under the dominant influence of the moon's gravity. Up until that time the displays here in mission control will continue to show the gradual decrease in velocity that we have seen ever since translunar injection. That velocity will continue the gradual decrease and then after the sphere of influence change we'll see the velocity gradually begin to build up again, and that will continue until lunar orbit insertion. At the present time the spacecraft weight is 93,267 pounds. The flight surgeon advised a short while ago that biomedical data indicated that commander Tom Stafford was sleeping on top of the center couch with command module pilot John Young sleeping in the sleep station under the commander's couch, and lunar module pilot Gene Cernan sleeping in the sleep station under the right hand couch. At 59 hours 53 minutes this is Apollo Control.

APOLLO 10 COMMENTARY, 5/21/69, CDT 0047, GET 60:58 219/1

PAO This is Apollo Control at 60 hours 58 minutes into the flight of Apollo 10. The spacecraft currently 188,923 nautical miles from earth and the velocity reading of 3,145 feet per second. The spacecraft cabin temperature has been running right around 72 degrees, this evening. The flight surgeon reports the crew appears to have been asleep since about 59 hours ground elapsed time, which would mean that they have been asleep now for about 2 hours, and we've been seeing average heart rates of about on the upper 40's or lower 50's. The lunar sphere of influence crossing time of which we gave you earlier, we'll repeat that now 61 hours 50 minutes 50 seconds. And the spacecraft weight still constant, 93,267 pounds. At 60 hours 59 minutes, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/21/69, CDT 0139, GET 61:50 220/1

This is Apollo Control at 61 hours PAO 50 minutes, and we're here in Mission Control, standing by for one of the more momentous events of this translunar coast period. The crossing over under the lunar sphere of influence. The primary indication that we've done this is going to show up on our displays. And in about 10 seconds we'll see the earth reference velocities change to lunar reference velocities. We're reading an altitude right now of 190,540 nautical miles from the moon, and our velocity is 3,119 feet per second. These displays should shortly be updating, and we expect that we'll show our velocity at that time, of 3,795 feet per second, but this is with respect to the moon now. And our altitude from the moon will be 33,800 some nautical miles. At the present time, the spacecraft is still maintaining its passive thermal control rotation of about 3 revolutions per hour. The guidance officer tells us that we've had no thruster firing since setting the spacecraft up in this mode. And all spacecraft systems continue to function normally. And we've just had our displays changed over in Mission Control Center, we're now showing our velocity with respect to the moon, 3,795.8 feet per second, and we show that we're 33,661 nautical miles from the moon. That display changeover, which doesn't necessarily bare any relevance to the event itself, occurred at 61 hours 56 minutes into the flight. And according to the calculations that we had, the event itself was to occur at 61 hours 50 minutes 50 seconds. At 61 hours 56 minutes into the flight of Apollo 10, this is Mission Control, Houston.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 62:57 CDT 0246 221/1

PAO This is Apollo Control at 62 hours 57 minutes. The spacecraft is now traveling at a speed of 3808 feet per second with respect to the moon. And we're at an altitude of 31,363 nautical miles from the moon. That distance from the moon now decreasing at an increasing rate. As we sit here monitoring the displays about every 10 seconds, the display showing range from the moon updates, and we're now showing 31,348 and that is just updated to 31,340 nautical miles from the moon. The Apollo 10 crew is now about 5 hours into their sleep period, and we estimate that they have been asleep for about 4 hours of that time. This is Apollo Control at 62 hours 58 minutes.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 63:43, CDT 0332, 222/1

PAO This is Apollo Control at 63 hours 43 minutes. Apollo 10 now 29 614 nautical miles from the moon and the velocity continuing its gradual increase now up to 3819 feet per second. Here in Mission Control we are presently going through a shift change. Flight director, Pete Frank, and his team of Orange flight controllers coming on to replace Milton Windler and the Maroon Team. The CAPCOM for the upcoming shift will be Astronaut Jack Lousma. During the previous shift the crew began their sleep period. That started at roughly 58 hours ground elapsed time. The flight surgeon reports that the crew actually began sleeping according to biomedical data about 1 hour later at about 59 hours ground elapsed time. They've now been sleeping for about 4 hours 45 minutes. Prior to beginning the rest period, the crew was advised that it appears the trajectory and the pericynthion altitude - altitude of closest approach at the moon will not require the mid-course correction - mid-course correction 4 which had been scheduled to occur tomorrow at about 70 hours 45 minutes ground elapsed time. The crew was also told that they would be able to extend their sleep period if they desired up to 71 hours. During the evening, we've crossed the lunar spear of influence - crossed into the lunar spear of influence. That event occurred here in Mission Control when our displays shifted from Earth reference to Moon reference. At that point, the spacecraft was about 190 500 nautical miles from Earth and about 33 820 nautical miles from the moon. In the intervening time, our velocity has increased with respect to the moon from 3795 feet per second to the current velocity of 3820 feet per second, and their altitude, distance from the moon, has dropped from 33 820 nautical miles to 29 501 nautical miles. At 63 hours 46 minutes, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 65:16, CDT 0505 223/1

PAO This is Apollo Control, 65 hours 16 minutes ground elapsed time. Apollo 10 is now 26,111 nautical miles away from the moon, traveling at a velocity of 3846 feet per second relative to the moon. The crew is not scheduled to wake up for another 6 hours perhaps, at least they have the option of sleeping that long since the midcourse correction, burn number 4 has been deleted from the flight plan, in as much as the trajectory is so accurate that it will reach the desired pericynthion of 61 nautical miles without having to do these midcourse corrections. Here in the Mission Control Center the orange team of flight controllers have settled in for the night, and just a few moments ago, watched a replay from video tape of yesterday's television passes. The Flight Surgeon, Dr. Ken Beers, is particularly interested in watching the demonstration of the water bags or plastic picnic jugs as they're nick named, that the crew has aboard in which they take the fuel cell byproduct water and attempt to spin it up in a centrifuge fashion. The bag has a handle on it where by the crewman can spin it up and try to separate the suspended hydrogen gas from within the water so they can bleed the gas off from one end of the bag and have pure water without the hydrogen in it. However, the TV pass did show that the bubbles do not come out of suspension, they stay down at the bottom of the bag, no matter how hard it's spun up by the crewman. Its very quiet here in the Control Center. The Flight Director, Pete Frank, has been discussing with the various console positions the up coming day's activities, the system status, the reports out of the spacecraft analysis room are getting increasingly shorter. All the entries in the various systems are almost a continual line of dittos, all system normal. And at 65 hours 18 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/21/69, CDT 0550, GET 66:01 224/1

PAO This is Apollo Control. 66 hours and 1 minute ground elapsed time. Apollo 10 presently is 24,404 nautical miles away from the moon, traveling at a velocity of 3,863 feet per second. Remaining sleep time, something like 5 hours. If they do use the option of sleeping until approximately 11 o'clock central time. And since the midcourse correction burn number 4 has been deleted, they likely will use this time for rest. Meanwhile, in a related subject to Apollo 10, more than 175 astronomers the world over will be focusing their telescopes on the lunar surface while the Apollo 10 crew spends the next two days orbiting the moon. The project is called Lunar International Observers Network. Acronym is LION, and the purpose of the project is to determine whether ground observations and lunar vents can be confirmed by the Apollo 10 crew. LION is coordinated program of the National Aeronautics and Space Administration with the Smithsonian Institute Center for the study of short lived phenomena in Cambridge, Massachusetts. Participating astronomers are located in 34 different countries. Lunar event sitings will be related through the Smithsonian Center to the science support room here at The Manned Spacecraft Center, where scientists will evaluate the report. If the sitings warrant further investigation, the information will be forwarded to Mission Control Center. The Science Support Room has already received several reports of activities in the region of the crater, Aristarchus. These reports came from participating LION astronomers in California, New Mexico, At 66 hours 3 minutes ground elapsed time, this and Spain. is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 0650, GET 62:01 225/1

PAO This is Apollo control, 67 hours 1 minute ground elapse time. Apollo 10 now is 22 thousand 120 nautical miles away from the moon. And traveling relative to the moon at 3 thousand 8 hundred 90 feet per second. The crew is still asleep at this time. Some 4 hours remaining in the additional option for crew sleep. They may wake up earlier than that. The spaceflight meterology group here in mission control has issued a forecast for weather conditions in the planned landing areas. They say that the conditions are expected to be satisfactory for the next three days. Ocean areas of concern should have partly cloudy skies, winds 10 to 15 knotts, seas 3 to 5 feet, temperature 72 to 76 degrees and widly scattered showers. The outlook for the end of mission area is satisfactory. At 67 hours 2 minutes ground elapse time, this is Apollo Control.

end of tape

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 0750, GET 6801 226/1

PAO This is Apollo Control, 68 hours, 1 minute Ground Elapsed Time. Apollo 10 now some 19,810 nautical miles away from the moon, traveling at a velocity of 3,924 feet per second. Some 4 hours remaining in the crew rest period assuming they use the additional 2 hours option since the deletion of midcourse correction number 4. Flight Director Pete Frank is reviewing the upcoming day's activities with the console positions here in the Mission Operations Control Room, and from the back rooms where the opaque televisors are, actually, they're television cameras looking down on a layout table where various displays can be drawn in graphs and trend charts, this sort of thing, a cartoon has been put on one of the channels which has Apollo 10 command and service module docked with a doghouse with the beagle Snoopy complete with a space helmet riding on top of it. The caption is, "Happiness is a successful Apollo 10 moon mission." At 68 hours, 2 minutes Ground Elapsed Time this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 69:06, CDT 0855 227/1

PAO This is Apollo Control 69 hours 6 minutes ground elapsed time. Apollo 10's present position is 17 286 nautical miles away from the moon traveling at a velocity of 3970 feet per second. The crew has about 53 minutes remaining in the scheduled rest period, with an additional 2 hours at their option for sleep. They may call prior to Some numbers have been generated here in the that time. Mission Control Center. We will reach closest approach to the moon at 76 hours plus 10 seconds, pericynthian of 61.09 nautical miles. A new time for ignition of the lunar orbit insertion burn number 1 will be just 5 minutes prior to that time at 75 hours 55 minutes 53.5 seconds. It will be a 2981.3 foot per second SPS retrograde burn, burn time of 5 minutes 53.8 seconds. This is some 11 minutes later than the premission time for LOI 1, in fact, all lunar orbit activities will slip ahead or later by some 11 minutes. However, the transearth injection burn will be targeted to the nominal end of mission time of 192 hours and 5 minutes. The reason for this slip of ll minutes has to do with the fact that the spacecraft continued on the injection trajectory for an additional 12 hours or so to the midcourse correction made yesterday. Consequently, the track or the spacecraft trajectory has not followed the exact preplanned track or course and they are arriving at the moon some 11 minutes later, so consequently this makes an impact of 11 minute slip in all the lunar orbit activities. And at 69 hours 9 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 0945, 68:56 GET

PAO This is Apollo Control, 69 hours, 56 minutes ground elapsed time. We're getting ready to make a wake up call to the crew, which will be in the form of music, I understand. We are now 15 324 miles away from the moon, traveling at a velocity of 4017 feet per second. There goes the music. (On A Clear Day played here) SC (whistling) Reveille, reveille, up all hands, heave out, trice up, clean sweep down, fore and aft. Apollo 10, Houston. Sounds like CC we're ready for a Navy drill on the Flight Direct. SC Its good music. CC How it'd come through this time John? Its loud and clear. Its beautiful. SC Sounds like we've got stereo.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 0950, GET 7001 229/1

PAO This is Apollo Control. While we are waiting for the antennas to sort themselves out, communications to improve here, and the passive thermal control mode to - rotating around causes antennas to break lock momentarily. That was Robert Goulet singing "On a Clear Day" to wake the crew. John Young came back with a snappy response about "clean sweep fore and aft, and hit the deck and all that sort of thing." We're continuing to monitor the air to ground for resumption of the conversation.

PAO This is Apollo Control and the crew is now stirring around in the spacecraft, not talking very much. We're some 5 hours 44 minutes away from loss of signal as the spacecraft goes behind the moon for the first time. Lunar orbit insertion burn number 1 now scheduled for 75 hours 55 minutes 53.71 seconds. This burn is targeted to place Apollo 10 in an orbit with a pericynthion of 59.5 nautical miles, apocynthion of 169.2 nautical miles, which two revs later, will be lowered to approximately 60 nautical miles circular for the remainder of the lunar orbit activities. We will leave the circuit up, monitoring any possible airto-ground communications that come from Apollo 10.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 0955; GET 7006 230/1

Houston, this is 10. The world SC doesn't look very much littler than it did yesterday. 10, roger. I bet you the moon looks CAPCOM a little bigger though. Hello, Houston, Apollo 10. How do SC you read? Hello, Houston, Apollo 10. How do you read? Apollo 10, Houston. Go ahead, over. CAPCOM Hello, Houston, Apollo 10. How do SC you read? Apollo 10, Houston. Loud and clear. CAPCOM How me? Over.

CAPCOM Apollo 10, Apollo 10, Houston. Over. I'm keying. COMM TECH Apollo 10, Houston, how do you read? CAP COM CAPCOM Apollo 10, Houston. How do you read? Over. Hello, Houston, Apollo 10. How do you SC read? Over. CAPCOM Apollo 10, Houston. How do you read? SC Hello Houston, Apollo 10. How do you read? COMM TECH Madrid COMM TECH, Houston COMM TECH, GOSS conference, net 1. Goddard voice. Houston COMM TECH Net 1. SC Houston, Apollo 10. Over. COMM TECH Goddard voice, Houston COMM TECH. GODDARD V. Goddard voice. COMM TECH Roger, I can not raise Madrid. GODDARD V. Do you want Madrid to come up on here? COMM TECH Yes, sir. GODDARD V. Roger. COMM TECH Madrid COMM TECH, Houston COMM TECH, net 1. MADRID C.T. Apollo 10, This is Madrid COMM TECH. SC Roger, Madrid COMM TECH. We can read you loud and clear. How us? MADRID C.T. Loud and clear. Houston is having a problem contacting you. SC Roger. Madrid COMM TECH, Apollo 10. Is Houston SC reading us at all? MADRID C.T. Negative, not at this time. CAPCOM COMM TECH. CAPCOM Apollo 10, Houston, how do you read? Over. CAPCOM Apollo 10, we are reading you loud and clear. How do you read us? Over. SC Loud and clear. CAPCOM Roger, you are coming through good now. Have you got all those lazy bones up there? SC Yeap, they're all up. Everybody's up and everybody feels great, Jack. Good, glad to hear it. You ought to with CAPCOM that kind of sleep. You missed the music, though. SC What's new this day? CAPCOM We're standing by for news. We'll get it to you. SC Okay, we wanted to go ahead and get to the consumables update and go through a couple of things here before we get into it.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 70:11, CDT 1000 231/1

CAPCOM Okay, we've got a consumables update for you and flight plan update when you're ready. SC Okay, I'm ready to copy. Go ahead.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1005, GET 7016 232/1

CAPCOM - we've got a consumables update for you and a flight plan update when you are ready.

SC Okay, I'm ready to copy. Go ahead. CAPCOM Here's your consumables update which is current GET of 70 hours, your RCS total 85 percent, Quad A 85 percent, Quad B 85 percent, Quad C 84 percent, Quad D is 86 percent. Your H2 total is 40 pounds; your 02 total is 484 pounds; your RCS is 7 percent of the flight plan. We have a considerable list of flight plan updating to do. Are you ready to copy the flight plan update?

SC Okay, stand by. We got the consumables update and we are ready to copy on the flight plan. CAPCOM All right. The flight plan update

follows -

SC Where are you going to start? CAPCOM We're going to start at the - 70 hours.

SC

Okay.

CAPCOM Okay. We deleted all midcourse correction 4 activities and starting about this time, when you are ready, we would like to begin the fuel cell 02 purge. We would like it at 7030 to get the postsleep checklist. At 7045 we will do the P27 update and pass along our new pads. At 7050 do the canister change. That leaves our TV update on schedule and 7115 you can begin the P52. And this would then put us back on our nominal time line with ECS redundant component check at 71 + 55. I'd like to point now, however, that -

SC

CAPCOM

Okay, do you want to -Go ahead.

SC You want to commence that 02 purge at this time, sleep checklist at 7030, about 7045 P27 update, at 71 hours canister change, about 7115 at P52, and the TV pass is the same as scheduled.

CAPCOM Affirmative. Also, we would like you to know that LOI is now about 11 minutes later than our preflight planning, because we didn't burn midcourse correction 1 and made our translunar trajectory adjustment at midcourse 2 instead, so this puts us 11 minutes behind on LOI and 11 minutes behind throughout all of our lunar orbit activities.

	CAPCOM	I have	some	additions	to	make.
	SC	Roger,	that	means we	will	l be burning
LOI	at -					

CAPCOM Roger, you will be burning LOI at approximately 11 minutes late; all other activities will be retarded by 11 minutes and we will come up with a more accurate pad in a moment. I'd like you to make some additions to your flight plan. At 7315 verify on panel 382 that your APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1005, GET 7016 232/2

primary evaporator control is in auto and along with that, reservice the primary evaporator. And then at 7330, on schedule, you can activate the primary evaporator. Then, Apollo 10, we would like you to jump over to 84 hours and 20 minutes and make a change there. Change the battery A charge to battery B charge; that is, B not A. SC Roger, Houston. At 8420 we will initiate battery B charge instead of A -

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1010, GET 2021 233/1

SC - 20 we'll initiate battery B charge instead of A and at 7315 we'll reservice the primary evap and then activate the evap at 7330 on schedule.

CAPCOM That's affirmative.

SC Houston, this is 10. I'll go ahead and initiate that fuel cell 02 purge on schedule now and I did, however, do one last night before turning in I'm sure you're aware of.

CAPCOM Houston, roger, we copy. At 7315 when you reservice the primary evaporator we want to make sure that you verify that the primary evap water control is in AUTO. You didn't read that back, over.

That's affirm. We checked it. It SC is in AUTO; it is in AUTO. CAPCOM

Roger, thank you.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1015, 70:26 GET

This is Apollo Control. Apparently PAO the crew is in the midst of preparing breakfast. Spacecraft Communicator Jack Lousma likely will read up the morning news report to the crew the next time conversation resumes. Apollo 10 is now 14 020 nautical miles away from the moon, gradually accellerating in the lunar gravitational field. Now at 4 054.8 feet per second. Spacecraft weight now 93 281 pounds. Continuing to monitor communications between Apollo 10 and Mission Control Center. If a line were projected from the center of the earth out through the surface to the spacecraft, it would be over North central Africa. Members of the day shift are the Black Team of Flight Controllers, beginning to now drift into the Control Center here for the hand over due in about an hour and 10 minutes.

CC Apollo 10, Houston. We have the morning newspaper if you've got time to listen now.

Go ahead. We'd like to.

CC Roger. During the night, you entered the lunar sphere of influence, at 61:51 to be exact. And you are now 13 957 miles from the moon at 4056 feet per second. Technically there is no change in the CSM systems status, or your LM heater currents, and you are ahead of your flight plan on all consumables. And now the newspaper. The Flight of Apollo 10 has been temporarily knocked out of the lead story position in the Houston Post. William Forster has resigned his position as Administrator of the Harris County Hospital.

END OF TAPE

SC

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1020, GET 7031 235/1

William Forster has resigned his CAPCOM position as Administrator of the Harris County Hospital, but never fear, as the Apollo 10 nears the moon news services around the world have followed the flight. It's been estimated that over a billion people have seen at least some of the television pictures from the Apollo 10. Whether you want to be or not, you're famous. But in spite of this enthusiasm, that now unemployed local philosopher to whom we referred yesterday, says now he thinks color television is on its way out, way out. In other news highlights, Governor Nelson Rockefeller continues his South American tour. His reception in Peru was not too friendly. President Nixon will meet with South Vietnamese Thieu on the island of Midway on June 8. Leaders of the Presbyterian Church meeting in San Antonio have called for the Nixon administration to restore diplomatic relations with Cuba. Texas International Airlines has won the privilege of sending the first plane into the new Houston International Airport on June 8. 99 VIP's will be aboard the flight that will depart from Hobby Airport and land at 1 minute after midnight. A 2 day open house featuring air shows will be held on May 31 and June 1. The Soviet Union launched an unmanned spacecraft into orbit yesterday. It has been designated Cosmos 282. An old buddy of ours, world traveler Frank Borman, has arrived in Prague, Czechoslovakia, for the 12th plenary session of COSPAR. Although the Czech press did not mention Frank's arrival, there were several hundred people on hand to greet him. Frank waved back and said, "Hey, Hey." Frank doesn't speak Czech too well, you know. In sports news, it was Houston over Montreal 5 to nothing, and Cincinnati over Philadelphia 4 to nothing. In the American League, Detroit defeated Chicago 7 to 6, New York over Oakland 2 to 1, Washington beat Seattle 6 to 5, Cleveland over Kansas City 4 to 1, and Minnesota downed Baltimore 3 to 2 in 13 innings. In today's big sports story, the former scourge of the Big Ten, the University of Chicago, will resume intercollegiate football. This fall, the Marcons, once coached by the famous Alonzo Stagg, will play such big midwestern football giants as Wheaton College, Lake Forest College, North Central Illinois, and Valparaiso at Indiana. That's the University of Chicago, a town up north, you know. In golf, today is pro-am day at the Atlanta Classics. That's today's newspaper. SC You're a good newsman, Jack. That's

fine stuff. CAPCOM That came from the Public Affairs Office here. SC What was the name of that town up north? APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1020, GET 7031 235/2

0

CAPCOM Let's see, C,h,i, Chicago, Chicago. Oh, yes. I was looking at it yes-SC terday. I saw them out there practicing. Speaking of Chicago, did the Cubs play ball? I don't have them listed, Gene. Do CAPCOM they play ball? Oh, you're really bad, you're really SC bad. Say listen, I've got some rand readings for you. How about the Commander 26034, the CMP is 05034, and the LMP is 15036. CAPCOM Oh, you tried to catch me there, didn't you? The CDR is 26034, the CMP is 05034, and the LMP is 15036. SC I knew being in the Marines you'd be on your toes. Listen, we just cycled the fans, we purged the fuel cells, we'll change the canister here in about 20 minutes and we're grabbing a bite of chow right now. CAPCOM Houston, roger, we copy. SC With your military background I bet it really hurts you to see us sleep, doesn't it?

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1025, GET 7036 236/1

CAPCOM - well, we were just about to ask I know John, he probably slept on his you how you slept. back, his side, or his stomach, but how about the rest of you? SC The CDR slept great. CAPCOM Roger, CDR. We know that. SC I slept with those other three guys under couch down there. Those three guys with the big suits. Okay, they probably didn't keep you CAPCOM awake. SC And believe it or not, I slept pretty well. CAPCOM Roger, thank you. SC I slept pretty well, Jack, I got about 6 or 8 hours of pretty good sleep. PAO This is Apollo Control. Apparently in rotating around in passive thermal mode, we've had break lock again with the antennas. Houston, Apollo 10, over. SC CAPCOM Go ahead, Apollo 10. Roger. We decided maybe we can get SC around that delay problem by trying to remember to stay over after conversation. It hadn't worked too well so far, over. Apollo 10, this is Houston. Let's CAPCOM get back to that in a couple of minutes. We're getting a lot of background noise. This is Apollo Control. Spacecraft PAO Communicator Jack Lousma is waiting for the background noise to fade out before they resume conversation. Transmissions are barely audible through the background noise. As the spacecraft rotates around where the antennas are in a better

END OF TAPE

position, the noise will drop off.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 70:41, CDT 1030 237/1

CAPCOM Apollo 10, Houston. Say again your last transmission, please.

SC Roger, Jack. We thought maybe we could get around this delay problem by taking a cue from stuff we were doing last night and that's by saying "over" at the end of every conversation. Over.

CAPCOM Roger, we copy, over.

SC Roger, and we have been operating with the S-band squelched in Able for the last 2 days and request to know if that's been bothering you down there or if that affects our operation. Over.

CAPCOM Roger, stand by one, please. Over.

CAPCOM Apollo 10, Houston. The S-band squelch switch position doesn't affect us in any way. At this time we'd also like you on your H2 cryro heaters go to OFF on tank 1 and to AUTO on tank 2, and we'd like to verify a valve position on 382 that the - panel 382 that the primary evap flow water control is in AUTO as opposed to the switch on the panel. Over.

SC Roger, that valve is in AUTO and it's been in AUTO since liftoff. Over.

CAPCOM SC SC CAPCOM Roger. Over. That's "Roger out", Jack. Over. Houston, this is Apollo 10. Over. Apollo 10. Houston, stand by one, please.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1035, 70:46 GET 238/1

CCApollo 10, Houston. Go ahead; over.SCRoger. I was just wondering whatthe - are we gonna knock off the PGC to do the realine tothe new REFSMMAT; I guess we are. I would like to get anattitude to go to which will avoid that desire to get gimbalangles - use gimbal lock, program alarm if possible.CCRoger; stand by.SCThe second thing is does this changein our flight time at the moon affect its lunar umbra beforewe get to the moon? Over.

CC Apollo 10, Houston. You'11 be entering lunar penumbra 10 minutes later, that will be at approximately 72:50, and sunrise will be 10 minutes later, at about 74:50; over.

SC

Roger.
APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1040, GET 7051 239/1

CAPCOM Apollo 10, Houston. We're coming up with a P52 realignment attitude and in the meantime, we're standing by with the 27 update computer and several - when you are ready.

SC Roger, and we will go to accept on the computer. And if you can stand by on the pad for a couple of minutes, we will be with you. CAPCOM Apollo 10, roger, copy.

CAPCOM Apollo 10, Houston. Your uplink is coming at you now.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1046, 70:57 GET 240/1

PAO This is Apollo Control. The crew is still in the midst of breakfast at this time; after they have washed the breakfast dishes, we'll have resumption of communications from Mission Control here, with planning the days activities, and there will be uplink the new state vector, and all the other numbers that have to stream into the spacecraft computer for our attitudes and so on for the lunar orbit insertion burn. We've got some 4 hours and 48 minutes until the spacecraft passes behind the moon and out of sight from the antennas here on earth. Their distance now from the moon is 12 822 nautical miles; velocity continuing to accelerate, 4 095 feet per second. To recap the plans for the lunar orbit insertion burn, ignition time 75 hours, 55 minutes, 53.71 seconds, ground elapsed time. The velocity change which will be in retrograde, 2913.9 feet per second; spacecraft weight at the time of the burn 62 554 pounds, will produce a lunar orbit with a pericynthion of 59.5 nautical miles and apocynthion on the side toward the earth of 169.2 nautical miles. Burn time of this maneuver will be 5 minutes. 54 seconds.

CC 10, Houston. The attitudes which you want for your lunar landing site 2 REFSMAT, P52 IMU realine; stop your roll at 330 degrees and then pitch down to 30 degrees; over.

SC Roger; stop the roll at 330; pitch down to 30.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 71:03, CDT 1052 241/1 SC Houston, Apollo 10. What time do you want us to do the realign? As outlined in the flight plan? 10, this is Houston. According to the CAPCOM flight plan we have that at 71 plus 20 roughly. SC Yes, we've got that, Jack. CAPCOM Roger. CAPCOM Apollo 10, Houston, uplink complete. You can go to block. Over. SC Okay, we're at block. Houston, Apollo 10 on that attitude SC besides the 330 roll, it said pitch down 30 degrees. Was that down 30 degrees from 90 to 60 or down to the inertial angle of 30 degrees? Over. CAPCOM Stand by one, 10. CAPCOM Apollo 10, Houston. The angle to which you want to pitch down is 30 degrees. Over. SC Roger.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1057, GET 7108 242/1 SC Hello, Houston, this is 10. I'm ready to copy your pads. CAPCOM Roger, 10. Maneuver pad follows. This is a PC + 2 pad. SPS G&N, NOUN 47 is NA, 077, correction NOUN 47 in NA, NOUN 48 is also NA, 077552900 + 43184 -03459 - 13910, roll is blank, pitch is 312, all the rest in NA, over. Okay, it's PC + 2, is that correct? SC CAPCOM Affirmative. SC SPS G&N, NOUN 47 is NA, 48 is NA, NOUN 33 is 077552900 + 43184 - 03459 - 13910, roll is blank, and pitch is 312, and everything else is NA. CAPCOM Roger, 10, that is affirmative. Another maneuver pad follows, over.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1102, 70:13 GET

CC Roger 10; that's affirmative. Another Maneuver pad follows; over.

Go ahead.

CC This is preliminary LOI one. SPS, G&N, 62554 plus 095 minus 017 075 55 5371 minus 29139 minus 05614 minus 02968 355 230 342 01692 plus 00595 29823 554 29751 16 2140 392; the rest is NA; your set stars are Vega, number 36, and Deneb, number 43. Roll aline is 241, pitch aline 240. Yaw aline is 013, no ullage. Your LM weight is 30727; over.

 SC
 Roger Jack. Just PLOI one, SPSG&N,

 62554 plus 095 minus 017 075 555371 minus 29139 minus

 05614 minus 02968 355 230 342 01692 plus 00595 29823 554 29751,

 16 2140, 392. The rest is NA. Set stars are Vega, 36, and

 Deneb, 43. 241 2400 13, no ullage and the LM weight is 30727.

CC Roger 10 that's affirmative, and another maneuver pad. PEI number one. SPS G&N. 38766 minus 057 plus 059 078 11 42 00 plus 31139 minus 01028 plus 00725 roll is blank, pitch is 034, the rest is NA; over.

SC Roger. PEI one, SPS G&N 38766 minus 057 plus 059 078 11 42 00 plus 311 39 minus 01028 plus 00725, roll is blank, pitch is 034.

CC That's affirmative and another maneuver pad. PEI plus four. SPS G&N Noun 47 and Noun 48 are NA. 084 39 1200 plus 34087 minus 01518 plus 00464 roll is NA -

END OF TAPE

SC

243/1

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1107, GET 7118 244/1 CAPCOM - roll is NA, pitch 027, and the rest is NA, over. Okay, Jack. TEI + 4 is SPS G&N. SC NOUN 47, 48 NA, I get 084391200 + 34087 - 01518 + 00464, roll is NA and pitch is 027. CAPCOM That is affirmative and the next is your TV attitude, when you are ready to copy, over. SC Okay, I'm ready. CAPCOM Okay, Gene. For the television, your inertial -SC Hey, Jack. Apollo 10, Houston. Go ahead, over. CAPCOM SC I'm ready to copy, over. Roger. I just have some new dope CAPCOM TV attitude is the same as your inertial on the TV attitude. attitude for P52, that is, roll 330 degrees, pitch 030, yaw three balls. And for the above attitude, your high gain antenna angles are pitch + 38, yaw 299, over. SC Hey, Jack, are those attitudes going to change when we do a P52 realign? CAPCOM Stand by one, 10. The attitude will stay the same, SC but the inertial reference system will switch its little whatchacallits. SC Hey, Houston, 10. CAPCOM Apollo 10, Houston. The attitude that was just passed up is the attitude in which you should stay to have TV looking at the earth. However, when you torque your platform after the alignment, you will have different angles read out, over. Roger, Jack, (garble). SC Apollo 10, Houston. I didn't copy CAPCOM your last transmission. Say again, please. SC It's no hurry. Apollo 10, Houston. Tom, I'm not CAPCOM reading you, but I'm reading John okay. Could you have a relay there, please? Okay, we're squared away, Jack. SC We got the earth out of Tom's window now, we will be able to handle it. And I've got a question. Who has been feeding Snoopy? He's 8 pounds heavier than he was a little ago. CAPCOM Well, peculiar things happen out there, you know. We will check on that. SC He's eaten 8 pounds of something since yesterday. END OF TAPE

APOLLO 10 MISSION ... MMENTARY, 5/21/69, GET 71:23, CDT 1112 245/1

SCHouston, Houston, this is 10, we arecommencing the redundant component check. We will check themain regulators here in a second.CAPCOMRoger, 10, we copy.SCcoming at you, Houston.CAPCOMSay again, 10.SCWell. if you didn't get it, that was amain regulator being checked there.CAPCOMCAPCOMRoger, Inderstand, main regulator check.

The reason for the increase in LM weight is that we pumped a few pounds of oxygen in there and this was not included in the pad update yesterday. Over

SCHow about that.SCHave you got any?SCNo.SCBoy, Houston, you all think of everything.I never would have considered that.

APOLLO 10 COMMENTARY, 5/21/69, CDT 1117, 71:28 GET

SCHouston; Apollo 10, how do you readme now Jack?I'm reading you loud and clear nowCCI'm reading you loud and clear nowTom.SCSCOkay, I didn't have the mikes upclose enough I guess, so that was the main trouble; over.CCRoger, you're real good now Tom.

END OF TAPE

246/1

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1122, GET 7153 247/1

PAO This is Apollo Control. We have several minutes of dead air here in which there is no conversation taking place with the crew of Apollo 10. Now some 11,390 nautical miles away from the moon, traveling at a velocity of 4,153 feet per second. Some 4 hours, 12 minutes remaining until loss of signal with the spacecraft when it goes behind the western rim of the moon, as viewed from earth. The Black Team of Flight Controllers is now being briefed by their predecessors here in Mission Control Center with handover due in about 5 minutes. In Ground Elapsed Time the loss of signal at some 4 hours and 12 minutes from now will be at 75 hours, 48 minutes, 24 seconds out of Goldstone. Out of Madrid some 10 seconds later, 75:48:34. We'll continue to monitor air-to-ground for resumption of conversation.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1127, GET 7138 248/1 Houston, this is Apollo 10. Good SC news tonight. I can see Acrux and Alpha and Beta Centauri, and it's the first time I've been able to see a constellation I could recognize since we got up here. CAPCOM Roger, good news, 10, and your friendly black team is now on duty here in the MOCR. We thought we could hear you changing SC shifts. We could hear a lot of noise in the background there when Jack was passing up the update. CAPCOM Yes, we were trying to get up to speed here. Did you guys sleep well? Jack's already asked that. SC CAPCOM Okay, I'll get it from Jack then. I thought you guys go through a formal SC change of the command ceremony down there every morning. Over. CAPCOM Say again. The ECS redundant component check SC is complete and our secondary loop looks good, and my other comment was that I thought you'd have to go through a formal change of command ceremony to get a hold of the microphone down there. CAPCOM The CAPCOM position is definitely fully manned, I'll tell you that. We have about 5 of us sitting around. SC I guess only a Marine could sound as chipper as Jack does in the morning. CAPCOM Roger. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1132, GET 7143 249/1 SC Okay, Houston, we're going to torque the platform now. Those are pretty small torquing errors considering it sat around all night and then got itself all torqued up. CAPCOM We copy, 10. Over. SC Roger, can you see the gyro torquing errors down there now? CAPCOM That's affirmative. We have them. Over.

END OF TAPE

.

APOLLO 10 MISSON COMMENTARY, 5/21/69, GET 71:48, CDT 1137 250/1

DEAD AIR

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1142, GET 7153 251/1

SCHello, Houston. Houston, this is10. How do read in high gain?
CAPCOM10, Houston. Reading you about4 by in the high gain.
SC0kay, we're now AUTO high gain nar-
row at the present time.
CAPCOMrow at the present time.
CAPCOMRoger, 10. You're just a littlescratchy.
SC0kay.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 71:58, CDT 1147 252/1

CAPCOM Hello Apollo 10, Houston. Over. SC Go ahead, Houston, this is 10. Over. CAPCOM Roger, 10. We have a problem with the Goldsone. We won't acquire the 210 foot dish until 71:49, that means we'll have to get the color down through the 85 foot dish at Goldstone at 72:14. Now, we're not sure just -

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1152, 72:03 GET 253/1

CC - at the Goldstone at 72:14, now we're not sure just exactly how good the color quality will be through the 85, so we can work it your choice on the thing; we can go as scheduled at 72:20 and see what the quality of the color is, and if it's bad, and it won't impact your time line, we suggest that we then delay until 72:50 and when we pick up the 210, and try another show. Also that give us - at this time you are in the lunar umbra and your friendly geoligist here says that there should be a spectacular shot looking right through the moon into the solar corona. Over.

SC Houston, this is 10. We're kicking around shooting the TV at the solar carona; I don't know; do you think the thing would handle it - seems like it would damage it from the light standpoint.

CC Stand by. Everybody is shaking their head back here - the experts - as long as the sun is completely down, or completely set, it should be all right; we'll be looking at just a shafting from around the moon; we think it'll be all right; you could probably take a peek out your window and if it looks all right to you, then you could turn the camera over that way.

SCWe don't see the sun. We don't see it.PAOThis is Apollo Control at 72 hours, 6minutes. We are standing by waiting for some word on whatwill be attempted for this next TV transmission at the regularlyscheduled time, as you heard Charlie Duke pass up to the crew.Goldstone will not be able to acquire with the 210 footantenna; the 85 foot antenna will be available but we're doubt-

the quality of color TV we can receive through this antenna. The 210 dish will acquire at 72 hours, 49 minutes. The regularly scheduled TV pass is at 72 hours, 20 minutes. We are now at 72 hours, 7 minutes. We may try to come up at the regular time, feed through the 85 foot dish, see what the quality is; if it is bad, hold off until about 72:50. We'll continue to stand by for a resolution of this.

CC Roger 10; we barely read you, Tom. We are looking at your display; 29 for a periloon of 2906. You are very scratchy 10 -

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1157, GET 7208 254/1

Roger, 10. We're just barely read-CAPCOM ing you, Tom. We are looking at your display, 29 for perilune of 2906. You are very scratchy, 10, at least Tom is. Almost unreadable. Heuston, this is 10. Radio check, SC over. CAPCOM Roger, you are 5 by, John, over. SC Roger. SC Roger, Charlie. How do you read me now? Over. CAPCON Roger, Tom. You are 5 by, over. SC Okay, real fine.

APOLLO NEWS CENTER HOUSTON, TEXAS

23

CHANGE C. SHIFT BRIEFING MAY 21, 1969 TIME: 12:00 NOON

PARTICIPANTS:

M. P. Frank - Flight Director
W. M. Stovall - Flight Dynamics Officer
R. T. White - PAO

CHANGE OF SHIFT BRIEFING, 5/21/69, CD: 12:00

WHITE Okay, change of shift briefing for your friendly orange team of flight controllers. One the left, Pete Frank, orange team Flight Director, Bill Stovall, the Flight Dynamics Officer for this shift; Pete, you want to run down what happened during the night other than sleep?

FRANK Well, I don't want to skip that sleep part that apparently went very well with the crew. As you are probably aware, we can only monitor the conditions of two of the crewmen, and the two that we saw all night apparently slept very soundly and very well. Respiration rates very low, and all that goes along with that. Gene Cernan was sleeping down below the couches and therefore we were not measuring his condition, reported that he had 6 to 7 hours of good sleep; I think that was somewhat less than the other 2 crewmen had. We debated midcourse 4 for several hours and finally came to the conclusion that we would not do that: it was definitely not necessary and the only debate that we had was whether it was worth doing to try to improve the condition slightly. I guess that's the reason they took so long talking about it because it wasn't any major argument for doing it or not doing it, and we finally decided that we would just skip it. And one of the big factors was that we could let the crew sleep another 2 hours, and that accounted for something since we didn't need the maneuver, we decided to forget it. The LOI, or the lunar orbit insertion, the original - the preliminary plans for that have been made, and we have some facts on those if you care to get them. Let's see - I - there's only one other point, and that that our time line has changed by 11 minutes which I am 18 pretty sure has already been reported. And that is the only change to the activities in lunar orbit, we now expect everything that is listed in the flight plan to occur approximately 11 minutes later than it is shown there. Things will still be happening over the same parts of the moon - all that stays the same - its just simply that the time has slipped by 11 minutes. There were no problems that came up during the night; the passive thermal control procedures worked very well; we didn't fire any jets all night; we again got a little bit further ahead in our RCS propellant budget, doing very well in that respect. And I can't think of anything else of significance to bring out at this point. You think of anything we left out?

WHITE No, I can't think of anything off hand. Bill, do you have anything to add?

STOVALL Just if there are any questions on -WHITE Okay, please wait for the mike so we can get it on the transcript. Go ahead.

QUFRY You said the time line had slipped by 11 minutes for all these lunar events; I'm sorry I was

A/1

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/21/69, CDT: 12:00 A/2

late; I didn't hear the explanation

on that.

QUERY

FRANK Okay, I guess I didn't explain it. As you recall, we did not make the midcourse maneuver at the original time. We had a time we called MCC 1, and it was decided not to perform the midcourse correction at that point; we delayed until MCC 2 and one of the results of that delay was to cause us to arrive at the moon about 11 minutes later than the preflight plan.

QUERY Couple of questions. I gather that from what we were told this morning, that you are going to make up this 11 minutes - you are going to somehow make up this 11 minutes so the transearth injection will be at the right time.

FRANK No - that's not right. The transearth injection will also be about 11 minutes later. Assuming everything else holds nominal from now on; we will arrive back at the earth at the nominal time; we'll make up the 11 minutes on the way back.

Oh, okay.

FRANK Don't hold me to that exact minute; it'll be approximate makeup there.

QUERY Alright. Second question was a mention this morning of - maybe this isn't in your area - but some information coming in from Astronomers about activity near Aristarchus. Are there any plans being made to - for the astronauts to try to look at that part of the moon, or do anything about this report?

FRANK I'm sorry; I'll have to plead ignorance on that; I'm not aware of that report.

WHITE I think the plot is that if these astronomers - in, what is it, 34 countries - that are watching the various portions of the moon see anything interesting and they report it to our science support room, or what ever its called, and its considered noteworthy enough, it might be passed to the crew on a real time basis, and to look for a target of opportunity such as these bright spots in Aristarchus, and so on.

FRANK Well yes, that's the plan, but apparently there's some reports being made, and they have not come through out to the flight director's position as far as I know.

QUERY I just heard a report that the TV transmission is going to be delayed 43 minutes; can you confirm that?

	WHILE			Delaye	d ho	w ma	ny m	inut	88?			
	QUERY			43 min	utes	•						
	WHITE			There	is a	de 1	ay b	ecau	se	of	acquis	ition
of	the 210	dish	at	Goldston	ne,	and	this	is	the	one	e that	they

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/21/69, CDT: 12:00 A/3 planned to bring the color in on, That's the reason for that. OUERY Would the 43 minutes figure be accurate? WHITE Say again. QUERY Would the 43 minute figure be accurate? WHITE I imagine so; it could also be - I didn't hear the commentary on why the shift in the time, but it probably has to do with when the crew wants to do it. Front row up here. QUERY Could you comment on the - when they do TV today, they talked yesterday about shooting the solar corona in the shadow of the moon. Wonder if someone could comment on that. Is that planned, and how will it work? Well that was being discussed when FRANK we came over - and I think they will do that; yes. QUERY Could you tell us how it will work? How will they do this and when, where? Well, unless I am missing something, FRANK it just simply is a pass into the shadow - the lunar shadow they will point the camera at the moon. WHITE Understand; we do have the TV pass coming up, right Larry? Okay, anybody want to go watch it?

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1208, GET 7219 255/1

PAO This is Apollo Control at 72 hours, 19 minutes. We are going to attempt to get a TV feed through the 85-foot dish at Goldstone. The crew indicates that they have the camera turned on. We're standing by now.

CAPCOM We're in the process of handing over Goldstone as yet has not received your signal to Goldstone. and we'll let you know, over.

Okay, we've got a beautiful picture SC on our monitor this morning.

Good show, 10, over.

CAPCOM

A few minutes ago at 72 hours,

PAO 13 minutes, Tom Stafford asked for his distance from the earth to the moon and the velocities. These are the figures we passed up to him at 72 hours, 13 minutes. Apollo 10 is 208,950 nautical miles from the earth, velocity 3,013 feet per second relative to the earth, distance from the moon 9,813 nautical miles, velocity relative to the moon 4,234 feet per second. We're continuing to stand by to see whether we'll be successful in getting this TV feed through the 85-foot dish.

SC Give us a hack when you're getting a picture, would you please?

Roger, 10, we'll do that. Stand CAPCOM by, I'll give you some word on the Goldstone acquisition. SC Okay, if they don't have it before

too long we'll go ahead and terminate it.

CAPCOM Roger, 10. If you'll stand by for 2 seconds we'll give you an estimate of acquisition time. We're supposed to have it at 7214. So far they haven't got a signal through the 85.

Houston, while you're waiting for SC Goldstone, we'll just keep a lock on here. We'd still like to have you check with GUIDO while we have a 290.6 parallel in there on our verb 82.

CAPCOM Roger, stand by, 10.

CAPCOM Hello, 10, Houston. The big pericynthion number is due to the conic integration in the verb 82. At these distances the GUIDO's are not disturbed. They say that's a normal reaction to that integration. There is a way you can get a better number if you'd like us to pass it up to you, we'll give it to you, over.

We can take P21 to about the middle SC of the LOI burn, that ought to tell us, huh?

CAPCOM That's the way we were going to suggest, 10. Over.

SC Okay. Okay, we figured it was strictly due to the conic, but we just wanted to give it a APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1208, GET 7219 255/2 recheck. CAPCOM Roger. CAPCOM Hello, 10, Houston. We suggest your GET for the P21 if you're going to run it is 76:00:14, over.

Roger.

END OF TAPE

SC

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1213, GET 7224 256A/1

SC Hello, Houston. The tube is on right now. CAPCOM Roger, 10. Stand by; we don't have a picture yet, over.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1213, GET 7224 256/1

SC Roger, thank you. SC Houston, Apollo 10. Do we have anything through Madrid at this time? The Goldstone isn't locked on, over. CAPCOM 10, Houston. We have a Madrid acquisition and they are getting a picture recorded on tape; so Goldstone lockup is estimated in another 10 minutes, so it's dealer's choice on whether to terminate or not. SC Okay, we will knock it off now. Let us know when you have acquisition. We will give it to you for just a short bit in about 10 minutes. Tell us when. We don't want to just keep holding the camera here. We have a few other things to do. We will give it to them in 10 minutes for a short while, over. CAPCOM Roger, 10. We suggest you hold off until we get acquisition and we will give you the word on acquisition at Goldstone, over. SC All right. PAO This is Apollo Control at 72 hours 25 minutes. As you heard, we will wait 10 minutes for Goldstone acquisition and the crew will try for a short TV transmission at that time. SC - you can read our DSKY, we now show 61.8 mile perilune. It looks pretty good. Rog, we copy. CAPCOM SC Just like you guys said. CAPCOM Roger, 10, go ahead, over. CAPCOM 10, you will have to say again. Tom. You are barely readable at this time, over. SC Roger (garble) CAPCOM I can understand you want the distance to the moon and distance to the earth, over. That's affirmative. Distance from SC the earth; distance to the moon; and our present velocity. Roger, 10. Tom, you are 5 by now. CAPCOM You're breaking up. A couple of your transmissions have been barely readable and this last one was 5 by, over. SC Okay. CAPCOM Hello, 10, Houston. Your present distance from the earth is 208,950 miles; distance from the moon is 9,813 with a velocity relative to the earth of 3,013 feet per second, over. SC Roger, I have it copied down, thanks a lot. CAPCOM Roger. CAPCOM Apollo 10, Houston. We're standing by for your decision on the TV, over. SC Okay, we will give you the - an external shot at 20 minutes. CAPCOM Roger, standing by for the TV. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 72:29, CDT 1218 257/1

PAO This is Apollo Control at 72 hours 32 minutes. Goldstone has acquired Apollo 10. We'll stand by until we have a good strong signal and then we'll pass that word up to the crew for another attempt at television. PAO Apollo 10's distance from the moon is 9028 nautical miles. It's velocity in reference to the moon 4283 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1223, GET 7234 258/1

CAPCOM Hello, Apollo 10, Houston. Goldstone has a good acquisition. We're GO for TV, over. SC Okay, Charlie, we'll get you going

right now.

CAPCOM

SC Hello, Houston, Apollo 10. Our monitor shows a good picture of the earth. How are you doing?

CAPCOM 10, we haven't got our signal yet. Stand by.

Rog.

PAO

Picture coming up now. Okay, Apollo 10, Houston. We're

CAPCOM Okay, Apollo 10, Houston. We're getting it in black and white now. Stand by for the color. We've got the color now, Apollo 10. We have the earth and the center - correction - it seems to have a bluish tinge to the background. We see a very bright blue, pale blue I should say, in the center of the earth right near the terminator. Could you describe that for us, over?

Right, you can see the South Atlantic SC Ocean there and the orange spot to the right is the North African Continent. You can see basically the Sahara Desert and above that the Mediterranean Sea. The rest of the world is pretty much encased in clouds. The solid cloud cover that's covered the North Pole and most of Europe is still with us today. At this time as we look at the earth we are 210,000 miles away. We've only got about 9,000 miles to go to the moon and we're traveling approximately 2500 miles an hour relative to the earth. Also, in about 15 minutes we will enter the shadow of the moon and make our major burn to enter lunar orbit in approximately 3 hours. And also in about 15 minutes we will enter the shadow of the moon and make our major burn to enter lunar orbit in approximately 3 hours. Now at this distance the earth looks slightly smaller than a tennis ball to us and a little bit larger than a golf ball, and I hope it shows up the same way on your screen.

CAPCOM 10, it's a -

SC And again South Africa - go ahead, Charlie.

CAPCOM Roger, I was just going to add that we can see the northern part of Africa. We had a bluish tint to it at first but now it's coming in to a sort of orangish brown and we can see the South Atlantic and the cloud cover very well. The colors are very good, over.

SC Roger, again the Sahara Desert, the Atlas Mountains, Morocco, Libya we can see from here. It is an orange - brownish orange. The night time, the terminator -

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 72:39, CDT 1228 259/1

SC A brownish orange, the night time, the terminator has cut across the Suez Canal and most of Egypt and is now covering most of South Africa. I can see Spain. It is a greenish brown and is completely contrasted with respect to North Africa. However, you may have difficulty seeing it on your set due to resolution at this distance. Again, you can see Brazil, but it is covered mostly with clouds at this time.

CAPCOM	Roger, 10, we haven't - we can see -
SC	Houston, Apollo 10.
CAPCOM	Go ahead. Go ahead 10.
SC	Roger. This - Roger. At this time

Apollo 10 is going through the preparation for the lunar orbit insertion burn and the next - after we lose contact with the earth the next time that we come around we will to have contact with the earth we'll be at approximately a 60 mile by 170 orbit around the moon. Right now we can not see the moon even though it is rapidly accellerating it towards us - towards it by it's mass. Over.

CAPCOM Roger, Tom, we copied. A very good description. We have difficulty seeing any land mass in our picture except for North Africa, and we can see the terminator cutting across Africa. Europe, the land masses of Europe, are just sort of fade into a bluish color. It looks like an ocean to us. Over.

SC Right. Really, the only major land mass we can see is exactly what you can see on your set there, and that is the North African continent. Most of Europe is covered either by high clouds or some scattered low clouds and it's very difficult for us to see it, too. We'll give you a quick shot on the interior now, and then we'll terminate this pass. We'll go inside now.

CAPCOM Roger, thank you very much for the view. We'll be standing by for the inside.

CAPCOM Hello Apollo 10, Houston. You are coming in on the black and white monitor now.

CAPCOM 10, we have the color now. The resolution on the 85 is I think better than most expected here. The sun is pretty bright in the background coming in through the - I guess that's the hatch window. No, side window I guess it is. The patch is visible but it's pretty dark due to the background being so bright.

CAPCOM

10, do you read? Over. Go ahead, Charlie.

CAPCOM Roger, thought we had lost voice there for a moment. You're coming in 5 by now. We've got your arm patch now that's very dim at this setting. We had Gene's smiling face there for a minute along with your patch. The flag is coming in a little bit better now. However, it's still APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 72:39, CDT 1228 259/2

CAPCOM pretty dark due to the bright background. That's a lot better there, 10. Over.

END OF TAPE

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APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1233, GET 7244 260/1

CAPCOM - that's a lot better there, 10, over.

CAPCOM There. We have a good view now. Now we can see Gene again.

CAPCOM We see you waving, Gene. Barbara is in the viewing room. She says hi.

SC A little difficult to get the proper lighting up here, Charlie. Spots flood it out and we've got to deflect the light.

CAPCOM Roger, we see you trying hard on the thing. It looks like the ALC is averaging out and the background looks real good, the spacecraft back along the hatch. Tom's hand covering his window is real clear, his face is dark though. Over.

SC That's those whiskers there, Charlie. CAPCOM I see. Thank you very much, John, that wasn't quite -

SC That's known as a 72-hour shadow, Charlie.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1234, GET 7329 261/1 - you're coming real great, over. CAPCOM SC Okay. And the overhead hatch window there. SC 10, Houston. We see some streaks CAPCOM on your hatch window. Could you comment on those? SC Yes, they come from the dumps that we're making overboard as we progress along. I don't think any of them are due to the thruster burn, Charlie. CAPCOM Rog. SC Houston, the hatch window is phenominally clear. There is what appear to be a few dump particles on the outside, maybe a couple of smear prints on the inside. The right-hand window has got a little bit of a smear on the outside, not necessarily particles, but just a general smear, and the left-side window has got some definite particles lashed across it. We're not very good at this camera SC work, but we will probably improve with practice. SC We will show you the navigator down in the LEB. CAPCOM Roger, 10, we have no complaints at all. That's a pretty good show. He's the star of the cast because SC he gets all the good light down there. Rog. There's old John's smiling CAPCOM face. SC (laughter). SC John's pointing right now at the sextant and the telescope, which are our navigation means to get home. And hopefully, to do part of the rendezvous. Yes, this is the best working part SC of the whole machine. It's really working beautiful now. CAPCOM Got a good operator. CAPCOM 10, Houston. Show us a piece of tape that you have around the eyepiece. One on the bottom of the sextant SC and on the right-hand side of the telescope. CAPCOM Roger, thank you much, Gene. We see it. SC You know, once you lose the thing in here and you have to look for it for about 20 minutes, you find a way not to lose it again. SC Well, it wasn't quite 20 minutes, but it sure was a scramble going for it, I'll tell you that. CAPCOM Roger, we copy. We have you entering the lunar penumbra at this time. Do you notice the sun setting at all? Over. SC Can't see the sun right now, Charlie. CAPCOM Roger.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1234, GET 7329 261/2 SC We're not in the right attitude to see it. SC In this attitude, to look at the earth and everything, we can't get a picture of the sun that we can see. If there is any solar corona, we will give it a quick shot. CAPCOM Roger. Jack is estimating you will have about 30 seconds only, over. SC Okay, Charlie. It appears that the sun's reflection on Snoopy here is getting a little bit dimmer, so we very well could be where you say we are. I hope we are. Your friendly FIDOs will bet on it. CAPCOM SC - some navigating now. SC Yes, I guess we are too, aren't we? CAPCOM Rog. SC I never doubted them anyway. just - like I said yesterday, I'll wait until I see that 60 nautical miles. CAPCOM 10, Houston. Does it look any different upside down there? The stars are 180 out of the posi-SC tion they were before. That's one thing about this envi-SC ronment, if you don't like it, just turn upside down. CAPCOM Roger, 10. SC Okay, Charlie, we will terminate this pass with one quick look outside to see how the 210foot dish looks at the earth from outside, okay? CAPCOM Roger, 10, we are standing by, over.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1240, GET 7251 262/1

Does it look any different upside SC down, Charlie? The stars are 180 out of the posi-CAPCOM tion they were before. That's one thing about this environ-SC If you don't like it just turn upside down. ment. CAPCOM Roger, 10. Okay, Charlie, we'll terminate this SC pass with one quick look outside and see how the 210-foot dish looks at the earth from outside, okay? Roger, 10, we're standing by, over. CAPCOM Charlie, it's definitely getting a SC little darker outside. Roger, 10, that's good news, over. CAPCOM Looks like we're right on trajectory SC Okay, here's another look at the earth through the then. 210-foot dish at Goldstone, and I hope the colors are coming through a little better. Again, the west coast of North Africa is still a bright orange and the central part of North

Africa is starting to turn purple as nighttime approaches over the western part of Libya and the eastern part of Tuni-Again, it's awful hard to see Spain because Spain is sia. a greenish-brown this morning. You have the Mediterranean and the Atlantic covered with some clouds. So it's awful hard to see any part of Spain. But again, the earth to us this morning looks a little bit smaller than a tennis ball as we're 210,000 miles from the earth and now less than 9,000 miles to go to the moon. This is Apollo 10 signing off. We'll see you later today.

CAPCOM Thank you much for a good show, 10. Appreciate it. The 210-foot dish is giving us a very good resolution and the colors are a lot sharper, over.

SC Charlie, I can just see a little bit of reflected sunlight now out on the left thrusters. Τ believe it's probably from the earth over on the left side.

Roger, 10. We think it might be CAPCOM earthshine. We have an update to your LOI 1 burn card, over. SC Stand by a second.

CAPCOM

Roger, no hurry on this.

That was Gene Cernan describing

PAO Apollo 10's entry into the lunar umbra, the nighttime of the moon. The early part of that TV transmission was through the 85-foot antenna. We then acquired the 210-foot antenna and had a better picture. And Mrs. Gene Cernan watched this television show from the viewing room here in the Control Center.

PAO

At 72 hours, 57 minutes Apollo 10

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1240, GET 7251 262/2 is 7,987 nautical miles from the moon. It's velocity, 4,360 feet per second. That's with a lunar reference. SC Hello, Houston. Houston, this is Apollo 10. How do you read? CAPCOM Reading you 5 by, 10. Go ahead, over. Hello, 10, Houston. We just had CAPCOM a handover to Goldstone. Do you read now, over. Oh, yes, I thought that was us. SC We're back up high gain narrow beam, Charlie. CAPCOM Roger, 10. Network has just advised that we won't hand over till 7305, over. SC You will not hand over till 7305, And what is that update you have for us? okay. CAPCOM Roger, it's two of them. One for your LOI burn card. We have some updates to your angles. And we have a map update rev number 1, over. SC Okay, give me the rev l first, Charlie. CAPCOM Roger, LOS is 0754825, 0755252, 0762258, over. SC Okay, I've got map update rev 1 0754825, 0755252, and 0762258. Rog, that was a good read back, over. CAPCOM SC Okay, and go ahead with your update on the preliminary LOI. Roger, it's on your burn card that CAPCOM you have - that it's an update to the roll, pitch and yaw angles. Roll is now 179 degrees, pitch 68 - that's 068, yaw is Oll, over. SC Okay, Charlie, that must be for the abort card, right? CAPCOM That's affirmative, 10, over. SC Roger, roger. SC Okay, Charlie, I got roll 179, pitch is 068 and yaw is 011 on the LOI 15-minute abort card. That's affirmative, over. CAPCOM SC Okay. PAO This is Apollo Control. Those times that were passed up on the lunar revolution number 1 map update, the first time was the loss of signal time. That's 75 hours, 48 minutes, 25 seconds. The second time is, which Apollo 10 will pass 150 degrees west, was 75:52:52. And the third time was the acquisition of signal time, 76:22:58. We're 2 hours, 49 minutes, 46 seconds away from the lunar

orbit insertion burn according to the preliminary maneuver pad passed up to the crew a short time ago. This time will APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1240, GET 7251 262/3

be updated again prior to that burn. We expect to update the LOI pad about 74 hours and 10 minutes, and that ignition time may change a little bit.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 73:06, CDT 1255 263/1

DEAD AIR

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1325, GET 7326 264/2

CAPCOM Hello, Houston - correction, hello Apollo 10, Houston. We have your final LOI 1 pad ready to go and your P27 update. If you are ready to go with this, we are too, over. Roger. I'll - for the P27 update, SC I'll go into CMC accept now. CAPCOM Roger. SC You are in accept, over. Roger, 10, out. CAPCOM Okay, Charlie, I'm ready for the SC final LOI 1 and make it a good one. CAPCOM Roger, 10. This is LOI 1. SPS G&N 62554 + 095 - 017075555331, NOUN 81 is - 29138 - 05612 -0229 correction 02997355230342, apogee is 01692 + 0059529824 55429752, sextant star is 162146394, the rest of the pad is NA. Okay, your set stars are the same; your roll align is 241240 and 013, no ullage. The LM weight is the same, over. SC Stand by one. Houston, this is 10 with the read-SC back. CAPCOM Go abead. SC LOI 1 is SPS G&N 52554 + 095 - 017 075555331 - 29138 - 05612 - 0299735523034201692 + 0059529824 55429752162146394, rest of pad is NA. We've got Vega, 36 Deneb 43, roll is 241, pitch is 240, yaw is 013, no ullage, and the LM wieght is 30727. CAPCOM That was a good readback, 10. Gene, how was my readup? Was it too slow, too fast, or - comments, over. SC No, very good, Charlie, just right. CAPCOM Roger, out. Houston, Apollo 10. The uplink is SC coming through in good shape and I wish you would pass on to Jack Schmidt this message. The message is "would you believe the minimum stop on the 250-mm lens is 5.6. We do not have an F4 on the 250-mm." Over. Roger, 10. We will pass that on to CAPCOM And if no LOI 1 burn, you can expect AOS at 0761221. him. Okay, without an LOI burn, AOS will SC be 0761221. CAPCOM Affirmative, out. Hello, Apollo 10, Houston. We have CAPCOM your torquing load and state vector in. The computer is yours, over. SC Okay, thank you. PAO This is Apollo Control at 73 hours 38 minutes and we have just completed passing up the final lunar orbit insertion burn pad. It calls for an ignition time of 75 hours 55 minutes 53 seconds. A delta V of 2,982.4
APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1315, GET 7326 264/3

feet per second; duration of the burn 5 minutes 54 seconds. That burn is targeted for an apocynthion of 169.2 nautical miles, with a pericynthion of 59.5 nautical miles. Charlie Duke also passed up to Gene Cernan the acquisition time given no LOI burn. If the LOI burn does not take place, we will acquire Apollo 10 at 76 hours 12 minutes 21 seconds. We had earlier passed up an acquisition time for a good LOI burn at 75 hours 48 minutes 25 seconds.

PAO And the Environmental Control Officer William Burton has reported to Flight Director Jerry Griffin that he saw the evaporator take a drink and he feels warmer.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1330, 73:41 GET

PAO This is Apollo Control, with a correction. That last time I gave you is the LOS time, 75:48:25. Acquisition time with a good LOI burn is 76:22:58. We'll continue to stay up live here, for any conversation. In the meantime, let me recap those times.

CC Houston; do you have any questions for the standard setting for the 250 millimeter lense in lunar orbit; over.

SC No - it looks like we're going to have to use an F 56 and 1/25 since the 250 millimeter lense doesn't have an F4 on it.

CC Roger, Tom. I was just talking to Jack here and he says we would like to use an F5.6 at one two fifteth except near the terminator, and then go down to one, one twenty fifth; over.

SC Okay, we'll do that. CC Roger.

PAO This is Apollo Control. Apollo 10 will go behind the moon and we will lose signal at 75 hours, 48 minutes, 25 seconds. If Apollo 10 does not do the LOI burn, we will reacquire the spacecraft at 76 hours, 12 minutes, 21 seconds. If the LOI burn is a good one, we will reacquire Apollo 10 at 76 hours, 22 minutes, 58 seconds. We now have clocks counting down in the Control Center to LOS and to ignition. We are showing 2 hours, 3 minutes, 10 seconds to loss of signal, 2 hours, 10 minutes, 35 seconds to ignition.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 73:51, CDT 1340 266/1

PAO This is Apollo Control at 73 hours 56 minutes. Apollo 10 is 5463 nautical miles from the moon, velocity 4640 feet per second. Flight Dynamics Officer Phil Shaffer reports that at the time of lunar orbit insertion Apollo 10 will be 98.4 nautical miles from the moon and 215 847 nautical miles from the earth.

COMM TECH Goddard Voice, Houston COMM TECH. GOSS conference. GODDARD V Goddard Voice.

COMM TECH	Roger, read you loud and clear. How me?
GODDARD V.	Roger, you are 5er also.
COMM TECH	Thank you.
GODDARD V.	You are welcome.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1351, GET 7402 267/1

	CAPCOM		Hello,	Apollo	10, H	ouston.	We'd	
like	to give	you a h	ack on	your m	ission	time,	over.	
	SC		Go ahea	ad, Hou	ston.			
	CAPCOM		Roger,	10. 0	n my m	ark it	will be	
74 h	ours, 14	minutes	even.	Stand	by, m	ark 74:	14.	
	SC		Roger,	Housto	n, Apo	110 10.	We're	
synce	ed right	on with	you.					
	CAPCOM		Roger.					
	PAO		Charli	e Duke	gave To	om Staf	ford that	
mark	2 second	ds early	becau	e Apol	10 10	is at a	distance	now
in w	hich the	re is a	2 secon	nd dela	y in c	ommunic	ations.	

PAO This is Apollo Control. There are five astronauts at the CAPCOM console at the present time. The two regular CAPCOMs for this shift, Charlie Duke and Bruce McCandless, and in addition, Gordon Cooper, Commander of the backup crew for Apollo 10, Ed Mitchell, the backup Lunar Module Pilot, and Dr. Jack Schmitt, the scientist astronaut who is a geologist and who has worked with this crew on lunar geology.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1406, GET 7417 268/1

SC Houston, Apollo 10. CAPCOM Go ahead, 10. SC Roger. Been reading our DSKY? Roger, sure have. That shows the CAPCOM star angle difference and the P52 and also the torquing angles, over. SC Roger. Looks real good. We've also done our sextant star check and we're right on. We've pulsed around here to the maneuver attitude, and we're just standing by. CAPCOM Roger, 10, we show you in attitude. And 10, Houston. We have an hour and 26 minutes to LOS, over. SC Roger, 1 + 26 to LOS. SC Houston, Apollo 10. Do you have any updates as to when we will have sunrise on this pass? CAPCOM Stand by. Hello, 10, Houston. We show sun-CAPCOM rise at 74 hours and 50 minutes and 11 seconds, over. SC Roger, 745011.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1433, 74:44 GET 269/1 This is Apollo Control at 74 hours PAO and 44 minutes and Charlie Duke is talking to Gene Cernan. Hello Houston; Apollo 10. SC Go ahead 10: over. CC I cycled the cryo fans at about 71 SC hours: should we go shead and cycle them again before this burn? CC Stand by. Hello Apollo 10, Houston, We'd like 0.0 you to stir up the cryos again when you normally do it in the preburn checklist; over. Okay, fine. And Houston, in looking SC at the earth right now, looking at the south Atlantic off the coast of South America, in about the center of the globe, is a very bright, very, very bright reflective light you can see it with the naked eye and then again see it with the monocular; its a very brilliant spot, just a spot, intense light from the earth. Roger; in the South Atlantic, 10? CC Over. Yeah, I think it looks to me like SC its right smack in the middle of the subsolar point. Just a continuous white, bright, brilliant light - just a pinpoint. 10 - Houston - we'll check it out CC with the guys in the back and see if they think that's the subsolar point or just a reflection - angle of incidence type thing; over. I'm sure its just a reflection but SC its the first time I've ever seen anything like that. Roger; we'll see if we can come up CC with some ideas -SC As a matter of fact its -Okay, the brilliance of the light is just now fading and it definitely is in the middle of the subsolar point and its - the reflection is totally gone at this time. CC Roger; copy. SC But when it was there, it was bright and brilliant. CC Copied; over. CC Hello Apollo 10, Houston. We have 2 comm switches for you, so we'll switch you in lunar orbit comm configuration. These are S band auxillary to downvoice backup and tape recorder forward to forward. Over. Roger Charlie. Do you want those SC now?

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1433, 74:44 GET 269/2 CC That's affirmative, 10, over. SC Okay - tape recorder to forward; and I'll go down voice backup - does that also mean you want the voice switch to OFF? CC That's negative, 10; over. SC Okey doke. We are now in down voice backup; tape recorder is forward and that's the only two changes. That's affirmative 10. And we've CC pulled the room and you are GO for LOI; over. SC Thank you. PAO This is Apollo Control at 74 hours, 50 minutes. We are 58 minutes, 4 seconds away from Loss of Signal when Apollo 10 will go behind the moon. We are 1 hour, 5 minutes, 23 seconds from the LOI burn. Here comes the sunshine. SC We copy 10; at 74:50 thereabouts. CC SC That's right. It's nice to have a little pad of darkness in there to go out there and do a good alinement where you can nicely recognize the constellations. CC Roger; we copy 10. CC How do they compare with the CMS? SC The stars are better. PAO That was John Young reporting sunrise. SC Preset point. We'll take one next time around Gordo. I'll bet it looks like Vulture's Row down there today, doesn't it? Yep. You can't stir 'em with a CC stick down here. SC We just turned a page in the flight plan and we certainly appreciate the insert that you put in there. CC Roger. SC Houston, Apollo 10. We still have a beautiful view of the earth right out through the center hatch window. It was just a little bit smaller than a tennis ball this morning; it's right now about the size of a hand ball. CC Roger, 10; we copy; that's a pretty good eye. SC Don't let 'em fool you Charlie; it looks like a dime to me. PAO That was Gene Cernan's comment there at the last. CC Fred says when it gets to look the size of a squash ball, let him know. CC Roger. PAO The backup Command Module Pilot Donn Eisele has joined the rest of the backup crew here in the Control Room.

APOLLO 10 COMMENTARY, 5/21/69, CDT: 1433, 74:44 GET 269/3

Apollo 10 is 3 012 miles from the PAO moon, velocity 5201 feet per second.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 74:54, CDT 1443 270/1

Hello Apollo 10, Houston. We'd like CC you to select OMNI ullage so we'd get a couple of minutes of high bit rate. Over. SC Houston. This is 10. You ought to have OMNI Charlie now. CAPCOM Roger, 10. We're reading you 5 by. Out. Houston, Apollo 10. We'll start through SC the P30 and P40 series at approximately 75:30. Over. CAPCOM Roger, 10. We copy. We'll be watching. SC Okay, Charlie. PAO This is Apollo Control at 75 hours, 14 minutes. Apollo 10 is 1892 miles from the moon. Lunar reference velocity 5723 feet per second. We're 34 minutes away from loss of signal, and a little over 41 minutes away from the lunar orbit insertion burn.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1504, GET 7515 271/1

This tape is blank.

APOLLO 10 COMMENTARY, 5/21/09, CDT 1518, GET 75:29 272/1

PAO This is Apollo Control at 75 hours, 29 minutes. Apollo 10 is 1134 nautical miles from the moon. Lunar reference to velocity 6,345 feet per second. Tom Stafford has just informed us that he is going into some of the computer programs preparatory to the LOI burn.

SC Houston, Apollo 10. We'll start through the P30P40 series now. Over.

CC Roger, 10. Standing by. SC Okay. And we know what that is. That is due to the conic intergration.

Roger.

CC

PAO The command module computer is now in program 40, the service propulsion system thrusting program, as the Apollo 10 crew gets prepared for the lunar orbit insertion No. 1 burn which will take place 22 minutes, 20 seconds from now. They will be behind the moon at that time behind the contact with the earth. Loss of signal 14 minutes. 39 seconds from now. Apollo 10 is reported to be maneuvering to burn attitude at this time. The LOI maneuver will be a retrograde burn with the spacecraft pitched up 22 degrees. There will also be some out of plane component in this burn to take care of the rest of the maneuver needed to place Apollo 10 on the proper inclination across the lunar equator. The first part of this maneuver was done during midcourse burn, be completed during the LOI burn.

SCWe can read our DSKY, we'vetrimmed and we're in a trim attitude and as far as our checklist we are minus 6 minutes, waiting.CCRoger. We copy, 10. We have you

holding at minus 6 minutes.

CC 10. Houston, one reminder. On the high bit rate, it's 30 seconds. Over. For the burn. SC Roger. Understand. Go to high bit rate. We've got that on our checklist, we'll make sure we'll go there 30 seconds prior to the burn. CC Roger.

PAO Following a good LOI burn Apollo 10 will be on the exact ground track that Apollo 11 will have. SC Houston, we've got a bunch of clocks running in here, but just in case, give us a sync hack in 10 minutes, will you? CC Roger. We'll give you a hack

in 10 minutes. Over.

PAO Apollo 10 is now 9 minutes away from loss of signal. It's distance from the moon is 681 nautical miles, velocity 6,916 feet per second.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1528 GET 7539 273/1

Houston, Apollo 10. Just tried SC looking out as far as we could out the top hatch window. still can't see the moon but we'll take your word it's there. Over. Roger. 10. That's a guarantee-CC its there. Over. SC Okav. PAO That was a trusting Tom Stafford. It's there plus 60 miles. SC I'll guarantee you on that. CC Our Trench guys - guarantee 60 by CC 170 on your, if you can burn on the P40 number. Man the beers on me. If it's 60 SC by 170. We'll take that. CC And if it ain't, we don't have to SC worry about it. PAO That was Gene Cernan. PAO And we're coming up on 3 minutes Mark 3 minutes. to loss of signal. Apollo 10. Houston. On my mark it will SC be 10 minutes to ignition. Over. SC 10 Roger. CC Apollo 10, stand by for mark 10 minutes. Mark 10 minutes ignition. We're synched. SC CC Roger. And again he gave you that mark PAO 2 seconds early to allow for the lag time in communications. SC Apollo 10, Houston. 2 minutes to LOS everybody here says got to be. Okay and then we'll see you on SC the other side in orbit. CC Roger. 76,22,55. SC We'll be calling you. PAO There's LOS right on the numbers. And as Apollo 10 and its crew goes behind the moon they're 7 minutes 16 seconds away from the lunar orbit insertion burn. That burn scheduled for 75 hours, 55 minutes, 53 seconds. Total Delta-V of 2,982.4 feet per second. Burn time of 5.54 minutes 5 minutes, 54 seconds. PAO This is Apollo Control. As Apollo 10 went behind the moon we were showing a distance of 256 nautical miles from the moon, velocity of 7,770 feet per second and a spacecraft weight of 93,281 pounds. They were in a good lunar orbital insertion burn. We should reacquire Apollo 10 in 20 minutes, 52 seconds as an elapsed time of 76 hours 22 minutes 58 seconds.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1528 GET 7539 273/2

PAO Mark 3 minutes to LOI burn. We won't know how this maneuver has gone until we acquire Apollo 10, as it comes around the front of the moon.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1543, GET 7554 274/1

One minute to LOI. 5 seconds. POA Ignition in Apollo 10 should be burning now. And at that time of ignition Apollo 10 was 98.4 nautical miles from the Moon, 215,847 nautical miles from Earth. We have 2 clocks counting in the control room now. The top clock reading AOSCM. It reads 25 minutes, 8 seconds. That's the acquisition of signal time with a good LOI burn. The bottom clock reads 14 minutes, 24 seconds and that is the acquisiton time if Apollo 10 did not perform the burn. Flight Director, Chris Kraft describes the attitude in this Control Center now as anticipatory. It's very quiet in this Control Room right now. A few conversations going but not very many. Most controllers sitting at their consols very quietly. The entire Apollo 10 backup crew is here in the Control Center, Gordon Cooper, Don Eisele, and Ed Mitchell, 2 CAPCOMS, Charlie Duke and Bruce McCandless. Jack Schmitt is still here. Deke Slayton, the Director of Flight Crew Operations is here talking at the moment with Dr. Robert Gilruth the Director of MSC. George Low the Apollo Spacecraft Program Manager is here with Chris Kraft, the Director of Flight Operations. Lt. General Samuel Phillips the Apollo Program Director is seated next to them. On the other side of General Phillips is George Hage, the Mission Director. We understand that Dr. Kurt Debus, the Director of the Kennedy Space Center and Dr. von Braun, the Director of the Marshall Space Flight Center are in the viewing room. We'll try to get a list of some of the other people in the viewing room. And this is Apollo Control. Among other distinguished visitors in the viewing room are Dr. George Mueller, the Associate Administrator for Manned Space Flight NASA, Mr. Lou Evans, the President of Grumman Aircraft Engineering Corporation, the prime contractor for the Lunar Module, and the Vice President for Space of that company, Joe Gavin. The manufacturer of the Command Module, Charlie Brown, is represented by William Bergen, President of the Space Division of North American Rockwell. And Rusty Schweickart who was the Lunar Module Pilot on the Apollo 9 mission is in the viewing room.

APOLLO 10 COMMENTARY, 5/21/69, CDT 1518, GET 76:09

PAO --- and the lunar map has replaced the world map on the big board in front of the control room. We are a minute 23 seconds away from the time we should acquire Apollo 10 if the lunar orbit insertion burn was not performed. We are 11 minutes 45 seconds away from acquisition of signal with a good lunar orbit insertion burn.

PAO ---and we've past the time for AOS if we didn't have a burn and there is no data. As Chris Kraft just said, "SILENCE"; and he counted down the last five seconds of that time out loud.

PAO We are 6 minutes away from the time we should be hearing from Apollo 10.

PAO 3 minutes, 56 seconds away. We are waiting.

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 16:08, GET 76:19 276/1 We're waiting. PAO PAO Mark 2 minutes. PAO One minute. Everyone here is watching displays and PAO listening. PAO 30 seconds. PAO 10. PAO We have AOS. We are getting data. We don't have any PAO voice communication yet, but at the time we got data indicates that was a very good burn. CAPCOM Hello, Apollo 10, Houston. Over. SC Roger, Houston. Apollo 10 can tell the world that we have arrived. CAPCOM Roger, 10. It's good to hear from you. Boy, you wouldn't believe this thing. SC PAO That was John Young. SC The guidance was absolutely fantastic, and we'll give you the - the burns right now. SC This engine is just beautiful. SC Charlie, my hat's off to the guys in the trench. I love them. Yeah, kiss that man that runs MSFN. SC I don't know whether I can do that or not, CAPCOM but I'll say thank you. SC Okay, Charlie. You ready to copy our burns? CAPCOM Go ahead. SC Yeah. Say thank you big. You ready to copy the post burn report? CAPCOM Roger, go. SC Okay, the burn was on time. The burn time was 5 plus 56. Our real pitch and yaw and angles guidance was all good. Our residuals were 0 minus .2 and 0. DELTA VC read 7.0 - that's minus 7.0. The fuel remaining is 37.7 per-Oxidizer is 39 cent. END OF TAPE

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1615 GET 7626 277/1

SC -fuel remaining is 37.7 percent, oxidizer is 39.5 percent. The unbalance I liked to talk about the present unbalance is 500 increase. We're in a 169.1 by a 59.6. The chamber pressure increased smoothly throughout the burn from 98 to 103 with no apparent discernible jump at 2nd ball valve initiation. I take that back Charlie. It bounced up to 98 and then slowly from 98 to 103 with all 4 ball valves on. The unbalance-are you still with me?

CC Roger. Go ahead. Standing by. Over.

Okay. I watched the unbalance SC go from where we left it at 200 decrease from the short I didn't touch it until after everything settled burns. down after we were in a burn for 30 minutes. At that time the unbalance was 300 to 350 decrease. I put the oxidizer flow valve in a decrease position. I brought it up to zero. I closed it and then it started on up. After it had about 150 increase it put it to increase and it held, it barely held it, and it creeped up from like 250 to the present point at 500. I actually neutralized the flow valve at about 20 seconds before the burn ended and when I put it to normal, valve increase went from about 400 to 500.

Roger. We copied 10. It looks CC like you really having a rise. It was a great burn. SC And the oxidizer, the oxidizer fuel remaining agree very accurately with the onboard graph I have of the unit pressure which is about 1750 right now. CC Rog. We copy 10. SC And the first view I had of the moon was reflected in the overhead window of the LM. How does that grab you? That's great. CC PAO That's Gene Cernan with the post burn report. SC Hello Houston. You'd have to see this planet to believe it. CC Roger 10. We've got the FIDO looking at your radar. Residuals are very small. Give us a chance to track a while and we'll confirm. Over. SC Okay Charlie. You don't think I think it's confirmed as far as I'm concerned. its go. Rog. We're committed 10. It CC looks that good. PAO That's John Young that's convinced there. CC How's the view 10? SC We have our student geologists here overlooking the surface and they'll report in a minute.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1615 GET 7626 277/2

Standing by. Over. CC Roger. Okay. We're just passing from SC the highlands over into the MARE area and you can pass on to Jack we caught a couple of real pretty volcanos, there's no doubt about it and we got a couple of good high resolution -photos and it still looks kind SC of brownish gray to us here, over. CC Roger, we copy. Here out. SC There were places back there wher There was one volcano, whatever it was, this and that. it was all white on the outside but definitely black on top of it. CC Roger. SC Charlie. It might sound corny but the view is really out of this world. Roger. (laughter) We had a couple CC of comments (laughter) from the back row that I won't repeat. Those first words we have received PAO were from Tom Stafford and John Young commented and then Gene Cernan gave the post burn report. That was also Tom with reporting two volcanos and then John Young came back in with the description of what looked like a volcano black around the top. Hello Apollo 10. CC Houston. We have a map update for Rev 2 if your ready to copy. Over. SC Stand by. Okay Charlie. SC Go ahead. For LOS 774759, 775827, 783119. CC we've got a sun rise time of 775140 and a sunset of 791333. Better put your rate back over. Okay Rev 2 is 774759, 775827, and SC Sunrise is 775140 and sunset is 791333. 783119. CC Roger. CC 10, Houston. According to our maps we have you coming up on the sep of waves and to your left Langrenus. This is Apollo Control at 76 hours, PAO 34 minutes and as you've heard Gene Cernan reported that burn was right on time. Duration was 5 minutes, 56 seconds. And the murmur of almost unbelieve ran through this Control Center when they read out those residuals. Zero minus two-tenths and zero. The onboard reading of the orbit lunar orbit for Apollo 10 was 169.1 nautical miles at the burn 59.6 nautical miles percynthion. We were shooting for 60 by 170. SC See the Sea of Crises up here. That's the first real thing seems to recognize it. Boy its really stands out. CC Roger. We copy.

3.8.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1615 GET 7626 277/3

PAO That was John Young reporting he could see the Sea of Crises - stands out very well. SC Houston, Apollo 10. One thing about the orbital light up here in the track. It's considerably slower than around the earth. CC Roger. We copied 10. Over. SC Also looking out at the horizon, some of the mountains we can see down here that's going to be a real pic tomorrow down at 50,000 feet. Over. CC We copy that. PAO That was tom Stafford.

APOLLO 10 COMMENTARY, 5/21/69, CDT 1625, GET 76:36 278/1

SC ----over. CC We copy that. PAO That was Tom Stafford. CC 10, we're expecting an appropriate comment tomorrow. We'll use the right words. SC This will be our fox. Charlie. CC Roger. PAO And the people in the trench that the crew showered the praise on are the Flight Dynamics Officers whose consoles are on the front row in the control center. That area is referred to as the trench. And Fido wants to get some tracking PAO before he commits himself on the orbital parameters, but he expects them to be right on nominal. Very, very close. We've got Langrenus now out here SC off the -- it depends on which way you roll, but off to the one side here. Very beautiful sharp peak right in the center. CC Copy, 10. SC Yes, and it appears our water boiler is working, too. Roger, we confirm that. We picked CC it up a moment ago. CC Apollo 10, Houston, we are working on a time for you to cross to site 1 and did you attempt to call a second ago. Over. SC Negative. I don't think so, Charlie. Over. CC Roger. PAO We are showing spacecraft weight now at 69,493 pounds. Apollo 10 losing a lot of weight in that long LOI burn. The weight at LOS was 93,281 pounds. CC Hello, Apollo 10, Houston. We have a time crossing a latitude for -- correction, longitude for site 1, 764900. Over. SC Go. Roger. Roger, Charlie, and I think we are SC coming over the taruntius twins now. Looks like we've got them real clear. CC Roger. WE copy, 10. What is your early estimate of landmark tracking ability. Jack do a good job for you? You've got a lot of good landmarks? SC Starting to look just like Nasa Road 1 out there now. CC Sounds really great. Over. SC Roger. Just wait until this afternoon. At the speed we are traveling, that TV camera with the zoom should really give you a fantastic picture.

APOLLO 10 COMMENTARY, 5/21/69, CDT 1625, GET 76:36

CC We're standing by. PAO Nasa Road 1 is the road in front of the Manned Spacecraft Center. SC Hey Charlie, you will be glad to know we are walking right up our LM chart, right up our track in the Apollo ridge right new. We've just seen the four Tarentius, Papa Kilo, Hotel and George, we've seen Big Tarentius. We're looking at Messier and Messier A and Secchi K ought to be coming up -- and that's Secchi. CC Roger. We copy, 10. We are following along with you. PAO That was Game Cerman calling out those landmarks along the ground track. SC We're Bl right now, come to think of it. CC Roger. we copy. SC Houston. Secchi is very well defined as we come to the Apollo ridge. The rill perpendicular to the ridge and parallel to the ridge is very well defined in this area. The chicken track area is very easy to see from this altitude. CC We copy, 10. END OF TAPE

278/2

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1635, GET 7646 279/1

CAPCOM 10, Houston. If you near site 1, if you get a chance could you comment on the volcanic cones on the highlands south of track, ever.

SC Houston, Apollo 10. We're right over Serenitatis at this time at least through my hatch window, over.

CAPCOM Roger, Tom. We copy. We're plotting you right along, over.

SC And I've got the terminator out my window coming up. It sure makes the landscape look a little different.

CAPCOM Roger, 10. Could you comment on the shadows as you come up to the terminator and your ability to detect land marks in that area, over.

SC I think it's going to be real good. Just like the 8 guys said, you can see down into these shadows.

Roger, good show, John.

SC Like, I'm looking at - down at one crater and their's a crater that's underneath the shadow but I'm not having any trouble at all seeing it from here.

CAPCOM Roger.

CAPCOM

SC

SC

SC Okay, we've reached 208 inertial and we'll just hold this attitude around since this is the same attitude as per Flight Plan.

CAPCOM Roger, we copy.

There is no doubt about it.

This Mare area out here is darker than the other. It looks like it's turning nearly black where before looking out there looks like a light shade of grayish-brown and I bet that TV camera will show it to you pretty good, over.

CAPCOM Roger, we're standing by for the TV and stop in orb rate at 208 inertial, over. SC Charlie, I got Theophilus

right on the terminator here and you can see well down into it. It's got a very pronounced central peak which is not nearly as high as the rim and its got a little rim crater just on the inside which is very easily distinguishable. And in just preceeding it at 30 east and about 11 south, the small crater preceeding it in contrast has no central peak that's visible.

CAPCOM Roger, 10. We've located you on a map. Go ahead, Tom.

Yea, well I'm right over

Maskelyne and Maskelyne B new to be leading right into landing site 2. APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1635, GET 7646 279/2

CAPCOM Roger, we've - keeping a check on all your systems. Everything looks great to us. You've got a great spacecraft.

SC And Sidewinder Rill and Diamondback Rill stand out just tremendous here. We're just about to cross the terminator.

CAPCOM Roger.

SC Boy, that's really something there. I don't see why the fish aren't dumped down that creek. And Torricelli is off to the right on foreward window very easily distinguishable at this Sun angle. Those Rills are something else again.

CAPCOM 10, Houston. We'll have you coming up on site 2 at 7653. You might be too dark at that point but that's the time, over.

SC Okay, Charlie. At 208 here inertial attitude we're going just about straight down. Most of the terrain right down below my window is starting to disappear and night time is getting black here but the one thing that really stands out was those features that we picked out and I guess all the homework has paid off because like I said, it's just like NASA Road 1 leading up to it, over.

CAPCOM Sounds really great. We've got our friendly geologist back here grinning and looks like we're going to be go for all the land mark tracking and everything then.

SC Okay, and I've just picked up Moltke down below. I can just see a little bit of a white rim and the rest is black. Landing site 1, pardon me, landing site 2 is completely in the black but I can see half of the rim of Moltke and that's about it. We're now passing into darkness.

CAPCOM

We copy, over.

SC Jack although this is, Charlie, although we're going into this backward it's still amazingly easy to pick up these land marks as we're going into the landing site. Especially the one that we've worked on a lot more heavily.

CAPCOM Roger, understand, 10. Do you have your are you -

SC We should be looking down. We're looking down right now as Tom said, right over site 2. It's in darkness and we've got a lot of reflected Sun off the LM but right over in the Survayer 5 area also but it's also in darkness at the present time. Also you can - the feature we called US 1 stands out real well. It disappears in the darkness right by Moltke and the area over to the

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1635, GET 7646 279/3

SC right, there's no doubt there's been some volcanism in there and that's what we term the Oklahoma hills, over.

CAPCOM We copy, 10. We thought you had your descent strip chart out. We're breaking our's out now.

SC I knew he'd name something "Oklahoma Hills." You notice he got that out on the first REV too. Charlie, Theophilus is still visible out my side window. It's still visible, Theophilus is still visible out my side window and it's right on the terminator and it's beautiful the way the shadows are falling in it. If you would believe this, the only thing that is lit in Theophilus is the back rim and the central peak in the center of it. The central peak looks like it's going to last just about as long in sunlight as the far rim.

CAPCOM 10, roger. We copy. 10, Houston. We'd like you to elaborate a little bit on your the Rills that you commented on about 5 minutes ago. The Diamondback and the Sidewinder, over.

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 16:45, GET 76:56 280/1

10, Houston. We'd like you to elaborate CAPCOM a little bit on your - the rills that you commented on about 5 minutes ago - Diamond Back and Sidewinder. Over.

SC Okay. I'll tell you, from my experience around the earth, you can tell Jack it looks like Canyon Diablo out there in New Mexico. They're definitely dropped down with sharp walls. It doesn't look like there is any build-up along the sides. It's just straight down like a crommet. At least from this angle up here - for at least 60 miles, it looks like they're straight down. It kind of looks something like Canyon Diablo, and we'll give you better description tomorrow at 50 000. Over.

CAPCOM Roger. We copy -

SC Oh, also. U.S. 1 - U.S. 1 looks like it's got pretty vertical edges, but again this is from 60 miles. We'll give you a better description tomorrow. Over.

CAPCOM Roger, 10. We copy. In the rills, can you see - do you think you can see the bottom of the thing? Do you see any boulders or anything down there? It's probably pretty difficult from that altitude, but can you comment on that?

SC Charlie, no. 60 miles is too far up. It's mostly dark down there at the sun angle. Later on we see some around on the other side, but tomorrow we'll give you a better description.

CAPCOM Roger.

To tell you the truth, I didn't look that SC close, but it's - the shadow - the shadow that goes down in there - it - all you can tell was the rim. You couldn't see the bottom of it.

CAPCOM Rog.

SC Gene-o, says that the ones he looked at are rounded off at the bottom. CAPCOM

Rog.

SC Houston, 10. You might tell Jack that he forgot to tell us to practice studying these landmarks standing on our head.

Roger. We - he heard the comment, and CAPCOM he'll take care of that for the next flight. We got a - we'll have no update for you on your block data for the TEI's, and we confirm your abor - your orbit is 60.6 by 170.1 on 8 minute tracking. Over.

SC Rog. 60.6 by 170.1. That agrees pretty close. SC I guess we owe you, don't we? CAPCOM Not me, the Fido. SC Houston, 10. You want me to leave my high bit rate switch in HIGH?

CAPCOM Stand by. APOLLO 10, MISSION COMMENTARY, 5-21-69, CDT 16:45, GET 76:56 280/2

10, Houston. We'd like your bit rate CAPCOM switch to go to LOW. Over. Okay. Sorry, I didn't catch that earlier. SC That's okay. CAPCOM SC Houston, 10. Go ahead, 10. Over. CAPCOM Okay, I guess I'm looking for some words SC on - on the FUG switch as to whether or not you want me to go ahead and put this on in increase at the start of the next burn or possibly use secondary, considering the unbalance we've got. Stand by. We'll get you some words on CAPCOM that. It's the oxidizer flow valves is what SC I'm referring to. Roger. We'll get you some words in a CAPCOM Over. minute. Okay, Charlie. The thing I didn't under-SC stand about it was I waited - waited until it settled down. It was over 300 decrease. I brought it back up very smooothly just before zero, and I tried to lead it, and I closed it, and then she started going up, and I started it to the increase position at 150, and then I could barely hold my own, and in fact, I was losing ground the whole time. I did see it go through the cross-over point through the 57 percent regime down to about 51 or so, and she did fluctuate all over - all over the place, and then settled down again afterwards. And I left the oxidizer flow valve on the increase position throughout that whole part of that burn. CAPCOM Roger. We copy, 10. It'll take our G and C guys awhile to analyze the tape. We'll give you some

word after - on our next rev. Over.

SC Okay, Charlie. Thank you. Boy, Charlie. I never saw nothing like SC that. We - when we came - when we came around on the back side, seems like the colors are different on the back side more - more light than they are on the front side. Primarily because of the MARE. I wouldn't say it's - I wouldn't say it's - it's shades of black and white and browns in there, and near as I can tell there's some brown in that thing.

CAPCOM Rog, 10. I copy -SC There are all kinds of shades of gray, of course.

CAPCOM Roger. Copy on the back side that the colors are different, that it appears to be more browns and blacks. Is that correct, or then the MARE. Over.

SC Well, yeah. I think it's different from the MARE. One thing that really stands out that wasn't impressed on me before we got here is that - is a very great observable

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 16:45, GET 76:56 280/3

SC difference between - between the - as far as elevation is concerned - between the MARE and the surrounding terrain - the surrounding highlands. Boy, this is really a rugged planet. And I saw a big basin on the back side, and we'll have to get around there and look at it again.

CAPCOM It ought to be coming up in a minute. SC Hello, Houston, Apollo 10. We've got a beautiful view of the earth here, and the margin of the moon and earth showing. Sorry about that slip, but it's absolutely fantastic here at night with earth shineing. Our TV camera might have enough to pick that up too.

CAPCOM Char -

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 16:55, GET 77:06 281/1

SC TV camera might have enough to pick that up too.

SC Charlie, the craters - the center of some of the lighter craters glow as if they're lit by radioactive they just glow in this very low dim light.

CAPCOM Roger. Stand by one.

CAPCOM Hello, Apolle 10, Houston. In about 10 minutes as you cross 45 west, look directly north and see if you can see the crater Aristocrus. It's near the horizon the northern horizon. There have been some reports last night and the night before of some transient events in that crater. Some glowing, and they were hoping that you might be able to give them some word on that. Over.

SC Okay, Charlie. We've got it located, and that's in the Ocean of Storms about 40 - maybe 47 west and about 23 north. Huh?

CAPCOM That's affirmative. It's going to be pretty close to the northern horizon, so you might be able to see it. Over.

Okay, fine.

SC Hello, Houston, Apollo 10. Houston, Apollo 10. I've got ... on my moon - my earth line. It's quite a sight here. Over. CAPCOM Roger. We copy 10.

END OF TAPE

SC

APOLLO 10 COMMENTARY, 5/21/69, CDT 1705, GET 77:16

PAO Apollo 10 is approaching 40 degrees west, now, getting near landing site No. 5 which will be north of the ground track and the landing area for Surveyor 1 is south of the ground track of Apollo 10. 10 should pass just a little bit north of Surveyor 1 before too long. SC Houston, this is 10. Over. CC Go ahead. SC Roger. Okay. We're set up in this sleep configuration right now, as far as the roll, PITCH and YAW goes and we've got it in Y deadband. Roger. WE copy that. Over. CC SC -- in 10 degree deadband plus or That's all we are allowed in this minus 10 degrees. sleep configuration, isn't it? That's affirmative, 10. That is CC what we want. You've got the proper entry. Over. Hello, Houston, 10. SC CC Roger. Go ahead. SC We were not able to see any particular activity in the area of aristarchus. It's amazing though how well you can once you find the landmark navigate in earth shine across the surface of the moon. It seems to be very well lit from our altitude here. CC Roger, 10. We are hoping we can get some TV past the terminators. The TV experts are looking at it and we think that we might be able to get some. We will let you know next time around. Over. Well, we can't. The moon past SC the terminators is totally dark as long as we are in sunlight, but the minute we go out of sunlight, in the darkness outselves, the moon then glows right at us. 10, we copy. CC SC Houston, this is 10. CC Go ahead, 10. Over. I can -- the LM thrusters stick SC out like a sore thumb in earth shine, too, but they don't keep us from seeing any of the stars. Up here at night it is real well lit up. Roger. CC Understand. In your P52 you can recognize everything and no problem that was not blocked by the LM. SC That's right and thus far, believe it or not, we haven't run into anything where the LM blocked us from a star. There was one case, but so far we have been lucky.

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APOLLO 10 COMMENTARY, 5/21/69, CDT 1705, GET 77:16

Houston, Apollo 10. In earth SC shine you can see way down in the craters. You can see the shadows in the craters from the earth shine, but the more you become adapted to it, it's phenominal the amount of details you can see. Over. CC Roger, 10. It's really what you call Field SC Grade Nighttime Flight, Charlie. CAVU, eh? We got you. CC Roger. Good thing this is all Field Grade. SC SC Roger. It's what John and I call Commander's SC Moon in the Navy. WE've got a lot of smart guys here CC in the CAPCOM console. Hey, Charlie, the best I can figure SC out we're passing now out of the Ocean of Storms into some more rugged country which is very evident on the surface. Roger, Gene, we are plotting you CC right along. That's a good call. Boy, that engine worked like a SC champ, Charlie. CC Roger. SC What did you think of those residuals? Man, that's really great. We CC couldn't believe it when you called them down to us. I know you guys are as happy as clams up there with that performance. We are, too, down here. One other thing we noticed your sleep attitude here YAW'd out about 20 degrees. We called for a YAW of zero and were wondering what we have. Over. Well, we got a YAW of 20 degrees SC because something keeps torquing us over that way, but is that going to bother you, or do you want it back to zero? CC Stand by. Over. We'll take it back there. SC SC Roger, Houston. It looks like this water boiler keeps torquing us off, because we haven't noticed that any pilot is holding inertial anywhere before. And particularly on this one little patch we wouldn't expect the YAW to get to ----but it looks like the water boiler is torquing us. Over. CC Copy, 10.

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APOLLO 10 COMMENTARY, 5/21/69, CDT 1705, GET 77:16 282/3 Either that or there is a big SC MASCON up north or something. It might be that giant S Gargo CC up there. We'd like you to take it back to zero YAW and let's start over again. Over. SC Roger. SC Boy, this moon is lit up like a Christmas tree on the dark side. I don't see the lights, but it is well illuminated from the earth. That's John Young. PAO CC That's very descriptive, John. I'm a little behind these other guys, SC they make ----Apollo 10, Houston. CC John say again all about the Christmas tree. Over. I said I don't mean lit with SC lights, but it sure is brightly illuminated compared with earth. I am a little behind these other two guys. They make me mind the DSKY. Roger. We recommend you get your CC share of viewing time, also. Apollo 10 is approaching 70 degrees PAO west. Should be in the area of the crater Grimaldi. SC Houston, just to tell you something interesting. It looks like we are coming into the termination of earth shine here and we are starting to get long shadows on the hills as we go into the earth terminator. CC Our friendly geologist says that is right. Coming up on us here. Would you believe you can even SC see down in the craters in the earth shine shadows. Or is that going a little too far?

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1719, GET 77:30 283/1 - see down in their craters and SC the earthside shadows? Or is that going a little too far? That's going pretty far there. CAPCOM Hello Houston, this is 10. SC CAPCOM Go ahead. Okay, it appears - I can SC recognize at about 30 south and about 80 west, that big, wide gorge, very rounded at the bottom that's bordered on one side by the rough mountains and on the other side by the corded mountains. CAPCOM Roger, 10. We copy. And I can see, I can see SC Schluter with a central peak very, very easily. Roger, understand. You got CAPCOM Schluter. SC Okav. Schulter is a crater at 85 degrees POA west. Hello Apollo 10, Houston. We CAPCOM got 86% on the waste water. We need a waste water dump whenever you get to it and as soon as you can get to it, over. We can do it right now. And SC I'm coming into the sleep attitude at this time. What do you want to dump it to, Charlie? CAPCOM Roger, down to 25%, over. SC Okay. Houston, 10. We got indications on the gage here that we're dumping slowly. CAPCOM 10, roger. Stand by. The Flight Dynamics Officer, PAO Phil Schaffer, says further tracking shows the orbit as 170.6 by 59.7 nautical miles. We're still 10 minutes. 45 seconds away from loss of signal on this first revolution of the Moon. Showing velocity of 5,115 feet per second. CAPCOM Hello 10, Houston. We're coming up on 9 minutes to LOS. We'll be standing by for your report on the high gain antenna on LOS and AOS pitch and yaw position as AOS of 783121, over. SC Roger. Boy, this planet is really something, Charlie. CAPCOM Roger, 10. Elaborate John. We heard that twice now. That's about the only way I SC know how to put it. It's got a lot more character than it looks like from sitting down there on the ground. When you get up close to it stands out. It's got its own -

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 17:29, GET 77:40 284/1

SC ... and when you get up close it it, it stands out. It's got its own features that are certainly clearly recognizable and much different than you - than you see around the earth. That's for sure.

CAPCOM Rog, Tom. Wish we were there to look at it with you.

SC	Charlie, there's -
CAPCOM	Go ahead.
C C	Chaulda there is a

Charlie, there's a - there's a three SC lighting conditions very evident. One is sunlight, earth shine, and now we're in pitch darkness although you can still see the lunar horizon against the black sky. It's the black moon that you can't really see anything on, but there is a definate distinguishment of our horizon against the black sky when the stars are coming up. And - and both terminators are very interesting. Terminator produced by sunlight and terminator produced by earth shine are very similar, although the earth shine terminator being of a lower light level has a very ghost like shadowy apperance where the sunlight terminators are very definate - definate shart image - sharp shadow image. Roger, 10. On this - your comment about CAPCOM the - in darkness you can see the moon horizon, is that just star ... or can you actually see features on the horizon? Over.

SC Charlie, if - if I had ³- if I had a pencil I could draw you a - right across my window, I could draw you a horizon. There seems to be a - every since we went into total darkness on the surface out of earth shine, there seems to be a continued glow from - from behind the horizon which lights it up continually, and - but you can't distinguish sharp features, but the general terain you can see.

CAPCOM	Roger.
CAPCOM	Is that like air glow or the air glow?
SC	Say again,
CAPCOM	Is that glow similar to the air glow

lighter here on earth - in earth orbit?

SC CAPCOM No, not at all. Oh, that's good.

SC Hey, I've been - going off and flying the spacecraft, I've just turned around and looked out, and it stars - you can see it's a bright horizon, but it looks like it might be the milky way, but the sky is definately lighter, and it goes down and clips off. You cannot make some of the rough terrain features out about it. It might be that we could be right close to the Milky Way out there, but it looks like about the same intensity of the Milky Way as you see it at night around the earth. It does get lighter over in one section, and we'll give you a copy on that later. CAPCOM Okay. Go ahead. APOLLO 10 MISSION COMMENTARY, 5-21-69. CDT 17:29, GET 77:40 284/2 What's going on out there is - there's SC no air glow at all, it's just a sharp definition between the moon surface and this parabolic glow that's out there. There's a good sharp horizon there, huh? CAPCOM SC . . . SC Yeah. I think you could make a cant shot off a horizon like that. You can tell it has to be well lighted. SC CAPCOM You might make a cant shot, but I'm not. I didn't even think you knew what that SC meant. Oh, I know all the words. CAPCOM LM launch might be just like a cant shot. CAPCOM 10, Houston. Coming up on three. You CAPCOM can terminate your water dump, and you're looking good as you go over the hill. SC Roger, Houston. PAO And we've lost the signal as Apollo 10 turns the corner and goes behind the moon. The crew giving

us a rather graphic description of their first revolution around the moon. Shortly after an acquisition of signal on this first REV, you heard Tom Stafford calling out some names of features that here to fore have not been attached to the moon. These are unofficial identifications of features that the crew has come up with. Names such as U.S. 1, the Oklahoma hills, Diamond Back Rill, Sidewinder Rill. Then they have a number of others. All of these features are primarily along on either side of the ground track in the area leading down to landing sites 2 - in the approach path of landing site 2. We will acquire Apollo 10 on the second revolution at an elapsed time of 78 hours, 31 minutes, 19 seconds, some 41 minutes from now.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1739 GET 7750 285/1

1.2

PAO -31 minutes from now. This is Mission Control Houston at 77 hours, 50 minutes.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1818, GET 7829 286/1

PAO This is Apollo Control at 78 hours, 29 minutes. We're about 2 minutes away from acquisition of Apollo 10 on its second Lunar Revolution. Shortly after acquiring with spacecraft, the ground will give the crew a go, no go for the LOI 2 burn. This is the maneuver designed to circularize the orbit to as near to 60 nautical miles as possible. This maneuver will take place behind the Moon as did the Lunar Orbit Insertion number 1 burn. It will come at approximately 80 hours, 22 minutes. We'll get the precise time when they pass up the update. It'll be a much shorter duration burn but again with the Service Propulsion System. We're less than a minute now from acquisition time. We'll stand by live for first transmission from Apollo 10.
APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1820 GET 78:31 287/1 Hello Apollo 10. This is Houston CC standing by. Looked like the REACQ mode worked SC pretty well there and then we acquired and read you loud and clear. Roger 10. We had you. Go through CC that again about the REACQ. Over. (Garble) and yaw angle into REACQ narrow SC deadband in this attitude picks you up loud and strong here. Roger. Where did the antenna CC go at pitch and yaw at LOS. Over. Charlie, I'm not sure I can answer that SC one specific question. 10, Houston. Do you think the antenna SC went to the angle that you had dialed in, or fairly close to it. Over. SC That's affirmed. It went to those angles at LOS. I went to REACQ and fired LOS and it did SC go to those angles and that's where they stayed and you could tell by the way they act. CC Roger. Stand by. PAO We're waiting for high bit rate telemetry so we can command state vector and some target pads. SC Houston, we have a total in our high bit We'd like you to select high bit rate over. rate command in. CC Hello 10, Houston. Over. SC Go ahead. I'll give it to you, Charlie. Okay. We've got it. We've got a look for CC you and if you'd give us the computer and accept we'll send you up a maneuver pad a correction, a target mode and a state vector. Over. SC Okay, here approve and accept. CC Roger, and we have a LOR2 pad, a TEI 5 pad and map update for you if you're ready to copy. SC Stand by 1 sec Charlie. SC Charlie give me the map update first, would you please? CC Roger. It's Rev 3 and we have LOS time of 795622 800641 AOS 804045. Time of sunrise 800013 and a sunset of 811430. Over. Okay, map update Rev 3 795622 800641 and SC 04045 sun rises at 800013 and sets at 811430. CC That's affirmed. CC 10, we are having trouble ... SC Charles, are you ready for a ...

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 1820 GET 78:31 287/2

10 Houston. We'd like you to go up tele-CC metry command reset to command reset and back to normal. We're having trouble getting our commands in. Over. SC Okay, command reset back to normal. CC Roger and if you're ready to copy I have your LOR 2 pad. Over. SC Just one sec Charlie. CC Apollo 10, Houston. Now we'd like to up the telemetry reset to off and then back to normal. Over. Okay. Off and then normal and SC then I'm ready to copy. Roger, 10 here comes the LOR 2 pad. SPS CC G&N 38650 plus 183 minus 074 080 250738 981 is minus 01390 plus all balls minus all balls 000209000 and now 44 is 00601 plus 00601 01390 014 013....

APOLLO 10 COMMENTARY, 5/21/69, CDT 1820, GET 78:41 288/1 ---plus 006010130901401325 CC Sextant star 162205232, rest of the pad is NA, your set stars are Vega and Deneb, 241240013, 2 jets at 17 seconds on the ullage. Over. Roger. LOI, QSP, G&N 38650 SC plus 183 minus 074 080250738 minus 01390 plus all balls minus all balls, ROLL 000, PITCH is 209, YAW is 000. 00601 plus 6601, 01390, 0141325, Sextant star is 162205232 Vega and Deneb 241240013, 2 jets at 17 seconds. Roger. That DELTA VC was CC 01324. Over. SC that's what I've Roger. got written down, 01325. Roger. Stand by for the TEI pad. CC Over. SC Okay. CC Hello, 10, Houston. We have your primary evap dried out, we'd like you to close the back pressure valve. Over. SC Okay. Closing it. CC 20, Houston. It appears we are having a little problem with our ground uplinking capability. We'll keep you posted. I have a TEI 5 pad if you are ready to copy. Over. Okay, Charlie. Wait a minute. SC My finger is still on a button here, I'll be right with you. Go ahead, Charlie, with the TEI SC pad. CC 10, Houston. Stand by for about a minute. We are going to bring down our uplink and you won't hear us for about a minute. We are going to try to reconfigure ground site. We've got problems with our uplink. Over. SC Okay. PAO This is Apollo Control. The time for the lunar orbit insertion No. 2 burn, 80 hours, 25 minutes, 7 seconds, DELTA V 139 feet per second. Duration of the burn will be 14 seconds. For you first time, we will be using ullage prior to this burn using two of the RCS thrusters, burning those for 17 seconds prior to the service propulsion system ignition to

settle the propellants in the tank. This is necessary after that long LOI No. 1 burn, we have a long ullage volume in the tank. Not near as many, as much propellants as before and we will use ullage to settle those propellants before igniting the SPS. APOLLO 10 COMMENTARY, 5/21/69, CDT 1820, GET 78:41

PAO And if this burn goes as planned, we will circular ---Apollo 10, Houston, ready with the CC TEI 5 pad if you are ready to copy. Over. SC Okay, Charlie, go ahead. CC Roger. TEI5, SPS, G&N minus 061 plus, correction the noun 47 is NA, starting off with noun 48 minus 061 plus 047 086191000 plus 36430 minus 01492 plus 00546, PITCH angle is 025, rest of the pad is NA. Okay. TEI5, SPS, G&N, starting SC with noun 48 is minus 061 plus 047086191000 plus 36430 minus 01492 plus 00546, PITCH angle is 025. That's affirmative. And we've CC had a problem with our uplink at Goldstone. They are configuring now and we'll be with you in a - momentarily. Over. If this next burn goes as PAO planned, we will have circularized the orbit at 60.1 nautical miles. CC 10, while we have got them over here and before we get our load into you, we've got a couple of comments for LOI 2, we recommend you just point the oxydizer flow increase valve to normal and go primary. Over. SC You want me to stay normal in primary through that whole burn, is that correct? CC That's affirmative. We feel that it is so short that that is the best position and then for TEI we'll have a story for you on how we want you to operate the plugs. Also for TV, if we try the dark side, TV recommend an ALC to inside and an F-stop of 2.2. Over.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1840, GET 78:51 289/1 CAPCOM - also for TV if we try the dark side TV recommend a ALC to inside and and F-stop of 2.2. over. Okay, we got that Charlie and SC I want you to understand that I did go back to normal about 20 seconds before the LOI 1 burn ended so that's where I am and after I did that I went - my increase unbalance moved up probably about a hundred pounds. CAPCOM Roger. Charlie, just for reference SC as to exactly where we are, we're looking right down on the top of Messier and Messier A and we'll be - we've got Taruntius to one side and we're just right in the middle of the Sea of Fertility coming right off the track into the landing site. CAPCOM Rog, thank you. This is Apollo Control. We've PAO played back the data from behind the Moon during the LOI 1 time. You can really see some boulders SC in the bottom of Messier A now. Yea, you can see some tremendous boulders down there. We copy, 10. We finally got CAPCOM Goldstone configured. We're coming up with the load now, over. SC Okay, we are seeing them and accepting them. We can see the load coming. CAPCOM Rog. SC You guys been taking some good pictures for us? SC Right, and for correlation, I've been on the same sites. I've been shooting one black and white of the special or I've been shooting one black and white and one of the special color on the same reference. Roger, that's very good, 10, out. CAPCOM Roger, we think we've got a SC few colors here for you at least you're certain of the ones that are real black going into whites and then some browns. Rog, we heard your tape on CAPCOM the back side during the LOI 1 and seemed like there was a disagreement between brownish and bluish there. SC The blue was just a little remark. 10, Houston. If you've got CAPCOM a moment to comment on your tape playback from LOI 1 after the burn was completed, we heard a comment about "Hey, look at that bubble". Could you elaborate on that, over.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1840, GET 78:51 289/2

SC Charlie, I guess it was a bubble of water of something. Right - hanging right with us after the burn. I tried to take a picture of it. Ι don't know if we got it or not but it was a bluish crystalline type bubble about 5 feet out where the LM thrusters It probably came either from water or from the resultant are. residual of the SPS burn. CAPCOM Roger, 10. How large was it? Could you estimate that? SC Oh maybe a half an inch in diameter. CAPCOM Roger, we copy. Okay Houston. This time we SC are looking down, right down on Bl out of the hatch window. We copy, 10. How's the terrain CAPCOM look around there? SC Looks just like the map. CAPCOM Rog, how does the terrain look around that area? With the naked eye it's full SC of holes. Roger, it looks pretty smooth CAPCOM on our map, of course, we got one of the world here but it's real smooth. SC Charlie, through the binocular you can see little shinny fresh craters that you can't see with the naked eye. They're pretty well scattered but there is quite a few of them down there that you can't seem to pick out with the naked eye. CAPCOM Rog, we copy. 10, Houston. We got the loads in. You can go back to block, over. Okay, we're back in block. We're SC passing right over Maskelyne now and John is shooting back at site 1. CAPCOM Rog. SC At this rate, we're going to run out of all our film in a couple of revs. A slight shudder emanated from CAPCOM the geologist back there. Charlie, I'm personally amazed SC at how accurate the maps are at picking out these land marks and craters. CAPCOM 10, Houston. You can put your PCM switch back to low bit rate, over. SC Okay.

APOLLO 10 COMMENTARY, 5/21/69, CDT 1850, GET 79:01

SC Houston, Apollo 10. We can now see quite a bit more of Moltke as the moon revolves and the landing site 2 is rough, it is just barely starting to come in. It is still too early to tell much about it. Over.

290/1

We copy, 10. CC Roger. 10, can you see on the CSM lunar CC orbit map the spot marked 112 near site 2? It looks like a bright, whiteish crater? Over. Oh, that's Moltke. Excuse me. CC Sorry about that, 10. Moltke is very, very easy to see. SC We've seen it both times around. Not only are the rills. but the low ridges are very distinguishable approaching the landing sites. The sun angle is such that we cannot see into the bottom of Diamondback or inside one of their

r111s. CC Very good. PAO This is Apollo Control. The Flight Surgeon is taking a look at the heart rate data now from the playback during the LOI 1 burn. The ignition time of that burn was 75:55:53. At 75:55:50 Tom Stafford's heart rate was 120. At 75:56:10 was 123. at 75:56:30. it was back to 120. At 75:56:30, 40, it was down to 95. For the Command Module Pilot, John Young at those same times it was 94, 98, 83 and 86. And for Lunar Module Pilot Gene Cernan it was 91, 85, 74 and 70. PAO Apollo 10 now near the landing site 3 area. This is also the area where Surveyor 6

END OF TAPE

landed.

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 19:00, GET 79:11 291/1 Houston, Apollo 10. We see the solar SC corona, and it's really beautiful. CAPCOM Roger, 10. We copy. SC What - okay time is it and how long we can see it now. We can still see it. The sun went down exactly at about 45, and we can still see edges of it. It's It's mostly a long shaft of light, and we can still see it. still there. CAPCOM Roger, 10. Houston, Apollo 10. It's - the corona SC is still out there. You can see it quite bigger. CAPCOM Very good, 10. SC And you can see stars and then about -I can see some at about 20 degrees of the corona. It's still there. Charlie. It's amazing. Rog. On the TV pass, do you think we CAPCOM could pick that up? SC Shouldn't be any problem in this attitude. If we're in this attitude upside down going away, and we'll go from interior to the out there. You should see it as a long straight, and right now it's finally started to fade out, Charlie. It took a period of nearly 2 minutes that we could see it. 10, how long does the shafting look as CAPCOM Does it get shorter as you go away or just it comes across. sort of fade out? Over. It just fades out, and the shafting's SC getting shorter and shorter. There's just a little bit left there, and it'll be gone in a few seconds. CAPCOM Roger. SC It spread over an area - a very small area of the horizon just right in the vicinity where the sun sets. It doesn't go any further either left or right. CAPCOM Rog. SC Still - still see traces of it. It's greately diminished now, but you can still see traces of it. Okay, we'll get on with that P52. CAPCOM Be good, 10. PAO Most of that description was by Tom Stafford with Gene Cernan coming in right there at the - along toward the last. PAO We have about 36 minutes left before loss of signal on this revolution number 2. PAO This is Apollo Control. Apollo 10 is now realigning their inertial measurement unit and shortly should be maneuvering into the attitude for the lunar orbit insertion number 2 burn.

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 19:11, GET 79:22 292/1 This is Apollo Control. Apollo 10 is -PAO has just passed the 45 degree west longitude line. CAPCOM Apollo 10, Houston. We'd like to leave your back pressure valve closed for another REV or so looking at it, we'll probably go to sleep tonight with it closed. Over. PAO This is Apollo Control. We've lost lock on the high gain antenna that was the cause of all that noise. It happened when the spacecraft started maneuvering to the burn attitude. We're apparentely on the omni's now. Apollo 10 is 22 minutes away from loss PAO of signal on the second revolution coming up on the 60 degree west longitude line in the Ocean of Storms area. CAPCOM Hello, Apollo 10, Houston. If you read we'd like you to select omni Charlie. Over. CAPCOM Hello, Apollo 10, Houston. Over. Hello, Apollo 10, Houston. CAPCOM If you aren't already in - on omni Charlie, we'd like you to select omni Charlie. Over. SC Hello, Houston, this is 10. Do you read? CAPCOM Rog. Gene, reading you about 3-5. Over. SC Hello, Houston, Houston, this is 10. How do you read? CAPCOM 10, we're reading you about 3-5. How me? Over.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1927, GET 79:38 293/1 Hello 10, Houston. CAPCOM Over. Hello 10, Houston. Over. Roger, Houston. Now I'm read-SC ing you loud and clear. We lost you on high gain. I've been waiting to pick you up on omni. We're maneuvering out of the burn altitude. CAPCOM Roger, we're getting low bit rate, 10. I don't know whether you copied my last transmission before we broke lock. We're going to leave the back pressure valve closed and watch it for another rev and probably for the sleep configuration we'll have it off, over. Yeah, we got that, Charlie. SC Thank you. Houston, this is 10. Can you recommend an omni for the burn? CAPCOM Stand by. For the burn attitude before SC LOS. CAPCOM Roger, 10. We copy. Your best omni is Charlie, over. Okay, that's where I am now SC so I'll stay there. CAPCOM Roger. SC Houston, this is 10. On the last pass on the back side, we're pretty sure we identified through the optics going backwards, CPl and CP2. Rog, 10. It really sounds CAPCOM great, over. 10, did you call it up or did you just manually track, over? SC Just manually tracked. If we'd have called it up that would have shot our wide deadband out of the sky. CAPCOM Rog. PAO That was John Young reporting they could see the selected land marks on the back side of the Moon. Flight Director Jerry Griffin is taking a status check here. You wouldn't hurt the wide SC deadband. Would you check on that for us. CAPCOM Rog, stand by, 10. 10, Houston. You can call up any program, it'll collapse the deadband back down, over. SC That's what I was afraid of. Hello Houston, Apollo 10. CAPCOM Go ahead, 10. Over. Okay, I'm looking ahead in SC the Flight Plan to 81 hours when we really start getting busy there. One thing we're going to want to do is we want

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 1927, GET 79:38 293/2

SC - to delay the canister change and also that fuel cell 02 purge until afterwards. The CO2 content is real low and delaying it an hour or two isn't going to hurt a thing. And we want to get through that busy time without any interruptions so we're recommending delaying there at 8120 the canister change and the fuel cell 02 at 8140 until after we get through most of this activity, over.

CAPCOM We concur will all that, 10. SC Roger. PAO We have 10 minutes of acquisition time left in this pass and we're 39 minutes away from the LOI 2 burn. This will be another retrograde burn with the spacecraft pitched up 10 degrees. SC Houston, Apollo 10. We've already completed the program 30. Do you want us to go

into 40 before we lose you at LOS? Over. CAPCOM Roger, we'd like to see a P40, 10. Over. SC Coming up.

APOLLO 10, MISSION COMMENTARY, 5-21-69, CDT 19:38, GET 79:49 294/1 P40 is the service propulsion system PAO testing program in the command module computer. Are you all getting the high bit rate now? SC That's negative. We got your low bit rate. CAPCOM We're seeing at program 40. Rog. In other words you can read all that SC stuff, you need high bit rate up with you. Huh? 10, we can command the low bit rate even, CAPCOM but it takes a little bit longer. We got some parameters on our low bit rate, but all your DISKY's stopped so that we can see low bit rate. Over. CAPCOM Apollo 10, Houston. Coming up on a 5 You're looking good. Go on over the hill. We'll minute LOS. see you AOS 80:40:47. Over. Roger. 80:40:47. SC And 10, one more update for you after CAPCOM your maneuver, after LOI 2 as we come around the horn the high gain antenna for the COM will be a pitch of a minus 55. Over. SC ... pitch of 55. What about the yaw? CAPCOM It's still good. SC Okay. PAO This is Apollo Control at 79 hours, 55 minutes. We're still showing 40 seconds to loss of signal, but the noise has stopped. It appeared we have broken a lock there. We've got about 30 seconds left till the loss of signal. And we do have loss of signal now. PAO We're 28 minutes, 30 seconds away from lunar orbit insertion number 2 burn. The maneuver by which we will circularize Apollo 10's orbit. We've targeted for a circular orbit of 60.1 nautical We're presently showing Apollo 10 in a lunar orbit miles. of 170.7 by 60.1 nautical miles. A review briefly, this upcoming burn, it will be service propulsion system, retrograde with the spacecraft pitched up 10 degrees. Ignition time is 80 hours, 25 minutes, 7 seconds while Apollo 10 is behind the moon and out of contact with the earth, we will have to await acquisition of signal and a post burn report from the crew to find out how it went. A DELTA-V of 139 feet per second, duration of the burn 14 seconds. We will next acquire Apollo 10 at 80 hours, 40 minutes 47 seconds. 42 minutes and 37 seconds from now. This is mission control, Houston.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 2014 GET 80:25 295/1

This is Apollo Control and we should be PAO burning now for the LOI 2 burn. This was a short burn -14 seconds in duration. We'll know when we acquire the spacecraft in about 15 minutes how this burn went. The first thing we'll get is a burn report. And almost at the moment of acquisition we were changing shifts in the Control Center. The maroon team with Flight Director Milton Windler will take over right after the acquisition of signal. And a short time after we have acquired, we should have our first TV show of the lunar surface. As you've heard Tom Stafford talking, he hopes to be able to bring a pretty good show with the color TV. Our best estimate right now on the change of shift news conference time is 9:30 PM Central Daylight Time. We'll try to keep you updated on that time with the best estimate at present is 9:30.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2028, GET 80:39 296/1

PAO This is Apollo Control at 80 hours, 39 minutes. We're expecting to reacquire Apollo 10 now, in about 1 minute, 50 seconds at which time we expect to get a report from the crew immediately on the LOI 2 maneuver that was performed on the back side of the Moon. Here in Mission Control we've completed the change of shift. Flight Director Milton Windler has relieved Flight Director Jerry Griffin. Our Capsule Communicator on this shift will be astronaut Joe Engle. Ten seconds now until AOS. We have conformation of AOS now. We'll stand by for the Capsule Communicator to put in a call to the crew.

CAPCOM Apollo 10, Houston standing bv. Apollo 10, Houston standing by.

Roger, read you loud and SC clear.

CAPCOM Hey, good show, Gene-o. How about a burn report there.

SC Okay, Joe. We got a good burn. The burn was on time. It was 14 seconds. Roll. pitch and yaw were nominal. Our residuals were plus .5 minus .3 minus .4 delta VC was minus 5.6. Fuel remaining 34.9. Oxidizer 37.1. We now are reading a 600 unbalance to the increase. Chamber pressure was steady at 103 and we show it to be in a 61.2 by 60 nautical mile orbit.

CAPCOM Roger, very good, Gene. Thank you. Copy all that and we're standing by for your TV whenever you want to go.

SC Okay, we're about ready on it now.

CAPCOM Roger. Apollo 10, this is Houston. We'd like for you to do your verb 66 now. SC Okay.

PAO We're standing by now for television transmissions from the lunar surface. That burn report passed back to the ground by Gene Cernan indicated that we got very close to the planned burn. The onboard reading was 61.2 by 60 and after some tracking on the ground we'll have some Mission Control Center figures to go along with those from the crew.

Charlie, we've got some TV SC coming down to you now. We'll try and tell you exactly where you are in a minute but Tom's looking out the hatch window. We're upside down and going backwards at the moment so we'll have give it the chance to locate you.

CAPCOM Okay, Gene-o, fine. We're getting the picture now and it looks real good.

SC Tom's going to try and have you looking right at a very bright young raid crater, very APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2028, GET 80:39 296/2

SC distinguishable and very bright. CAPCOM Okay 10, this is Houston. That's a real good picture and we see the crater you're talking about. That's an awfully good TV picture. Okay, we'll be coming up SC on the left side of your picture on Neper here if Tom can scan over to get it. CAPCOM Okay, we verify. PAO The spacecraft now over Smyth's Sea. SC We should be coming right over the Smyth's Sea right at the present time. Roger, that's affirmative and CAPCOM the was F1 you were showing us there just a minute ago, Gene-O. Roger, okay. I've got this SC Do you like it at full zoom or do you want at full zoom. it back down a little bit? On our monitor it looks like we've got some pretty good resolution here. CAPCOM You got fantastic resolution, Tom. You might back off the zoom just a little bit there and give us a little bigger picture, get a little better orient. That's good right there, Tom. Apollo 10, this is Houston. We'd like for you to cycle that ALC just so we can get a comparison of the picture. Stay there for about 5 seconds and then go back to your present position. Okay, we're on inside right SC now and we'll give you a mark when we go to outside. CAPCOM Roger. Mark it. We're on SC Okay. outside now. Joe, can you see we just passed over a rille down there. The rille should be in the upper left hand corner of your screen. CAPCOM Yea, we've got ahead of it, Tom.

And the outside position on that ALC seems to give us better resolution down here than the inside. Hows that compare with your -

APOLLO 10 COMMENTARY, 5/23/69, CDT 2038, GET 80:49

The position on that ALC seems CC to give us better resolution here than the inside. How does that compare with your monitor? Same way, Charlie. Outside gives SC us much better. And at this time we are passing over a big crater now and can see it with the rear mirror. CC Roger. Got. SC And it's got a couple of small ones on the inside. Okay. Those little small beacon areas are pure white. The rest of the crater is a brownish gray with several little spirals of white. How does it show up down there? It still looks exactly the same, CC Tom and that's perfect. SC Okay. I've got a real bright I'm going to zoom in on the top of it. crater. It's pure white and it looks like there may be pieces of bolder around on it. I am going to zoom on it. CC Okay. We think that may be Schubert, Tom. That's great. That detail is just great, Tom. PAO We estimate this crater is about 40 miles in diameter. SC Again, for your edification, we are upside down going forward to keep the flood off the windows and also to conserve fuel. But the rate you see there on the monitor, at least what I can see, is exactly our orbital rate here. John is maintaining that 315 orb rate upside down. CC Okay, we copy that. Thank you. And, Tom, could you see all the little ---SC Go ahead, Joe. CC You know we would like to confirm that you are in infinity on your focus. SC That's affirm. We are on infinity. SC As you can see in this area, the whole area is marked by these small new craters. They are pure white where they stand out and then they fade into a grayish - light gray brown into a darker brownish gray, as you get to the older areas. CC Roger. That is just the way it looks --SC -- get into some Maria area. I want to tell you you are getting into some maria area, I guess you noticed the bottom of this one, that depression here is more brownish, more of a deep brown now.

APOLLO 10 COMMENTARY, 5/23/69, CDT 2038, GET 80:49 2

Roger. It's looking here exactly CC as you are describing it, Tom. That's just tremendous. SC Joe, we should be looking down right now on the Foaming Sea and to the left of us is the Gruithuisen Basin and we will be coming over the Sea of Fertility and the landing site area very shortly. CC Roger. SC It is amazing the number of new small craters are all out right on your screen as a brilliant white with a gray pattern usually going through each one. They are showing up real CC Roger. good, just like that down here on the screen, Tom. 10, This is Houston. We'd like, CC when you are coming along some of this area here, we'd like for you to go all the way from one end to the other on the zoom. Give us a mark when you back it all the way off and hold it there for about 5 seconds, 5 to 10 seconds and all the way back to zoom again. SC Okay. Going full off on the zoom at this time, coming back on the zoom. Okay. We'll take you on the right SC side and Gene will show you the crater Langrenus. CC You were reading our minds. We were just going to tell you to take us over there, if you could. SC We're starting to get it in there. PAO Jim Lovell described the terraces of this crater on Apollo 8. CC Okay, Tom, we are getting that picture very good and that is tremendous color you got. SC Joe, I don't know if you can see Langrenus with its central peaks, but it is an enormous crater. Roger. It looks pretty impressive CC from the picture we're getting, Gene. PAO Langrenus, the crater in the center of the screen, is about 90 miles in diameter. CC Okay, 10, this is Houston. Whatever you did there, if you were playing around with your lighting, you gave us a real good picture then. SC You're looking right at the central peak of Langrenus right now. CC We're getting tremendous detail Are you cycling the aperture at all, during this Gene. time?

297/2

APOLLO 10, COMMENTARY, 5/21/69, CDT 2038, GET 80:49 297/3 Yes, that is what I was doing SC and when I opened it up and then stop it down, my monitor just goes very clear for you. Same here. When you stop it down CC a little bit, we get an awful lot of detail. That's just great. We are getting a real good picture of that central peak now. I wonder if you could zoom in on CC that central peak with that aperture shut down a little Oh, you got it. I'm sorry. bit. PAO The walls of Langrenus are about two miles high and that central peak is about 7,000 feet above the floor of the crater. -- over here, I'm losing out of SC my window. And just for your CC Roger. We're information, your onboard vector looks great. satisfied with it. John is going to show you SC Mare Crisium over there on his side. Okay, we're standing by. CC You can see the horizon in the SC distance there. That is just absolutely beautiful. CC SC On your left on John's side you are looking at the Sea of Crises and on the right window the Sea of Fertility and we're coming very shortly up upon Apollo Ridge out our hatch window. SC We're right over -- we started looking straight down over the Mare version of the hills. We'll show you the Taruntius twins and Secchi A and B and right down Nasa 1 for us. CC Tom, the resolution, the detail that we're getting is just unbelieveable. This is just great.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 2048 GET 8059 298/1 We ain't getting bad detail light SC up here. CC Roger back. The low flat ridges really do SC stand out here in the MARIA area. We're coming right up on Taruntius SC Papa, Kild, Hotel, and Golf here leading into a landing site area. CC Roger. We're picking them up now. SC It appears, looking with the binoculars down into a crater like Taruntius Golf that the shadows which appear rather than to be peaked, they appear to be slight and small boulders of some sort. CC Okay. Are they down in the center of the crater, Gene? SC Yeah. They all seem to be down in the flat portion of the crater. SC Hey tell Jack to look at these little old ridges we have here. They all look like oh. they could be 4 to 500 feet elevated and run in various patterns. There standing up pretty good in our monitor now. CC Roger. We see them real good Tom. CC Okay. It appears you're showing us front of Delta now Tom. And eastern on Messier A it appears SC I would have to say, there's boulders on the slope leading toward the same direction we're moving. CC Rog. SC These are thrown out on the rim and Secchi Kilo is another one which appears to have boulders and you can contrast them very easily from the little pinpoint craters around the edge. They just stand out differently and if there to be boulders that are out on the rim, out on the edges of the rim. Rog. Which window are you looking CC out of now Gene? SC Tom has got it out the hatch window. Okay. Just for your info, we're CC seeing the RTV on the side of the window and its pretty much in focus as is the line of service. SC I should have Gutenberg coming up the other way. Gene's got it out the other window. He's looking to the south. SC Joe, I think, if I'm not mistaken that might be Gutenberg right there and I'm showing you the central peak which is very clear on my monitor here. That's where all the pencils CC Rog. are pointing down here, Gino. Okay, Joe Jack, we're passing SC over the Apollo ridge right now looking down. CC Well listen you guys. That color is really spectacular. That really brings it home.

APOLLO 10 MISSION COMMENTARY 5/21/69 CDT 2048 GET 8059 298/2 SC Okav. Its about kind of a. it's still half between gray and brown right now Joe. Jack. Your looking at some of SC those depressions that go right through some of the craters now and they're very flat and where they're shallow we can see right to the bottom of them. CC Rog. PAO The spacecraft should be just about opposite landing site 1 at this time. SC Roger. SC Here you'll be looking just about right in the area Bl right now. CC Roger. We're picking it up. Gene. We've got it in the upper left hand portion of our screen now. And I don't know what- Okay, I SC don't know whether Tom can scan the Sasserides. But Sasserides should be just to the right of that in the hills. CC Roger. We copy and we had a real interesting little dome about 5 or 6 small craters in it that was awfully interesting to look at. SC Yeah around this area you can tell the strictly lots of volcanic activity and cones in there. That is Sasserides should be oblique to SC you. Sasserides is a relatively new PAO lunar crater and great scientific interest. Here it comes. Here's the crater SC Maskelyne. CC We copied. Roger. SC You can see the shadow in it. CC Roger. It stands out, Tom. SC It's in there like it might be a Boulder. There is Maskelyne. SC Okay. We're going to try to show you some of these rills. Diamondback Rilles and sidewinder rilles that are going across here at a very distinctive. there. There are very shadowed in area and the bottom sees full, however some of the areas that go perpendicular to the sunline is deep enough to be in shadow. CC Okay. We copied all that SC (Garble) Maskelvne B. SC And here's our little our little

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 80:59, CDT 20:48 298/3

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SC nick names, the rilles Diamondback and Sidewinder.

CC 10, this is Houston, those rilles and all those details are really coming out great, and that color doesn't hurt a thing.

SC Okay we're coming into the terminator, Houston.

SC Okay, Tom's going to try an get you Moltke and then of course right adjacent is site number 2, and we're coming into the terminator. We're not sure how much of it you can see but you should be looking right at the area right now.

SC Okay, at the bottom of your screen is Moltice and right about there is landing site 2. It's still awful dim because the sun is trying to shaft it, but the landing site 2 is right to the left the crater you see. That's where we'll be going down tomorrow to photograph.

CC Roger that, Tom, and we're still getting a real good picture on that. There's a lot of good detail, although the color is starting to fade out a little. SC Yeah. Well let me see if I can get something started across the terminator if I can just keep the sunlight off the window, you can -

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 2058, GET 81:09 299/1 - start across the terminator if I can SC just keep the floodlight off the window, you can see it. Okay, Tom. Can you go to inside on ALP CAPCOM and to 2.2 on your camera now. Jack, the area now is being uncovered by SC light in the landing site 2 area looks a little bit rugged. CAPCOM Copy that. Rugged. Okay, the rill you see beside Moltice is SC what we have termed as highway U.S. 1. Roger. We're getting that loud and clear, CAPCOM That shows up real good. Tom. SC The sun is coming right on the window. We're hitting the terminator, so it's kind of rough. I'm going to have to knock it off here, because I don't want to hurt the tube, and when the sun goes down, we'll shoot back there, and maybe we can give you a little picture of the Corona. CAPCOM Okay. Mighty fine, Tom. That was just fantastic. SC Okay. Gene is going to try to shoot it outside for a minute there. CAPCOM Righto. CAPCOM 10, this is Houston. Before you terminate the TV, before you secure it, we'd like to have a color chart shot so we can calibrate things. SC Okay, stand by. CAPCOM You - no hurry on that at all. Just before you secure it. SC Okay. Okay, Joe. Looks like that's going to be all we can show. I wanted to show you Theophilis looking across the terminator, it's got two very distinct central peaks. It's a huge crater, the peaks are still in, the back side rim is still in, but I don't think I've been able to show it to you from what I can see on my monitor. CAPCOM Okay, we picked it up down here, 10. Well, it didn't come in too good on my SC monitor. I was hoping to get it to you before we got too far away from it, but we'll show you a color chart here in a minute. CAPCOM Okay, mighty fine. PAO Among the interested observers here at mission control is astronaut Jack Schmitt, who is also a geologist and worked with the crew prior to this mission on lunar feature identification. SC Stand by 1 second, Joe. We gotta cover up a window slightly here. SC Houston, we'll knock it off right after this because we've gotte repress the LM and get on with the LM activities.

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APOLLO 10, MISSION COMMENTARY, 5-21-69, CDT 2058, GET 81:09 299/2

That Tom. We'll pick up the CAPCOM Roger. color chart now. Give us about 5 or 10 seconds of that. Tell you what, Joe, I'll just hold this. SC CAPCOM Okay, that's good enough right there, Gene. Thank you very much. SC Okay, I guess we'll go off the air for today. CAPCOM That should be a good enough show for today there. SC That's enough, (inaudible) Really great. The colors were great too. CAPCOM CAPCOM Okay, what I'm recommending this, 10, but vour TEI 5 pad is GO in case you do need to use it. SC Yeah, we'd like to stick around for awhile. CAPCOM Roger, there. Okay, Apollo 10, this is Houston. CAPCOM SC Go ahead, Joe. CAPCOM Okay, Geno, before you start activating, we'd like to get a LM CM DELTA-P readout from you, and while you're up there, would you look for - see if you can find any mylar hanging around in the cabin dump valve there? Okay, we fully expect to find it in the SC LM cabin dump valve. CAPCOM Roger. PAO The total duration on that television transmission from the moon was 29 minutes, 9 seconds. At this time we estimate that the change of shift briefing will occur at about 9:15 central daylight time. CAPCOM Apollo 10, Houston. SC Go ahead, Houston, Apollo 10. CAPCOM Okay, hey listen, while you're activating there if you've got somebody that can copy down some updates, I've got a map update and a couple of landmark tracking updates, 10. And let me know when you're ready to copy. Go ahead, Joe. SC CAPCOM Okay, 10, I'11 give you your map update pad first. It's for REV 4. LOS will be 815301 820448 823911. Sunrise will be at 820041, sunset 831308. CAPCOM And 10, this is Houston. I'll go ahead with these landmark updates and you can read back the whole thing at once if you want to. SC Go ahead. CAPCOM Okay, this is your landmark tracking update. F1, 823845 824347 000326000, north 071220. That concludes F1. Coming up now with BRAVO 1, 825547 830050 000274000, north -END OF TAPE

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- 000 North 304825. CAPCOM That concludes and standing by for the read back. Stand by one second. SC CAPCOM Roger, that. Okay, Joe. Here they come SC real quick. Rev 4 is 815301820448823911820041831308. You with me? CAPCOM Roger, that's correct. F1 is 823845824347 3balls SC 326 and 3 balls. North 071220. CAPCOM Roger, that. Go ahead. 825547830050 3 balls 274 3 balls SC North 304825. CAPCOM Read backs, correct, Gene. Thank vou. PAO We have some preliminary

figures from our Flight Dynamics Officer on that LOI 2 maneuver. We were shooting for an orbit 60.06 by 60.06 nautical miles and our preliminary tracking shows that we obtained an orbit of 59.7 by 60.2 which, of course, is very close to the preplanned.

APOLLO NEWS CENTER HOUSTON, TEXAS

CHANGE OF SHIFT BRIEFING TIME: 9:15 PM DATE: MAY 21, 1969

PARTICIPANTS

Gerald Griffin - Flight Director Charles M. Duke - CAP COM Jack Schmitt - Astronaut-Geologist Phillip C. Shaffer - Flight Dynamics Jack Riley - PAO

RILEY One or two of these gentlemen have to get back very soon. To my left, Jerry Griffin, who's been taking the Flight Director's duties again today, next to him Charlie Duke at CAP COM, and Jack Schmitt, who will answer questions about the geology, and Phil Shaffer, the Flight Dynamics Officer on this shift. Jack Schmitt would like to get back to the control center very soon. He wants to be there in time for the landmark tracking, so we would ask immediately after Jerry's summation that if you have any questions to direct to Jack Schmitt, do it at that time so he can leave. Jerry.

Okay. We came on today at around 71 hours GRIFFIN Everything was pretty much as planned up to and 30 minutes. that time, and I guess I could summarize the entire day's activities by saying that - by saying that they completely normal, and we've certainly been satisfied with the way the spacecraft and the crew have performed today. We just saw the TV I'm sure as you did, and I think those were some of the most fantastic shots that I'll ever see. We had little problems today, in fact, the only thing that I can think of is we had one ground configuration problem that took us some time to get some commands in. Other than that, we ran pretty much completely by the timeline, completely by the flight plan, and did pretty much exactly what we wanted Let me point out that we did have, as you've probably to. copied from the air-to-ground, we did have the primary evaporator dry out on us on the second REV in lunar orbit. We closed back pressure valve which essentially shut that system down, and we plan to stay in lunar orbit with that primary evaporator not supplying any cooling and letting the right radiators handle it. Now, the shift that's on duty right now will be watching that over the next couple of REVS, and I'm sure that that's all okay, and we suspect that it will be, and they'll probably just sleep tonight with the primary evaporator shut I'm going to let - if you have questions about what down. the velocities were of the two burns that we did today and what kind of resultant orbit we had, I'll let Phil answer those questions, he's got all the data. I don't really think there's too much really to cover. I think most of it's in the air-to-ground transcript, and I think we ought to - in the interest of saving some time here - get on with the questions unless some of you guys had something they want to add to it. Why don't we go onto questions?

RILEY Yeah. Let's get the ones that have - does anybody have any questions for Jack Schmitt, cause we want to get him out of here. Okay, let's start right here.

QUERY Okay, here's the question. Are you suprised by the volcanos that Stafford, Cernon, and Young reported seeing? And what about the comment that some of

QUERY those craters glow as if they were radioactive. Do you think that they possibly could be?

SCHMITT Well, I think as far as volcanos, I'm sure and Tom and Gene, and John, all three of them are describing what we have talked about, a type of feature we talked about in the training. Apollo 8 got some rather striking photographs of some cones with high craters in them with dark interiors, and what they apparently are seeing are some more of these type of feature which is very similar to a volcano, and apparently they've seen some additional features on them that make it even more striking appearance of volcanic origin. I am not sure exactly where they were seeing these. The likely place - we'll find out later - the likely place is the - the large basin on the back side, I believe it's called number 9 in the international, by the national committee on nomenclature.

QUERY Give us the longitude so we pick it up on the map.

SCHMITT As I say I am just speculating, but it's on the map and this is alikely place. It's a basin similar to the one that Apollo 8 flew over, and it's a likely place for them. We'll know more about that later, so I wouldn't jump to conclusions on it. Of course, there's been abundant evidence for some time that both volcanism and impact processes are operating on the moon amoung probably many other kinds of processes. The big question that we're trying to answer as best we can within the context of the test flight program what are the relative proportions of volcanism and impact? Certainly the dominant feature on the sculpture and the surface is impact, but we're pretty sure, and this is just more evidence that volcanism is an important process. The radioactivity bit I think is just a normal description of a - an appearance of something glowing. There's certainly no necessary implication that there's a radioactive area that glow is a contrast between the dark interior of a crater and the brightly lit central peak and that's something you guys saw on the TV today, and it was apparent in (inaudible) on Apollo 8 in some of the pictures, so I wouldn't attribute that to radioactivity. That was a - it's just a descriptive term.

QUERY Would you attribute it to a transient event, the glow, or just a natural - the way you described it?

SCHMITT No, it's not a transient event unless I'm very sorrily mistaken. It's just the appearance - it's the contrast of a slope getting near or approaching zero phase, the high reflectance that the moon has with the other parts of the craters that are at low phase - at high phase angle. And as you - some of you know who looked at the moon's photometric function, this is what you'd expect to see. QUERY Three simple questions. 1. Did it

QUERY strike you that their description tonight including some of the TV maybe, seems somewhat different that Apollo 8?

SCHMITT No, I think their descriptions were quite a greater amount of training by all three crewmen in looking and working with the orbital track that they had - that they're flying over. They - we've talked a lot about the possibilities about the things they'll see, for example, when we asked them about more descriptive work on the rills they came back with no sign of buildups on the edges, and this is why the possibilities we have discussed. We try not in the training to come up with any clear cut answer that this crater is volcanic or impacted or water worn or what have you. We just try to be as objective as we can, and I think that you'll find their descriptions are remarkably descriptive.

QUERY Sort of to follow that, it's my understanding that you've probably spent as much or more time going over these photographs and things as anybody, and I wondered, did it look like you thought it would, and what were you thinking when you were sitting there tonight watching those television pictures?

SCHMITT I can't claim to have spent as much time with the photographs as anybody as far as the onboard data is concerned, I probably have. There are certainly plenty of people that are working full time on lunar photogeology where I, it's sort of a part time task with me - extracurricular almost. As far as what I felt like, I felt like I was seeing an old friend, just like the crew seemed to feel, something we've been familiar with in Apollo 8, and we're seeing more of it now through the - not only through the eye of the teleivision camera but through the eye of crewmen that have spent more time training on it, and I find that most of what they're - they say is - is within the relm of the possibilities we have anticipated so far. I think the striking thing again is the detail with which they appear to be observing the surface visually and again just to demonstrates to me the - the adaptability and capability of man's eye and its coupled brain in this kind of an effort.

QUERY I have two questions. The first is, how do you interpret the report of I think it was Gene Cernan who thought he saw ashes in one of these calderas that he was looking at, and -

	SCHMITT	One of these what?
	QUERY	These are calderas that he's describing.
	SCHMITT	I don't know where that he's used the
term	caldera.	
	QUERY	He didn't use the term, but this is what
it -		
	SCHMITT	Well, no caldera is a very specific type

SCHMITT of volcanic crater. What they are seeing and the descriptions I've heard are more kin to, those of you who are interested, to a composite volcano with a central crater in the peak part of it. This is what we've seen a little bit before.

QUERY Then - then -SCHMITT I'm not saying they're not called ... on the moon, but what they're talking about are not -QUERY These are not called calderas then in your opinion.

SCHMITT What's that?

QUERY These are not calderas or calderas in your opinion.

SCHMITT I'm not hearing you very well in terms of you terminology. What we are looking at are composite volcanos, if they are volcanos. The type of feature would be normally be called a composite or shield volcano or cone volcanic cone. A caldera or caldron are two different things.

QUERY _____Okay, the - what about the ashes? Are there any -

SCHMITT Well, again, I missed that term. The certainly the - the term ash or cinders is a common expression and a common type of material, geologically speaking, around these kind of volcanos, and the darkening of the interior the dark interiors and the dark rims which they also mentioned and which we also saw in Apollo 8 photographs is typical of volcanic cones and relatively recent -

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SCHMITT ---which we also saw in Apollo 8 photograph is typical of volcanic cones and relatively recent eruptions. Now, what relatively means in terms of years, I am not willing to say, but it is apparently the inside and the rims of these craters are still dark relative to the other parts of them which have lightened with time.

QUERY The second part of the question is would there be any possibility that the illuminated object that they report instead of being radioactive might have been some form of outgasing as in Aristarchus?

SCHMITT As I said before, the normal explanation, and I think that is all we can go on, what you'd like to expect and what you have seen before, is that it is just a characteristic of the lunar photometric function and where you get bright, strong contrast as a function of slope. In the case of central peak you have a steep slope and that particular orientation to the sun was giving you a bright central peak. He could have said bright and there would have been no great discussion about it, and he said it. But, the contrast made it appear as if it glowed. I am not saying it isn't some kind of glowing, because I didn't see it, but the logical and simple explanation is the other.

PAO

Jack?

QUERY Two questions. First, it seems that when you look at the moon through a continuously transmitting television camera of this type and it is shifting, you get a substantially greater feel for the texture of the ground from continually changing angle than you do from the stepped-typed photography and some of the other motion pictures that have been taken and I am wondering whether or not you have an opinion on putting this type of camera system into an unmanned satellite and doing a complete high resolution, high magnification photo reconnaissance of the moon.

SCHMITT Well, if you -- earlier in the space program had decided to do this, I think it would have been an -- we have essentially started to do it with the ranger system which was an excellent camera system and we got excellent detail from it. The difficulty in a small satellite of getting bad width that will carry this kind of resolution or range kind of resolution in continuous strips is quite great. Now, what we've got now, we've got reconnaissance photography of a large part of the moon with the orbiter system and to plan to fly a

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SCHMITT ---satellite just to do this. with the TV camera, I think would take some soul searching at this stage of the game. But, you did get an illustration of how much greater your over all interpretative capability and resolution really of features with a continuous view like a man has, versus the step view that a normal picture taking gives you, this capability is much, much greater. It makes a great deal of difference.

QUERY I was away for part of the earlier space to ground communication, has there been any statement that would provide a basis for comparing the 8 crew's appraisal of black and white or plaster-of-paris color and texture to the impression that this crew has. You know, we are very deceived by the color distortion of the 3 filter system. Sometimes the screen looks pinkish and sometime it looks bluish. It depends on how the lighting is and so on. And have you at all asked the crew or anything that would give you a calibration on how believable any of the colors are that we see?

SCHMITT Well, just at the last of the last transmission we got them to give us a picture of the color chart and to my lay eye in this case, it looked like they were getting excellent representation. That the gound had established the right color balance. The crew's statement on color - statements - moderately well concurred in by all three, is that its a brownish gray and this is the same impression that the 8 crew had, at least in their photo debriefing, and when they discussed the color pictures they said the black and white pictures gave a better representation of lunar color with the exception of a little brown tinge they'd like to see in it. And, so, I think the two stories are entirely consistent.

QUERY Were you startled at all by anything that the crew said or that you saw on the television? Was there any detail that didn't seem to conform with what you expected?

SCHMITT Well, I can't - I think it did startle me in a sense to hear their vivid, fairly vivid descriptions and we've also listened a little bit more on the back side tapes of these volcanic features - that appear like volcanoes to them. I wasn't really expecting a fairly clear-cut observation like that this early, because this is the operational part of the mission and so I guess you might say I was startled with that. As far as the given kind of featured -- oh, one thing else that I am quite surprised at and I think though that there are CHANGE OF SHIFT BRIEFING, 5/21/69, CDT 9:15 PM

SCHMITT seeing bolders in these craters from 60 nautical miles. There are just some pretty large slide areas anyway, large masses that are in and around some of these relatively fresh craters. That is a very interesting observation.

QUERY I think he was using the monocular when he saw the boulders. He wasn't seeing those with a nacked eye.

SCHMITT No. That is just an 8 power monocular and it corresponds with Bill Anders only observation of boulders in the crater Tsiolkovsky in which he saw some that had apparently rolled out from the central peak out onto the floor. So, again, we're getting fairly consistant observations there, but I will have to go back and look at it or you can look at the transcripts, but I believe that Gene did at one time say he thought he picked them up as a difference in texture with the naked eye. Bill Anders said the same thing, so the eye is almost resolving boulders and the eye is doing a fantastic job, There is no question about that.

QUERY I am having a little problem orienting some of the things that I saw through the television camera. We talked about the brownish gray appearance of the moon and yet I out one set of windows it appeared quite gray and on the other side almost reddish brown. This was a function of the way the light was hitting the lunar surface.

SCHMITT I noticed that, too. In the early TV pass the screen appeared more gray and when they switched over and got part of the night sky or the part of the sky in the picture and I really don't know the answer to that one. I would be interested to hear the answer to that myself. I don't know whether you agree, Charlie, but I did - nobody commented on it at the time, - but I did notice a distinct change in the hue.

QUERY This seemed to change from window to window whenever they were passing it from one side to the other.

SCHMITT I wouldn't be a bit surprised if the light levels the camera was seeing was making it difficult for the ground to stay locked onto what they thought was good color.

QUERY So the color differences we saw was perhaps more a function of what the ground mixers were doing.

SCHMITT They definitely are a function of what the ground is doing to try to make them good pictures, but I think they have a number of controls

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SCHMITT that you will have to talk to Paul Carn, or somebody like that about. But at the end, when they did show the color chart, and after seeing a lot of brownish gray moon, at least on our color monitor, the color chart came out real well, and I suspect that that was pretty close representatiion of what they were seeing.

QUE RY OUE RY Thank you.

The appearance of the landing site.

SCHMITT Well, I'd like to see it a little closer up, but the - it looked we've seen it before pretty much. Again, when you get very low sun angles on these landing sites, they start to look a little bit rougher and rougher, and it's getting more and more, in my eye anyway, that you're going to have a real piloting job when you get down close, but so far, I don't think we see anything we didn't really know we were taking on when we decided to land there.

QUERY That takes care of my question, Jack. SCHMITT Okay.

QUERY To the right of the landing site, I think it was, there was what appeared to be a number of high ridges, almost a mountain range. How far away is this from the landing site itself?

SCHMITT Those to the south, it's the area the Northern Pyrenees is what you're talking about. And as I recall, they're on the order of 30 or 40 nautical miles south of the landing site 1, now. We haven't had a good look yet of landing site 2 and - but the same comment would apply. There are high highland, relatively high highland areas to the south of landing site 2 and landing site 1.

QUERY Then you're - Is that within your range of error?

SCHMITT We're much - As a current estimation of our guidance error for LM targeting through - for the landing neglecting the piloting site of it, is on the order of 10 nautical miles by 4 nautical miles, so we're 10 long by 4 wide, so we're those are not of any consequence to the landing at all.

QUERY Did I understand you to say that we have not had a look at landing site 2 yet?

SCHMITT Well, we just got a bare glimpse of it. They were showing you the crater Moltke, which is just south of landing site 2.

QUERY But it seems to me - -

SCHMITT It's south and east of landing site 2, and landing site 2, in the television shots was just still pretty close to the terminator and they were having trouble getting it because the sun shafting and everything like this.

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QUERY This is what impelled you to say that you wouldn't want to draw any conclusions about the roughness or smoothness of landing site 2, based on this very low sun angle. Is that correct? SCHMITT Well, I think

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the roughness or smoothness of landing QUERY site 2 based on this very low sun angle.' Is that correct? Well, I think we've drawn our conclusions SPEAKER on the landing sites. There's been extensive analysis prior to this mission, of the relative roughness of the different parts of the moon and we selected landing site 2 as one place that we're willing to commit to a landing on. What, I think, we see at these low sun angles that we haven't seen before and some of the Apollo 8 photography showed this in landing site 1, is that you start to see very settled differences in slope. You start putting a l degree or half degree sun on a surface and you see fantastic detail that you never knew was there, and that would apply to this rug as well as it does to a landing site. But these are relative low features that you're picking up and they start to look very striking at low sun angles, but I don't think there's any reason to suspect that we have any greater problem than we had before.

QUERY In your opinion as a geologist, have they broken any new geological ground, particularly with reference to the volcanoes. Do you feel their observations fairly well establish that some of these craters are of volcanic origin?

SPEAKER I think that, that, in my own personal feeling, that that question has been established for some time. You won't know without fear of contradiction until sample and start looking at some of the textures of the rocks that the Apollo 11 crew hopefully brings back. I think that the knew ground that this crew is breaking in conjunction with the Apollo 8 crew, is two things. From the pure lunar science point of view, we're getting more and more information again on a relative amount of volcanism versus impact for those if you're willing to take my interpretation on what volcanism and impact is. The other side of it is, again we're proving step by step here that we've got the glassware, if you will, that we can perform experiments with. And, of course, any time we get another step of this test flight program out of the way, we've got another bit of that glassware to do - eventually do some really fine science on the moon.

QUERY Following the same thought, do you think that 50 000 foot pass is going to give them a lock-in perhaps that we haven't had before on some of these questions that are still open?

SPEAKER I suspect that the 50 000 foot pass for a few of the features that they've already commented on and some others that we selected with some crazy names, but mainly the use of these names is to seat them in your memory of what you're looking for. For example, the two rilles that we've talked about. They've already made, I think, a very significant observation on the senuous rilles that we see on that track and that they'll be getting much closer to, and that is at the very

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SPEAKER low sun angles they were not detecting any buildup on the edges of these rilles which is one more piece of data that you have to filter into the - or put into the hopper to interpret them. The chance - they have another excellent chance to confirm this observation as they get down at 50 000 feet. Plus just - they have a higher sun angle, they'll be able to see into these things better at that time and from a much closer vantage point.

QUERY To your own opinion, what the rilles are? SPEAKER Well, I have - there's several possibilities and the only thing that I feel is that when all the air is cleared, it will turn out that they're rilles and they're rilles, and that they're formed by a combination of processes. This is usually the way it happens in geology in spite of everybody taking firm stands one side or the other.

QUERY Jack, have they had a chance yet to look at the rilles where Apollo 8 recorded seeing a buildup inside a levee, you called it the other day?

SPEAKER I must have missed that in Apollo 8 or forgotten it. I'm not too sure of it.

QUERY There was a picture from Apollo 8 right fairly late in the mission. Right toward the terminator they had a picture of a rille where there appeared to be a buildup on the side of it, like a levee.

SPEAKER I did have the impression on one of the late Apollo 8 pictures of this same rille that they're looking at - Diamond Back - that in the very low sun angle, very late in Apollo 8 it looked like there was a buildup on the side of it, but we're not able to confirm this, and I suspect their observations much better than the one we had from those very, very low sun angle pictures. They're much closer to it for one thing.

QUERY Would you explain what you mean by buildup on the side of the levee?

Well, if any of you have ever been in the SPEAKER mountains and seen the track in the Sierras, for example, that track of a mud flow that's coming down a fairly steep slope. It's not confined to the mountains, but this is the best place to see it. You'll see a channel and then on either side of the channel, there will be a little levee, and you can watch these things when they're happening; you get a mud flow or during a rainstorm, and what's happening, the velocity is high enough and the turbulance in the flow is high enough that it's kicking material out the side; so what - if these senuous rilles do have an origin by some evolution process, that is a roche process, this is one of the things you might have expected to see by certain kinds of these processes. So far, they're saying that they didn't see it and this does tend to narrow the possibilities.
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QUERY Does the crew have instructions from you to look for these indications of erosion and the rills when they go down to the low altitude tomorrow?

SPEAKER Well, I don't have any real instructions to the crew, but the emphasis of what we're trying to do is come back with as objective set of observations as we can and one of the best ways to do that is to think about the possibilities of origin, so that you're thinking of what kinds of things would indicate various kinds of origin and so from the erosive standpoint of origin of these rills, yes they have been briefed on the kinds of things that an erosive origin and might leave as traces, one of these things were these levees, which they've already talked about.

QUERY What kinds of cameras will be used, if there's more than one tomorrow for the two low passes, and will these be triggered automatically, will they be sequence cameras, or -

SPEAKER We have one sequence camera with an 18 millimeter lens on it. It's a standard sequence camera we've been using in the Apollo program.

QUERY	Which one is that? Is that the	
SPEAKER	That's the Mauer.	
QUERY	Mauer?	
SPEAKER	Mauer camera. 16 millimeter ca	me

SPEAKER Mauer camera. 16 millimeter camera with an 18 millimeter lens, and that will be taking a sequence photography out the right-hand window and Tom, primarily, but shared with Gene, will be using an electric Hasselblad with an 80 millimeter lens out the left-hand window, and the sequence camera photography will be color and the Hasselblad will be black and white, primarily.

QUERY As you watch that Television picture these pictures of the moon, did any of the terrain strike you as familiar with any parts of the earth?

Well, I think the impact craters looks SPEAKER like the impact craters we've seen on earth. Probably, the most unusual style - type of feature that we saw today are the senuous rills and the Mare ridges. These are not awfully common, at least at this scale, on earth. I don't know of any good examples of them. The main thing to keep in mind about the moon is the chances of there being planetary processes of which we are unfamiliar are relatively small. What we're seeing is the difference in the relative proportion of these processes having acted and their effect because of a different gravitational and atmospheric and hydrospheric environment. That's a little complex, but really most - so far the history of the space program and with respect to the moon has shown that we're not - we're seeing - we sort of think we're seeing old friends. We're seeing them in different proportions.

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QUERY Do you not agree that some of those high mountain ranges we saw might look the same from a high flying aircraft looking down over the earth?

SPEAKER The main difference between most terrestial mountain ranges, other than the fact they're covered by vegetation and snow, would be the degree of sharpness. At least the Sierras, the Rock Mountains are generally much sharper than the lunar mountains. The characteristic thing about the high terrain in the moon is that it's very subdued; it's rounded. It may be high, but there are no sharp corners. And because of the types of weathering processes operating on the earth, namely, wind and rain and ice compared to meteor impact bombardment on the moon, we're getting a - that different kind of surfacial characteristic. Is that clear?

QUERY I've got two things. One, when the camera was at full zoom and you got a full screen picture, how large an area were we seeing?

SPEAKER You mean a minimum zoom, a 12.5 millimeters, I think that is? I'd have to guess off-hand. I think - let me take a look here. We did look at the area - John's going to do some land tracking in a little while around F-1. We probably were seeing

SCHMITT Around f:1. We probably were seen at least 120 nautical miles wide, probably more than that actually, and then we had a good shot of Langrenus and you can see how big Langrenus is and make that comparison. But that was largely at full out zoom 75 millimeter.

QUERY A second thing, what significance did Tom's remark that one feature was similar to the Canyon diablo have for you.

SCHMITT Well, we had - I'd used that because that was something that all of us are familiar with, having flown back and forth across southern United States. As a real light feature on earth. And when he said that, that confirmed the observation that it had - well, you can see this to a certain degree on the photographs, but that it's relatively angular in its outline in detail, it's an irregular outline, but each individual portion of it is - approaches a straight line, plus the lack of these levees. If you've ever flown over Canyon Diablo, it comes like that and then drops. It's a right angle, right angle cliff.

QUERY Will both near passes tomorrow be of the same altitude or will the second one a little higher or -

SCHMITT Little higher. The second a couple of nautical miles higher. I think it's about that. Can't really tell till we see what SHAFFER kind of an orbit we start out in. SCHMITT No, let's wait. Donald's 8.4 for the first one, Phil? No, it's 8.23 miles which is 50,000 feet. SHAFFER OUERY A couple of questions, Jack Schmitt. Back for the cameras. Was that the 80 millimeter on the Hasselblad? SCHMITT What? OUERY On the Hasselblad. SCHMITT 80-millimeter lens. OUERY Yeah. SCHMITT 70-millimeter camera. QUERY How much film will they have for both cameras? SCHMITT Oh, in the LM? GRIFFIN That question from the query desk has all kinds of camera stuff that you can get. QUERY Okay, a question for Phil. GRIFFIN Hey, let's take care of all the questions for - all the questions for Jack Schmitt first, because he's going to leave here very shortly. SCHMITT Then I'll run out on you. GRIFFIN Okay, and then we'll get these other three and then let Jack go.

18D/1

QUERY On this - when they zoomed in, question two parts, you can answer bing bang or say "I don't know." What - could you guess as to what size object they saw and (2) when they zoomed in with the color lens, could they see detail that normally you couldn't see with the unaided eye from 60 miles up?

SCHMITT The answer to the second question is no. The first question, let's see, the best example I can give you, I don't know the exact number, what the resolution of that camera would be at full zoom, but remember late in the TV pass, we talked about Bl, the crater Bl, and somehow or another, I'm sure Jack and his infinite resourcefulness can get a picture of what Bl looks like and so you can compare it with the video tapes. But that crater is about 22,000 feet across, I believe. Well, anyway, it's something on that order, 22 to 25,000 feet across. And it was fairly, fairly small but very definitely recognizeable on that.

OUH	ERY		What	t is t	he	reas	son -	-				
SCI	IMITT		Go	ahead								
OUI	ERY		For	what	rea	ison	did	vou	deo	cide	to	
the	black	and	white	film	on	the	Hass	selb1	ad	duri	ng	the

low power.

use

SCHMITT Well, we have color film on board, but our general feeling is that we, well first of all, the black and white film is - is higher resolution film then what we have in terms of the color, the SO 368. This is 3400 film that we carry, in black and white. And it's a wider latitude, we can cover broader ranges of exposures with one f-stop and shutter speed, and plus the fact that the moon is basically a black and white world except for this light brownish tinge. Now, well we will take a few color pictures, there's no question about that. We took a lot in Apollo 8 and we'll be taking quite a few. in this one. We actually do have some kodacolor film on board that we're going to try out also. We haven't used that before. But our basic, we hope that with the black and white film, we get generally better pictures from a resolution point of view and from a training point of view.

QUERY One more question about the rilles. It struck me as we were watching during the TV pass. There was one particularly good shot of the rille that looked remarkably like some of the creeks, or creeks, I remember in the Ozark Mountains, the slow moving kind of thing, that just gradually eats its way into the ground. Would you comment on that?

SCHMITT Well, that rille, there's no - called Diamondback, is unquestionably different in its general shape then the one we called Sidewinder. And the one you're referring to, I think, is Sidewinder. And that - reason that we call it that is because it looks like a sidewinder in its shape.

SCHMITT And that is more truly a sinuous rille. And I believe, when they were commenting about the Canyon Diablo characteristics, they were talking about the one north of track, there, not the Diamondback rille. So, I don't know, I think we'll have to wait till tomorrow till we get Tom give us some more observations on the one south of track before we'd be worth saying anything about it. It looked that way to me, too. And that's what makes people think these things are errosive in character, is that they do resemble streams in some of their characteristics.

GRIFFIN Okay, we'll let Jack get back to the landmark tracking, he wants to get away.

SCHMITT That's near Winsell, Arizona? You heard of the Canyon Diablo meteorite? That form meteorite crater. Yes. Right west of there.

GRIFFIN Okay, I'm back over here.

QUERY One question about the orbits of are you going to be happy tomorrow with the orbit that you have now, or will there be some maneuver performed tomorrow to try to exactly circularize the orbit?

SHAFFER No, we'll go into the rendezvous out of the orbit we have, we won't try to adjust it.

QUERY Phil, why did they arrive at the moon 10 minutes 10 seconds later, or eleven minutes, whatever it was.

SHAFFER 10 minutes? Well, they - the nominal flight plan assumed that we would do the first midcourse at about 9 hours about TLI, but later dispersion analysis demonstrated that if we would delay that first midcourse until the second point, that the probability that we could do LOI without a subsequent midcourse was very high, and we have demonstrated that since we didn't do it on the midcourse, but that trajectory that we were on, was a sensely a fatter trajectory, therefore, slower in of arrival, and it caused us to arrive at the moon late. They both did. It's just a matter of how long you stay on on any given trajectory and then make it up.

QUERY I wonder if you could run through the best estimated times for DOI and the rendezvous sequence for tomorrow.

SHAFFER Strange that you should ask. DOI is 99 hours 45 minutes and about 53 seconds. The phasing maneuver will be at about 100 hours 58 minutes and 20 seconds. Insertion maneuver at 102 hours 54 minutes 20 seconds. CSI at 103:45:30. CDH at 104:43:30, 43:30. TPI at 105:20:45, and docking should be at 105:20:45, and docking should occur shortly after 106:05.

QUERY	106:05	rendezvous?	2
SHAFFER	That's	rendezvous	itself?
QUERY	Yeah.		

SHAFFER That's probably correct. 106:05 is much closer to station keeping, or rendezvous if you will. The docking could take, probably will take a few minutes more than that.

QUERY We were told on the water to try to fill that plastic bag 3/4 full rather than half full and see if that would settle it the gas bubble problem. Was that done, or have they said anything about it?

SHAFFER I'm not aware of telling them to fill it 3/4 full. You talking about today?

QUERY I understood they were told to fill it more than half full.

SHAFFER We told them that yesterday, and it's to my knowledge, I don't know what they've done with it. I don't think there was anything said. There was nothing said about water today, during the day.

Tonight, please.

GRIFFIN Would you start the question again, please. We didn't hear.

QUERY How long do you expect Cernan to spend in the lunar spacecraft?

END OF TAPE

QUERY

CHANGE OF SHIFT PRESS BRIEFING, 5/21/69, CDT 9:15 pm. 18E/1

SPEAKER Would you start the question again, please, we didn't hear you.

How long do you expect Cernan to spend OUERY in the Lunar spacecraft tonight?

I think it's on the order of about SPEAKER 2 hours. He goes in around 82 and a half something on that order and comes out around 84 or 5. So it's maybe a little more than 2 hours.

And it's only Cernan who goes in? QUERY You can look in the - incidentally it's SPEAKER whatever is in the flight plan.

OUERY SPEAKER OUERY SPEAKER

It is only Cernan that goes in, then? It's in the flight plan, yes. Oh, it isn't in the press court? Okay, you can get a flight plan over in the news center and it's there, yeah.

Can you give us a rundown on exactly OUERY what Cernan will be doing during this 2 hours and a quarter. 2-1/2 hours?

No. I can - in fact I've got a flight SPEAKER plan here. I guess I could go through the thing. Let's see. primarily what he's doing is - he is going to go in and do some housekeeping, that is, he's going to stow some things, that he's going to bring over from the command module with He's going to do some primarily as far as we are conhim. cerned with (garble) he's going to do some comm checks. Communication checks. He'll do several of those, lasting for quite a while, and then he'll check the OPS, that's the oxygen purge system; he'll check the pressures on those and then he'll move out and go on back to the CSM. So primarily it's a - oh, he'll also look at some of the other parameters, system parameters, like on the descent propellant or descent propulsion system, and he'll look at the supercritical helium pressure; read that out to us so that we can see what kind of rise rate we've had since the liftoff.

... He's bringing from the LM to the CM. OUERY SPEAKER He brings some logs and checklists. He brings a radiation survey meter and some 16 millimeter film, 70 millimeter film, binocular; he also brings the flight data file which is a checklist and crew logs and things of that sort, and he stows that as soon as he gets over there. It's generally the stuff he's going to be using tomorrow.

QUERY A couple of things. One, are we still adding 11 minutes to get the right time, or did that work out someway.

SPEAKER It's approximately 11 to 12 minutes. And the other thing, there's a lot of QUERY talk in the first pass about how much they could see by earthshine and they thought they would try the TV on it and CHANGE OF SHIFT PRESS BRIEFING, 5/21/69, CDT 9:15 pm, 18E/2

QUERY then I never head anymore about it. SPEAKER I think it became apparent to Tom, or this is my impression, that they still had a lot of activity to do subsequent to the TV pass and I think he felt he wanted to go ahead and get on with it, and we certainly didn't want So we told him to go ahead and stop it whento hold him up. ever he wanted to. QUERY No private conversation? No. SPEAKER SPEAKER No. No private conversation since the one last night at 8 o'clock. Let go back up to I couldn't see you. Oh, there you are. What was the written note inserted into QUERY the flight plan for which Stafford sent down his thanks? SPEAKER When he sent down his what? OUERY Just before LOI, he said he wanted to thank you for what was written into the flight plan. Some There was a blank page ahead of the message. Yes, I don't know what that was. SPEAKER It was probably something that the support crew left a note for him or something like that when they closed out the logs. Ι really don't know what it is. SPEAKER The backup crew inserted something into the flight plan and they have declined to say what it is. SPEAKER It's probably -They smile when you ask them what it was. SPEAKER The backup crew smiles. OUERY In these television broadcasts that we've seen, especially the interior shots, well specifically the interior shots where you were able to look out the window. We've noticed that consistently the sky seems to be a rather bright and light blue, almost as it is here on earth. We've always been given to understand that way out deep in space where there's a vacuum there is no color, because there's nothing to propogate the color. Has there been any discussion about this, and what explanation, if any, does come out of these discussions? SPEAKER Okay, Bill, somebody asked that question last night, and we haven't done anything further on it. As far as I know it's just the color reproduction that that camera gives you. Now, I was talking to the TV people prior to the flight and they said that lighting is very important I guess much the same as lighting a football game effects a - the color quality or the color exactness that you get. And I suspect that it's probably something to do with lighting, but I think one of the reasons tonight that we asked to see the little color strip was so the people could correlate exactly what they looked when they saw outside and inside the cockpit to see if they can correlate any of this data with known colors.

CHANGE OF SHIFT PRESS BRIEFING, 5/21/69, CDT 9:15 pm, 18E/3

SPEAKER So I suspect that we'll be able to put a story together probably at least post-mission if not before, what might be causing that to shift that obvious black which we know it is to a blue. And I've noticed it too on every one of them.

QUERY Some quick ones for Phil. What are the latest numbers on the present orbit, if you have them? SHAFFER Well. let me look through my data here.

SHAFFER Well, let me look through my data here. The numbers that we had when I left were 59.7 by about 60.6. OUERY And do you have an exact time figure, a

differential that we can correct our flight plan times with? SHAFFER No. TPI is coming up essentially 12 minutes late. And everything is going to slip by about

that much. That's the number we shoot for, and everything else kinda deltas from that.

QUERY And do you have any more - enough tracking data to know any more than you did after 8 about the mascons?

SHAFFER We know they're still there. We haven't been there long enough to know we've been so busy computing maneuvers and getting ourselves into the circular orbit that we really haven't had time to do any kind of analysis. We looked at the stuff and sure enough they were still there. And the radar data still wobbles around like it did on 8.

QUERY A couple of questions. One, on the SPS burn for LOI - Well, it apparently worked beautifully. There was a good deal of talk, I think, from Young on the pressure building up. I wonder if you could explain what that was all about.

SPEAKERI missed the first part of your question.QUERYThere was a good deal of talk from Youngon the pressure building up during the LOI burn. I was won-dering what that was all about.

SPEAKER He was talking about chamber pressure seeming to increase throughout that burn. A small step function when he - when they switched on the second (garble) ball valve he said it jumped from about 98 to 100 which is something that you would expect, very normal. Then he said that there was a slow increase throughout the burn ending up at somewhere around 104 or 105 psi as I remember. That was both John and Gene commented on it. I think Gene commented on it first and then a little later John Young commented on it and I may be thinking about the backside voice tape that we listened to also, after we dumped that first rev data.

SPEAKER Jerry I'm not sure but I think that's expected too for the thrust to increase slightly.

SPEAKER Yes, but I wanted to add that, of course, he was playing some manipulation of the propellant utilization valve.

QUERY

(Garble)

APOLLO 10 CHANGE OF SHIFT BRIEFING, 5/21/69, 9:15 pm 18F/1

QUERY During this IVT night when Schweikart on one end of the LM, they had a little bit of sickness. Now Cernan's the only one going in this time, he'll be in there about 2 hours I believe you said. Will we get a report as to whether he experienced any motion sickness or not while going in, while in, or after he came out of the LM? GRIFFIN I'll say you'll hear whatever I

hear, of course I may not be there but we don't look for any trouble in that area. They've been so good up to now that I'm afraid you hear about anything that happens.

QUERY Well, specifically I expect to ask when he comes out of the LM "did you have any kind of motion sickness or any discomfort," distress or any other synonym that they use for you know what.

GRIFFIN No, I'm sure we won't ask that from the ground, if they've got something to tell us, they'll tell us, otherwise we'll leave them alone.

QUERY Do you plan to make up these 12 minutes delay and if so when and how.

GRIFFIN No we won't make those up. Phil might talk about what you have to do. It would be pretty wild to do that.

SHAFFER We will make it up when we land. (laughter) I don't think it's going to make that much difference, but the only place you can make it up now is with trans earth injection and landing time, and we'll go to the primary landing area and land there when the boat's there. It'll all be made up.

GRIFFIN Oh, you're talking about the end of the mission. SHAFFER That's affirmative. RILEY Okay, thank you very much.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2210, GET 82:20 301/1

PAO This is Apollo Control at 82 hours, 21 minutes. During the Change of Shift Briefing Apollo 10 completed the third revolution. We collected We're about 4 minutes of conversation with the crew on tape. now about 17 minutes, 40 seconds from acquisition of signal again at the beginning of the fourth revolution. Shortly before loss of signal. Gene Cernan reported that he had removed the hatch, the drogue, and probe and was preparing to go into the tunnel and into the Lunar Module. Cernan also reported that some mylar insulation on the outside, actually on the Lunar Module side of the Command Module hatch had apparently broken and some silicone insulation contained underneath was sifting out making somewhat of a mess in the LM tunnel. Just as we had loss of signal, Tom Stafford reported that he would assist Cernan in cleaning We'll play back the tape of that conversation up the mess. for you now.

CAPCOM Apollo 10, Houston. SC Go ahead, Houston. CAPCOM Roger, Geno. We're kind of

monitoring your gimbal angles here. It looks like you might be drifting close to lock and I'm going to keep an eye on it.

SC Okay, thank you, Joe. And for your information, we got the hatch out and we're working on the probe right now. The pressures are equal. What we did, Joe, was to make an auto maneuver to come around here for the 326 degree pitch for land mark tracking and we're all working with the tunnel and just occassionally monitor it. I think we'll be okay.

CAPCOM Okay, thank you, Tom. And let's see there's just one other item. We want to make sure that you are noting to take a hack when you transfer to LM power so you can pass that on to us. And we'll also want the roll calibration angle but that's already in the checklist there.

SC	Yeah.
CAPCOM	Okay.
SC	Hello

SC Hello Houston, this is the LMP. I'll be going off the air, Joe. I'll be talking to you from inside Snoopy later.

Okay, Geno.

SC Okay, Houston. What Geno's doing now is, he's up in the tunnel cleaning the mylar out of the valve up there. Or insulation it is. It looks like cotton, is what it looks like. It tastes like fiberglas.

CAPCOM

CAPCOM

Roger, Tom.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2210, GET 82:20 301/2

SC The probe came out pretty easy. It didn't seem to fold as much as it normally does but it is a lot easier in zero G than it is in 1 G. I guarantee vou that. CAPCOM Okay, we copy that. It's working all right isn't it John. SC Yeah. It is right this minute. Hey Houston, this is Apollo 10. CAPCOM Go ahead, John. SC Roll cal is plus .1. It's not quite zero but it's close. CAPCOM Roger, copy. Plus .1. SC Geno says change it to minus .1. CAPCOM Okav. minus .1. You can tell how close it is. SC He can't make up his mind whether it's plus or minus. That must be pretty close. CAPCOM That's thanks to you, Joe. SC You really got an eyeball for calibrating that thing. Roger, that. Okay, 10 this CAPCOM is Houston. We're showing about a minute 50 from LOS and just to verify we're calibrated we're figuring on AOS at 823852 John. Roger. And Geno is just now SC moseying into the LM followed by showers of insulation. CAPCOM Roger. Hey, we're going to have a SC heck of a cleaning job here. They had insulation all in the seal, all in the valve and it is really a heck of a mess up here. CAPCOM Okay, we copy, John. SC It will be just about impossible to get that LM -CAPCOM 10, this is Houston. SC Go ahead. CAPCOM Roger, 10. I want - have you got the umbilical hooked up to your suits now. SC I'm still on my umbilical here. I'm up in the tunnel trying to help Gene get this crap cleaned up. Yeah, okay Tom. You might CAPCOM want to watch real close if you do unhook the umbilicals to try and keep letting that mylar get in the intake or the inlet side of those things. It'll get into the suits. PAO That concludes the tape playback of the conversations we had with the crew before LOS. We're now 12 minutes, 15 seconds from acquisition of signal at the beginning of the fourth revolution and we'll come back up as we approach the AOS time and stand by for conversation with the crew. END OF TAPE

APOLLO 10, MISSION COMMENTARY, 5-21-69, CDT 22:26, GET 82:38 302/1

PAO This is Apollo Control at 82 hours, 38 minutes, and we are about 1 minute now from acquisition of signal as Apollo 10 moves into the fourth revolution around the moon. By this time, we would expect that Gene Cernan would be in the lunar module beginning some general housekeeping chores and figuring circuit breakers and switch panels for a communications test which will follow later on REV 4. Also, on this revolution, we'll be doing some landmark tracking. The crew will be taking sites on two landmarks primarily as a practice exercise in the use of the spacecraft's optical system. We're now about 4 seconds from acquisition of signal. We'll stand by for a call to the crew.

CAPCOM Snoopy, this is Houston. We're standing by. How do you read?

CAPCOM Hello, Snoopy, Houston. We're standing by.

PAO We have data from the spacecraft but still no voice communication.

PAO We would expect at this time the crew is involved in taking landmark sightings on a landmark designated F l which is in the middle of Smyth's Sea. This is a crater about 5000 feet in diameter.

CAPCOMStanding by.PAOAnd we've just put in a call to the crew.CAPCOMHello, Snoopy, this is Houston. How doyou read?Apollo 10, Houston. How do you read?CAPCOMApollo 10, this is Houston. How do youread?CAPCOMCAPCOMHello, Snoopy. This is Apollo - this is

Houston. SC Apollo 10 -CAPCOM Apollo 10, this is Houston. Reading you

real weak, Tom. SC Okay, we're right in the middle of our landmark tracking and Geno is reading you loud and clear. Over.

CAPCOM Okay, Tom. Understand you're reading us loud and clear, and is Gene in Snoopy yet?

SC Yeah. He's in Snoopy. ... (garbled) CAPCOM Okay, Snoopy, this is Houston. We're picking you up now, Geno, and we can go ahead with this voice check now, and if you'll give me a long count in each of your three modes, we'll see how it works out, and if you would identify which mode you're in.

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 22:36, GET 82:48 303/1

ast market :

Charlie Brown, this is Houston. CAPCOM CAPCOM Charlie Brown, Houston. 10, we're reading you loud and clear. CHARLIE Okay, Charlie Brown, I understand you're CAPCOM reading us loud and clear. You're breaking up pretty badly, and you're just about unreadable. I wonder if you could give us an idea. Is Snoopy ready to try the checks from his end yet? CHARLIE (Garbled) SNOOPY Houston, Houston, ... how do you read me? Okay, Snoopy. We caught that one, Geno, CAPCOM and how do read Houston? Reading you loud and clear, the only SNOOPY problem is that my command module hose is out here. My command module ... Everything is squared away, everything is going smooth (garbled) over. Okay. You're pretty tough to make out CAPCOM in this mode, Gene, so we'll go ahead and catch the long counts though if you want to give us a long count in each of your three modes, go ahead and identify which mode you're in. Houston, Houston. I'm CSM Comm, Charlie SNOOPY Brown COM. I can read you when I go to Snoopy COM, but you cannot read me. CAPCOM Okay, Snoopy. We copy. You're on PSM COM and you can read us when you're on Snoopy's COM, but we're not picking you up at all. Okay, stand by just a minute, Gene, and in the meantime, how's the snow situation up there? It's pretty lousy. Everything else in SNOOPY the LM is go. I'll give you all the readings when I get back in the CSM ... I can read you loud and clear on the Snoopy COM, but you're not getting me at all. CAPCOM Okay, we understand, Geno. Stand by here. SNOOPY You might have me verify some switches to make sure I got them all, I think I did. CAPCOM Okay, that sounds like a good idea. Okay, Snoopy. This is Houston. You CAPCOM want us to go through your switch list to confirm these? SNOOPY Houston, unless you got a better idea, we might just as well. CAPCOM Okay. Okay Snoopy. Your audio LMP, the one S band PR to transmit receive. VHF A transmit receive. VHF B to receive. SNOOPY Go. CAPCOM S-band PM primary to primary. Down voice backup PPM off, reset off low. VHF A transmitter to voice. VHF B to receiver on and S-band antenna forward. SNOOPY Yeah, I got all those. CAPCOM Okay, that should hack it, Gene. SNOOPY Okay, can you think of any circuit breakers

APOLLO 10 MISSION COMMENTARY, 5-21-69, CDT 2236, GET 82:48, 303/2

SNOOPY that might be out. I've double checked every where and I can't see anything that's out on any and I'll have a quick double check and I'll switch back to Snoopy COM. CAPCOM Okay, Snoopy, we're looking at circuit breakers now. SNOOPY Sure like to complete this, on this front side pass, if we can. CHARLIE (Garble) SNOOPY (Garble) CAPCOM Roger that, Snoop. CAPCOM Snoopy, we're getting real good data, it's just our comm that we're having a little problem with here. SNOOPY Okay, (garble) SNOOPY Houston, this is (garble) Snoopy, how do you read? CAPCOM Okay, Gene, you're still coming in a little garbled, but go ahead. CAPCOM Snoopy, this is Houston. Go ahead, Gene. SNOOPY How're we doing, Joe? CAPCOM We're trying to figure out if maybe another antenna for this would work better, Gene. In the meantime, we suggest that you turn those - you have the guys in Charlie Brown turn their suit compressors off so we don't set this stuff up into the suit loops. CHARLIE Charlie (Garble) CAPCOM Charlie Brown, this is Houston. Say it again, if you would, Tom. CHARLIE Got some strings over the (garble) we're all right now. Got good signal (garble) forward (garble). Go ahead and switch over and give it a try again? CAPCOM Roger. Let's give it another try. CHARLIE Okay, I'll give it another try.

CB Hello Houston, this is Charlie Brown speaking. Snoopy's been calling you and calling you, do you read him? CAPCOM Charlie Brown, this is Houston, That's a negative receive on Snoopy, Charlie We sure can not. Brown. Charlie Brown, this is Houston. CB Garbled. CAPCOM Roger, Charlie Brown. This is Houston and Snoopy also is here reading and what we're going to try and do is go over to the CDR side and set the switches up there and see if we can get any voice time over there. An d we'll read off the switch list to you, Geno. Okay, Snoopy. This is Houston. On the panel 11 push in the commanders audio and then on the commanders audio panel set your S-band TR to TR, VHF ATR, and VHF C receive and on the LMP panel go to backup and let's try it. Snoopy, this is Houston. If CAPCOM you're trying to give us a call would you try that again please I think we're getting you real faint. SNOOPY Hello Houston, Houston, this is Snoopy, how do you read? CAPCOM Okay Snoopy. This is Houston You're booming in loud and clear now. How do you read me? CAPCOM Okay, I'll take one on that one. My down voice back up was in the off position it looked to me like it was down voiced. I pulled it twice but apparently not hard enough. I've got down voice back up now on the LMP's panel and you read me loud and clear, is that correct. CAPCOM Loud and clear Gene. Lets press on I bet we can wipe this out in time. Go ahead with one long count in each mode and give us an ident., identify which mode you're in. Push the and so forth, okay? Okay, real quick, let me, let me SNOOPY reconfigure the other panel here the way it was. CAPCOM Roger, go. SNOOPY Okay, on that ICS, on that ICSPTT long count follows, 1 2 3 4 5, and 5 4 3 2 1, how do you read me? CAPCOM You're loud and clear. push to talk Geno, go ahead with ICS. SNOOPY Roger, that was ICS PTT how do you read me? ICS PTT 12 3 4 5, 5 4 3 2 1. Loud and clear, press on. CAPCOM SNOOPY Okay, reading the ICS PTT now. 1 2 3 4 5, 5 4 3 2 1. CAPCOM Loud and clear, press on.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2246, GET 8258

304/1

APOLLO 10 MISSION COMMENTARY, 5/21/59, CDT 2246, GET 82:58, 304/2

SNOOPY Okay this is PTT. How do you read me, 1 2 3 4 5, 5 4 3 2 1. Loud and clear, press on. CAPCOM Now I'm in vox, how do you SNOOPY read me in vox, 12 - -5, 54321. Okay, give me a long count in. CAPCOM You know I think maybe the signal dropped out in one of them there. SNOOPY Okay, a long count in bocks, 1 2 3 4 5, 5 4 3 2 1, 1 2 3 4 5, 5 4 3 2 1. CAPCOM Okay, that looks good Geneo. Lets press on to figures on the voice PM step 1 activation 14. SNOOPY Okydoke, and by the way, you do have me on a hot mike ICS PTP in this configuration, just to confirm it. CAPCOM Roger, that. Okay, step 1, I go to voice, SNOOPY Okay I'm going to voice and biomed right. CAPCOM Okay, and stand by until we get set up here. I'll give you a call. Okay, Goldstone, this is CAPCOM Capcom. Goldstone, Capcom. GOLDSTONE This is Goldstone. CAPCOM Roger, configure for LM mode 6.07.00, low bit rate, and give me a call when you got it. GOLDSTONE Roger, Roger, we start in test 2 sequence 1. Contact Goldstone, we are there. CAPCOM GOLDSTONE Thankyou. CAPCOM Snoopy, this is Houston, on the voice PM, how do you read? SNOOPY How do you read me? CAPCOM Okay, the first part of your transmission didn't come through Snoopy, but give me a long count on this is you would. SNOOPY Okay, now I'm still in the same configuration, and going to voice switch to voice, and biomed to right at this time. On my mark. Mark it. CAPCOM Roger, go ahead. SNOOPY Okay, this is Snoopy, with a long count, 1 2 3 4 5 5 4 3 2 1, how do you read? CAPCOM Okay Geno we're reading you loud and clear. How about 2 more long counts so we can verify the TM bit here. SNOOPY Okay, I'll give you a long count this time. 1 2 3 4 5 6 7 8 9 10, 10 9 8 7 6 5 4 3 2 1, 1 2 3 4 5 6 7 8 9 10, 10 9 8 7 6 5 4 3 2 9 1, I'm just getting tired of talking that's all, go ahead.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2246, GET 82:58, 304/3

CAPCOM Okay, Snoopy sounds good. Stand by just a second. SNOOPY Roger that. You're cut out, you'll say again. Okay Geno we're go with that CAPCOM let's press on with step 3 activation of 14. SNOOPY Okay step 3 and range is going to CAPCOM Roger that, stand by, I'll tell you when to configure. CAPCOM Okay Goldstone, this is Capcom. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:08, CDT 2256 305/1

GOLDSTONE Stand by, I'll tell you when to configure. CC Okay, Goldstone, this is CAPCOM. CC Goldstone. GOLDSTONE Goldstone, CAPCOM the figures are CC We're there. CC Okay Snoopy, this is Houston in the blind. We anticipate no voice at all in this mode of course, but we'll stand by and see if we can pick up some data. Okay Snoopy, this is Houston in the CC blind. We're still monitoring data and standing by in this . configuration and I'll let you know when we'll press on. CC Okay Snoopy, this is Houston, we've got our data, we can proceed on with step 5 now. СС And Snoopy, this is Houston, if you're in step 5, how about a voice check. Okay Snoopy, this is Houston, we've CC got no voice from you. How about going to down voice backup. SNOOPY How do you read me Houston ... one. CC Roger, stand by Snoopy. Goldstone, this is CAPCOM. CC Goldstone, ready for configure LM mode 6.04.00 high bit rate and verify. GOLDSTONE Roger, we're there. CC Roger that. SNOOPY You finished it. Are you in an attitude that I can get? Is that where we're supposed to be, okay. Okay Snoopy, this is Houston, we're CC reading you now Geno. SNOOPY (Garbled). Okay Joe, do you read me now. CC Roger, reading you now Geno. I supposed you're worried because SNOOPY I suppose I'm in hot mike in this configuration. CC Roger, that's affirm. CC And Charlie Brown if you can -SNOOPY If you're ready to press on I'm ready to go on. Okay, we're going to stand by until СС we verify Charlie Brown here that he's in his landmark tracking or sleep attitude. SNOOPY He is, I just got word from him. CC Very good. Okay let's press on with steerable voice PM. SNOOPY Okay, steerable voice PM. Here goes that antenna, so stand by. CC Goldstone, CAPCOM. Okay. Goldstone, CAPCOM, come up please. GOLDSTONE GOLDSTONE. CC Roger, the configure LM mode, 6.02.00. Give a roger.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:08, CDT 2256 305/2

GOLDSTONE That's affirmative, we are configured. CC Okay, Geldstone I'm standing by for a lock on announcement. Charlie Brown, this is Mouston. While we're waiting here we'd like for you to turn H2 tank 1 heaters to AUTO and H2 tank 2 heaters to OFF, please. CC Snoopy, this is Houston standing

by.

SNOOPY CC We should be ready to press on now and give me a long count in each of your three modes again.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 2306, GET 83:18 306/1

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Houston, standing by. CAPCOM SNOOPY Roger Houston, do you read? Hey, got you loud and clear, CAPCOM Geno. We should be ready to press on now, and give me a long count in each of your three modes again. Houston, Charlie Brown CB SNOOPY Not yet Joe, wait until I get this thing locked up on auto. I'm only on sluge. John my mistake, he's got about another 10 seconds to maneuver. CAPCOM Okay, Houston we copy. What's LOS time, Joe? SNOOPY We've got about 33 more minutes CAPCOM Snoopy. SNOOPY Okay, we'll make it. CAPCOM Roger that, and Charlie Brown we'd like to have your H2 tank 1 heaters to auto, H2 tank 2 heaters off. Do you copy? Roger, that's what we did, over. CB CAPCOM Okay, thank you much. SNOOPY How soon? SNOOPY Okay, Houston, I've got you locked up on Auto, how do you read? Snoopy, this is Houston, I'm CAPCOM reading you loud and clear. Geno, a long count in each mode and identify which mode you're in please. Okay, I'm in PTT and instead SNOOPY of a long count I'm reading a signal stregnth of 4.2 locked up in s-band auto, and I guess, I'm not sure but it might lock up anywhere from about 3 2 to 3 6. This time I was at 38 and ended up locking up solid here at 42 and I'm going IC at PTT. CAPCOM Roger, you're loud and clear. SNOOPY Okay, how do you read me now? I'll give you a long count and I'm going to unkey it to see whether I've got a hot mike, and then I'll pick it up again. 1 2 3 4 5 6 7 8 9 10, 1 2 9 8 7 6 5 4 3 2 1, how do you read me? CAPCOM Okay, you're loud and clear Geno go ahead with vox. SNOOPY Okay I'm in vox, and what I really want to know is I unkeyed about half way through the ICS PTT mode to see whether I had a hot mike, I assume I did not is that correct. That's verified. CAPCOM SNOOPY Okay, and I'm in vox, and you're reading me loud and clear, I guess. That's affirmative Snoopy. We're CAPCOM reading you loud and clear, and stand by 1, we'll see if we're ready to go on here with the data.

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2306, GET 83:18 306/2 SNOOPY Okay, standing by and I tell you when that S-band antenna moves around you'd think that the whole house was coming down on you. CAPCOM Roger, we copy. Charlie Brown, we'd like to update your state vector, if you'd give us, accept please. CB We got it, over. CAPCOM Roger, thank you. What happened? Did that last thing get CB transferred from the land mark track, over. So far so good. SNOOPY Roger, that's affirmative. CAPCOM And Snoopy we can proceed on to the FM mode now. SNOOPY Okay, I'm going FM and I'll give you a call if I don't hear back from you in 30 seconds, I'll switch back to PM. Negative, stand by in the FM CAPCOM Geno, let me give you a call. You should be able to read me and if we don't catch you, if we can't read you I'll give you another mode to go to. Okay, fine Joe, I'm in FM SNOOPY right now. CAPCOM Okay, we'll be with you in just a minute. MCC Goldstone, this is Capcom. GOLDSTONE Goldstone. Roger, Goldstone let's configure MCC LM for 6.00.09 high bit rate. GOLDSTONE Capcom, we are configured. MCC Thank you much. CAPCOM Okay Snoopy, this is Houston, I'm ready to listen to you now. How about some good numbers. SNOOPY Hello Houston, do you read me FM? CAPCOM Okay, Snoopy, this is Houston, Rog, I'm reading you on FM now. SNOOPY Okay, you're coming through loud and clear. CAPCOM Okay, let's double check, Geno, you're not in the down voice back up are you? That's affirm, I am in down SNOOPY voice back up. Let me go to voice. CAPCOM Roger, that. Okay, Snoopy, this is Houston. CAPCOM We're standing by for a call on FM mode. Would you try one more time please. Houston, this is Charlie Brown. CB Do you read Snoopy? CAPCOM Charlie Brown, negative, we're not reading him although we're still trying to acquire some data in this mode. Tom, in the meantime you can have your

APOLLO 10 MISSION COMMENTARY, 5/21/69, CDT 2306, GET 83:18, 306/3

CAPCOM computer back. CB Okay we're in CAPCOM Roger that, Tom. CB Houston, Charlie Brown is set up for the LM relay test. CAPCOM Charlie Brown, this is Houston,

We're not quite ready for that yet. We'll be with you in just a minute on that. We've got to try this PM mode yet, John.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:28 CDT 2316 Snoopy, this is Houston. I'm still CC on SM mode, how do you read? SNOOPY I'm reading you loud and clear, do you read me. CC Roger, sure am. You're not down voice backup are you? SNOOPY Negative. I'm in voice in P ... in FM. CC Oh, you're clear as a bell. How about a little short count there to confirm all the disbelievers here Jim. SNOOPY I'll give you a short count, 1 2 3 4 5 5 4 3 2 1. You're coming in loud and clear, Joe, as clear as any other way I've heard you. CC Roger, this is as clear as we've had. Are you in push-to-talk mode? SNOOPY That's affirm, push-to-talk. I'11 give you a short count now on ICSPTT. This is ICSPTT, 1 2 3 4 5 5 4 3 2 1. How do you read now. CC Boy, you're loud and clear. How about one quick one on GOSS and we'll press on. SNOOPY Okay I got you on GOSS, 1 2 3 4 5 5 4 3 2 1, how do you read? CC Very good and stand by 1 and I think we'll press on here. Okay Snoopy this is Houston, that's loud and clear. Let's press on with the PM mode and then to backup voice test step 1. Okay I'm in PM mode and I can hear SNOOPY Chris back there talking in the background so it must be pretty good. CC Roger we're copying now. Stand by. Okay Goldstone this is CAPCOM. SNOOPY Well, maybe he's got the strongest S-band I've ever heard. CC Goldstone. SNOOPY That's pretty good. CC Okay let's configure for LM mode 8.04.00. GOLDSTONE We're configured. CC Roger. SNOOPY How we coming down there, Joseph? CC We're trying to lock up, Snoopy. We'll give you a call here when we get it. CC Okay, Snoopy, this is Houston. We're not able to lock up down here. I wonder if you'd confirm if you've gone through that step 1 backup voice test. SNOOPY (Garbled). SNOOPY Hello Houston, Houston. This is Snoopy are you reading?

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:28 CDT 2316 307/2

CC Roger, reading you. Go ahead. SNOOPY ... try and take some CHARLIE BROWN Hello Houston, Charlie Brown. Go ahead, Charlie Brown, Houston. CC CHARLIE BROWN Look, I don't know how it sounds to you down there Joe, but, but it sounds like things are kind of loose on this total COMM situation. Over. Roger, Tom. We're not able to get CC a lock up right now. We'd like to verify that step 1 on that stack up board - correction - step 1 on the backup voice test has been accomplished. CHARLIE BROWN Say again. CC Roger, we'd like to confirm that step 1 on the back up voice test has been done. CHARLIE BROWN Is that where we are. CC That affirm. SNOOPY Hello Houston, Houston are you reading. Snoopy on the backup voice test, over. Snoopy, this is Houston. Roger CC Gene, we got you now and stand by and we'll get -CC Charlie Brown, this is Houston, Charlie Brown, this is Houston. Charlie Brown Go ahead Houston, this is Charlie Brown. CC Roger Charlie, I think we've got you in the relay mode. I wonder if we could have you come out of that relay mode for now. CHARLIE BROWN Okay, I'll go ahead and turn off the VHF. Okay you think we're still in it now? CC Stand by and I'll see. Okay Snoopy, this is Houston. Let's try it again now. SNOOPY Okay Houston, this is Snoopy, how do you read me now, 1 2 3 4 5 5 4 3 2 1. Okay, I'm reading you loud and clear, CC Snoopy, but I think we're still in the relay mode. SNOOPY Well, I'm now in about 27 volts, 27 too now, so let's keep going if we can. Let's get Charlie Brown out of the relay mode then. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:38, CDT 2327, 308/1 Well, I'm down to about 27 volts 27 2 SNOOPY now, so let's keep going if we can. Let's get Charlie Brown out of the relay mode then. CAPCOM Charlie Brown, this is Houston could you verify that you're not in relay mode, please? Could you verify that you're not in relay mode, please? CHARLIE We're not in relay mode please. Okay, thanks. CAPCOM SNOOPY Okay, thank you. CAPCOM Okay, Snoopy, this is Houston. Let's proceed on with step 3. SNOOPY Okay, Houston, Rog. Proceed on with step 3. SNOOPY Roger, step 3. CAPCOM Okay, Goldstone, this is Capcom. CAPCOM Goldstone, Capcom. Come up please. GOLDSTONE Capcom, Goldstone. Go ahead. Go LM mode 6.02.00 and verify it. CAPCOM GOLDSTONE Wilco. GOLDSTONE Capcom, Goldstone. We confirm uplink mode 6. CAPCOM Thanks. Roger. CAPCOM Okay, Snoopy and Charlie Brown, this is Houston. Let's press on to the LM relay pitch and verify when you're ready to go. SNOOPY This is Snoopy. I'm ready to go, if you're reading me. CAPCOM Reading you Snoopy. How about Roger. you, Charlie Brown. CAPCOM Charlie Brown, this is Houston. How do you read? CAPCOM Hello Charlie Brown. This is Houston. how do you read? CAPCOM Snoopy this is Houston. Still reading me okay Gene? SNOOPY Yeah, I'm reading you, Joe. CAPCOM Okay, Gene. CHARLIE Houston, this is Charlie Brown. We're reading you about 4 by 4. Over. CAPCOM Okay, Charlie Brown. That's fine. How about giving me a short count, Tom. Roger. 1, 2, 3, 4, 5. CHARLIE Okay, Tom, I'm reading you loud and clear -CAPCOM stand by one please. CHARLIE Hey, hang on. That doesn't count. CAPCOM Okay. Snoopy and Charlie Brown. that ought to terminate these things. Let's go back to our basic comm mode now and verify it please. SNOOPY Hey, Houston, I never - I never got to the

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:38, CDT 2327, 308/2 I've just been waiting for LM relay set. SNOOPY your call. Roger that. We're going to terminate CAPCOM that, Gene, and we'll pick that up later. We want to go back to basic comm now. You were cut off by Charlie Brown. SNOOPY Say it again. Okay, we verify we're not going to check CAPCOM that right now, Gene. So we want to go back to the basic comm mode. Okay, stand by a minute. SNOOPY CAPCOM Roger that. CAPCOM Goldstone, this is CAPCOM. GOLDSTONE Capcom, Goldstone. Go ahead. Okay, let's go back to basic comm. CAPCOM That will be LM 6.02.00 and command module 6.02.00. GOLDSTONE Roger, I copy. LM 6.02.00. Roger and command module (garble) CAPCOM SNOOPY Okay, Joe, how do you read me? Okay, Snoopy. This is Houston; reading CAPCOM you five by. CAPCOM, Goldstone, we confirm. GOLDSTONE Okay, I'm reading you loud and clear. Snoopy Roger that. CAPCOM We've got about 8 minutes until LOS, Gene. CAPCOM I'm going to have some stuff to send up to you here in just a minute. SNOOPY Okay. I'll give you all the LM data when I'm in the command module up there or down I get back home. there wherever the case may be. The voltages and all that other jazz. CAPCOM Okay, that will be fine. How does the glycol temp look? The glycol temp has been sitting on zero SNOOPY since I got in here. I haven't been able to get it to read at all. CAPCOM Okay, we copy. SNOOPY I don't know who makes the berries for that S-band antenna, but I sure am glad they're not in my car. CAPCOM We copy. CAPCOM Hello Snoopy. This is Houston. SNOOPY Go ahead Houston. This is Snoop. CAPCOM Rog. A couple of things we need to We're showing your AG deadband switch in the check, Gene. Would you verify it min and cycle it to the max position. min position? SNOOPY Okay, Ed. It is in min and I'll cycle off to max and then back to min.

APOLLO 10 MISSION COMMENTARY, 5/21/69, GET 83:38, CDT 2327, 308/3

CAPCOM Roger. It's in max now and I'll bring it back SNOOPY to min again. Okay, it's back in min. SNOOPY Okay. The ascent oxidizer is reading CAPCOM 17 psi high on the ground. We'd like for you to read that out for us, and in order to do so, on panel 16 row 1 display engine override circuit breaker in and your prop temp monitor to asset and give us a reading, please. Which ascent pressure was that? Helium SNOOPY pressure or REG pressure? CAPCOM Oxidizer pressure, please. SNOOPY Okay, oxidizer pressure looks like it's about 180 psi. Okay, Snoopy, if you will put that cir-CAPCOM cuit breaker again please. Okay, Ed, it's out. By the way everything SNOOPY in the LM was just as we launched with it. After I thoroughly checked the configuration. CAPCOM Roger, Roger Snoopy. Stand by one please. CAPCOM Snoopy, this is Houston. We're through with you for today. The comm relay tests will go by the board for the moment. You can proceed with the rest of your housekeeping and close out. SNOOPY Okay, that's fine. Everything is looking good in here. I didn't mean to be so impatient, I just wanted to get this thing over before we lost you and I also didn't want to use too much power on this bird. Contents I guess are always that way, but they sounded pretty good from this end if you're all satisfied on the primary mode. Roger. What we heard was good, what we CAPCOM didn't hear was obviously - obvious that we didn't hear it. Okay, fine. I'll be closing out the LM SNOOPY and finishing housekeeping and see you next door. CAPCOM Charlie Brown, Houston. CAPCOM Charlie Brown, Houston.

APOLLO 10 COMMENTARY, 5/21/69, CET 2337, GET 83:49

CAPCOM		Charlie	Brown,	Houston.	
CAPCOM		Hello.	Charlie	e Brown, H	Houston.
CHARLIE	BROWN	Charlie	Brown,	Houston.	
CAPCOM		Snoopy,	Houston	ı.	
CAPCOM		Charlie	Brown,	Houston.	
CAPCOM		Charlie	Brown,	Houston.	
CAPCOM		Charlie	Brown,	Houston,	transmitting

in the blind, we show an O2 flow highlight. We'd like you to select your BD roll in the DAP, and on the - the hatch, we could - we tested out the flight tape and we'd like you to use the flight tape to tape over the mylar. The tape will stick to the mylar and the hatch rim, but will not stick to the RTV or the fiber glass, so you'll have to bridge the gap, and just tape it over to - over the mylar. For a cleanup, we could get you use a - the first choice that you use a wet tarycloth and go out to the RTV and fiber glass with that. The other suggestion, that if that doesn't work next time around, we'll suggest for cleaning up. Over.

CAPCOM

Snoopy, Houston.

PAO This is Apollo Control. We have loss of signal, now. During that pass, the activity that we were most involved with, was the lunar module communications test, checking out all the various COMM modes, communications modes on the lunar module, both voice and telemetry, and also the antenna options that are available. At the same time, John Young was involved in taking those landmark sitings. We didn't hear any conversation from John relative to that. We now have 45 minutes until acquisition of signal again at the beginning of the fifth revolution. At the present time, Apollo 10 is traveling at a speed of 5,346 feet per second. And we show a weight in orbit of the combined LM, command and service module, of 68,351 pounds. This compares with something in acsess of 93,000 pounds prior to doing the LOI 1 and LOI 2 burns. The difference in weight is - represents the propellants consumed by the SPS engine. At 83 hours 53 minutes, this is Apollo Control.

END OF TAPE

309/1

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0025, GET 84:36, 310/1

PAO This is Apollo Control at 84 hours 36 minutes. We're just about 1 minute now from acquisition of signal from reacquiring Apollo 10, as the spacecraft comes back around on the front side of the moon, for its 5th revolution. We expect that when we do hear from the spacecraft next, Gene Cernan will be back in the command module, and the crew will be involved in getting the spacecraft set up for their sleep period, and also making what ever arrangements in advance they can for the very busy day that they'll have tomorrow, with the LM rendezvous activitys. We'll stand by now for reacquiring the spacecraft and for a call to be put through to the crew by capcom, Joe Angle.

CAPCOM

module, Gene?

Apollo 10, this is Houston, we're standing by. CAPCOM Apollo 10, Houston. MCC Honeysuckle, contact Houston, Houston contact Honeysuckle. HONEYSUCKLE Read you very weak, very weak. Roger stand by. Voice control MCC Houston, contact. Voice control Houston, conference. GODDARD VOICE Roger, Honeysuckle reports MCC they're reading you very weak, How do you read me? GODDARD VOICE I hear you loud and clear on the back up, but you're not coming on the normal gos 1. MCC Roger. MCC Transfer to over head gos. GODDARD VOICE Houston, how do you read. SC Hello Houston, Houston, this is Apollo 10 calling from the Moon, do you read. MCC Honeysuckle, Houston. Comtact converence, how do you read. SC Hello Houston, Houston, this is Apollo 10, how do you read. CAPCOM Apollo 10, this is Houston. Reading you loud and clear now, John CAPCOM Apollo 10, Houston, Apollo 10 Houston, how do you read now? SC Hey down there Houston. Do you read Apollo 10 from the moon? CAPCOM Apollo 10, Apollo 10, from the This is Houston. We're reading you loud and clear, moon. How are you doing now? John. SC This ain't John. This is the fellow that came back from Snoopy back in Charlie Brown. CAPCOM Hey, okay there fellow. How about the snow situation, have you got any in the command

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0025, GET 84:36, 310/2

SC Would you believe we've been living in what you might call snow for three days, and we found out where the rest of it is. It's in our good friend Snoopy. But however, I think if we look at the cabin dump valves and a hatch real good, which we've done once, and we look at them again tomorrow, when we close it we will be alright, okay?

CAPCOM Okay, that sounds pretty good. Evidently it isn't bothering you too much as far as inhaling it, or getting it in your nostrils and your mouth. Is that affirmative?

SC Yea, I didn't have to worry about inhailing it. I are my way through.

CAPCOM Okay

CAPCOM I've got a pencil. You go ahead. Geno, before you start going I wonder if we could have and accept.

SC The LM went off at 82 29 20. CSM power to LM came back on at 84 +3200. CSM on board readout BATC 37 volts pyro bat A 37 pyro bat B 37 RCS A 81, bravo 87 Charlie 84 and delta 84. We have cycled the H2, 02 fans and we still have H2 fan number 1 in Auto. I have innitiated battery B charge at the present time, and now I have some very interesting news from Snoopy if you'll stand by 1.

CAPCOM Okay, we'll stand by. We would like for you to PO and accept, we've got an update state vector for you. Okay, I'll go to po and accept. SC Stand by. Okay Houston you have Po and accept. CAPCOM Roger, that. SC And I have some news from He's a pretty good fellow, by the way. Snoopy. CAPCOM good to hear that. SC Okay, I think you've got the rocal angle of -.1, that's pretty close to zero. That's just off of zero and that's as close as I can read it. CAPCOM Okay, that's -1 and -.1. SC -0.1CAPCOM roger that. My docking pilot has a good SC eye ball. The normal RAD level in the, in Snoopy is point 001 rev per hour. CAPCOM Okay, we copy.

SC Snoopy was found to be sleeping during the whole 3 days of our translunar journey and APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0025, GET 84:36, 310/3

SC was exactly the way we put him to sleep when we left the pad. There were no switches, or breakers or anything misplaced.

CAPCOM Okay we copy that.

SC Okay, when I looked at the EPS system, I found out that battery 1 had 35 volts, bettery 2,3, and 4 also had 35 volts. Battery 5 and battery 6 had 37 volts. Commanders bus had 29.2 volts when I powered up and systems engineers was reading 29.0 and those were all on low taps. CAPCOM Okay, we copy.

CAPCOM Okay, we copy. SC Okay, my AC Bus voltage was on a high side of the green for inverter number 2. CAPCOM Okay. SC Okay, when I deactivated the Comm and shut down APS, battery 1 - -

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 84:46 CDT 0035 311/1

- and shut down EPS, battery 1, 2, SNOOPY 3, and 4 at 37.8 volts. I don't know that's possible, unless I misread it. And the Commander's BUZZ and the LM's BUZZ are at 27.2.

CC Okay, We understand That's not possible is it? SNOOPY Roger, everybody's shaking their CC heads yes Ed. The name's Gene, Joe. SNOOPY CC Okay Bill.

SNOOPY Okay, the OPS - the OPS is both at 5800 pounds on and it check out okay. The LM housekeeping is done. I think it's in good shape, if you want to know the truth, after my initial ... and down voice backup switch I think the COMM came out pretty good. It's part of the fact that the S-band antenna shaked the LM around when it moved. It really held MOC at about 4.2 on the meter. I'm not sure exactly whether it will lock out automatically below 3.6 but it'll probably be worth the try tomorrow.

CC Okay. We verify on that Gene. We've got some good words for you on the COMM too, it - particularly on the OMNI we're a lot more satisfied than anybody'd expect. We got a lot - real good voice COMM with you on OMNI. In fact you're coming down on normal voice, loud and clear, we're not going to have to go on backup on that mode. SNOOPY

Oh, that's very good. That means that - oh, that's very good. Hey, there's one other thing, Joe, I noticed that before you asked me then I went ahead and proceeded and I never did get an indication on the glycol temperature. It was down at off scale low the whole time. CC

Okay, we copy that.

SNOOPY And I think the same guy how supplied the berries for the S-band antenna supplied them for the glycol pump.

Okay I'll check into that.

But other than that I'm real happy. SNOOPY There's no disorientation when you go down there. As a matter of fact, it's a lot more comfortable down there or up there, I don't know which, but it's a lot more comfortable over there than it is in here as far as being able to know what's up and what's down.

Okay, understand.

CC

CC

SNOOPY You get some reports from Snoopy today, I hope we - go ahead Joe.

Okay I was just going to tell you, CC go ahead and go the block on - you can have that computer back now.

SNOOPY Okay, we're in block and that's our report from Snoopy today, I'm personally very happy APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 84:46 CDT 0035 311/2 with the fellow and I hope we can give you as good a report tomorrow. CC You bet your life. Let see, we've got a couple other items here on the command module. We'd like for you to zero the optics and, let me see, we'd like to have the LM command module delta theoried out if you could. Yeah, this is before ... SC SC ... was 1.9. CC 1.9, thank you. SC 1.9 prior to egress but prior to pressurization when we pressurized it it was zero. Roger, understand John, thanks. CC SC Okay, we on the vent right now. We're going to keep this thing pumped up so tomorrow it won't be agonizingly slow. CC Okay. SC You got anything else for us right at the moment Joe. If not we're going to hustle around here and get prepared for tomorrow and eat something and those other things. But while those other two guys are down there I'll always be willing to do anything I can. Okay Charlie Brown - Apollo 10. CC Stand by for a minute, we've got a couple of three items we're discussing now. SC Okay Ed. CC Okay, Apollo 10, Houston. SC Go ahead Houston. CC Roger Tom. We've got a few items we'd like for you to check here. First off, we'd like to verify the position of the H2 tank heaters number 1 to AUTO and number 2 to OFF. We'd like to verify that with you. Okay we've got number 1 H2 tank SC heater in AUTO and number 2 in now OFF. CC Okay and we'd like direct -SC . . . CC Okay thank you, and direct power off for another two hand controllers, please. SC Okay, that's done. CC And just prior to LOS under this last pass we were showing an 02 flow high indication. Did you hear that in the cockpit and if so do you have any good words on that. SC Yes. 02 flow high is caused because the inflow valve gets all clogged with insulation, also the intake to the hoses.

APOLLO 10 COMMENTARY, 5/22/69, CDT 0045, GET 84:56 312/1 CHARLIE Also the intake to these hoses. You know we've been cleaning all these CHARLIE exhaust hoses and the intake to the inflow valve off a couple of three times a day. Okay, I understand. CAPCOM CHARLIE But doing LM ingress - doing LM ingress the flow of mylar overcame the flow of cleaning off the hoses. Okay, I understand. CAPCOM CAPCOM Apollo 10, Houston. I've got a maneuver pad I'll send up to you whenever you're ready to copy. Okay, Joe. One more second. SC SC Okay, Houston. I'm ready. Okydok, 10, this is for TEI 10, CAPCOM SPS G&N. Your time is 096, 02, 4054, plus 29966, minus 01794, plus 01605, roll is NA, pitch 054, all else is NA and I'll stand by for your readback. Okay, Joe. TEI 10, SPS G&N, starting SC with now 33, 096, 02, 4054, plus 29966, minus 01794, plus 01605, roll is NA and pitch 054, and the rest is NA. CAPCOM Okay, on your now 33, your seconds is 40.54. I'm sorry. That's what I've got SC written down. 096, 02, 4054. CAPCOM Roger that. Okay, Geno, now we got some words CAPCOM for you on this PUGS, it looks like you've got an engine that burns fuel rich, and what we're recommending is on the next burn, for you just to go to FULL INCREASE, and leave it in FULL INCREASE for the entire burn. You've got no fuel depletion problem, so just leave it in FULL INCREASE. Okay, fine, I'm hoping that next SC burn with the SPS is a big one. CAPCOM Yeah (laughter). And 10, this is Houston. We've got some discussion words for you on this stuff that's floating around in the cockpit. It looks like the first thing when you get that hatch open next time, will be to try and take some of that tape and tape over any holes that you can see. Does it look like - What looks like damage the mylar, does it look like it was torn, or somebody punched a hole in it, or just what? It looked like high velocity oxygen SC ripped it apart. It's - the - the insulation from underneath the - the, I guess aluminum covering, is what's come out in crumbs and snowflakes and that's what around. We've taped it up best we can, so that no more comes out and it's there, babe, and I just think we can live with it, that's all, as long as we watch the dump valve and the hatch.

APOLLO 10 COMMENTARY, 5/22/69, CDT 0045, GET 84:56 312/2

Rog, okay. Well, listen, if it's CAPCOM floating around a good bit, Gene, there are several ideas that you've probably already thought of to clean it up. We've found that the stuff adhears pretty well to anything that's saturated with water. Take either a Kleenex or those towels that you've got, soak them up with water on the fruit border of the water gun would be better even, and you can - you can kind of mop the stuff up with that, if you can catch it and then trap it, and one other thing that you might think about doing is placing one of your towels - one of your tarvcloth towels over the cabin inlet fan, of the inlet to the cabin fan, and turning the cabin fans on and this will act as a filter and should trap most of it.

SC Okay, Joe. Thank you. I think our major problem in the command module is solved. We've got most all of that over the last three days. It's the LM where most of it is right now. I understand you're still saying the same thing on the cabin fans and the LM, huh?

CAPCOM It'll be a little harder to get to the inlet, or intake on that fan in the LM. Gene. You can try it if you think it's worth it.

SC No, I don't really, Joe. I think the big problem is solve it for the next flight. I think we can handle it as long as we keep that hatch clean. CAPCOM

Okay.

SC It can't hurt us - It can't hurt us no more to breathe it anymore.

Roger.

One other little item. SC I forgot about Snoopy.

CAPCOM Okay, go.

I didn't - I didn't get a chance to SC drink much of the water, but I took about 8 or 10 big, good, gulps, and I got about 4 good gulps of air. CAPCOM

Okay, we copy.

CAPCOM Okay, 10. Houston again. In order to - to reduce primary loop temperature during your sleep period, we'd like to power down, oh, we got three attitudes we'd like for you to power down. On panel 7, we'd like the SPS electronics power switch to ECA. And on panel 100, we'd like G&N power optics off, and up there on panel 2, we'd like -SC Wait, wait a minute.

CAPCOM Okay, okay. SC Okay, now it was on panel 7 you wanted what, Joe? CAPCOM Roger, SCS electronics power switch to ECA.

END OF TAPE

CAPCOM
APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0066, GET 85;06, 313/1

SC Okay now that was on panel 7, you wanted what Joe? CAPCOM Roger, SCS, electronics power switch to ECA. SC Okay, SCS electronics power to ECA? Roger, that's affirmative. CAPCOM SC Joe, come back with that one in about 5 minutes we'll talk to you about it. There's some discussion about it up here. Okay, how about the portable CAPCOM water heater to off. That's on panel 2. SC We'll do that for you. Okay portable water heater, that's off. CAPCOM Okay, G&N power optics off on panel 100. SC Okay that's off on panel 100. G&N power optics. CAPCOM Okay. 10, Houston here, one more thing we'd like to have the H2 fans 1 and 2 both off please. Okay there off, Joe and I did SC cycle them just a little while ago by the way. CAPCOM Okay, thank you. SC How's the comm set up, Joe. We acquired you on REAC and looks like we're doing real fine right now. REAC in medium beam list is that okay. CAPCOM Roger, you're coming in real good, Gene. Is that okay for sleep then. SC CAPCOM Stand by we'll get a good read out on it. Apollo 10, Houston here. We've got 2 more items right now. First of all we'd like to verify you're going to make a canister change here before you go to bed, and we'd like to have an 0 2 purge. SC Okay, I'll verify, we will make the change and will give you the 0 2 purge right now. ... CAPCOM Roger. SC You know speaking of comm Joe I'm amazed this is a quarter million miles away. Maybe half a million miles coming and going and it's really outstanding. CAPCOM Yea, we sure agree with that Gene. We were really amazed at how clear you were coming in on voice on those ominies. SC I'll tell you one thing it's a lot better than the simulator. CAPCOM Okay. SC Maybe we ought to have a relay station on the moon so that the CMS can work with the LMS.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0055, GET 85:06, 313/2

CAPCOM Yea, agree there. Okay 10, this is Houston. Gene we'd like for you to set up your antenna here in narrow beam and REAC which will be your sleep configuration. We can watch it until LOS and make sure it's going to work out.

SC Okay we acquired you in reac medium beam here this last time, and I just switched to narrow so I assume it's going to work because we picked you up this last time on it.

Roger, that.

SC Now you watch Snoopy well tonight, and make him sleep good and we'll take him out for a walk and let him stretch his legs in the morning. CAPCOM Okay.

END OF TAPE

CAPCOM

APOLLO 10 COMMENTARY, 5/22/69, CDT 0105, GET 85:16

Houston, this is Charlie Brown. CHARLTE CAPCOM Roger, Charlie, go ahead. CHARLIE Okay, we're going to let battery recharge all night, is that correct? That's affirmative. CAPCOM Okydok. CHARLIE CAPCOM And Charlie Brown, we'd like for you to disable B and C and use B and D rolls and DAP, please. CHARLIE You want us to use, say - say again once more. CAPCOM Okay. Disable Bravo and Charlie. and use Bravo and Delta. Roll and DAP. CHARLIE Disable - disable Bravo and Charlie, then use Bravo and Delta roll in the DAP. That's affirmative. CAPCOM CHARLIE Okay. CAPCOM Apollo 10, Houston. Go ahead, Houston; 10. CHARLIE CAPCOM Hey, okay, Tom. We'd like, first of all, I'd like for you to terminate purge on fuel cell 2 and start fuel cell 1 purge, if you would. I'm sorry, Joe. CHARLIE CAPCOM No sweat. CHARLIE We're still trying to scramble around up here. CAPCOM Okay, listen, when you get time,

I guess we'll get, crew status we'd like to get from you are PRD readings and medication and all that sort of thing, and the chlorinations all that. Whenever you get a chance, or whenever you want to call that down press on and that'll be about it for tonight, then.

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 85:26 CDT 0115 315/1CHARLIE BROWN Hello Houston, this is Charlie Brown. Hi Charlie Brown, Houston, go ahead. CC CHARLIE BROWN OK. Reading ... 26036 the chimp is 05036 and the LM is 15038. CC Okay, we copied all that. The Cernan had nothing, and the CHARLIE BROWN chimpy had nothing and the limp had 2 aspirins about 30 minutes ago. CC Okay. SC Joe, I took those two because my athlethes feet were bothering me. CC Okay, we copy that. And I'm sure much to your joy I might SC go off the air for a while and turn it over to my partners in crime. CC Okay, the man on the left says that sounds like the proper medication on that, one for each foot. SC Oh, only one foot was bothering me, I didn't know I'd only have to take one. I'll see you later. Okay. Let's see, I guess, are you CC still purging fuel cell one there Gene, we can't monitor that down here. CC Apollo 10, Houston. SC Go Houston. CC Roger Tom, is John still up? SC Oh yeah, we're still scribbling around here trying to get the place squared away. CC Okay, you might check and see if wants to talk over landmark tracking tonight or if he wants to wait until morning to go over some of that. SC Apollo, Houston, say again about landmark tracking. CC John, the guys in the back room Rog. have come up with some critique on the marking if you're interested in discussing it. SC Sure, go ahead. CC Okay, talk about Fl first. The marking on that was just great, the timing between mark was just what they were looking for. One comment here, they observed your pitch rate at about 2/10ths of a degree per second and they know how it appeared to you that its their opinion that it increased it just a little better to give you maximum marking But the marks on F 1 were really great. On B1, time. you probably, you obviously noted the problem. It appeared that you started marking about a minute and a half early. Your spacing was good, and I guess you noticed then if you weren't sure, didn't have it below you then you took quite a while between the fourth and fifth mark and your pitch rate on that one was about .15 degrees per second and it was a little bit

too low to get the maximum marking time. The last mark was

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 85:26 CDT 0115 315/2

pretty near the turning limit as you probably observed. Have you got any comments on the Bl, the marks were still good except for there but they're not quite as good as on Fl. It was pretty good OJT for the first crack at it.

SC That Fl is a great big crater. So what I did was I turned the little crater on the edge of it. I couldn't even - the whole - the Fl that I was tracking was my whole optics was clean down inside of it.

CC Schmitt back here says that's great. The way to do it.

SC And that Bl is no small crater either. CC Comment on the one and a half minute early mark, John. Did we pass you up the time that was wrong or did you start a little early or what.

SC I just started marking whenever I saw it. I can see that that's what you ought to do. You see the thing comes out from behind the lunar module and it's acquisition is - you really got to hurry on it. So I wasn't really paying attention to the clock. When I'm flying it by myself I want to get the first mark at least as soon as I can. I get a feel for this thing and I think it will work out alright.

CC Okey Doke, no problem. That was what we were wondering if you had really started on the TP time or if you started early or perhaps we passed you up a piece of time that was a little early. And I guess that's about all the comments we got here, John.

SC I think it went okay. CC Rog, we concur that it was a good mark.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0125, GET 85;36 316/1

CAPCOM today, and got a big day tomorrow so let's go to sleep, get ready for it. Yea we concure that. We're getting SC a little bushed up here and we're just about to turn in and fix breakfast. CAPCOM DEKE wants you to hurry up and He says he's getting hungry. eat. SC Okay. Hey DEKE don't forget to skip lunch today. You didn't have time for it. Okay he's one up on you. He CAPCOM only gets 1 meal tomorrow then I guess. SC That's right. Keep him honest. DEAD AIR END OF TAPE

APOLLO 10 COMMENTARY, 5/22/69, CDT 0135, GET 85:46 317/1

CAP COM SC Okay, Apollo 10, Houston. Go ahead, Joe.

CAPCOM Roger, Tom. We got about a minute and a half, a minute 45 till LOS. There's a couple of things we'd like to confirm. First of all, we'd like to make sure you're in AUTO RCS, if you disable Bravo and Charlie quads, and that you set up Bravo and Delta roll in the DAP, and also we'd like to confirm with Gene that they did close out the cabin after transferring power. We want to make sure that he - that he got the circuit breakers status for the checklist. We just - we just want a confirm on that.

SC (garbled) Everything is squared away there. We're still trying to eat, get a little things squared here, that's why we haven't got to the DAP, yet. We'll get it.

CAPCOM Okay, mighty fine, Tom. We're just about a minute from LOS. We just want to confirm those things. SC Okay.

CAPCOM And I guess we'll be losing COMM with you pretty shortly, you about ready to turn it in for the night?

SC Yeah. I think we made have one quick contact with you before we sack out. We want to make sure we get called on time because it's going to be a busy day. CAPCOM Roger, sure is. You saying you

may contact us again coming around the other side?

SC	Right, we may do that.
CAPCOM	Okay, we'll be waiting.
SC	We'll call you.
CAPCOM	Roger that.
PAO	This is Apollo Control

PAO This is Apollo Control. We've had loss of signal now. We'll reacquire the spacecraft again in 45 minutes 39 seconds. And as you heard, Tom Stafford advised that the crew possibly would be up at that time, but we'll wait to hear from them in the event that they have been able to take care of the activities that they need to get squared away before they begin their sleep period. And in that case, we would not want to awaken them. At 85 hours 51 minutes, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0024, GET 86:34, 318/1

PAO This is Apollo control 86 hours We're about 50 seconds now from acquiring 35 minutes. Apollo 10 as the spacecraft comes back on the front side of the moon for its 6 revolution. Before losing signal, going behind the moon, Tom Stafford advised that he and the crew maybe asleep as they come around on the front side and we reacquire this pass. He said if the crew was still up and about they would give us a call. So we'll be standing by and if we don't receive a call from the spacecraft, we don't intend to put one in from here. We're now 10 seconds, we're coming up on 10 seconds from acquisition of signal. In the event that we don't hear from the crew of course, we will be getting another look at all of the spacecraft systems we haven't seen them for some 46 minutes. And we have conformation of acquisition of signal. Houston to Apollo 10, over. SC CAPCOM Roger 10, this is Houston, go ahead. SC Roger, could you take a look at the Dap and see if that's what you want? CAPCOM Okay, we sure will. It sounds like it's really using SC alot of fuel out there. I don't know, maybe we haven't got the right thing set up here. CAPCOM Okay, John we'll take a look at it. CAPCOM Apollo 10, Houston. SC Go ahead, over. CAPCOM Okay, on these RCS jets we'd I think maybe the problem may be in like to confirm. which ones we've got on and off and what we'd like to do is to turn off or disable C2 which is minus roll and B2 which is minus roll. That's Charlie 2 and Bravo 2 and bravo 4 which is minus yaw. SC Okay, but now wait a minute we had to turn off the B4 and B3 because ... did the high gain, because ... did the high gain antenna. Okay, Apollo 10, this is Houston. CAPCOM Roger, this configuration will take care of that, although I gave you 1 wrong thruster here. Let me go over the one we'd like disabled or turned off again. That'll be Charlie 3 instead of Charlie 2, so it's Charlie 3 which is + pitch, bravo 4 which is minus yaw and bravo 2 which is minus roll. Those 3 we want disabled, and I have 2 of them to turn on as soon as you get those. END OF TAPE

APOLLO 10 MISSION COMMENTARY, 5/22/69 GET 86:44 CDT 0234 319/1 - one disabled and I have two of CC them to turn on as soon as you get those. Okay, I got those turned off. SC CC Okay, and then I'd like for you to turn on alpha 1 and alpha 2, alpha 1 plus roll and alpha 2 minus roll. SC Okay. CC Okay, that configuration ought to do it, Tom. How the sleep going, are you the only one awake or have you got everybody awake and running around in there? SC I put everybody to sleep. But. now wait a minute, C4 and B3 are also off, you know that? CC Okay, roger that's right. We're turning off the entire B and C, Bravo and Charlie. Okay, so this configuration that SC we've got on the (garble) RCS switch, which is now compatable with the DAP is that correct? Okay, that's confirmed. CC It is compatable. SC Okay. CC Apollo 10, Houston. SC Go ahead. CC Yeah, John, we realize this configuration is different than the one you've been used to seeing in the PTC but this is the normal orbital lunar configuration and G&C has checked it over and they're sure that this the way we want to be set up. SC Okay. We just heard a lot of noise out there and I figured I'd better wait up and check with you guys to make sure we're doing the right thing. Okay, we sure appreciate it. Why CC don't you go ahead and get some sleep now, you've got a big day. CC 10, this is Houston. G&C says you can probably expect more finds now that we're in lunar orbit because we're holding an attitude to keep the antenna position right. You may expect a lot more finds than we had when we were PTC. SC Roger, understand that. PAO This is Apollo Control. We don't expect any further cconversation with the crew on the pass, In the event that we do hear anything, we'll come back up and play it back for you. At the present time Apollo 10 is about 48 minutes from loss of signal, at the point at which it will be going behind the moon on this the sixth revolution. And we're 87 hours 22 seconds now into the This is Apollo Control, Houston. mission.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0335, GET 87:47 320/1

This is Apollo Control at 87 hours PAO 47 minutes. We're about 1 minute 20 seconds now from LOS and it appears that all 3 crewmen are asleep at this time. We have about 5 and a half hours of sleep period left. At present time the space craft is in an orbit 61 nautical miles by 59 nautical miles and our velocity is about 5 thousand 3 hundred 43 feet per second, or about 1 mile per second. We are now 30 seconds from loss of signal as the spacecraft approaches the end of its sixth revolution. And after having observed all spacecraft systems on both the LM and the CSM flight controllers here in mission control have concluded that everything is continuing to function normally. And we are now showing loss of signal. We'll reacquire Apollo 10 in 46 minutes at which time we'll get another look at all the spacecraft systems continuing to moniter the performance of both snoopy and Charlie Brown. At 87 hours 49 minutes this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 88:32, CDT 0421, 321/1

This is Apollo Control 88 hours 32 minutes PAO now into the flight of Apollo 10. We're 1 minute 50 seconds from reacquiring Apollo 10 as the spacecraft comes around the front of the moon on its seventh revolution. We don't anticipate any communication with the crew. It appears that they are all asleep. At least that was the indication we had prior to losing signal from the spacecraft on the previous revolution. We will stand by for acquisition of signal and we'll listen briefly and in case we should get any call from the spacecraft. We're now 30 seconds from reacquiring Apollo 10 and here in Mission Control we're also in the midst of a change of shift. Flight director, Pete Frank and his Orange Team of flight controllers coming on to replace the Maroon Team headed by flight director, Milton Windler. And we're still standing by for confirmation from the network controller that we do have acquisition of data from the spacecraft. And we've been advised by the network controller that we do have data from the spacecraft at this time. This is Apollo Control. It's now 5 minutes 10 seconds into the frontside pass on this, the seventh revolution around the moon. We'll have loss of signal in 1 hour 7 minutes, approximately from now. And we'll continue to monitor spacecraft systems and stand by should the crew awake and decide to put in a call to the control center here. We have about 4-1/2 hours left in the present rest cycle. And all indications at this time are that the crew are all sleeping. A change of shift press briefing is scheduled. We expect that will occur in about 20 minutes at about 10 minutes to five central daylight At 88 hours 41 minutes, this is Apollo Control. time.

APOLLO 10 COMMENTARY, 5/22/69, CDT 0536, GET 89:47 322/1

PAO This is Apollo Control. 89 hours 47 minutes ground elapsed time. Apollo 10 spacecraft has just gone over the hill. The end - toward the end of the seventh lunar revolution. We have some 44 minutes 15 seconds until acquisition of signal again. Apollo 10 crew is still asleep. Lunar orbit measurements are 61.5 nautical mile apogee, 58.7 nautical mile perigee. As you were - those are apocynthion and pericynthion respectively to get into lunar terminology rather than earth terminology. And it shows the next revolution acquisition of signal at 92 hours 32 minutes 25 seconds. The orange team of flight controllers have settled in for tonight's activities. Coming up on manning of the lunar module. Preparations for today's rendezvous sequence, and at 89 hours 49 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0621, GET 90:32, 323/1

Sec. As.

PAO This is Apollo Control 90 hours 32 minutes ground elapse time. We've just had acquisition of signal as Apollo 10 came over the hill beginning the 8th revolution around the moon. The crew has a little less than 2 hours remaining in the sleep period before beginning a very busy day. Powering up, manning the Lunar module and doing the complete rendezvous sequence, which will include a sweep down within 8 nautical miles of the lunar surface quite near Apollo landing site number 2. We have an hour and 11 minutes remaining in this revolution before loss of signal. If the crew should waken and begin talking to the ground we'll come up again with the circuit, and at 90 hours 33 minutes ground elapsed time, this is Apollo Control.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 7:33 AM, GET 9144 324/1

This is Apollo Control, 91 hours, PAO 44 minutes Ground Elapsed Time. We've just had loss of signal from Apollo 10 as it went over the hill on the 8th revolution, lunar revolution. The spacecraft systems are functioning extremely well. In fact, ony of the shortest hourly reports on record has just come into the Control Center from the spacecraft analysis staff support room, about a half a page long. And most of the entries say systems performance normal. No change in status, and so on. As the spacecraft went over the hill, Commander - Apollo 10 Commander Tom Stafford had a heart rate of about 53, respiration rate 8; the Command Module Pilot John Young had a heart rate of 57, respiration 11; cabin pressure holding at 4.9 pounds per square inch; cabin temperature 77 degrees Fahrenheit; orbital weight now calculated at 68,144 pounds. Apollo 10 is in a 58.4 by 61.7 nautical mile lunar orbit. One hour and 25 minutes until alarm, wakeup alarm time. We'll have acquisition of signal again at 92 hours, 30 minutes through Madrid, which is just less than an hour from now. At 91 hours, 46 minutes Ground Elapsed Time this is Apollo Control.

APOLLO 10 COMMENTARY, 5/22/69, CDT: 0819, 92:30 GET

PAO This is Apollo Control, 92 hours, 30 minutes ground elapsed time. We've just had acquisition of signal from Apollo 10 as it came around from the back side of the moon on the 9th revolution. The nominal awake time is some 40 minutes away, however, if it appears the crew is awake at the present time, we'll begin the day's activities. The flight surgeon will sample the incoming biomedical data to try to determine whether they indeed are awake, from heart rate, respiration and so on, he can tell pretty well what a man's status is. No call from the crew yet. After the crew has awakened, their first job of course will be to have breakfast, report their crew status on sleep to the ground here in Mission Control Center, get a flight plan update on the day's activities, and prepare to repressurize the lunar module and the lunar module pilot will be the first man across into the LM through the tunnel, at about 94 hours, 30 minutes ground elapsed time, followed some 10 minutes later with the commander going over; Tom Stafford. Heart rates and respiration rates are up slightly above what they were at LOS on the - or loss of signal - at the 8th revolution. Still waiting word from the surgeon as to whether the men are awake or not. Surgeon reported to the Flight Director Pete Frank here, that it appears that the crew is still in light sleep; Flight Director said, "We'll leave them alone for awhile." Next loss of signal as the spacecraft goes around the back side of the moon again on this revolution will be some 1 hours, 8 minutes from now. Still no conversation with the spacecraft; we'll come back up when the communications do start for the day's activities, and at 92 hours, 35 minutes, ground elapsed time, this is Apollo Control.

END OF TAPE

325/1

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0840, GET 9250 326/1

This is Apollo Control 92 hours 51 PAO minutes ground elapsed time. We are anticipating a wake-up call to the crew of Apollo 10, which will be in the form of music again, apparently. Standing by for music to go up to the crew; pleasant way to start the day.

Rendition of "The Best Is Yet to Come."

Apollo 10, this is Houston. CAPCOM Reveille, reveille.

SC Roger, understand reveille. I didn't think that sounded like the Marine Corps hymn there, the music that was coming up. It did sound pretty good.

Roger, 10, we copy. Go ahead and CAPCOM have your breakfast and we are ready to go when you are. We're a bit ahead of schedule. We've SC

already had breakfast and gone through the redundant component check.

CAPCOM Roger. We have a consumables update and flight plan update when you are ready. SC

Go ahead.

CAPCOM Roger. Your consumables update valid at 93 hours; your RCS total was 77 percent; Quad A 75 percent; Quad B 81 percent; Quad C 77 percent; D 81 percent; -SC Go ahead, Houston, with the consumable and flight plan update, Jack.

Apollo 10, Houston, how do you read? CAPCOM CAPCOM Apollo 10, Apollo 10, Houston, over. SC We read you loud - we read you loud and clear, Jack.

CAPCOM Apollo 10, Apollo 10, Houston. Your consumables update follows. Valid at 93 hours; RCS total 77 percent; Quad A 75 percent; Quad B 81 percent; Quad charlie 77 percent; Quad delta 81 percent; that's 8 percent ahead of your flight plan. Your H2 total 32.5 pounds; 02 total 435 pounds, over.

SC Rog, we got it. CAPCOM Roger, 10. I have a flight plan update when you are ready. SC

Okay, go ahead with it, over.

No, we will get that later, Jack,

CAPCOM Okay. At the end of your postsleep checklist, add these items. At 93 + 45 terminate battery B charge. At 9350, dump waste water to 36 percent, I repeat, to 36 percent. All lunar activities are about 12 minutes later than the flight plan. I have your nominal burn times, if you want them.

SC thank you. CAPCOM

Houston, roger.

Okay, that was terminate battery B SC charge on waking up and dump the waste water to 36 percent. APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0840, GET 9250 326/2

Roger, 10, that's affirmative. CAPCOM Is that all the update? Over. SC Roger, 10, that's the end of the up-CAPCOM date. Okay, thank you. SC SC Good morning, Smiling Jack. Good morning. You boys have been CAPCOM up a while, I see. Yes, we tried to sneak up on it by SC just about a half hour or so. SC Or more. Roger, 10, I know you're busy. If CAPCOM you have some time to listen sometime when you are interested, I have the local newspaper again. Go ahead, we would like to listen SC to it. Okay. One kind of interesting thing CAPCOM was John's horoscope this morning, says "everybody you know has something helpful to offer. Listen carefully while you

make the rounds quickly. Put in a busy day and assemble your results in the evening." Now here goes the news. Springfield, Massachusetts; it seems that Springfield Technical College has told President Edmund T. Garvey they were taking over the Administration Building. Garvey was nonplussed. The students, about 40 in number, marched into the building Wednesday night armed with mops, brooms, scrub brushes and staged a "clean-in." They said they would clean all night. A student spokesman said the clean-in at the 1200-member campus was to support the administrative policies of the 2-year school. Sari, Morrocco; on Friday, Thor Heyerdahl will get out from here to cross the Atlantic in a papyrus The man who must keep his papyrus boat together with boat. rope and string bought his third wife this year, and is now complaining about the price. She cost about 60 dollars in Egypt, much more than the going rate in Chad, where Abu Debrine learned how to make papyrus boats and hitched onto Heyerdahl's expedition. If he succeeds in reaching Mexico in his boat, modeled after a 4700-year old Egytian craft, Heyerdahl will consider he has strengthened the argument that the great early civilization of the Americas -

APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 93:00 CDT 0850 327/1

If he succeeds in reaching Mexico in his CAPCOM boat, modeled after a 4700 year old Egyptian craft, Heverdahl will consider he has strengthened the argument that the great early civilization of the Americas learned from the pharaohs. Debrine is packing pictures of wives A and B, smiling side by side, into his kit for the reed boat trip. A photo of wife C, who has less seniority but is more expensive, gets a less prominent place. Good grief, Charlie Brown. Paris, Allied negotiators headed into the Vietnam talks today with what sources close to the meeting said were optimism that discussions and proposals by President Nixon and the Viet Cong could bring progress. U.S. delegation sources said Henry Cabot Lodge, Chief U.S. Negotiator, would comment on the Viet Cong's 10 point peace plan Washington said included some points meriting further study. The chief North Vietnamese negociator indicated he and his Viet Cong counterpart were still studying the Nixon 8 point proposal. Washington: Warren E. Burger, an Appeals Court judge with a reputation for being strong on law and order, was picked Wednesday by President Nixon to be Chief Justice of the United States. Burger, 61, a member of the U.S. Circuit Court of Appeals in Washington since he appointment by President Dwight D. Eisenhower in 1956, is known as a strict constructionist, the type of judge Nixon promised to elevate to the court during his campaign last fall. Plymouth England: Solo around the world sailor Nigel Tetley was pulled from the Atlantic by a tanker crew today when his boat sank 14 days from home. Tetley's wife, on hearing the news, said, "It is a home that is gone. All my pots and pans have gone to the bottom of the sea." Tetley was competing in a global race sponsored by a London newspaper. Moscow TV showed the Apollo 10 astronauts in a Moscow: l minute broadcast. It said it was live from the American space capsule. And do you remember that unemployed local philosopher? He now says that while he believes in the future of color television, he thinks that because of your flight it will go round and round in people's minds for a while yet. Here is a sports story: Houston 3, Montreal 2, and Houston has just climbed out of the cellar. New York 5, Atlanta 0; Chicago at Los Angeles, a night game; just heard from the back room that Los Angeles beat Chicago. Over.

SC

Boo.

PAO This is Apollo Control. Apollo 10 is almost directly over landing site 3 near the lunar equator and longitude 0 on the visible face of the moon. The crew -

CAPCOM Houston, we've got a couple of items here we'd like your help on. We have a temperature rise in the helium tank in quad alpha, so what we'd like you to do after LOS we'd like you to roll 180 degrees and then come back to the normal attitude at AOS for S-band acquisition. In addition, APOLLO 10 MISSION COMMENTARY, 5/22/69, GET 93:00, CDT 0850 327/2

CAPCOM we'd like your crew status report and we'd like you to include some information on the cabin environment during the night to see if there is any change in it since the evaporators were not on the line. Over. SC Yes, it was fine. It's its normally chilly self. We didn't need to turn off all that stuff. CAPCOM Understand, roger. SC Okay, could we have an update on when you expect LOS? Over. Okay, 10, LOS is going to be at 93:42, CAPCOM and AOS will be at 94:29. Over. Roger, 93:42 and 94:29. SC SC Okay, Jack, on that roll do you want a roll to 180 degrees, or a roll of DELTA angle of 180 degrees? CAPCOM 10, we want you to roll a DELTA angle of 180 degrees. SC Okay, that's what I figured, just trying to clarify it, though. CAPCOM Roger, 10. SC Jack, the ECS redundant component check is complete and it looks good from here. CAPCOM Roger, 10, we copy. SC Jack, crew status report, we all had about 6 pretty good hours sleep. We've eated breakfast -

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0900, GET 9310 328/1

SC Jack, crew status report. We all had about 6 pretty good hours of sleep. We've eaten breakfast this morning, and the readings on the dosimeters are, in order, 26037, 05307, 15039.

CAPCOM Okay, Gene, we copy 6 hours sleep and 26037, 05307, 15039. Thank you.

SC The cryo fans have been cycled, redundant component check is complete. I'm about ready to purge the H2 here in about 5 minutes and then we'll get the battery and the water dump here before too long. I might take the batteries off the line, that charge off the line, maybe 10 - 15 minutes early, if it's compatible with our suiting up and everything.

CAPCOM Roger, we copy, and the battery action is all right by us.

SC Okav.

CAPCOM Apollo 10, Houston. We'd like you to cycle the heaters on the hydrogen cryo tanks, number 1 OFF and number 2 AUTO. Over.

SC

1 OFF and 2 AUTO, Jack.

CAPCOM Roger, thank you.

SC And I'm ready to purge the fuel cells. I'll start with fuel cell 3, oxygen then hydrogen. CAPCOM Boger, we copy. We're standing by.

CAPCOM Roger, we copy. We're standing by. PAO This is Apollo Control. Apparently

the crew is busy at the present time doing some housekeeping chores, washing the breakfast dishes, and so on. The wakeup call which turned out not to be a wakeup at all because the crew had already been awake and had had breakfast, was playing up to the crew Tony Bennett's record of "The Best Is Yet To Come." The crew reported they all had 6 hours of good solid sleep. They gave their radiation dosimeter readings on all three crewmen, and from the ground they were given flight plan updates of a few changes in the flight plan, moving a few operations around slightly. We're still 23 minutes away from loss of signal on this the 9th revolution around the moon. We'll continue to monitor the air-to-ground and leave the circuit live until we do have loss of signal. Ground Elapsed Time is now 93 hours, 19 minutes. Acquisition of signal, the next revolution, 10th revolution, will be at 94 hours, 28 minutes, 50 seconds. The crew has not as yet been passed up the new times for the maneuver sequence, all the maneuvers that have to go into the rendezvous such as the descent orbit insertion, the phasing, coelliptic sequence, constant delta height, etc. These likely will be read up to them during the next revolution. Apollo Control standing by on air-ground for resumption of communications with Apollo 10.

APOLLO 10 COMMENTARY, 5/22/69, CDT: 0910, 93:20 GET 329/1

PAO - by on air to ground for resumption of communications with Apollo 10. Apollo 10, Houston. I have a map-CC up date for rev 10 if you want it. SC Hold it just a minute Jack. SC Hello Houston, this is 10; are you reading us? That's affirm. Loud and clear. CC SC Okay, fine. Houston, the fuel cell purge is complete; the H2 purge line heater is OFF and I'd like to go ahead and terminate battery B charging at this time. Roger, we copy. Stand by 1 on the CC batt. Apollo 10, Houston; you are clear to terminate battery charge. SC Okay, thank you Jack.

APOLLO 10 COMMENTARY, 5/22/69, CDT: 0920, 93:30 GET 330/1 CC Apollo 10, Houston. We'd like you to verify that all the fans are OFF in the cryo tanks; over. Negative Jack; I had them cycling; SC thank you, I'll turn them off at this time. CC Houston; roger. SC I got too many meters running I guess right now. Take your time, but hurry. CC SC Jack, give me another hack on when LOS is, would you, and AOS? CC All right; LOS is at 93:42; AOS is at 94:29, and I have your map up dates for 10 and 11 when you're ready. SC Okay, Jack, go ahead. Okay, map update; rev 10. 093 42 40 CC 093 54 35 094 28 50; sunrise 093 52 22, sunset 095 04 46, rev 11, 095 41 06, 095 52 52 096 27 16, sunrise 095 50 58, sunset 097 03 22; over. SC Okay, Jack, I got all those and good; I don't need to read them back. CC Houston; roger. I think we're in pretty good shape SC except for the waste water dump which we've got yet to go right now. CC Roger, we copy. And you're dumping to 36 percent. Okay, we'll dump to 36. SC Houston, we're starting the waste water dump now. CC Roger 10; we copy. CC Apollo 10, Houston; we want to remind you to actuate your GDC optics power, and potable water; over. SC Okay, optics power coming on right now and potable water GDC ON.

APOLLO 10 MISSION COMMENTARY, 5/22/69, CDT 0930, GET 9340 331/1

PAO This is Apollo Control, 1 minute to loss of signal as Apollo 10 goes around behind the moon in the 9th revolution.

CAPCOM Apollo 10, Houston. We're going to lose you around the corner. We'll pick you up in about 46 minutes.

SC Okay, to give you a status, we've got two guys, one suited, John's getting suited. I'm on my way to the LM here as soon as we complete the waste water dump.

CAPCOM

Roger.

PAO This is Apollo Control. We have had loss of signal with Apollo 10. The crewmen who will go aboard the LM, the Commander and the Lunar Module Pilot, are now preparing to repressurize the LM, go in through the tunnel, power up all the LM systems, complete the checkout, and prepare for the day's activities which will be about an 8-hour sequence of several maneuvers in lunar orbit to simulate everything but an actually landing, the lunar landing mission that will be carried out on Apollo 11. Some 44 minutes to acquisition of Apollo 10 on the next revolution. That will be at 94 hours, 28 minutes Ground Elapsed Time. And at 93 hours, 44 minutes Ground Elapsed Time this is Apollo Control.

APOLLO 10 COMMENTARY, 5/22/69, CDT: 1018, 94:29 GET

PAO This is Apollo Control, 94 hours, 29 minutes ground elapsed time. We should have acquisition of signal now in the 10th revolution as Apollo 10 comes around from behind the moon. We should, for the first time, begin hearing the call signs, "Snoopy" for the lunar module and here -

Go ahead Apollo 10, Houston.

CHARLIE BROWN Roger, Tom and Gene are in the LM checking things out.

CC

CC

Roger; we copy.

CHARLIE BROWN We've gotten through the steps; we changed the canisters; we've got the LM power on, LM power cables are disconnected and stowed; I and Tom are in our PGA's, and you got the roll cal from last night. CC That's affirmative: we have that.

CC That's affirmative; we have that. CC Apollo 10, this is Houston. We'd like to have the CMC for an uplink.

CHARLIE BROWN Roger; wait a second. I read you guys loud and clear. You have POO and accept Houston. CC Houston; roger. SC We just got a VHF BEAT check and its

so much better than the simulator, Tom says you can't believe it, and I agree.

CC Roger 10; thank you. CHARLIE BROWN Houston, Snoopy is giving you a call on S band. CC Okay, Charlie, we're not reading

Snoopy yet. CHARLIE BROWN Are you reading them Gene? They are reading you, there, Houston.

CC Snoopy, this is Houston. We are not reading you. Hello Snoopy, this is Hous -CHARLIE BROWN Houston, Snoopy is calling you and he

reads you apparently. CC Okay, Snoopy, understand you are reading us; we are not reading you yet; you might try down voice back up.

CHARLIE BROWN He is using down voice back up. CC Hello Snoopy, this is Houston. How do you read; over. CHARLIE BROWN He wants to know how you read Geno; you hear him? CC Charlie, this is Houston. We are not reading Snoopy. Roger. He's changing antennas now. CHARLIE BROWN Houston, Houston; this is Snoopy. SNOOPY How do you read; over. CC Hello there, Snoopy. This is Houston.

Reading you now, but quite a bit of noise in the background.